A scoping review of Australian evaluations of health care delivery models: are we making the most of the evidence?

Abstract

Objective

Health care delivery models describe the organisation of health care practitioners and other resources to provide health care for a defined patient population. The organisation of health care has a predominant influence on the receipt of timely and appropriate health care. Efforts to improve health care delivery should be evidence-informed and large numbers of evaluations of health care delivery models are undertaken. This paper presents a scoping review of Australian evaluations of new health care delivery models, to inform a discussion of the appropriate use of such evidence to improve the efficiency and sustainability of the Australian health system.

Methods

A systematic scoping review was undertaken, following an a priori published protocol. PubMed, Embase and CINAHL were searched for primary, comparative studies of health care delivery models undertaken in Australia and published between 2009 and 2018. Primary prevention studies, such as health promotion activities, were excluded.

Results

Of 14,923 citations, 636 studies were included. 383 (60%) randomised controlled trials were identified. There were 18 clinical specialties in which over 10 evaluations were identified. Most models involved allied health practitioners or nurses.

Conclusion

Evaluations of health care delivery models provide important evidence that can be used to improve the use of health systems' most important and costly assets – the health care practitioners who deliver health care. A nationally co-ordinated system is required to support local health services to assess the local value of alternative health care delivery models.

Key Question Summary

1. What is known about the topic?

The organisation and delivery of health care is continuously evolving in response to changes in the demand and supply of health care. New health care delivery models are often evaluated in specific locations, but it is not clear how such evidence informs the delivery of care in other locations.

2. What does this paper add?

This paper reports the findings of a scoping review of Australian evaluations of health care delivery models, highlighting the large and increasing number of such evaluations that have been published in the last ten years.

3. What are the implications for practitioners?

Opportunities to improve health system efficiency are likely being lost due to the underuse of the available Australian evidence on new health care delivery models. Local health services need support to interpret such evidence in their local context, which could be provided through the development of a national framework for local evaluation.

Introduction

Health care delivery models describe the organisation of health care practitioners and other resources to provide health care for defined patient populations. Such models represent the systems within which health care is delivered, which are the principal determinants of whether patients receive timely and appropriate health care. Improving systems is difficult,[1] but it is an ongoing and necessary focus of all health systems. Evidence is an important input to improvement processes and evaluations of new health care delivery models are undertaken across the Australian health system, funded by the National Health and Medical Research Council, governments, local health services and charities.[2]

However, the lack of a consistent and co-ordinated approach to the use of evidence on health care delivery models undervalues the available evidence and is likely to result in missed opportunities to improve the Australian health system. Decisions to fund and implement new health care delivery models are made by state and territory health departments, Local Hospital Networks and Primary Health Networks, as well as by private health care providers. Some institutions have defined processes for designing models of care as part of a commissioning cycle,[3-5] but a more co-ordinated approach to the implementation of evidence-based health care delivery models has the potential to significantly improve the efficiency and sustainability of the Australian health system.

The aim of this scoping review is to profile the volume and coverage of existing evaluations of health service delivery models undertaken in Australia, and to discuss why it might be underused and options for using this evidence to improve the Australian health system.

Methods

A scoping review was undertaken according to a published *a priori* protocol [REF]. The review was conducted and reported in line with the Joanna Briggs Institute (JBI) Reviewers' Manual and the PRISMA Extension for Scoping Review checklist.[6, 7]

Eligibility criteria

Only primary studies undertaken solely in Australia were included in the review. Studies were required to evaluate a health care delivery model that provided a new service, or delivered an existing service using an alternative set or mix of health care practitioners. Evaluated health care delivery models could be compared to a current practice health care delivery model or to no treatment. All population groups with an existing health condition were included. Primary prevention studies, such as health promotion activities, were excluded.

Search strategy

Searches were conducted in the following databases for citations published in English: PubMed, Embase and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). Papers published between 1 January 2009 and 31 December 2018 were included. The final search strategy for PubMed is available in the Supplementary File.

Study selection

Due to the large number of citations identified, the title and abstract review was undertaken in two steps. One reviewer screened all titles, with a second reviewer screening 10% of titles to ensure agreement. All abstracts were then screened by two reviewers. Screening and selection of full-text articles was done by one reviewer, with 10% checked by a second reviewer. The PRISMA diagram can be found in the Supplementary File.

Methodological quality appraisal

Methodological quality assessment and risk of bias were not undertaken for this study, consistent with scoping review guidance.[6]

Data extraction

An extraction form developed using Microsoft Excel (2013) was used to extract data. The first 10% of data extraction was done by two reviewers. The remaining data extraction was completed by one reviewer. Free text descriptions of the clinical area, evaluated health care delivery model, workforce effects and sample size were extracted. In addition, fixed categories were defined to standardise study characteristics with respect to geographical setting (metro/regional/rural), clinical areas (as per the Medical Board of Australia),[8] health system setting (primary and community care/outpatient/emergency care/inpatient/aged care), workforce (allied health/nursing/GP/specialist/non-clinical) and study type (RCT/cohort/pre-post with control/pre-post without control).

Synthesis of results

Descriptive statistics are used to summarise the characteristics of the included studies using the fixed category variables, presenting the numbers of studies in different categories. Two-way analyses are also presented, e.g., reporting the numbers of studies by health system setting and workforce categories. To illustrate the range and potential value of the reported evidence, included studies in the clinical area 'Emergency medicine' published in the last six months of 2018 were reviewed in more detail. The NHMRC's framework[9, 10] for assessing the quality of scientific evidence was applied to the selected Emergency Medicine studies to illustrate the relevance and reliability of the evidence, as well as the magnitude of the potential benefits associated with the implementation of new health care delivery models.

Results

The review included 636 studies, of which 108 (17%) were published in Australian journals. 521 (74%) were undertaken in metropolitan areas, 68 (10%) and 71(10%) were undertaken in regional and rural areas, respectively. The most common study design was a randomised controlled trial (383, 60%), with similar numbers of pre-post studies without controls (124, 19%) and cohort studies (124, 19%). Victoria (158, 25%), New South Wales (142, 22%) and Queensland (136, 21%) accounted for almost 70% of all studies. Very few studies were undertaken in Tasmania, the Northern Territory and the ACT. There were 37 (6%) national studies and 46 (7%) multi-state studies.

Figure 1 presents the studies categorised by clinical specialty, noting studies can be assigned to multiple specialties, e.g., an evaluation of rehabilitation after hip surgery is categorised as both rehabilitation medicine and orthopaedic surgery. There were 18 clinical specialties with more than 10 evaluations, and four specialties in which there were 70 or more evaluations (psychiatry, cardiology, geriatric medicine, and rehabilitation medicine).

Figure 2 presents the number of included evaluations by health system setting and workforce category. Accounting for studies undertaken across multiple settings, there were over 200 evaluations in each of primary and community, outpatient and inpatient settings. Almost 70% of these evaluations involved the provision of health care by allied health practitioners or nurses, who were also involved in more than half of the evaluations undertaken in the emergency department and aged care settings.

Using the NHMRC's framework for assessing the quality of scientific evidence,[9, 10] Table 1 presents summaries of four evaluations published in the last six months of 2018 in the clinical area of Emergency Medicine (ED).

The health care delivery models piloted were diverse and their implementation requires resource re-allocation. The only RCT, of a facilitated intervention to increase uptake of guidelines for minor traumatic head injury, reported increased aggregate costs and no significant difference in clinical outcomes.[11] The pre-post evaluation of a nurse-led intervention to improve the care of frail older people in the ED reported reduced ED and inpatient costs and reduced hospital admission rates, though it was not clear if intervention costs were included. The lower 95% confidence interval for hospital re-presentations was 0.99, implying uncertainty regarding the non-inferiority of the intervention.[12]

The retrospective cohort analysis of direct versus indirect transport to a PCI-enabled hospital was limited by the extent to which available data included all potential confounders.[13] It is possible that the data did not capture in full the factors influencing paramedics' decisions regarding initial destination hospital. However, the study reported a very large intervention effect, risk differences of over 10% for surviving to hospital discharge, 30 days and 12 months. The pre-post evaluation of a behavioural assessment unit in the ED was unable to control for other changes in the ED over the timeframe of the study but it did report significant reductions in ED length of stay and in 'actual or potential violent, aggressive, abusive or threatening behaviour' (defined as Code Greys).[14]

Discussion

The implementation of new health care delivery models requires the re-allocation of resources, typically involving either the substitution of one type of health care practitioner with another or the employment of a new set of health care practitioners. Decisions are required to make such re-allocations. The aim of the presented scoping review is to highlight the large number of health care delivery models that have been evaluated in Australia, in order to promote consideration of a more systematic approach to the use of this evidence base to inform decisions

157 to fund and implement health care delivery models. The review identified 636 published
158 Australian evaluations in the last ten years, with an increasing trend in the number of
159 publications each year. The evaluations were spread over the majority of the clinical specialties
160 delineated by the Medical Board of Australia.[8] The majority were evaluations of models
161 delivered by nurses and allied health practitioners. The review was limited to Australian
162 evaluations published in peer-reviewed journals. There are likely a large number of evaluations
163 that have been published as non-peer reviewed reports, such as evaluations of advanced
164 musculoskeletal physiotherapists,[15] and urgent care centres in public hospitals.[16]

165 Evidence on the effects of health care delivery models generated in other countries can inform
166 Australian health policy and practice. However, the review focussed on Australian evaluations
167 because the local context is a more important determinant of the effect of a health care delivery
168 model than of the effect of pharmaceuticals and other 'simple' health technologies.[17, 18] There
169 are differences in local context between jurisdictions within Australia, but the commonality of
170 providing health care within the Australian health system, with its unique organisational
171 structure and funding mechanisms, increases the relevance of Australian evaluations of health
172 care delivery models.

173 ## *Evidence-based Service Improvement*

174 As outlined by Scrivens,[19] health service planners and decision-makers are commonly faced
175 with a range of *explicit standards* that are used to monitor existing services from institutions
176 external to their organisations (e.g., the National Health Performance Framework,[20] Service
177 Level Agreements between state & territory government departments and Local Hospital
178 Networks and reports from clinical registries). Decision-makers also face external incentives
179 and pressures from a range of ad hoc *expert judgements*, in the form of commentaries on
180 performance. Examples of these include non-routine government department reports and

white-papers (e.g., the Atlas of Healthcare Variation[21] and CSIRO Future of Health[22]); reports by stakeholder and interest groups (e.g., Palliative Care Australia[23] or the Grattan Institute[24]); through to academic research (e.g., NHMRC funded evaluations of existing and emerging practices) and commercial developments (e.g., new communications and logistics technologies); and media investigations (e.g., newspaper articles on sentinel events). Such external evidence often drives internal self-assessment and shapes opinions on the actions required for improvement.

State and territory health departments support the development of 'models of care' in prioritised clinical areas, for example, the Agency for Clinical Innovation in NSW has developed a wide range of models of care.[25] These models of care outline best practice care, describing the services to be provided and the health care practitioners needed to provide the required services.[26] The re-organisation of health services to implement the developed models of care (i.e., the development of health care delivery models) is undertaken with Local Health Districts, who may need to develop localised business proposals to justify the resource implications associated with implementation.[3]

Searles et al reviewed the use of local level evaluations of healthcare in Australia and found inconsistency in the conduct and quality of local evaluations.[27] This confirmed findings from previous studies, such as experience at Monash Health that "evidence is not used systematically or proactively to drive decisions".[28]

Local Level Evaluation Framework

Health service managers and leaders follow many heuristic processes to inform changes in practice, in the context of varying local resource and cultural constraints and preferences of local stakeholders.[29] Local health systems are complex, a response to which is an aim "to turn healthcare into a learning system, with participants attuned to systems features and with strong

feedback loops to try to build momentum for change".[1] Local level evaluation frameworks may support the move towards a learning health care system, providing a formal basis for the investigation of local health system features and the explicit and contestable evaluation of proposed options to improve local health services.

In their review, Searles et al outlined a framework for local level evaluation in the Australian health system, which was informed by a review of health technology assessment (HTA) frameworks, in consultation with senior Australian health service managers and clinicians.[27] The framework includes processes of evidence gathering and initial evaluations of new health technologies and models of care, leading to an implementation decision. Following implementation, Searles et al describe the need for ongoing monitoring and evaluation to improve, or optimise the implemented intervention, as well as to identify whether an intervention fails to provide value and is a candidate for disinvestment.

In their survey of representatives of 27 different health services, Searles reported that 81% identified a lack of evaluation staff and skills as a barrier to local evaluation.[27] To apply a local evaluation framework, capacity is required to identify and undertake initial evaluations to inform the design and implementation of new health care delivery models. This process requires the estimation of the value of new delivery models relative to existing delivery models for defined populations in local health services, combining evidence on the effectiveness of new delivery models with local health systems data and stakeholder engagement to design locally relevant evidence-informed delivery models.[30]

In Australia, such evaluations may be best undertaken at the Local Health Network or Primary Health Network level, but such institutions are unlikely to have sufficient capacity to design evidence-informed delivery models on a routine or regular basis.[27, 28] It may also be wasteful to duplicate all evaluation activities across different local health services. To address these

issues reviews of evidence on the effects of new delivery models could be undertaken by an external organisation and disseminated to local health services. Likewise, analysis plans for the synthesis of evidence on the effectiveness of new delivery models with local health systems data could be developed externally and disseminated.

The NHMRC accredited Advanced Health Research and Translation Centres (AHRTCs) and Centres for Innovation in Regional Health (CIRHs) and the umbrella Australian Health Research Alliance (AHRA), are well placed to co-ordinate the design of locally relevant evidence-informed health care delivery models. These Centres could facilitate linkages between local health services and local researchers to undertake local evaluations, whilst AHRA could facilitate the co-ordination of activities nationally to disseminate relevant resources across jurisdictions. Funding for local and national activities could be provided through the Medical Research Future Fund (MRFF), given the relevance of the proposed activities to MRFF priorities (e.g. Comparative Effectiveness Research).[31]

Conclusions

The most recent Council of Australian Governments (COAG) Heads of Agreement on public hospital funding and health reform expressly referred to the further development of nationally cohesive HTA.[32] Currently, the COAG Health Council Health Technology Reference Group provides evidence-based advice on emerging technologies, but this Group focuses on specific procedures (e.g., ablative techniques for the treatment of localised prostate cancer). There is no equivalent group focussing on health care delivery models, despite the abundant evidence base and the fact that the majority of government spending on health is used to employ health care practitioners,[33] whose value is greatly influenced by the health care delivery models within which care is delivered. Further development of nationally cohesive HTA should explore options for a co-ordinated system for the development and dissemination of resources to

253 support local evaluations by health services to assess the value of new health care delivery
254 models, in local settings. The AHRTCs and CIRHs, under the umbrella of the AHRA may
255 provide the infrastructure to support such a system.

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