LITERATURE REVIEW: CLINICAL NETWORK PLANNING, MODELS OF CARE AND INTERVENTIONS

Prepared for Launceston General Hospital Clinical Service Planning

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KPH

knowledge into practice

Contents

Tables

Abbreviations

Abbreviation	Meaning
CAH	Critical Access Hospital
CINAHL	an index of English-language and selected other-language journal articles about nursing, allied health, biomedicine and health care
ComRRS	Community Rapid Response Service
DRG	diagnosis-related group
ED	emergency department
GP	general practitioner or general practice
HITH	hospital in the home
IHT	inter hospital transfer
LGH	Launceston General Hospital
MeSH	Medical Subject Headings
NHS	National Health Service of the United Kingdom
OECD	Organisation for Economic Cooperation and Development
PPP	public-private partnership
STP	Sustainability and Transformational Plan
UCC	urgent care centre

Context

The Launceston General Hospital (LGH) is a critical part of Tasmania's single statewide health network, the Tasmanian Health Service. The LGH provides clinical services to the immediate catchment area of Launceston, Upper Midlands, North and Northeast. The LGH also acts as a regional referral centre, providing secondary and tertiary level care for residents of the Central Coast, North West and Upper West coast regions of Tasmania.[1] As such the LGH is the foremost health hub for a population of approximately 250,000 and acts as a spoke site for dedicated statewide services.[2]

KP Health is working with the Tasmanian Health Service to develop a clinical services plan for the LGH. The clinical services plan is a key component of the Launceston General Hospital Master Plan.

The purpose of this literature review is to inform the clinical service plan by identifying new, emerging or evolving technologies, interventions or models of care, in use by clinical networks, which are likely to influence future service demand and projections.

This document describes the key findings from the literature review.

Search strategy

We included literature published in English within the past five years (2015 to current).

We performed structured searches of CINAHL via Pubmed using keywords and MeSH terms. We also performed structured keyword searches of Google Scholar. We also identified additional publications of relevance through hand-searching the reference lists of identified articles.

All relevant publication types were considered. We included evidence from acute, sub-acute and cross-sector clinical networks. We considered publications pertaining to clinical network: planning; emerging models of care; and interventions. Comparator and outcome measure exclusions were not applied. We also performed a 'grey' literature search that included jurisdictional and departmental websites across Australia.

Key messages

Planning

1. Patient, carer and community voices must be included in the design, delivery, monitoring and evaluation of services. This means that genuine, meaningful and systematic engagement strategies should be used.

2. Health services acting alone cannot solve issues of rising health service demand, complexity, and cost. There is an increasing awareness of the interdependence of primary care, acute care and social care services and the need for of a whole-of-system, population health approach to planning and delivering health care services.

3. A system-wide response to health care challenges requires effective inter-organisational collaboration and new governance approaches that foster interdependence, teamwork and shared leadership beyond organisational boundaries.

4. Delivery models to support optimal care in regionalised systems largely involve decentralised care where possible and centralised care where necessary. The LGH operates within a regionalised system of care. An effectively-designed and well-implemented hub and spoke network prevents duplication of complex, high-cost services. It also facilitates shared services through centralisation at the hub site and distributes health care services across the network in spoke sites that are safe, sustainable and locally responsive.

5. Transfer of patients between hospitals as part of an integrated care network can provide a safer and more efficient model of care. Implementation of care networks affects patient flow and casemix, especially for principal referral sites. These changes in service volume and complexity need to be considered in service planning forecasts and performance monitoring metrics.

6. Integrated care networks rely on professional cooperation in addition to formal governance structures for network stability and effectiveness. Models that support professional cooperation can improve patient care and resource optimisation.

7. Shared service models have higher rates of success in transaction-based, non-strategic, low-risk, high-volume activities. Shared service models are more challenging for services that require significant expertise and context specific knowledge.

8. Quality and safety improvement approaches for clinical networks are multifactorial. Fundamentally the system requires:

   ▪ effective clinical governance;

   ▪ agreed system-wide approaches to quality and safety standards, monitoring and improvement;

   ▪ access to accurate and meaningful data;

- support for research and innovation to drive improvement; and
- transparent reporting for public accountability.

Models of care

9. Plans to improve the sustainability of health care by reducing hospital activity requires robust community-based alternatives. Many of the alternatives identified in the literature have the potential to improve patient outcomes and experience but only some were able to demonstrate net savings. Further, shifts to community-based care can expose unmet need which may, over time, lead to increased service demand.

10. Key models of care identified to improve system sustainability include:

- improved community-based support for patients of mental health, alcohol and other drug services, and sub-acute services;

- targeted and coordinated community-based services for patients with complex chronic care needs;

- improved access to specialist outpatient care through expanded use of telehealth and virtual care services delivery and a supported shift of low-complexity non-urgent specialist outpatient services to primary care;

- separation of planned and unplanned acute care;

- expansion of hospital substitution programs such as hospital in the home and assisted self-care using remote patient monitoring; and

- emergency department avoidance strategies including general practitioner-led urgent care centres, triage of low-acuity patients to community-based services, and community-based rapid response teams.

11. Rural hospitals often serve communities with declining populations, increased ageing, and poorer health indicators. Maldistribution of workforce can lead to a reduction in the depth and breadth of health care services available in rural areas. In recent years the financial sustainability of rural hospitals has also become a major concern. Despite these contextual limitations regional hospitals play an important role in access to health care and supporting the continuum of care.

12. Key models of care identified for rural and regional hospitals include:

- active participation in formal network arrangements with metropolitan hospitals to improve clinical support, better define referral pathways, and enhance workforce education;

- leading and coordinating locally responsive integrated care arrangements according to population health needs;

- improving system-wide capacity through the provision of step-up and step-down care particularly in the areas of rehabilitation and mental health services; and

- supporting provision of care closer to home, in partnership with private and non-government health providers, facilitated by telehealth and virtual care services, particularly in the areas of outpatient services and hospital substitution services.

Enablers

- Sharing scarce workforce resources can improve system capacity, increase local access to services and expertise, and reduce reliance on locum, agency and overtime arrangements. Developing patient-centred integrated models of care also require health professionals to work together in interdisciplinary teams within and across organisational boundaries.

- A flexible workforce is required to meet health needs, especially in rural and remote areas. Improving workforce flexibility requires a workforce design that:

  - looks beyond traditional professional silos to embrace advanced scope of practice roles;

  - supports generalist training and career pathways;

  - identifies opportunities for the assistant, technical and peer-support health workforce; and

  - is ready to realise the opportunities provided by telehealth and virtual technologies.

- Digital technology is a key enabler to clinical service provision, particularly within a clinical network. Core elements of a 'future-ready' digital health platform include:

  - a single shared health record for integrated care;

  - telehealth for improved service access and collaboration across health care providers; and

  - advanced data analytics to inform service planning, personalised care, research and innovation.

- Sustainable services require flexible funding approaches including the capacity to pool service demand and move resources (finances, assets and workforce) across organisational boundaries. Historical funding arrangements tend to be organisationally-siloed, which stifles patient flows, care integration, inter-organisational partnerships and innovation.

- Capital for hospital infrastructure development is generally sourced from government project grants but more recently private-public partnership models (PPP) have emerged as a mechanism to access private capital, share risk between the public and private sectors, encourage innovation and improve value for money. Most PPP models involve long-term private sector facility management services. More recently some PPP models include private-sector management responsibility for all service provision in the hospital, including clinical care. The success of PPP models in Australian hospitals is mixed. Possible risks include negative budgetary impacts, lack of actual risk-sharing due to societal expectation of government responsibility for public health services regardless of management models, loss of staff morale and expertise and decline in service access and quality. Decisions to privatise public hospital services must be carefully considered.

Section One: Clinical network planning

We identified the following major themes in a range of jurisdictional service planning and strategic planning documents.[3-16] They are supported with international literature where available.

- Person-centred care, consumer, carer and community participation
- Alliances for system-wide collaboration
- Regionalised system design.

Person-centred care, consumer, carer and community participation

The importance of person-centred care is universally identified and affirmed in jurisdictional service planning documents.

Person-centred care is care that is organised to meet the needs of patients and their carers rather than organising services around provider structures.

The literature also highlights a shift in approach to consumer, carer and community engagement. The language employed in contemporary planning documents signals a new focus on genuine, meaningful, systematic inclusion of consumer, carer and community voices in the design, delivery, monitoring and evaluation of services.

A number of jurisdictions have committed to developing or enhancing mechanisms to:

- embed consumer, carer and community representation within health system governance structures;[3,8,15]
- routinely employ co-design methods in service planning, policies and projects;[3,11,15,16] and
- harness patient and carer feedback to improve service quality.[3,7,17]

Of note, NSW Health has developed a suite of patient-reported outcome measures and patient-reported experience measures to enable patients to provide direct feedback about their care.[18] The Department of Health Western Australia has signalled intent to expand real-time consumer feedback mechanisms and implement public reporting of patient and carer reported experience and outcomes by July 2021.[3]

Alliances for system-wide collaboration

Public hospitals and health services acting alone cannot solve issues of rising health service demand, complexity, and cost. This is a key recognition reflected in contemporary service planning documents.[3,13]

There is an increasing awareness of the interdependence of primary care, acute care and social care services[3,4] and the need for of a whole-of-system, population health approach to planning and delivering health care services.[10]

The literature identifies the importance of alliances with: Primary Health Networks;[3,15] health care providers across the health care continuum;[10] other government agencies such as education, housing and social services; non-government health organisations;[4] and consumers, carers and community organisations.[16]

The international literature also describes the importance of system-wide collaboration with hospitals 'integrated into the fabric of the local health system' and the importance of leading though working in alliances with other health care providers.[19]

Inter-organisational collaboration is a form of vertical cooperation, where providers acting on different levels along the continuum of care participate in forward-backward cooperation behaviour often facilitated through referral and transfers. This arrangement supports patient-centred care across the continuum of care and the provision of care in the right place at the right time.[20]

Inter-organisational collaboration

Effective inter-organisational collaborations can improve care quality, access, efficiency and improve patient satisfaction, however, it is estimated that between 50-70% of inter-organisational collaborations fail.[21] A systematic review by Nicholson et al. identified ten governance elements linked to successful health care integration as outlined in Table 1.[22]

Table 1: Ten governance elements linked to successful health care integration

Governance element	Description
1. Joint planning	Working together using a joint strategic focus for future work between stakeholders focusing on the continuum of care.
2. Integrated information communication technology	Systems designed to support shared clinical exchange, such as shared electronic health records, tools to support systems integration, and data sharing.
3. Change management	Bilateral support for an agreed change process which is managed locally, and has demonstrated leadership, vision and commitment.
4. Shared clinical priorities	Target areas for redesign are agreed and multi-disciplinary pathways across the continuum supported.
5. Incentives	Funding mechanisms are provided to strengthen care coordination and there are incentives to innovative.
6. Population focus	Geographical population health focus.
7. Measurement	Shared data is used for planning, quality improvement and redesign. Collaborative approaches to measuring performance provides transparency across organisational boundaries.
8. Continuing professional development supporting the value of joint working	Inter-professional and inter-organisational learning opportunities provide training to support new ways of working and align cultures.
9. Patient/community engagement	Involve patients and communities in developing the outcome they want.
10. Innovation	Resources are available and innovative models of care are supported.

Nicholson and colleagues[23] also studied two examples or inter-organisational collaborations between a Primary Health Network and a Local Health Network in

Queensland in order to determine the extent in which the ten governance elements were applied in practice.

The study identified three key barriers to effective integration:

- failure to move from an organisational focus to a system focus;
- failure to change leadership approach and culture; and
- failure to engage the community.

A summary of the key issues for each barrier and key facilitators for future collaborations is summarised in Table 2 below.

Table 2: Inter-organisational collaboration issues and facilitators

Key issues	Key facilitators
Shifting to a system focus	
- No joint accountability for population health planning, performance and outcomes - A lack of aligned goals or conflicting goals - Short term strategies and policy cycles - Inflexible funding systems - A lack of access to quality data - Legal issues and mistrust regarding data ownership, shared risk, political risk, privacy and confidentiality	- A system-wide vision and an agreed long-term strategy (policy framework) - System accountability, shared priorities, and joint key performance indicators - A focus on partnering - A focus on population health care needs across the continuum of care - Flexible funding systems that support innovation and change - Data sharing, data quality and agreed data governance - Support for innovation and change management - Cross-continuum teamwork.
Developing system leadership and culture	
- Lack of leadership and commitment to change - No central coordination - Inability to see past vested interests, failure to seek mutually beneficial outcomes - Hierarchical relationships, i.e. hospital is the master, other services are the servant - Risk adversity - Poor clinician engagement across the continuum - Insufficient resources to support engagement - Failure to strategically build workforce capacity.	- Effective system leadership where leaders: - are convinced of the need for change - effectively articulate the vision and shared goals - are committed to working honestly, transparently and collaboratively with partners - communicate and collaborate across boundaries - affect change with influence rather than relying on control - Clinician leaders are engaged across the continuum of care - Innovative clinical roles that work across the continuum - Joint clinical governance and agreed clinical protocols across the continuum - Allowance of time to develop trusting relationships. - KPIs are used to change culture - Culture of success is established prior to embarking on innovation - Support interprofessional and cross-continuum learning opportunities.
Engaging the community	

Key issues	Key facilitators
• Failure to systematically engage with the community • Failure to include the community in decision-making • Community engagement not prioritised by leaders • Insufficient resources allocated to community engagement • Preconceived ideas of community needs and wants	• A vision to keep people well rather than focusing on illness • A clear systematic engagement strategy that recognises the community should be a vital part of decision making • Address community expectations and social conditioning that hospital care is best • Joint accountability for community engagement and monitoring performance.

A literature review by Auschra[21] also identified the barriers to integration between health care organisations. In addition to the barriers identified by Nicholson et al. [23] Auschra also found the following barriers to inter-organisational integration:

- exclusion of key partners, intentionally or through lack of knowledge;

- cultural distance between organisations - integration is more challenging between organisations with large differences in norms and practices; and

- prior collaboration experiences - a negative past collaboration experience may increase reservation towards future collaborations.

Collaborative governance

Organisations become interdependent through collaborative interactions and activities. Collaborative governance requires a shift in leadership approach from autonomy and independence to interdependence, teamwork and shared leadership beyond organisational boundaries.[24]

Alliance governance is an example of collaborative governance. It originated in the construction industry where alliance contracting for large projects is common. In health care, different organisations across the spectrum of patient care work collaboratively to establish a joint work program that is focused on system improvement, rather than individual organisational interests. The arrangement requires the building of trust between partners, shared responsibility for system improvement and facilitates integration and innovation.[25]

Example: Alliance governance (New Zealand)

Alliance governance arrangements were piloted in New Zealand in 2010 and implemented across the country in 2013.

The alliance structure consists of a mix of managerial and health professional members of partner organisations (District Health Boards and primary health organisations) and independent organisations such as ambulance services, aged care facilities, consumer and community representatives.

Members contribute on behalf of the health system rather than as a representative of their individual organisation.[19]

The alliances feature an independent chairperson and operate in accordance with an Alliance Charter. The leadership teams are supported by a management team from partner organisations. Service networks report to the Alliance management team.

Alliance activities are funded using a flexible funding pool, consisting of some reallocated primary health organisations funding and contributions from District Health Boards and other providers.

The NZ government has begun work on a suite of system level measures for performance monitoring. In the interim some alliances have developed their own measures.

Early service remodelling suggests that the model is effective but further evaluation is required over time to determine if the model systematically improves integration and outcomes.

Authors caution that alliance formation takes time and building trust between members in important.[25]

Regionalised system design

Regionalisation of care is becoming more prevalent.[26]

This is due to health system participants seeking to satisfy the triple aim of optimised health system performance:

- improved patient experience of care (quality and satisfaction);
- improved health of the population; and
- reduced cost of health care.[27]

Regionalisation can be defined by geopolitical boundaries, population base, or by following the natural patient flows that result from referral patterns. A regional care network usually includes a major hospital, some smaller hospitals and several primary care providers. Regional health system strategy is informed by population needs assessment, evidence based clinical pathways and protocols to navigate optimal flows through the system, and process and outcome measures to track system quality.[28]

Delivery models to support optimal care in regionalised care systems largely involve *decentralised care where possible and centralised care where necessary.* Decentralisation improves access closer to home. This involves anchoring services in primary and community care to prevent unnecessary referrals and reliance on hospitals. Centralisation is necessary for complex care that requires specialist skills, equipment and high case volumes for better clinical outcomes and improved efficiency.[28]

The Tasmanian Health Service is arranged as a single networked system in which the LGH is the principle referral 'hub' for the North and North West region of Tasmania. The LGH receives referrals from the North West Regional Hospital, Mersey Community Hospital and a range of district hospitals located across the North and North West of Tasmania. The LGH also acts as a 'spoke site' for statewide services led from Southern Tasmania.[2]

Hospital network arrangements

Hub and spoke network design is based upon strategic centralisation of advanced medical services at a single hub and distribution of basic services at a range of geographically dispersed secondary sites.[29]

A hub and spoke network which is designed and implemented effectively, prevents duplication of services that require intensive skills and technologies across multiple sites, and supports centralisation of services that support care delivery (such as shared services).

Hubs are generally associated with hospitals with a high rate of referrals (from within the hospital or from partners). Hubs have high visibility and prestige and are able to exert control over network resources. Hubs that are highly collaborative with other hospitals gain a greater knowledge of the capacity across the network. This understanding can improve transfer effectiveness and increase the quality of care provided.[31]

The secondary sites (spokes) provide distributed health care services across the network. The service offering at each spoke site may vary in response to local context, but each spoke is integrated within the wider network.

Elrod et al.[29] identify four key benefits to the hub and spoke network outlined in Table 3 below.

Table 3: Key benefits to the hub and spoke network

Benefit	Description
Consistency across operations	Achieved by local implementation of network-wide policy, systems and processes, and facilitated by direct reporting arrangements between the spoke and hub sites.
Efficiency	Through reduced duplication of services, improved economies of scale, centralised support services and leveraging value from existing assets.
Enhanced quality	Through maintenance of specialist skills, technologies, experience and service volumes in complex services provided at the hub.
Improved agility	Improved access to sustainable local care provision. Improved agility in service provision as lower-cost spoke facilities can be modified in response to evolving care needs. Spokes can also be leveraged to provide step-down inpatient care and support shared outpatient care.

Key planning considerations for a hub and spoke network are shown in Table 4.

Table 4: Planning considerations for a hub and spoke network

Planning consideration	Description
Hub capacity	Planning is required to ensure that the network-wide demand directed toward the hub can be accommodated.
Spoke location	Spokes located too far from the hub will not support adequate service delivery and will be inefficient as transit times become too large.
Transportation	Timely and accessible transportation systems are critical for patient flows across the network.
Network culture	Spokes must operate under the authority of the hub. Siloed work practices diminish consistency, lead to duplication, and will eventually undermine the network hub. Clear communication between hub and spokes, and effective leadership at each spoke is required to actively foster a network culture.
Operationalisation	The relationship between network parties must be structured. This involves explicit instruction on service offerings, reporting relationships, operational protocols, role definition, and facilitated workforce cohesion.

Inter-hospital transfers

The practice of patient-sharing embeds hospitals in a collaborative network in which information and behavioural practices are exchanged.[31]

'Patient sharing' refers to the transfer of patients between hospitals or inter-hospital transfers (IHT). Patient sharing requires effective communication and coordination to support the exchange of complex medical information.

Patient-sharing supports regionalisation of services and improved patient outcomes in a range of conditions such as trauma, stroke and acute myocardial infarction.[32]

Historically transfer practices have been informal and have grown organically based on physician patient-sharing relationships. More recently transfer practices have received a greater strategic focus as providing a safer and more efficient model of care. Unhindered transfer promotes efficiency by freeing beds in specialised hospitals for those who need them most.[32]

A study by Assareh et al.[33] investigated inter-hospital transfers for NSW hospitals (public and private) during 2013-15. Of almost 5 million admissions, 7.3% were associated with IHTs and 6.7% of patients had an IHT.

Characteristics of transferred patients

IHT patients were found to have poorer health status and higher mortality compared with non-transfer patients.

- increased age;
- higher number of co-morbidities;
- longer length of stay in hospital; and
- higher mortality rate (2.7% vs 0.7%) than non-transferred patients.

Almost half the transfer-in patients were admitted with a different principal diagnosis group to the one they received at the referring hospital indicating an inter-specialty transfer.

The inter-specialty transfer patients had poorer health and stayed longer in both sending and receiving hospitals compared with intra-specialty-transferred patients.

Patients with trauma and circulatory system diseases were more likely to be transferred compared with the other 18 disease groups (IHT rate 0.3%–7.7%) and were often admitted with the same principal diagnoses.

Interhospital transfer flows

The study[33] also considered the flow of inter-hospital transfers and found:

- IHTs are increasing due to centralisation of specialised care;
- public hospitals had the highest IHT rate with higher transfer-out rates and lower transfer-in rates;
- 61% of IHTs were an up-transfer to larger hospitals with greater specialty, this rate was consistent with findings in an Italian study;[31]
- 30% were down-transfers to smaller hospitals;
- one-fifth of all admitted patients to NSW small community and district hospitals were transfer-out patients; and
- hospitals interacted more frequently with those from the same sector (public or private). IHTs between public and private are limited which is likely linked to funding arrangements.

Readmission patterns

An Italian study of the Abruzzo regional hospital network considered the extent to which hospital referral patterns reduced the likelihood of patient readmissions. The study found:[31]

- hospitals that participated in many referrals are less likely to readmit patients, perhaps suggesting a better capacity of these hospitals to handle hospitalisations;
- likelihood of readmission increases with many referral partners (whether sending or receiving), suggesting that the quality, rather than quantity, of partners matters;
- a network in which referrals present clear and structured transfer patterns, directing patients from peripheral nodes to central hubs is beneficial; and
- a network in which partners have a homogenous set of capabilities increases the likelihood of a readmission event whereas a network structure of patient transfers characterised by the presence of a clear "hub" is most beneficial.

The findings underscore the importance of defining the role of individual hospitals within the regional network in order to support effective strategic decisions regarding service scope, capacity, staffing and resourcing.

Patient-centred care

Authors of the NSW study recommend a careful assessment of the effects of transfers as an integral part of patient outcome and hospital performance indicators. Patient sharing should be acknowledged in hospital and regional performance profiling. The NSW study identified that IHTs appear to be largely driven by management practices rather than patient preferences, suggesting a need for a patient-centred approach to inter-hospital transfer policy.[33]

Integrated care networks

Integrated care is 'a patient-centred, multi-level, multi-method strategy designed to achieve improved coordination of services across the care continuum of complex health systems'.[23]

The LGH leads integrated care services across the North and North West of Tasmania in clinical areas such as surgical, critical care and cancer services. The LGH also participates in statewide integrated care such as the statewide trauma network.

Integrated care networks consider the continuum of care and depending on care type may include preventative, primary care, integrated care, acute care, sub-acute care and rehabilitation phases.[35]

Integrated care networks emerged in in late 1990s as a mechanism to improve coordination of care, integrated service delivery, quality improvement and effective use of scarce clinical resources.[34] International literature on integrated care networks identified in this review largely focused on trauma networks. There is a substantial body of evidence from the US, Australia and England that demonstrates that trauma care networks improve patient outcomes.[26,35,36]

Integrated care networks consider the continuum of care and depending on care type may include preventative, primary care, integrated care, acute care, sub-acute care and rehabilitation phases.[35]

Implementation of care networks affect patient flows and casemix to principal referral sites. A study by Metcalfe et al.[37] looked specifically at the effect of regionalised trauma care on four major trauma centres using a retrospective cohort study.

The study found that implementation of a regionalised trauma network impacted major trauma centre volumes and changed patient demographics.

- Increased case volume:
    - 200% increase in patient volume;
    - 253% increase in patient surgical operations;
    - 237% increase in critical care bed days; and
    - 188% increase in total bed days.
- Patient demographic changes:
    - average patient age increased;
    - proportion of penetrating injuries increased;
    - reduced injury severity score; and
    - reduced revised trauma score.

Changes in service volume and complexity need to be considered when performing service planning forecasts and determining performance monitoring metrics.

Professional cooperation

Integrated care networks rely on professional cooperation in addition to formal governance structures for network stability and effectiveness. Prades et al.[34] studied the structure and tools utilised to support professional cooperation in two European cancer service delivery networks (one in Belgium the other in Spain). The cooperation models identified are described in Table 5 below.

Table 5: Cooperation models utilised in cancer service delivery networks

Cooperative intensity level	Rationale	Cooperative benefits
Specialty-based		
Vertical integration through departments *[e.g. generalist staff located in service 'spoke' sites seek advice and support from specialist staff in hubs; or staff work across both spoke and hub sites]*	Centralised planning and organisation of professionals and technical procedures.	• Quick access to clinical expertise and optimisation of resources

Cooperative intensity level	Rationale	Cooperative benefits
Disciplinary-based group cooperation *[e.g. a discipline forms a team and shares the work amongst the team across institutions]*	Collaborative working that crosses organisational and managerial barriers.	• Flexibility to cover all patient needs from a whole network perspective • Exchange of scientific knowledge and skills;
Informal horizontal cooperation *[e.g. shared specialist staff working across hospitals]*	Exchange of professionals across centres, including junior doctors.	• Exchange of best practices and scientific breakthroughs; • Improved access to workforce
Isolation *[non-cooperative model)*	Resistance to collaborative working with other professionals or centres in favour of 'home' clinical department	• Nil
Multi-disciplinary based		
Multidisciplinary teams *[e.g. multi-disciplinary case conferences]*	Alignment of all health care professionals based on specific disease type or presentation, may include clinicians from external hospitals/ levels of complexity	• Improved decision-making • Control patients' referral between hospitals • Set up the core elements towards integrated care, sharing medical knowledge and scientific breakthroughs.

The study identified benefits of the network as:

- providing a larger community of practice;
- a way to strengthen core specialties; and
- potential to foster innovation.

Challenges identified included:

- more managerial and organisational complexity; and
- cultural challenges and potential conflicts between self-interest and network interests.

Social capital value

A German study considered the social capital value of inter-hospital trauma centre networks. Social capital is believed to facilitate cooperation and reduce transaction costs, and can be defined as 'the sum of resources attainable by individuals, groups, organisations, and communities through a durable network of social relationships'.[38]

Interviews with 23 trauma surgeons, representing almost all of the 26 hospitals, identified the following social capital benefits:

- improved personal contacts among the regional trauma surgeons;
- a culture of mutual respect and transparent decision-making;
- improved trust, reciprocity and collective identity;

- optimised medical care;
- shared medical and political goals for the service network (not just hospital of employment);
- smoother interhospital interactions; and
- improved service credibility.

The main issue identified by the participants was again the tension between network goals and individual hospital goals, particularly when resources were scarce.[38]

Shared services

Shared service models are intended to offer economies of scale and scope, improve service standardisation, quality and efficiency.

'Shared services' means the unbundling of support functions that are common to a range business units or organisations in order to create a centralised semi-autonomous unit that delivers services back to 'customer' areas.[39]

Shared service models have higher rates of success in transaction based, non-strategic, low risk, high volume activities There is a lack of agreement regarding the suitability of shared service models for professional-advisory functions.

Risks of shared service models include, lack of 'customer' control over costs, poor responsiveness, reduced access to service, inflexible service provision.

Australian researchers explored the perceived benefits and risks of transitioning the management of a range of support services (linen, supply, IT, recruitment and payroll) to a shared services model in a large NSW health care organisation.[39]

The research identified five benefits and six risks in transition to a shared service model[39]. Perception of benefits varies significantly between the share service providers and the customer agencies.

Table 6: Benefits and risks of shared service models

Benefits of model	Risks of model
- Economies and efficiencies - Sharing best practice - Transparency of services - Investment in technology - Retaining skills and knowledge	- Lack of trust in the shared service to meet customer needs - Impact on workloads, roles and responsibilities - Loss of control over policy, process and delivery of service - Lack of flexible or innovative service provision - Lack of accountability for the service performance - Loss of identity for shared service staff

The research identifies that the model best fits non-strategic transactional services (i.e. linen) and is more challenging for services that require significant expertise and context-specific knowledge.

Quality and safety strategies

The identified literature provides the following strategies or approaches for safety and quality improvement in clinical systems or networks, including:

- an agreed system-wide approach to quality and safety standards, monitoring and improvement;[2,7,12,16]

- improved data collection, analytics, reporting and benchmarking across the system to inform planning and performance evaluation;[12,16,40]

- contemporary clinical governance frameworks for system-wide clinical governance;[16,40,41]

- improved legislative levers for safety and quality;[12,41]

- defined referral pathways informed by contemporary role delineation and clinical services capability frameworks;[12,16,40]

- safe minimum service volumes;[2,20,26,42]

- improved data access and data sharing across the system for clinical care, planning, research and innovation;[3,40]

- utilising research and innovation to drive quality improvement;[2,40]

- clear leadership and governance support for coordinated services across the care continuum;[3,10]

- public reporting of quality and safety measures, patient experience and outcome measures, and clinical variation;[3]

- support for a culture of safety and quality;[3]

- person-centred, evidence-based care;[3]

- workforce training and education;[12,16] and

- focus on clinical systems rather than capital developments.[3,5]

Section Two: Models of care and interventions

Sustainable models of care

Sustainability and Transformational Plans

In 2015 the NHS announced Sustainability and Transformational Plans (STPs) as a key mechanism to drive sustainable health care service delivery across England to address the aims of the *NHS Five Year Forward View* and in the context of significant ongoing fiscal constraint.[43]

STPs are five-year plans covering NHS spending in each of 44 NHS regions of England. In developing the plans local leaders were required to identify priorities for their local area to improve:

- quality;
- health and wellbeing, and
- efficiency of services.

The plans also included a focus on integration with social care and local services.[44]

The King's Fund reviewed each of the 44 STPs submitted in October 2016 and identified key themes as per Table 7 below:[45]

Table 7: Key themes from STPs

Key theme	Detail
Reduction of hospital capacity	Including reduction of hospital sites and beds, greater centralisation of services.
Reconfiguration of acute services	Centralisation of specialist services (such as acute stroke care, maternity and neonatology) separation of planned care and urgent care with designated 'elective care' hospitals, development of hospital and community-based care networks.
Improved community-based care integration	Multidisciplinary teams (often GP-led) working in community hubs for defined population and coordinating specialist services as required.
Shifting hospital services to community-based hub services	This includes outpatient appointments, diagnostic services, sub-acute care (such as rehabilitation and palliative care).
New integrated models of care	To provide a single point of care of patients with physical health, mental health and social care needs.
Risk stratification and targeted care	For patients with complex care needs to support self-management.
Strengthen prevention and early intervention	Focus on social determinants of health, education and awareness, targeted interventions for patients with long-term health conditions, self-care and home-based self-monitoring programs.
Improve productivity	Using shared services arrangements, collaborative procurement, medicines optimisation, reducing unwanted variations in care, improve referrals pathways.

Key theme	Detail
Workforce capacity	reduce barriers for staff to work across local care providers, staff wellness programs, reduce reliance on agency workers, increased use on non-clinical workforce.
IT enablement	development of digital roadmaps, shared electronic patient records, improve information availability for patients, applications to support self-management and self-monitoring.

A King's Fund review of the content of the STPs raised concerns about the proposals to reduce capacity in hospitals, warning that such proposals would only be credible if there are robust plans to provide alternatives in the community before the number of beds is cut. The review also identified that cuts in social care and public health spending together with a lack of funds to support transformation would affect the ability of NHS organisations and their partners to implement plans. [45]

Reduction in hospital activity was a common theme across STPs with some plans targeting up to 30% reductions in areas such as emergency department attendances and outpatient care. The Nutfield Trust performed an in-depth literature review of the 27 initiatives identified across the STPs to reduce hospital activity, to determine the evidence based for improved patient outcomes and cost savings. [46]

The review found that many of the initiatives have the potential to improve patient outcomes and experience but only some were able to demonstrate net savings. The authors caution that a significant shift in care from hospital to the community will require additional community investment in facilities, workforce, data and analytics in the short to medium term.

Further, shifts to community-based care can reveal unmet need and, in time increase service demand. Cost effectiveness analysis found that whilst some initiatives reduce cost others do not, and some may increase overall costs to the health care system recognising the NHS funds both acute and primary care. [46]

A summary of the relative strength of the evidence for each initiative is provided in Table 8 below. Please note that cost effectiveness information may not be directly transferrable in the Australian setting due to differences in health funding arrangements.

Table 8: Evidence strength for reduction in activity and whole-system costs by initiative

Relative strength of evidence of reduction in activity and whole-system costs	Initiative
Most positive evidence	- improved GP access to specialist expertise ambulance/paramedic triage to the community - condition-specific rehabilitation - additional clinical support to people in nursing and care homes - improved end-of-life care in the community - remote monitoring of people with certain long-term conditions - support for self-care

Relative strength of evidence of reduction in activity and whole-system costs	Initiative
Emerging positive evidence	• patients experiencing GP continuity of care • extensivist model of care for high risk patients • special prescribing • senior assessment in A&E • rapid access clinics for urgent specialist assessment
Mixed evidence, particularly on overall cost reduction	• peer review and audit of GP referrals • shared decision-making to support treatment choices • shared care models for the management of chronic disease • direct access to diagnostics for GPs • intermediate care: rapid response services • intermediate care: bed-based services • hospital at Home • case management and care coordination • virtual ward
Evidence of potential to increase overall costs	• extending GP opening hours • NHS 111 (online or phone-based urgent medical advice) • urgent care centres including minor injury units (not co-located with A&E) • consultant clinics in the community • specialist support from a GP with a special interest • referral management centres

This table is replicated from the Nuffield report.[46]

Jurisdictional sustainability planning

A Western Australian sustainable health review, commissioned by the state government and delivered in 2019, included eight strategies and 30 recommendations to assist the WA health system in improving system sustainability over the next ten years.[3]

Key examples of models of care recommended by the review include:

- improved community-based support for patients of mental health, alcohol and other drug services including early intervention and crisis support, supported accommodation, community-based and home-based recovery services, and emergency department alternatives for people with mental health, alcohol and other drug presentations;

- community-based services for targeted populations including people with long-term health conditions and end-of-life care, wrap-around community-based services for older people with complex chronic illness and frequent presenters to hospital;

- remodelling of hospital outpatient services including moving low-complexity non-urgent specialist outpatient services to primary care, and expansion of telehealth and virtual care services for outpatient service delivery; and

- expansion of hospital substitution programs such as hospital in the home and assisted self-care.

New and emerging models of care

The following sections consider some new and emerging models of care particularly in the areas of emergency department avoidance and community-based care.

Emergency department avoidance strategies

Emergency department (ED) challenges include increasing presentations, overcrowding, long waiting times and rising health care expenditure.

Non-urgent ED attendances

Non-urgent attendances are an important factor in increasing ED presentation rates.[47] The literature reports the proportion of non-urgent or avoidable ED presentations ranges from 15-40% internationally[48,49] and is at 30% in Australia.[5]

Non-urgent presentations to the ED are an important area for attention as they:

- divert ED resources from time-sensitive and life-threatening emergency care;
- are an inefficient use of acute care resources; and
- contribute to a lack of continuity and follow-up in the primary care setting.

A study by O'Keefe et al.[49] looked at characteristics of non-urgent users of 19 EDs in a large region of England over three years (2011-14) for adult patients (16+ years).

The study found that:

- almost two thirds of non-urgent attendances presented after-hours, with highest peak attendances early morning (midnight to 4am) Saturday and Sunday;
- younger patients (aged 16–44) were more likely to attend non-urgently compared to those aged 45 and older;
- younger patients were also far more likely to arrive by ambulance compared to those 45 and older; and
- once in the ED, time to treatment and total time in ED were significantly less for non-urgent attendances versus urgent attendances.

Data from SA Health identified that approximately 46% of mental health consumers arrive at an emergency department by ambulance, with 23% of people arriving being triaged as non-urgent.[5]

Patients attend the ED non-urgently for a number of reasons including:

- a lack of community-based alternatives;
- a lack of awareness of other more appropriate care settings (particularly after hours);
- cost of access elsewhere; and
- convenience of access.[5,49]

Urgent care centres

Urgent care centres (UCCs) are GP-led clinics that are equipped to diagnose and deal with non-emergency patient presentations to hospital. UCCs have been utilised in the UK, US and parts of Europe as a strategy to reduce ED demand and congestion.[50]

There are a range of UCC models in operation but largely UCCs are GP-led and co-located within a hospital emergency department or located alongside the ED. Some integrated models involve the UCC acting as the 'front entrance' of the ED. Patients present to the UCC and are streamed to either the ED or the UCC. Streaming decisions are made by GPs and these decisions are supported by evidence-based guidelines. In general, patients who would normally be seen in general practice are streamed to the UCC.[50]

A meta-review of interventions to reduce ED utilisation found some evidence that a co-located after-hours general practice service in an ED with one emergency care access point has the potential to reduce ED visits; especially in health systems with high rates of non-urgent ED presentations.[48]

The model involves a collaboration between general practitioners and the ED staff, as they share a combined entrance. However, the review authors warn that GPs and ED staff must preserve their own independence, identity and practices. Models in which GPs are hired as staff in the ED risk GPs adapting their practice with that of ED practitioners, resulting in increased ordering of examinations and tests.

A large literature review by the Nuffield Trust reports evidence suggesting that UCCs that are not co-located with the emergency department have the potential to increase overall health system costs.[46]

A low-quality systematic review by Ramlakhan et al.[51] considered the impact of GP-delivered, hospital-based (adjacent or within the ED) unscheduled care services on process outcomes, cost-effectiveness and patient satisfaction. The review identified 20 studies across seven high-income countries. The studies had significant heterogeneity in the models used, study types, and costs used in the economic evaluations, which made the data difficult to compare. Key findings of note are shown in Table 9 below.

Table 9: Impact of GP-delivered unscheduled care services

Finding	Detail
Provider-induced demand	European studies consistently demonstrated increased system demand as a result of integrating or including primary care practitioners and services within emergency departments. Authors recommend accounting for provider-induced demand when estimating the proportion of patients to be streamed to primary care services. Risk also exists if the primary care service is not operational 24/7 as any increased demand out-of-hours will burden the ED.
Wait times	There is little evidence of improvement in throughput from streaming primary care attendances out of the general ED population. Reductions in wait times were seen when GP staff were added to existing staff numbers but not when total staff numbers remained the same.

Cost effectiveness	Due to the high fixed costs and relatively low marginal costs of the emergency department, potential savings from a diversion of non-urgent visits to primary care were expected to be modest.
Patient satisfaction	There is little evidence of increased patient satisfaction from ED-based primary care services. Risks include patient confusion due to blurring the line between emergency and primary care by co-locating services, loss of continuity of care that primary care provides, and encouraging ad hoc health-seeking behaviour.

Other ED avoidance strategies

The Tasmanian Health Service provides a Community Rapid Response Service (ComRRS) in Launceston, Hobart and Burnie and Devonport. The nurse practitioner-led, multidisciplinary team-based service receives GP referrals for the management and treatment of people in the community at risk of hospitalisation.[52]

Other ED avoidance strategies that were identified in the literature as having positive or emerging evidence for effectiveness are shown in Table 10 below.

Table 10: Other ED avoidance strategies

Avoidance Strategy	Detail
Telephone triage systems[48]	Telephone triage is a system in which people who are unsure if they should attend the emergency department can call trained nurses who use standardized protocols to evaluate symptoms over the phone and determine the appropriate course of action.
Ambulance/paramedic triage to the community	Transport of low-acuity patients towards care settings other than the ED was found to decrease ED use by three to seven percent in one US study and one UK study, and improve cost effectivness[46,48]
Case management for identified frequent attenders of the ED	Evidence suggests that case-management could reduce ED use, generally, the breadth of resources and intensity of intervention improve outcomes.[48] Evidence for the cost-effectiveness of case management and care coordination in general (not specific to ED presentations) is mixed.[46]
Patient education and self-management support	Multifaceted educational interventions that teach patients how to use the health-care system and providing counselling in social/emotional issues and support self-management have been shown to decrease cost and ED use in a number of studies.[48]

Clinical decision units and impact on patient flow

A Clinical Decision Unit (CDU) is a designated area within the hospital that allows health care professionals to monitor and evaluate the medical condition of patients who do not meet the criteria for inpatient admission but are not well enough to go home without further observation or diagnostic testing.

Bean et al.[53] performed a network analysis of patient flow over 18 months in two UK acute care hospitals (Denmark Hill and Princess Royal University Hospital). The analysis included ED presentations and patient ward transfers for all non-elective patients admitted via the ED.

The network analysis identified that each ward receives and sends patient to a small number of other wards but does so frequently. This flow is effectively a core 'sub-network' that accounts for 83-90% of all flow. Changes in performance in the core network will affect the most patients and have the greatest hospital-wide impact.

The single most frequent pathway (21% of all visits in each hospital) was that of the ED to a clinical decision unit and exit, highlighting the importance to efficient ED function of dedicated observation and triage units.

The study also considered ED performance with respect to 4-hour wait times and found that poor performance did not correlate with the number of arrivals but rather is associated with increased flow to surgical wards on the previous day. Times of best performance were associated with increased flow through clinical decision units.[53]

Weekend-weekday variation in patient flows was evident at both sites, this was again largely affected by the amount of flow through the clinical decision units.

Community-based interventions

Studies have demonstrated that multicomponent community-based interventions can be effective in improving access to care, reducing potentially avoidable hospital admissions and improving health outcomes.[54]

International examples of innovative practice in health workforce and service planning are shown in Table 11 below.

Table 11: International example of innovative practice

Country	Description
	The Canterbury NZ initiative,[55] improving the intersection between primary and hospital care
	The Scottish Remote Service Futures Project[56] involves community members and service providers explicitly in participatory health service planning; and
	The Maryland Health Enterprise Zone Initiative[54] improving health care access and reducing health care cost in underserved communities using locally determined models of care.

The need to build capacity of government and non-government community-based care providers to assist in meeting health demands was identified in several jurisdictional planning documents. This requires a shift in focus from hospital bed capacity, to one of capacity across the care continuum.

Examples of initiatives that are shifting the focus from hospital-based care to community-based interventions are described below.

Mental health, alcohol and other drug services

Several jurisdictional planning documents highlight a shift towards community-based models for early intervention response, assessment and treatment outreach for people experiencing mental health crisis in the community.[3,5,11]

The SA Health Mental Health Services Plan 2020-2025[5] includes the implementation of community-based services in response high rates of mental health and drug and alcohol related ED presentations, and consumer feedback regarding the need for safe and comfortable spaces away from emergency departments. Strategies identified for implementation are shown in Table 12 below:

Table 12: SA Mental Health Services Community-based interventions

Community-based service	Description
Upgrade of the Mental Health Crisis and Support Telephone and Web service to replace current triage models	The operator provides therapy and support and can dispatch mobile crisis teams in the metropolitan area. The model includes an on-call staffing arrangement in larger rural centres, and telehealth support to other health professionals in regional and remote areas.
Implementation of a stand-alone urgent mental health care centre located in proximity to a major hospital	Urgent services would be provided to consumers who walk in, or ambulance referrals up to triage category 3 (urgent, requiring assessment and treatment within 30 minutes), and police referrals with prior case discussion.
Future development of 6-bed Acute Behavioural Assessment Units in selected major emergency hospitals	Units will have a telehealth supported virtual Acute Behavioural Assessment Service for rural hospitals. The units are expected to be a collaboration between emergency medicine, toxicology, drug and alcohol services and mental health services, for the management of people with significant behavioural disturbance secondary to drug and alcohol use, mental illness, or both.
Residential crisis retreat centres of 10 to 20 beds	Located away from the main hospital campus in metropolitan and country areas, able to accept statewide admissions.

Hospital substitution programs

Hospital in the home (HITH) provides integrated care for patients in their home. The initiative provides enhanced management of patient health care needs in the community, in order to prevent unnecessary admission to hospital, facilitate early discharge from hospital and prevent avoidable hospital readmissions.[57]

The literature supports HITH as a safe and cost-effective model of care for selected patients. Patients and carers also report increased satisfaction when treated via HITH models.[58-60]

We identified two Australian HITH guidelines, an outline of the service model for each is provided at Table 13.

Expansion of hospital substitution programs such as HITH was also identified for improving the sustainability of health care in Western Australia.[3]

Table 13: Summary of HITH guidelines, Qld and NSW

Facet of model	Queensland Health	NSW Central Coast Local Health District
Eligibility	HITH can replace a full hospital admission or a component of the hospital admission. Must substitute a traditional hospital bed cannot be used to replace existing community-based services. Does not include mental health care.	Substitutes an entire inpatient admission in the form of a virtual bed or early transfer during an inpatient admission to a virtual ward. Does not include paediatric care, complex mental health or drug and alcohol related admissions.
Admission	Admitted as an inpatient via the emergency department and allocated to a virtual ward.	Admitted via the emergency department, General Practitioners, residential aged care facilities or medical specialists.
Clinical governance	Inpatient admitting team, or HITH authorised practitioner or a combination model.	Treating staff specialists with admitting rights are responsible for the medical management of all HITH patients.
Service type	Services are primarily provided face-to-face; telephone services are not recognised unless delivered in combination with face-to face clinical care. All patients have access to a 24/7 emergency response telephone support service.	Face-to-face services, telehealth services and remote telemonitoring of patients. All Patients have access to a 24/7 emergency response telephone support service.
Care setting	Home.	Home, residential setting or workplace.
Service provider	Public or contracted private service providers.	A combination of public and community-based services.
Staffing models	Dedicated HITH team or dual model of care with staff working across HITH and post-acute care or inpatient shared model with staff working across inpatient and HITH care settings.	Medical management (staff specialist) with interdisciplinary care. The model does not use a separately resourced stand-alone HITH team rather services are delivered by an interdisciplinary team of acute and community-based health medical, nursing, allied health and administrative staff. A future model may include supervised-self management.
Funding	Activity based funding.	Activity based funding.
Performance measurement	KPIs and comparative performance measures with admitted care.	KPIs and performance measures.

Key aims of the models include:

- support for integrated home-based care;

- enhance acute care capacity within existing infrastructure;

- provide an alternative for GPs, Ambulance, Residential aged care facility staff and medical specialists to admit patients to the HITH service rather than via Emergency Department (NSW model);

- increase patient care options; and
- realise hospital savings and efficiencies.

Information and communications technology are an important enabler for HITH programs and assist with registration, scheduling, documentation, data collection and reporting. Information sharing is facilitated with a shared electronic record and opportunities exist to increase the use of telehealth and telemonitoring for virtual ward rounds, case conferencing, technology assisted independent living solutions and supervised self-care.[3,59,61]

The Central Coast Local Health District Guideline[61] describes three phases of care implementation as follows:

- **Phase 1**: Treatment of a range of infection types, pulmonary emboli, and deep vein thrombosis.

- **Phase 2**: Inclusion of sub-acute services such as palliative care, rehabilitation, progressive neurological conditions.

- **Phase 3**: Specialised HITH services such as cancer care, health failure management, renal dialysis, parenteral nutrition, and post-surgical rehabilitation.

Specialised hospital in the home services

Home dialysis has been found to be cost effective, improve survival rates, lower hospitalisation rates, improve rates of patient employment, and is associated with fewer adverse events. Despite this only 9% of patients receive home dialysis. Key barriers for home dialysis and home parenteral nutrition were out-of-pocket costs for patients, geographic distance, patient ability to self-manage care, and feelings of social isolation.[59]

A publication by Lee et al.[57] describes a HITH program that has been operational in the Guys and St Thomas Trust in London since 2013. The program provides intensive and specialised HITH services led by advance practice nurses working in integrated multi-disciplinary health and social care teams.

Referrals are received from local hospitals, the ambulance service, GPs and community nursing teams and other community providers. The service averages 350 new referral per month.

The HITH service provides an intensive nursing service including an out-of-hours urgent nursing care service, as well as intensive physiotherapy and occupational therapy. The intense service consists of daily visits up to four times a day, for three to seven days. This service provides acute care services and post discharge support for conditions such as pulmonary oedema and community acquired pneumonia.

The team also provide a daily service for long-term conditions such as chronic obstructive pulmonary disease, unstable diabetes, heart failure, deep vein thrombosis, hyperemesis gravidum, and post-operative surgery. A specific palliative care specific service is also provided.

Patient and carer satisfaction with the service was very high as measured by survey. Quality and cost effectiveness were not measured. An evidence review performed by the

Nuffield Trust found Hospital at Home schemes successfully provide a safe alternative to hospital, but identified little evidence that they deliver net health system savings. [46]

Outpatient care

The literature identifies the need to improve equitable access to specialist services and outpatient care without increasing travel burden on patients and staff.[12,62] A number of jurisdictions are seeking to improve specialist service outreach and to support primary care to provide outpatient care using information and communications technology.[6,10,40]

The WA Sustainable Health Review recommends that 65% of all outpatient consultations are performed via telehealth for country patients by July 2022 and that telehealth becomes the regular mode of outpatient service delivery for most outpatient services, across all disciplines, in country and metropolitan areas by July 2029.[3]

Remote patient monitoring

We identified some emerging literature on the use of technology to gather and transmit biometric patient information to enable remote patient monitoring as an alternative to hospitalisation. Planning to support the development of remote patient monitoring has commenced in some Australian jurisdictions.[6,63] A recent international literature review found remote monitoring of people with certain long-term conditions such as heart failure was associated with decreased hospital use and reduced whole-system costs.[46]

Rural and remote health care

Rural hospitals

Rural hospitals often serve communities with declining populations, increased ageing, and lower socioeconomic outcomes.[30] As populations become more dispersed over large geographical distances hospital access becomes problematic leading to inequities in access to care.[64] Further, vocational maldistribution of workforce often leads to a reduction in the depth and breadth of health care services available locally.[30]

Australians located in rural areas experience poorer health outcomes than those located in urban areas.[65] This disparity is also evident in other developed countries such as Canada and the United States.[66]

In recent years the financial sustainability of rural hospitals has become a major concern, due to high capital expenditure and running costs to serve small populations.[64] Centralisation of specialist services, has become commonplace in the health systems of high-income countries.[30] Despite these contextual limitations regional hospitals play an important role in access to health care and supporting the continuum of care.

The English NHS recently undertook a large multimodal study of the 267 community hospitals in England in order to define profile, characteristics, patient experience and community value of community hospitals.[67]

The profile of the community hospitals in England was identified as:[67]

- small with 70% having 30 beds or less;
- rural with 78% based in rural or significantly rural areas;

- mainly nurse-led (although some were led by GPs, or in-house doctors);

- not having 24/7 medical cover and rely on nursing staff and out-of-hours doctors outside core hours;

- providing step-down and step-up care for frail, older inpatients;

- having an average length of stay of <30 days (median 24 days; mean 27 days); and

- providing local, intermediate and generalist care services on a spectrum from primary to acute care orientations.

The profile of the community hospitals in England share a number of similarities to the district hospitals in Tasmania including those in the North and North West of Tasmania. [68]

The NHS study identified that community hospitals are generally historically embedded and valued by their local communities. Community hospitals are a source of practical benefits through the provision local, accessible, integrated health and services. Through networks of interaction they provide social benefits and are also a significant source of employment and training in many small rural communities. Community hospitals can also provide symbolic value as they contribute to perceptions of viability, autonomy and act as a source of security and reassurance and civic pride.[67]

The study[67] also identified how communities support their local hospital through:

- volunteering time - on average 1.4 and 2.5 full-time equivalent personnel per hospital

- raising money - on average communities raised an average of £45,387 (median £15,632)

- providing services - various voluntary and community groups contribute to community hospitals through the provision of a wide range of services and activities both within and outside the hospitals.

- speaking up - a long history of community involvement in strategic decisions about community hospitals

Access to inpatient services for rural populations

A recent study by Rechel et al.[64] reviewed how eight high-income countries ensure their population in rural or remote areas receive access to acute inpatient services. Of the eight countries studied Canada and the United States were considered most like Australia, being high-income low population-density countries. A short summary of the rural and remote models of care identified for these countries is provided at Table 14 below.

Table 14: Rural and remote inpatient care access in Canada and the USA

Country	Rural and remote models of care
🇨🇦	• Patients are transferred to urban areas for tertiary care. Rural and remote hospitals provide primary care and very basic secondary care. • Use of medical air transport is critical due to a very dispersed population. • British Columbia requires that all residents of rural areas should be able to access emergency care in less than 60 minutes and secondary care in less than 2 hours.

	- Ontario facilitates doctors working across urban and rural sites - Ontario has established 'health hubs'. These include a 24/7 emergency department, complex continuing care beds, rehabilitation services, outpatient clinics, primary care, home and community long-term care, mental health and addiction care. - Inpatient care is provided in localities with catchment populations of 10,000-40,000 people. - Hospitals share an electronic health information system and are digitally connected to primary care providers. - Care is facilitated using telemedicine, virtual care and home-based digital monitoring.
	The USA government's Critical Access Hospital (CAH) program incentivises existing rural hospitals to alter their scope of services in return for cost-based reimbursement. Conditions of participation include: - rural designation and located more than 35 miles any other hospital; - maintenance of no more than 25 inpatient beds; - provision of 24/7 emergency care services; and - an annual average length of stay of 96 hours. CAHs are also required to have a formal partnership with tertiary care centres for patient transfer, quality assurance, and emergency coverage. The US government's Rural Health Clinics program encourages primary health services to provide services to rural and remote populations through enhanced reimbursement rates to public, private or not-for-profit organisations that provide primary care services for Medicaid and Medicare patients in rural communities. Rural Health Clinics must be located in rural, under-served areas and must be staff by one or more physician assistants or nurse practitioners. Federal support is also provided for demonstration projects to develop and test new models of rural health care delivery. Projects are planned and implemented by the community, and vary according to local needs. Projects often feature strengthening local systems of care, enhancing integration of care, improving health outcomes, workforce development and community level partnerships.

When planning for future service needs in rural and remote areas, it is important to note that current usage patterns may not match needs as unmet need may exist which is not reflected in current service usage.[66]

Models of care in Australian rural and regional hospitals

Australian jurisdictional strategies for care delivery in rural hospitals include:

- establishing formal network links between metropolitan hospitals and regional and rural hospitals to improve clinical support, better define referral pathways, and workforce education;[3,12]

- seed funding and support for the development of locally-responsive integrated care arrangements particularly for ageing populations, people with complex care needs and those who frequently use tertiary services;[13,18]

- improving network-wide inpatient care capacity by utilising rural and regional hospital sites for step-up and step-down care particularly in the areas of rehabilitation and mental health services;[3,5,9,14]

- increase sub-acute care provision via telehealth and in partnership with non-government providers, examples include increased rehabilitation services and renal care (including dialysis) in regional hospitals;[15,17]

- increased telehealth and virtual care services particularly in the areas of outpatient services and hospital substitution services;[3,10]

- improved access to elective surgery by greater 'pooling' of capacity across networks of services such that elective capacity is consider from a whole-of system perspective rather than access within a specific region;[12]

- rural hospitals to lead the coordination of preventative health, primary care provision and acute care access for local populations;[3] and

- specialist staff sharing arrangements between metropolitan and regional hospitals to support whole-system capability and access.[10]

To enable these initiatives rural and remote hospitals require the following key enablers:[64]

- novel approaches to support financial viability;

- approaches that support the recruitment and retention of health workers in rural and remote areas; including training placements, rural scholarships, improved allocation of internships, facilitation of work across urban and rural sites;

- effective transport arrangements, balancing the travel requirements of patients and staff; and

- investment in telemedicine to improve access to care and reduce avoidable admissions.

These enablers are discussed further in *Section Three* of this report.

Section 3: Enablers

Broadly, key enablers for better clinical network planning and innovative models of care and interventions fall into the categories of:

- Innovative approaches to workforce use

- Digital health technology

- Funding, capital investment and facility design.

Innovative approaches to workforce use

Workforce is a key enabler and essential resource for health care delivery. Health services across Australia recognise the need for service and workforce reforms to secure a quality, fit-for-purpose, affordable health workforce in the context of population ageing, increasing multimorbidity, increased heath service demand, and rising cost of health service provision.

The Tasmanian Workforce Planning Unit, established in 2018, is in the process of finalising the Tasmanian Health Workforce 2040 Strategy. The strategy is underpinned by the *One State, One Health System, Better Outcomes — Delivering Safe and Sustainable Clinical Services* White Paper, the Tasmanian Role Delineation Framework and Clinical Services Profile. It aims to shape the Tasmanian health workforce to best meet the needs of the Tasmanian community.[69]

The Tasmanian health workforce is comparable in size per capita to that of other jurisdictions. However, workforce distribution and specialty does not always match health service need.[69]

We identified contemporary workforce strategy documents[70-74] for four other Australian jurisdictions, and some innovative approaches to workforce collaboration in the peer-reviewed literature. We particularly focus on literature pertaining to workforce in clinical service networks. These approaches are:

- Shared workforce arrangements
  - o specialist sharing;
  - o system-wide rostering;
  - o cross-organisational workforce pooling; and
  - o workforce collaboration
- A flexible, needs-focussed workforce.

Shared workforce arrangements

The literature identified ways in which scarce workforce resources can be shared in order to improve access to services and expertise across the service network.

Specialist sharing

Specialist sharing is an example of horizontal integration, it occurs when a specialist has an active affiliation across two or more hospitals or care settings. A large study of specialist sharing in 89 hospitals across the Netherlands identified specialist sharing is common with all 89 included hospitals sharing specialists with another hospital. The study also found the average rate of sharing per hospital has increased over time, from 27% of all specialists in 2013 to 35% of all specialists in 2015. Specialist sharing is most common in paediatrics, anaesthesiology, gynaecology and obstetrics. Most shared specialists are actively affiliated with two hospitals; although, up to five affiliations per individual specialist were recorded. Specialist sharing generally occurs when the interests of specialists and the executive are aligned.[75]

Table 15: Benefits of specialist sharing

Who	Reported benefits[75]
Specialist	• supports specialisation • improves ability to meet volume requirements • improve organisational efficiency -through learning new practices and more efficient ways of doing things • improves work-life balance especially with weekend and after-hours rostering • personal financial gain • enables more patients to receive care closer to home
Hospital	• assists in meeting volume requirements • benefits in patient flow and referrals

The negative aspects of specialist sharing were identified as increased administrative complexity as specialists need to manage two separate workloads, and a lack of continuity as shared specialists may not maintain care for patient throughout their care journey.[75]

Jurisdictional approaches to shared specialist staffing also include:

▪ developing and expanding shared specialist clinical staff roles between specialist hospital sites and other smaller sites in order to improve whole-of-system access and capacity;[10]

▪ in-person and virtual outreach service provision;[72,73]

▪ formalised partnerships between generalists and specialists for the co-management of care;[40] and

▪ telehealth enabled collaborative arrangements between specialist staff and interdisciplinary care teams, particularly in caring for rural and remote populations.[70]

System-wide rostering

A number of jurisdictional documents identify the need to increase system capacity whilst reducing reliance on overtime and costly locum/agency contracts.[70,72]

A 919-bed tertiary network in the US implemented a voluntary system-wide nursing reallocation program called Happy to Help (H2H). The program was developed to encouraged nursing staff to volunteer to fill shifts in other hospitals and health care settings located within the network.[76]

Key components of the H2H program were:

- all generalist wards and units requiring shifts to be filled developed a one-page flyer on their basic resources and routines to inform potential H2H volunteers;
- staff volunteers that worked H2H shifts received a pay bonus;
- staff were preferentially assigned according to their experience, expertise and work preference. Staff were usually allocated to their home campus or the campus of their preference;
- unit-based on-call and call-back arrangements were also replaced by H2H;
- scheduling software was used to facilitate the program; and
- after the shift the volunteers were asked to rate the experience using a routine questionnaire.

A total of 272 nurses were enrolled in the program. Between 70-80% of shifts volunteered for were worked by H2H staff, and total savings in flexible staffing costs over three years was more $1.5 million.[76]

Surveyed nurses reported that staffing practices were more voluntary, supportive, appropriately incentivised, equitable, consistent, and supportive of work-life balance. Staffing was also perceived as less stressful and less demanding on nursing leadership. Nursing safety and quality indicators and rates of turnover were not affected by the program implementation.[76]

Cross-organisational workforce pooling

In a sub-regional area of Victoria and Queensland some public, private and non-government organisations have committed to working together as a single clinical service network, pooling their service demand, resources and workforce, in order to provide a safe and sustainable health service.[12,70]

Workforce collaboration

The development of patient-centred integrated models of care require health professionals to work together in interdisciplinary teams within and across organisational boundaries.[70,72] There is a particular focus on equipping the workforce to work collaboratively in responding to mental health issues and complex chronic care needs across sectors.[5,11,18]

Workforce collaboration across geographical boundaries, facilitated by telehealth technologies, can also enable virtual case conferencing, consultation, clinical supervision and workforce support.[73]

A flexible, needs-focused workforce

Historically health professionals have provided a model of care based on professional boundaries. Increasingly the literature identifies the need to determine community health needs first and then redesign workforce roles in order to best meet health service needs within available resources. This approach is particularly important in rural and remote service provision.[16,66]

Workforce flexibility includes:

- supporting staff to work at their full scope of practice;[71,72]

- implementing new extended and advanced scope of practice roles such as nurse, paramedic and allied-health led services;[69,71]

- pursuing medical and allied-health generalist programs, as research indicates that health professionals with more generalist skills provide better health outcomes at a lower cost in rural areas;[66]

- expanding opportunities for the assistant and technical health workforce;[71]

- developing and expanding the peer-support workforce (also described as lived-experience workforce) in mental health services and alcohol and other drugs services;[5,74] and

- realising the opportunities provided by telehealth and virtual technologies by supporting staff digital literacy capability and capacity.[6,63,70,72]

Example: Workforce flexibility (Australia)

A regional health workforce planning demonstration model was undertaken in Far North Queensland.

The area included Cairns as the regional centre and two small rural communities located approximately one hour from Cairns (Mareeba and Yarrabah). The approach was informed by local community needs assessment. Key stakeholders — community members and service providers — at the local and regional level were included in four cyclical stages of planning, based on action research methodology.[66]

The process involved:

1. Mapping population needs
2. Modelling existing services
3. Brainstorming models for proposed health service based on needs assessment
4. Assessing skills sets required to meet proposed model
5. Configuring the desired workforce for the selected model
6. Developing a workforce training and education plan

In determining the best model, the stakeholder group prioritised:

- strengthening primary health care service provision;
- expanding local provision of secondary care; and
- reducing demand on the tertiary health care hospital.

Approaches identified to enhance rural workforce flexibility to meet identified need were:

- telehealth solutions;
- task substitution and redistribution;
- increased use of delegated practice models;
- increasing the range of generalist skills amongst the health professional workforce;
- use of multidisciplinary teams and new health worker roles including nurse practitioners and physician assistants; and
- public-private partnerships in service provision.

Innovations resulting from the model included

- establishment of a chronic disease inter-professional teaching clinic;
- local delivery of fracture assessment services using tele-health; and
- rural delivery of renal dialysis.

Digital health technology

Digital technology is a key enabler to clinical service provision, particularly within a clinical network.

We identified 10-year digital technology strategies for health departments of NSW[63] and the ACT.[6] These jurisdictions have identified the following key elements required for a 'future-ready' digital health platform.

The four key elements identified are:

- Shared health records are required for integrated care;
- Analytics are needed to support service planning and care;
- Telehealth for improved access and collaboration; and
- Automation of administrative functions.

Shared health records are required for integrated care

Patients, clinicians, managers, and researchers require access to accurate, real-time health care information to inform care decision-making and improve patient outcomes.[77] Until recently electronic medical records have been siloed and health provider-centric rather than patient-centric. Integrated models of care require a single source of trusted patient information that is available to care providers across service settings and organisations. This requires integration of service-based patient health records and integration with the patient-controlled My Health Record.[6,63]

Services are also moving toward wireless and cloud-based technology as it provides greater capacity, improved affordability, requires less infrastructure and supports mobile access to the shared electronic health record and other information and tools that support patient care.[78]

Analytics are needed to support service planning and care

Analytics are required to understand the data stored in, and generated by, the digital system. Analytics provide insights that inform service delivery, improve quality and safety, and support research and innovation.

A number of health services have also commenced, or plan to commence, capturing and learning from real-time patient-reported outcomes and experiences.[3,6,12]

Some health services are using patient identification and selection tools to support tailored community-based care for people with complex care needs and those at risk of hospitalisation.[12,18]

Improved analytic capability is also expected to support:

- personalisation of digital information;
- targeted health care messaging;
- tailored patient engagement; and
- patient-empowered self-care into the future.[10,63]

Telehealth for improved access and collaboration

Telehealth involves the use of information and communication technology to enable diagnosis, treatment, and monitoring of patients, despite geographical separation between patients and care givers.[79]

Telehealth is particularly valuable in health regions with a large and dispersed rural population and maldistributed health care services. Effective telehealth networks can reduce patient transport requirements, improve access to services and improve service quality.[79]

Jurisdictions are planning to increase use of telehealth as an approach to:

- increase access to specialist outpatient clinics particularly for rural and remote populations through the use of virtual consultations;[3,10,15,17]

- support multidisciplinary shared care, case conferencing and care planning;[63]

- support primary care providers to provide low complexity outpatient care that is currently provided in the hospital setting;[3]

- support multidisciplinary, cross-campus and cross-organisational education and training; and

- enable remote patient monitoring by collecting patient biometric data at home (or remotely) for review by health care providers.[6,63,73]

Automation of administrative functions

Examples of digital automation described by jurisdictions include:

- electronic referral systems, replacing paper-based referrals, is expected to improve workflow, enhance communication and reduce duplication between care providers;[63] and

- online appointment tools to improve efficiency and transparency in booking specialist appointments.[63]

Funding, capital investment and facility design

Four key areas related to funding have been identified as key enablers for clinical network planning and innovation in models of care:

- Clinical network funding
- Capital investment systems
- Public-private arrangements
- Facility guidelines.

Clinical network funding

Sustainable services require flexible funding approaches based on service volumes, quality, and population health needs and outcomes.[3]

Organisationally-siloed historical funding arrangements stifle patient flows,[33] care integration,[22,23] inter-organisational partnerships[25] and innovation.[18,45]

A system-wide approach to care requires funding agreements that include incentives and penalties in relation to patient and population outcomes, rather than organisationally specific goals.[3]

Integrated models of care require the capacity to pool service demand and move resources (finances, assets and workforce) across organisational boundaries.[12,70] Seed funding is also required to support trials of innovative models of care.[18,19]

Capital investment systems

Capital for Australian public hospitals is generally sourced from capital funding government project grants but more recently funding sources include private-public partnerships.

A study by Kerr and Hendrie[80] identifies the five hospital investment systems used for public hospitals across 17 high-income countries. Using data and measures identified through review of the Australian and international literature, the authors ranked the five sources of capital funding against access to capital, against the domains:

- timely access to capital;
- flexibility of funding;
- affordable capital;
- fairness of distribution;
- patient access; and
- hospital efficiency.

Capital aligned with diagnosis-related group (DRG) systems gained the highest ranking. Government subsidies were ranked as the next most appropriate capital funding method, followed by Government project grants. private-public partnerships (PPP) ranked fourth and the predominantly private funding model ranked last.

Australia ranked ninth of 17 countries for access to capital, patient access to hospital and efficiency.

The authors concluded that 'Australia has a prioritised hospital investment system based on hospital asset replacement, institutionally-based capital planning, budgetary and political priorities.' The study identified that OECD countries most effectively funding acute care use DRG alignment for capital funding.

Public-private arrangements

Public-private arrangements in health care largely consist of the following three approaches:[81]

- inter-hospital contracted care — where care is organised and paid for by one hospital and performed by another. The majority of inter-hospital care involves private hospital care contracted by public hospitals;
- co-location and resource sharing — co-location of a private hospital within a public hospital enables sharing of facilities, equipment and staff; and

- PPPs for hospital infrastructure development — in which the private sector finances and builds new hospital facilities to treat public patients in return for the right to operate the facilities and receive funding from state and territory governments.

Public-private partnership models

A public-private partnership (PPP) generally describes a contractual arrangement between public and private sectors in which a private party (or consortium) builds a facility and operates or maintains it over a long period of time. The private party finances the build and the government pays the private party over the life of the agreement. [82]

Aims of the PPP model, as described by the Australian Government National Public Private Partnership Policy Framework include access to private finance to support procurement of large infrastructure, risk-sharing between the public and private sectors, encouragement of innovation, improved asset utilisation and increased value for money. [83]

The use of PPP for hospital projects emerged in the early 1990s. State governments contract with private consortiums to finance, build and maintain new hospitals. The cost and maintenance of the build is subsequently repaid through regular facility payments over the life of the contract (usually a 25-30 year period) and the hospital remains a public asset. The PPP arrangement effectively means that the state government doesn't have to pay the full capital costs up front, reducing the immediate debt burden on the state's balance sheet.

Many PPP models involve long-term private sector facility management services (such as cleaning, building maintenance, help desk, security, patient food provision, car parking, portering, materials distribution, waste management and grounds management. Examples include Casey Hospital, the Royal Children's Hospital, the Women's Hospital and Bendigo Hospital. [84]

More recently some PPP models go further with private-sector management responsibility for all service provision in the hospital, including clinical care. Examples include Sunshine Coast University Hospital, the Northern Beaches Hospital and Joondalup Health Campus. [85]

The success of PPP models in Australian hospitals is mixed. Victoria's Casey Hospital and Western Australia's Joondalup hospitals are widely recognised as successful examples. Notable failures include Port Macquarie Base Hospital in NSW, Latrobe Regional Hospital and Mildura Base Hospital in Victoria, and Robina Hospital in Queensland. [85]

A report by the McKell Institute [86] on the privatisation of public hospitals cautions that previous attempts to privately run public hospitals highlight significant risks to government including negative budgetary impacts, lack of actual risk sharing due to societal expectation of government responsibility for public health services regardless of management models, loss of staff morale and expertise and decline in service access and quality.

The report recommends that decisions to privatise public hospital services are carefully considered, that methods are considered to reduce government risk, that contractual arrangements are clear and include performance measures and efficiency standards and recognise that privatisation is only one of a range of options to reform public hospital service provision.[86]

Facility guidelines

Contemporary guidance for the planning, design and construction of health facilities located in Australia is provided by The Australasian Health Facility Guidelines (AusHFG).

The AusHFG is an initiative of the Australasian Health Infrastructure Alliance, and informed by a range of industry representatives, clinical experts and health consumers. The purpose of the AusHFG is to support appropriate physical design of health facilities that support contemporary model of care and meet the needs of patients, their carers, visitors and staff in a way that is affordable and encourages operational efficiencies. [87]

International Health Facility Guidelines are also freely available. The International guidelines are informed by a range of international contributors including Australian guidance documentation and expert contributors.[88]

[Please see page 5 for the Key Messages of this Literature Review.]

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