

The use and usefulness of outcomes based funding for hospitals

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Use and Usefulness

HOSPITAL OUTCOMES BASED FUNDING MODEL SCHEMES

ABOUT

Outcomes based funding model schemes are used to improve value based healthcare through financial incentives. They are defined in this study as consisting of pay for performance (P4P) and bundled payment models.

AIM



This study's objectives were to evaluate the effectiveness and potential usefulness of an outcomes based funding model scheme in moving towards value based health care in the NSW public hospital system.

METHOD

A systematic literature review was undertaken to identify schemes relevant to the NSW public hospital setting. Eight were chosen for a detailed review based on selection criteria.



SCHEMES EVALUATED



Five schemes operated in the US, two schemes operated in the UK and one scheme operated in Sweden. Six schemes were P4P, one scheme was bundled payment, and one scheme blended P4P and bundled payment.

RESULTS

Hospital outcomes based funding model schemes have had limited success. Four schemes had positive effects, but these were small and dissipated over time. Cost effectiveness is generally unknown, and there are weak conclusions on what scheme criteria are required for success.



Key design characteristics

- Conclusions on important design criteria for scheme effectiveness were limited.
- Performance targets should be based on prior performance and the capacity to improve performance.
- Hospitals should be rewarded for quality improvement and quality achievement.



Implementation

- Schemes must be uniquely developed around a specific objective and hospital operating context.
- Schemes should be designed in consultation with clinicians, and with leadership commitment from hospital management.



Effectiveness

- Two schemes showed no impact on quality, two schemes had mixed effects, and the remaining four schemes had positive effects.
- Scheme design characteristics (e.g., incentive size) and hospital characteristics have minimally impacted effectiveness.



Unintended consequences

- Some negative unintended consequences were highlighted (e.g. changing coding practices to avoid recording hospital acquired complications), but were not widespread.
- One positive unintended consequence noted was an increase in hospital quality beyond the scheme.

POLICY

- A hospital outcomes based funding model scheme may improve value based healthcare within NSW public hospitals.
- Other policy levers, such as performance management, should also be considered as an alternative approach.
- Any outcomes based funding model scheme developed for NSW public hospitals should be trialled (with a control group) and evaluated for its cost effectiveness.

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About MUCHE

Macquarie University is recognised as one of Australia's leading research universities, with an enviable reputation for excellence. While still relatively young, our success of the past 50 years has positioned our distinctive approach to deliver ground-breaking research with world-changing impact.

Recently, we have invested heavily in infrastructure, with over \$1 billion spent on facilities and buildings. We have also significantly expanded our teaching and research capacity in health, with the development of a new Faculty of Medicine and Health Sciences, and relocation of the Australian Institute of Health Innovation.

Macquarie University's objectives are to accelerate world-leading research; to prepare world-ready higher degree research candidates; and to actively engage externally as a world-recognised research collaborator and partner of choice. We believe collaborating with industries, governments, communities, professions and academic colleagues around the world is paramount to our success.

Macquarie University's Centre for the Health Economy (MUCHE) was established as a strategic initiative to undertake innovative research on health, ageing and human services. Our vision is to create a world where decision makers are empowered with applied, trusted and influential research into health and human services policy and systems. Our mission is to deliver leading innovative research by operating professionally, collaboratively and sustainably.

We undertake research for government, business and not-for-profit organisations, which is used to inform public debate, assist decision-making, and help formulate strategy and policy. We are interested in investigating the health economy at the macro level, with particular focus on the interdependencies of these systems with each other, and the broader economy. This includes investigating factors beyond the health and human services sectors that impact the health and wellbeing of populations.

Our point of difference lies in our approach to research. While MUCHE primarily consists of specialist health economists, we recognise that researching the health economy requires many skill sets and experience. Solving problems within health and human services now requires teams with multi-disciplinary skills working closely together.

We therefore work collaboratively with our partners, and across the University, including the Faculty of Business and Economics, Faculty of Human Sciences, and the Faculty of Medicine and Health Sciences. We also work with Macquarie University's world renowned research hubs, such as partners within the Australian Hearing Hub, the Australian Institute of Health Innovation, and the Centre for Emotional Health

We take pride in combining our professional approach to partner engagement, with our academic approach to research methodology, to deliver innovative and translational research.



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Executive summary

Healthcare systems around the world are grappling with how to deliver good quality care efficiently, while meeting increased demand for services and changing patient preferences. Challenges faced by healthcare systems include increasing chronic disease prevalence, population ageing, and increased health technology costs, all leading to greater budget pressures.

In response, some healthcare systems are shifting away from purchasing healthcare service volume to value. For example, the US Department of Health and Human Service's strategy aims to improve care quality through the use of incentives tied to outcomes, accompanied by better information and communication, and better care coordination. In England, the Quality and Outcomes Framework has been operating for over a decade, incentivising GPs through payment to achieve indicator targets set by the Department of Health.

The NSW Ministry of Health is also pursuing value based health care. Its objectives are to improve health outcomes that matter to patients, improve the experience of receiving and providing care, and improve the effectiveness and efficiency of care.¹ One primary approach being implemented is the Leading Better Value Care (LBVC) program, which is a collaborative state wide effort to reorganise healthcare system activity towards best practice models, utilising Patient Reported Measures (PRMs) and evaluation to promote ongoing learning.

However, the NSW Ministry of Health currently employs activity based management to fund public hospitals. This approach uses a combination of activity based funding and volume management, underpinned by performance management frameworks established within local health district service agreements. The shift towards value based health care within NSW suggests there is merit to exploring whether funding models that incentivise outcomes are appropriate for NSW public hospital funding.

The Macquarie University Centre for the Health Economy (MUCHE) was commissioned by the Sax Institute (on behalf of the NSW Treasury) to evaluate outcomes based funding models and their possible application to public hospital funding. The first objective was to explore the effectiveness of hospital outcomes based funding models in achieving their stated policy objectives. The second objective was to explore the potential usefulness of outcomes based funding models in supporting a move towards value based health care, and broader health care system objectives, within the NSW public hospital system.

Outcomes based funding model schemes

Outcomes based funding model schemes were defined within this study as either pay for performance (P4P) or bundled payments. A systematic literature review was undertaken to identify schemes relevant to the NSW public hospital setting.

Of the 37 schemes identified, eight were chosen for a detailed review based on selection criteria. Five schemes operated in the US, two schemes operated in the UK and one scheme operated in Sweden. Six

¹ See www.health.nsw.gov.au/value, accessed 17 December 2018.

schemes were P4P, one scheme was bundled payment, and one scheme blended P4P and bundled payment.

An additional literature review was undertaken to identify evaluations of each selected scheme. Results from these evaluations were summarised and compared to conclusions from the broader literature on the effectiveness of outcomes based funding model schemes.

Design characteristics

Selected schemes had a mixture of key design characteristics, using rewards and penalties attached to a variety of process measures, patient reported outcome measures (PROMs), patient reported experience measures (PREMs) and costs. Rewards and process measures were mostly used. No scheme had attached outright funding to PROMs or PREMs, with only limited use of these measures within composite quality indicators.

A medley of health outcome measures and risk adjustment mechanisms was found within the schemes. The lack of standardisation across health outcome metrics has reduced the potential to compare their effectiveness.

Incentive size was relatively small, making up 1–3 per cent of total revenue in US schemes, and 4–24 per cent in UK schemes. A strong correlation between incentive size and effectiveness was not found across the schemes or within other systematic literature reviews of hospital outcomes based funding model schemes.

Effectiveness

Scheme effectiveness was found to be variable. Two schemes showed no impact on quality, two schemes had mixed effects, and the remaining four schemes had positive effects, although these were small and dissipated over time. The lack of effectiveness found within some schemes may be a product of short timeframes between scheme implementation and evaluation.

Other systematic literature reviews found little evidence to suggest hospital outcomes based funding model schemes have improved care processes, health outcomes or patient experience. Scheme design characteristics and hospital characteristics were also found to minimally impact effectiveness. Three potential reasons were offered by the literature, including:

- schemes are implemented within a rapidly changing hospital environment, limiting the potential to demonstrate incremental benefits;
- designing schemes is complex, with little opportunity to test alternative design characteristics before implementation; and
- hospital support is often lacking, as schemes may impose an additional administration burden in collecting and processing data, and can threaten clinical autonomy.

Only one cost effectiveness analysis was found, concluding the scheme was cost effective. Evidence is also scant on the cost effectiveness of other outcomes based funding model schemes within the broader literature. Most economic evaluations suffered from methodological problems, including undertaking only partial evaluations, and failing to capture all relevant costs.

Unintended consequences

There was little evaluation of unintended consequences across schemes. This may be explained by evaluations not focusing their attention on unintended consequences, and the short timeframes between scheme implementation and evaluation, with unintended consequences potentially emerging after the evaluation has taken place.

Negative unintended consequences highlighted by the literature (although not widespread) included changing coding practices to reduce reported hospital acquired complications (HACs) and readmissions, and hospital selection bias within schemes. One positive unintended consequence found was improved quality in hospitals not participating in a scheme, which was thought to be driven by competitive pressure. Selection of high-cost and low-performing hospitals was raised as a specific concern of bundled payment models.

Key design characteristics

Scheme evaluations did not capture the interaction between design characteristics and context, nor measure a change in one design characteristic on outcomes, while holding all others constant. A strong conclusion on design criteria important for scheme success could not be made.

Other systematic literature reviews also limit their conclusion on important design criteria. While two studies provided recommendations on key design characteristics to promote effectiveness, there is some contention. Recommendations agreed upon include:

- selecting performance targets based on prior performance and the capacity to improve performance within provider constraints; and
- rewarding quality improvement and quality achievement.

One study suggested schemes may need to differentiate design characteristics for alternative hospital types if their capacity to improve performance is different.

The literature also offered some recommendations on characteristics leading to successful scheme implementation, although these were based on weak evidence. They include:

- developing clear scheme objectives;
- providing support to improve quality through staffing and better team functioning;
- using quality improvement tools;
- providing necessary infrastructure support; and
- ensuring effective leadership and clinician engagement.

Conclusion

Outcomes based funding model schemes can improve value when optimally designed within a specific health care context, although international experience suggests benefits may be small, and there is a significant risk of relatively little impact.

The effectiveness of an outcomes based funding model scheme for NSW public hospitals will depend on the interrelationship between design characteristics, governance structures, infrastructure and culture. A scheme may need to be tailored to unique local health district (LHD) circumstances to account for their different capacity to improve performance. It should be designed for a specific identified

behavioural change sought by the NSW Ministry of Health. Changes to other policy levers not related to funding, such as quality measurement and performance management, should also be considered as an alternative approach.

If an outcomes based funding model scheme is developed for NSW public hospitals, it should be trialled and evaluated using a control group. The evaluation should focus on health outcomes, cost effectiveness, and unintended consequences. It should allow for potential learning effects over the adoption phase, and identify potential areas for further improvement.

1. Outcomes and funding

The NSW public hospital system has undergone significant change in the last five years through the introduction of a national activity based funding (ABF) model, new standards developed by the Australian Commission on Safety and Quality in Health Care (ACSQHC), publication of the first Australian Atlas of Healthcare Variation, and multiple other initiatives introduced by state and federal governments.

The Council of Australian Governments (COAG) introduced ABF in 2014 to improve patient access to services and public hospital efficiency based on a national efficient price (NEP), and to make hospital services costs more transparent.[1] Quality was to be improved through improved standards of clinical care through ACSQHC.

The original ABF model suggested payment be adjusted for quality so that treatments for specified hospital acquired conditions were excluded.[2] This funding approach was being used in the United States for services delivered to Medicare beneficiaries, under the Hospital Value-Based Purchasing (VBP) Program.[3] While it did not account for poor quality care, additional funding was provided for complicated care.

More recently, the Independent Hospital Pricing Authority (IHPA) and ACSQHC have developed measures to consider quality and safety in the national efficient price. The Council of Australian Governments Health Council has directed IHPA to provide nil funding for a public hospital episode that includes a sentinel event on or after 1 July 2017, a reduced funding amount for all hospital acquired complications, and to undertake further consultation to determine a pricing and funding approach for avoidable hospital readmissions.

While these arrangements attach funding to health outcomes using proxy clinical measures, they do not attach funding to patient reported outcome measures (PROMs), and by default, to differences in health outcomes that occur beyond those relatively rare adverse quality and safety events. Consequently, they incentivise the avoidance of poor care, rather than incentivise better PROMs across the care spectrum.

Interest in value based health care

Health care funders around the world have started to combine health outcomes and funding arrangements to improve care quality. For example, the UK Department of Health has introduced PROMs for patient surgery, with the potential to transform the National Health Service (NHS) if appropriately combined with clinical management and funding arrangements.[4]

PROMs are also being used in US hospitals for performance measurement, and are attached to funding, although mostly in Medicare programs. However, different PROMs and risk adjustment mechanisms have reduced the potential to compare alternative providers or programs.[5]

Despite the push for PROMs, hospital outcomes based funding model schemes still primarily rely on mortality and readmission rates.[6] Some clinicians are unwilling to collect and share PROMs, and are concerned about appropriate patient risk adjustment.[5] Poor medical records and inadequate

information technology has also reduced capacity to collect data and accurately measure PROMs.[7] PROMs are considered important for performance management.[8] More recently, commercial organisations have pushed for greater use of PROMs in reimbursement mechanisms under the umbrella of value based health care (VBHC). The development of outcome measures by the International Consortium for Health Outcomes Measurement (ICHOM) is one example.

Value based health care

The concept of VBHC first originated within the US within the broader debate around health insurance reform, and the need to restrain the ever increasing cost of healthcare. It was defined as the ratio between health outcomes and costs,² with patient health outcomes measured over three tiers, including health status achieved; process of recovery; and sustainability of health.[9] However, health outcomes must matter to patients, and be measured over the full cycle of care.[10]

While patient experience was not explicitly included within the original definition of VBHC, it was deemed important through its potential impact on health outcomes via the relationship between experience and patient engagement with the healthcare system. The definition also explicitly separated value from care quality that was defined as adhering to evidence based guidelines.[10]

The suggested process towards VBHC within the US included measuring health outcomes, investing in prevention and health maintenance services, reorganising providers around medical conditions, and introducing bundled payments systems to incentivise providers around the interests of patients. It also includes increased competition for patients, investment in information technology (particularly electronic medical records), and consumers taking more responsibility for their health.[9]

VBHC has since gained worldwide attention as a potential way to manage increasing health care expenditure, improve health outcomes and reduce inequities in healthcare access. However, some have criticised VBHC as 'pseudo-innovation', and suggested some crucial concepts are misunderstood, leading to different concepts and confusion around the representation and measurement of value.[11]

Outcomes based payment model schemes and value based health care

The number of outcomes based funding model schemes is expected to grow within the US. The US Department of Health and Human Services is aiming to replace 50 per cent of fee for service Medicare reimbursements with alternative payment models (APMs), and have 90 per cent of Medicare fee for service payments rewarding quality or value by 2018.[12] In England, the Quality and Outcomes Framework has been operating for over a decade, incentivising GPs through payment to achieve indicators set by the Department of Health.

Outcomes based funding model schemes are also being used in Australia. The Practice Incentives Program (PIP) administered by the Department of Health makes financial payments to General Practitioners if they meet specific outcomes across 11 different domains such as providing earlier

² Value = Health outcomes that matter to patients / cost of delivering those outcomes.

diagnosis and effective management for people with diabetes. The National Disability Insurance Scheme (NDIS) will consider payment for outcomes, while private health insurers are exploring outcomes based funding model schemes for private hospital services.

The NSW Ministry of Health is also pursuing value based health care. Its objective is to improve health outcomes, improve the experience of receiving and providing care, and to improve the effectiveness and efficiency of care.³ One primary approach being implemented is the Leading Better Value Care (LBVC) program, which is a collaborative state wide effort to reorganise healthcare system activity towards best practice models, utilising Patient Reported Measures (PRMs) and evaluation to ensure ongoing learning.

The purpose of this study

The Macquarie University Centre for the Health Economy (MUCHE) was commissioned by the Sax Institute (on behalf of the NSW Treasury) to evaluate outcomes based funding model schemes and their possible application to NSW public hospital funding. This study had two objectives. The first was to explore the effectiveness of hospital outcomes based funding model schemes in achieving their stated objectives. A systematic literature review identified:

- existing funding models based on health outcomes delivered;
- where these funding models have been implemented and in which context;
- the effectiveness of these funding models in achieving intended outcomes;
- the risks or unintended consequences of such funding models;
- the design characteristics considered critical for effectiveness; and
- the transferability of these funding models to the NSW context.

The second objective was to explore the potential usefulness of an outcomes based funding model scheme in moving towards VBHC and broader health care system objectives, within the NSW public hospital system.

³ See www.health.nsw.gov.au/value, accessed 17 December 2018.

2. Literature review methodology

While the concepts of outcomes based funding models and value based health care (VBHC) are similar across countries, definitions differ reflecting changes made by governments to better suit their political context and policy objectives. This chapter first defines outcomes based funding models used within this study. It then provides a description of the systematic literature review protocol, including information sources, summary measures extracted from the literature, and the article selection process.

Outcomes based funding model scheme

Funding models employ financial incentives to align provider behaviour with health care quality and efficiency. They can provide incentives at the clinician, team or organisation levels, but are typically implemented alongside performance reporting and other management frameworks. Three types of funding models are categorised within the literature as outcome based, including:

- pay-for-performance (P4P);
- bundled payments; and
- accountable care organisations (ACOs).

P4P and bundled payments were used to define outcomes based funding model schemes within this study. These are described in Table 2.1. ACOs refer to an organisational structure formed through a contractual arrangement to deliver health care, accompanied by a unique funding arrangement. They are primarily located in the US, resulting from the introduction of the *Affordable Care Act 2011*. ACOs generally focus on delivering health and social care within the community to reduce hospital admissions.[12] They were excluded from this study given the focus was hospital outcomes based funding model schemes.

Literature review protocol

Research on outcomes based funding model schemes in health care primarily focuses on P4P models in primary care.[6] However, hospitals have different finance systems, governance structures, ownership types, cultures and models of care. Hospital care is typically delivered in a complex team environment, whereas primary care is often delivered by clinicians working on their own. Teams can respond differently to financial incentives compared to clinicians.[6]

Table 2.1: Description of outcomes based funding model schemes

| Scheme | Description |
|---------------------------|---|
| Pay for performance (P4P) | P4P is an outcomes based funding model type commonly used alongside public reporting of hospital performance.[8] It is typically an add-on to a payment system already in place such as ABF, and is applied to improve health care quality and efficiency. Providers are rewarded (or penalised) for achieving specific targets typically negotiated between the provider and payer. |
| Bundled payments | Bundled payments (also known as episode based payments) is an outcomes based funding model type used to fund health care services organised in a bundle around a medical condition. Risk-adjusted payments are based on a clinically defined care cycle. Providers are rewarded through shared savings, and penalised for poor quality care through shared excess costs. Bundled payments primarily improve efficiency by incentivising a reduction in unnecessary hospital services.[12] |

Source: MUCHE.

A literature review protocol was therefore developed to identify hospital outcomes based funding model schemes to answer the following question:

Do hospital outcomes based funding model schemes improve value relative to activity based hospital funding models?

The literature review protocol outlining the objectives, search strategy and inclusion and exclusion criteria is presented in Appendix A.

Information sources

An initial search was conducted in PubMed, an online database containing citations for biomedical literature from MEDLINE. A supplementary search was conducted in Econlit to identify additional articles in the economic literature. All searches were run in August 2017.

A snowball method was used to identify additional reviews of outcomes based funding model schemes and relevant grey literature to address data gaps on scheme characteristics.

However, the grey literature generally lacks rigour, with missing information, opaque evaluation methods and unsupported conclusions.[7] Conclusions from these types of evaluations were therefore not included in this study.

Synthesis of results

A data extraction template was developed to systematically capture information relevant to this study. Criteria included funding model type, study design, scheme design characteristics, interaction with other funding models, effectiveness meeting objectives, unintended consequences, size of scheme and definition of value. Additional information was obtained from evaluations referenced in the articles, while grey literature was used to further understand scheme characteristics.

Selection of articles and schemes

A systematic literature review was conducted to identify and further analyse hospital outcomes based funding model schemes relevant for this study. Figure 2.1 shows the selection process.

Eligibility criteria

Two reviewers screened the title and abstract and assessed full text eligibility. A third reviewer was consulted when there were uncertainties about study eligibility or other aspects of the review process.

The literature review search initially identified 1,050 articles after duplicates were removed. Only systematic literature reviews were included to efficiently identify potentially relevant outcomes based funding model schemes for this study.

Articles were excluded if they were opinion pieces or abstracts, had not been peer reviewed, or if schemes were applied to non-hospital health care sectors. Non-English articles and articles focused on middle and low income countries were excluded. This resulted in 24 systematic literature review articles for full text review, which identified 37 outcomes based funding model schemes to potentially undertake a detailed assessment.

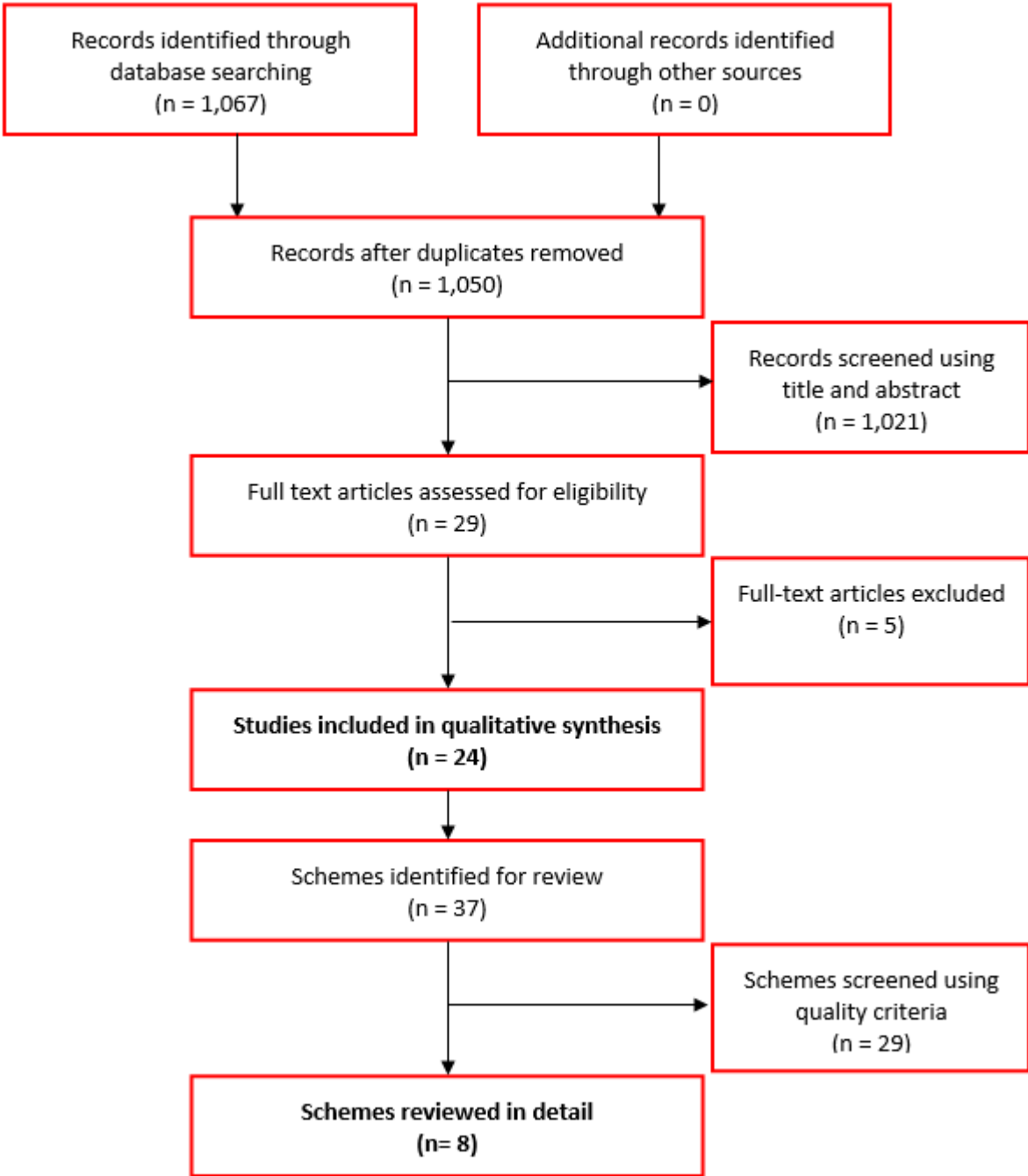
Selection criteria

Two steps were used to select outcomes based funding model schemes for a detailed assessment. First, grey literature was used to extend information on scheme characteristics. Secondly, a list of criteria was developed to identify and assess relevant schemes for inclusion. Selection criteria included:

- funded by one single payer,
- implemented across many hospitals;
- ABF operated prior to, or in combination with, the scheme; and
- had been operating for more than three years.

Schemes were excluded if their evaluations did not employ a control, or if their evaluations had been conducted prior to 2000. This reduced the final list of hospital outcomes based funding model schemes for detailed assessment from 37 to eight.

Figure 2.1: Flow diagram of study and scheme selection



Source: MUCHE.

3. Outcomes based funding model schemes

The systematic literature review identified eight outcomes based funding model schemes relevant for the NSW public hospital setting. Each scheme was further analysed using a separate literature review of their associated evaluations, with results compared to insights drawn from other systematic literature reviews of outcomes based funding model schemes. This chapter presents a summary of scheme characteristics, effectiveness, potential unintended consequences and key design characteristics.

Scheme characteristics

The literature review protocol identified 24 systematic literature review articles published between 2007 and 2017, which contained 37 outcomes based funding model schemes implemented in several countries.⁴ Schemes were mostly from the US (n=21) and the UK (n=10), with one each identified from Belgium, Canada, Italy, Netherlands, Sweden and Taiwan.⁵

After screening for quality, eight schemes were selected for further analysis, including five schemes in the US, two schemes in the UK and one scheme in Sweden. Six schemes were P4P, one scheme was bundled payment, and one scheme blended P4P and bundled payment. General characteristics are summarised in Table 3.1.

The limited number of schemes selected for this study, and the focus on US schemes, reflects other systematic literature reviews. One systematic literature review identified 34 P4P schemes where half had either not been evaluated quantitatively, or were not peer reviewed.[6] While there were 46 evaluations of the remaining schemes, three quarters applied to seven US schemes, and only six schemes had evaluations that employed a control group. Another systematic literature review found the majority of evaluations on schemes suffer from methodological problems, with around 75 studies (59 per cent) using either cross sectional data or a simple before and after design with no control.[31]

⁴ Two thirds were published in the past five years.

⁵ Other countries that have implemented outcomes based funding model schemes include Argentina, Australia, Brazil, China, Germany, India, Korea, Philippines and Spain. However, evaluations of these schemes did not meet the inclusion criteria.

Table 3.1: Selected outcomes based funding model schemes

| | Scheme | Type | Objectives | Hospitals | Year | Country | Funder |
|---|---|----------|---|------------------|----------------|---------|--------------------------|
| 1 | Hospital Acquired Conditions Reduction Program (HACRP) [12, 13, 15, 16] | P4P | <ul style="list-style-type: none"> Reduce prevalence of hospital acquired conditions | 3,000+ | 2008 – present | USA | Medicare |
| 2 | Advancing Quality in the North West of England [13, 17-20] | P4P | <ul style="list-style-type: none"> Reduce mortality, reduce costs, reduce length of stay | 24 | 2008 – present | UK | NHS |
| 3 | Premier Hospital Quality Incentive Demonstration (PHQID) [8, 13, 20-26] | P4P | <ul style="list-style-type: none"> Improve inpatient care quality | 266 | 2003 – 2009 | USA | Medicare |
| 4 | Hospital Readmissions Reduction Program (HRRP) [8, 12, 25, 26] | P4P | <ul style="list-style-type: none"> Reduce readmission rates | 3,000+ | 2012 – present | USA | Medicare |
| 5 | Hospital Value-Based Purchasing (HVBP) program [3, 12, 13, 21, 26] | P4P | <ul style="list-style-type: none"> Improve quality of care in selected hospital interventions | 3,000+ | 2012 – present | USA | Medicare |
| 6 | Best Practice Tariffs (BPT) for NHS hospitals [13, 27, 28] | P4P | <ul style="list-style-type: none"> Improve adherence to guidelines, perform surgeries as day cases | 122 | 2010 – present | UK | NHS |
| 7 | Bundled Payment for Care Improvement (BPCI) Initiative [29] | BP | <ul style="list-style-type: none"> Improve patient care Reduce Medicare expenditure Test innovative delivery arrangements | 315 ¹ | 2012 – present | USA | Medicare |
| 8 | Choice of Care in Hip and Knee Replacements (OrthoChoice) [30] | BP + P4P | <ul style="list-style-type: none"> Reduce waiting times Improve patient choice of care Reduce variation in treatment cost and outcomes | 10 | 2009 – present | Sweden | Stockholm County Council |

Notes: 1. Along with other types of service providers.

Source: MUCHE.

Pay for performance schemes

The Centers for Medicare and Medicaid Services (CMS) in the US Department of Health and Human Services have implemented a number of P4P schemes in the last 30 years. Several schemes are ongoing, albeit modified since their inception based on experiences and evaluation outcomes. Four of the six P4P schemes identified for this project are administered by the CMS.

The Premier Hospital Quality Incentive Demonstration (PHQID) was an early CMS initiative, and was the basis for the NHS Advancing Quality in the North West of England. Other relevant US schemes are the Hospital Acquired Conditions Reduction Program (HACRP), the Hospital Readmissions Reduction Program (HRRP) and the Hospital Value-Based Purchasing (HVBP) program, which are all funded by Medicare.

The NHS Best Practice Tariffs (BPT) scheme in the UK is based on best practice pricing, although it includes payment for achieving process measures. The UK Government sets the price for providing an evidence-based best practice package of service or model of care, and pays an additional tariff to hospitals that achieve metrics used to identify best practice.

Bundled payment schemes

Two schemes with bundled payments were relevant for this study, including the US Bundled Payment for Care Improvement (BPCI) scheme, and the Swedish Choice of Care in Hip and Knee Replacements (OrthoChoice) scheme.

The BPCI was implemented in 2013 under the *Affordable Care Act 2011* to reduce Medicare expenditure and improve care quality. The program includes four bundled payment models and covers 48 clinical episodes, from which participating hospitals can choose. Examples of clinical areas include diabetes, acute myocardial infarction (AMI) and chronic obstructive pulmonary disease (COPD).

The OrthoChoice scheme has operated in Sweden since 2009, blending bundled payments and P4P funding models. The model incorporates services provided to non-complex patients undergoing primary knee or hip replacements in both the primary and hospital settings over the full cycle of care.

Design features

Design features for selected schemes include the type of outcome measures used, size of incentive, indicative budget, reward versus penalty, and absolute versus relative performance thresholds (see Table 3.2).

Outcome measures used

Schemes used a variety of outcome measures, including process measures, patient reported outcome measures (PROMs), patient reported experience measures (PREMs), and costs. Process measures were most popular, including indicators that incentivise specific care models, appropriate pharmaceutical treatment, targets for treatment time, workforce targets, administration improvement, and readmission avoidance.

Schemes were found to employ several types of health outcome measures. HACRP evaluates hospitals against 11 hospital acquired conditions (HACs). AQNWE requires hospitals to report clinical outcomes in five categories, including acute myocardial infarction (AMI), heart failure, pneumonia, conditions requiring coronary artery bypass grafting (CABG), and conditions requiring hip or knee surgery. PHQID includes outcome measures on 30-day readmission rates, mortality and morbidity, and between 15 to 20 process measures across CABG, AMI, pneumonia, hip and knee replacement, and stroke.

While some schemes target improvements across all conditions (e.g., HACRP), most target improvements within specific conditions. The use of PROMs and PREMs was limited (e.g., AQNWE, HVBP, OrthoChoice), and no scheme has attached funding to PROMs or PREMs outright. This is consistent with many hospital performance frameworks that still focus on process measures. For example, the US National Quality Measures Clearinghouse in the US contains 1,958 quality measures, but only 32 (less than 2 per cent) are patient reported health status measures.[5]

Schemes were found to attach funding to several outcome measures, which is consistent with the broader literature. One systematic literature review assessed 25 hospital schemes (in addition to primary care schemes) and found an average of nearly 30 outcome measures per scheme.[13]

No firm conclusion was offered on the relationship between effectiveness and outcome measures. Using a limited number of outcome measures may result in hospitals focusing on a specific behaviour to the detriment of unmeasured outcomes.[12] Employing a broad set of outcome measures may address this problem, but also increase scheme complexity and cost, given more data must be collected, processed and interpreted.[32] An optimal balance should be sought, which could include attaching funding to a subset of measures likely to change intended behaviour within a broader performance framework.

Size of incentive

Incentive size is generally considered an important design characteristic within funding model schemes. Larger incentives are expected to motivate behavioural change more, as hospitals receive larger funding rewards for good performance, or larger penalties for poor performance.

Incentive size in the selected schemes were modest in relation to the total reimbursement for hospitals. The size of payment in US schemes ranged between 1-3 per cent of the total revenue, but between 4-24 per cent in the UK. Evaluations offered weak conclusions on the relationship between incentive size and scheme effectiveness, with some noting small incentives may explain why scheme effectiveness was limited.

Several systematic literature reviews have also found a weak relationship between incentive size and effectiveness.[6],[31],[33] While a small incentive may induce a large behaviour change if hospital margins are small and valued, the marginal cost of quality may mediate this relationship (i.e., more expensive quality requires greater incentives). One systematic literature review suggests limited variation in incentive size within and across programs has limited the ability of studies to find statistical significance between incentive size and effectiveness. [31] Another systematic literature review suggests incentive size may not impact care quality behaviours, but may impact a provider's decision to participate in a funding model scheme.[33]

Table 3.2: Design features of selected schemes

| Scheme | Type of outcome measures | Size of incentive | Reward vs penalty | Absolute vs relative target |
|--|--|--|---|---|
| Hospital Acquired Conditions Reduction Program (HACRP) | <ul style="list-style-type: none"> List covers eleven HACs, such as foreign objects retained after surgery, stage III and IV pressure ulcers, falls and trauma, manifestations of poor glycaemic control, and specific surgical-site infections. | <ul style="list-style-type: none"> Poor performers were defined as hospitals with HAC scores in the top 25% nationally. Poor performers were penalised 1% of revenue (based on total Medicare payments for all hospital DRGs). | <ul style="list-style-type: none"> Penalty. | <ul style="list-style-type: none"> Relative. |
| Advancing Quality in the North West of England (AQNWE) | <ul style="list-style-type: none"> Quality of care measures for clinical conditions across five categories, including: <ul style="list-style-type: none"> acute myocardial infarction (AMI); heart failure (HF); pneumonia (PN); conditions requiring coronary artery bypass grafting (CABG); and conditions requiring hip or knee surgery. Composite measure includes actual and expected mortality rates, and actual and expected survival rates. Hip and knee surgery also includes 28-day actual and expected readmission rates. PROMS and PREMs, although these are not included in the composite measure. | <ul style="list-style-type: none"> Hospitals in top quartile of quality receive a bonus payment equal to 4% of the revenue received under the national tariff, and those in the second quartile receive a bonus of 2%. | <ul style="list-style-type: none"> Reward initially and later a penalty was introduced. After initial 18 months, scheme changed from a bonus system to a penalty system where a fixed proportion of each hospital's income was withheld and paid only if quality thresholds were met. | <ul style="list-style-type: none"> Relative, including: <ul style="list-style-type: none"> 'attainment' (second-year score exceeding first-year mean); 'improvement' (second-year increases in the top quartile); and 'achievement' (second-year scores in top 50%) bonuses. |
| Premier Hospital Quality Incentive Demonstration (PHQID) | <ul style="list-style-type: none"> Surgical Care Improvement Project measures, 30-day readmission rates, and 15-20 process measures for five conditions, including: | <ul style="list-style-type: none"> Top 10% of hospitals were paid a 2% bonus in addition to standard Medicare payment for all hospital DRGs. | <ul style="list-style-type: none"> Reward initially and later a penalty was introduced. | <ul style="list-style-type: none"> Relative. Initially bonus paid for quality; program design changed in |

| Scheme | Type of outcome measures | Size of incentive | Reward vs penalty | Absolute vs relative target |
|--|---|---|--|--|
| | <ul style="list-style-type: none"> – CABG; – AMI; – pneumonia; – hip and knee replacement; and – stroke. | <ul style="list-style-type: none"> • Those hospitals in the next top 10% were paid a 1% bonus. • In the third year of the scheme, hospitals scoring in the lowest 10% were penalised 2% of the standard DRG payment. • Hospitals scoring in the next lowest 10% were penalised 1% of standard DRG payment. | <ul style="list-style-type: none"> • The scheme was changed from a bonus system to a penalty system where a fixed proportion of each hospitals income was withheld and paid only if quality thresholds were met | 2006 to pay for 'improvement' and 'attainment'. |
| Hospital Readmissions Reduction Program (HRRP) | <ul style="list-style-type: none"> • 30-day readmission rates for three conditions in financial years 2013 and 2014, including: <ul style="list-style-type: none"> – AMI; – heart failure; and – pneumonia. • Hip and knee surgery and chronic obstructive pulmonary disease (COPD) added in financial year 2015. • CABG surgery added in financial year 2017. | <ul style="list-style-type: none"> • Up to 3% of revenue, based on total Medicare payments for all hospital DRGs. | <ul style="list-style-type: none"> • Penalty. | <ul style="list-style-type: none"> • Relative. |
| Hospital Value-Based Purchasing (HVBP) | <ul style="list-style-type: none"> • Hospital performance based on an approved set of measures and dimensions grouped into specific quality domains.: <ul style="list-style-type: none"> – Patient-centred experience of care coordination including communication with nurse, doctors, hospital cleanliness, and discharge transition | <ul style="list-style-type: none"> • 1% of base payment was withheld from all hospital DRGs and redistributed among 'winning' hospitals. | <ul style="list-style-type: none"> • Reward and penalty. | <ul style="list-style-type: none"> • Absolute and relative. • Hospitals received quality points for both achievement and improvement, and a summary score was awarded equal to the greater |

| Scheme | Type of outcome measures | Size of incentive | Reward vs penalty | Absolute vs relative target |
|---|--|---|--|---|
| | <ul style="list-style-type: none"> – Safety including Catheter-associated urinary tract infection (CAUTI) and Central line-associated blood stream infection (CLABSI). – Clinical care: 30-day mortality rates for AMI, HF and PN. – Efficiency: Medicare spending per beneficiary • Hospital scores used based on clinical care processes weighted at 10%, patient experience of care 25%, outcomes 40% and efficiency 25%. | | | of the two point values. |
| Best Practice Tariffs (BPT) for NHS Hospitals | <ul style="list-style-type: none"> • Different BPTs were applied depending on condition and best practice guidelines, including: <ul style="list-style-type: none"> – Acute stroke – includes criteria for brain imaging – Fragility hip fracture – only specific measures included – Gall bladder – incentives for same day procedure – Adult renal dialysis – incentives for home therapies | <ul style="list-style-type: none"> • BPT can be up to 24% of tariff received for usual practice. • Actual BPT amount varies by condition. | <ul style="list-style-type: none"> • Reward initially and later a penalty was introduced. | <ul style="list-style-type: none"> • Absolute. |
| Bundled Payment for Care Improvement (BPCI) | <ul style="list-style-type: none"> • Hospitals defined their own quality measures. | <ul style="list-style-type: none"> • Varies by reimbursement model. Participating providers get about 2-3% of their original Medicare fee-for-service payments. They may share potential saving beyond the discounted amount at the end of the models. <ul style="list-style-type: none"> – Model 1: Discounted amount based on payment rates under the IPPS (ceased model). The minimum | <ul style="list-style-type: none"> • Reward and penalty. | <ul style="list-style-type: none"> • Relative. |

| Scheme | Type of outcome measures | Size of incentive | Reward vs penalty | Absolute vs relative target |
|---|--|---|---|---|
| | | <p>discount ranges from 0-2% over three years.</p> <ul style="list-style-type: none"> – Model 2: Retrospective arrangement, expenditure reconciled against a target price. Includes inpatient stay, post-acute care (PAC) and readmissions. CMS requires minimum discount of 2-3%. – Model 3: Retrospective arrangement, expenditure reconciled against a target price. Includes services during the post-acute period and readmissions. Size of discount may vary, just like in Model 2. – Model 4: Prospective payment for all services performed by the hospital, physicians, and other practitioners during the entire inpatient stay. | | |
| Choice of Care in Hip and Knee Replacements (OrthoChoice) | <ul style="list-style-type: none"> • PREMs, process measures (e.g., length of stay and waiting time). • Clinical outcomes and PROMs measured but were not linked to funding. | <ul style="list-style-type: none"> • Bundled payment set at 56,300 SEK (approximately \$8,800). Covers care provided in primary and hospital setting. | <ul style="list-style-type: none"> • Results-based reimbursement; 3.2% of the total reimbursement withheld and paid retrospectively to providers who achieve goals determined by process measures. | <ul style="list-style-type: none"> • Absolute. |

Notes: CMS = Centers for Medicare and Medicaid Services; DRG = diagnosis related group; IPPS = Inpatient Prospective Payment System; PAC = post-acute care; PREMS = patient reported experience measures; PROMS = patient reported outcome measures.

Source: MUCHE.

Some hospitals have also been found to have changed behaviour in response to outcomes based funding model schemes that are contrary to expectations. Examples include improving performance when incentives were small, and improving high cost performance rather than low cost performance, despite equal incentives.[26]

Reward vs penalty

Deciding on whether to use a financial reward or penalty to motivate hospital behavioural change is complex. While individuals tend to respond more strongly to losses,[12] the decision should also consider whether the payer requires a budget neutral scheme, desired effect size and acceptability of penalties by hospitals. In general, rewards are considered more palatable given penalties remove hospital funding, thereby limiting their capacity to improve future performance.[6]

Within the selected schemes, three schemes used rewards (PHQID, HVBP and BPT), three schemes used penalties (HACRP, HRRP and OrthoChoice), and one scheme used both rewards and penalties (AQNWE).⁶ Within BPCI, the total cost of the bundled service was first determined, with 3.2 per cent of funds initially withheld and then paid retrospectively if selected outcomes were achieved.

While scheme evaluations did not conclude whether penalties provide a stronger incentive to change behaviour, two schemes (AQNWE and PHQID) first used a reward, and later introduced penalties to motivate further behavioural change.

Some contention exists within other systematic literature reviews on whether rewards or penalties are more effective in changing behaviours. Scheme effectiveness is impacted by other design characteristics and provider characteristics, making any conclusions weak.[31] One study suggests combining rewards and penalties may be optimal, taking advantage of stronger incentives associated with penalties while limiting adverse reactions from providers.[34]

Absolute vs relative performance targets

Hospital outcomes based funding model schemes either measure outcomes on an absolute or relative basis. Absolute targets compare hospital performance to an absolute level of performance, remaining unchanged over time, or adjusted in response to prior performance.[6] Relative targets compare hospitals to either their own performance or the performance of their peers.⁷ They include:

- a tournament approach, where the top performing hospitals receive a bonus, or the bottom performing hospitals are penalised;
- a peer performance approach, where hospitals are rewarded based on their performance relative to a hospital peer group; or
- a historical performance approach, where hospitals are rewarded based on their own performance improvement over time.[6]

⁶ The first year of the AQNWE scheme used a basic tournament which was subsequently changed to attainment and improvement payments. After 18 months, the scheme was changed from a bonus system to a penalty system where a fixed proportion of each hospital's income was withheld and paid only if quality thresholds were met.

⁷ Risk adjustment is often used to ensure patient and catchment factors are considered when measuring hospital peer performance. This helps avoid hospitals gaming the system by attracting relatively healthier cohort of patients.[26] Risk adjustment is unnecessary if measuring historical performance and population characteristics remain stable.[12]

Five selected schemes used relative targets (HACRP, AQNWE, PHQID, HVBP and HRRP) by comparing performance against hospital peers. HACRP defined its poorest performers as hospitals with HAC scores in the top 25 per cent nationally, which were penalised one per cent of their revenue. PHQID provided bonuses to the top 20 per cent of performers, and penalised the lowest 20 per cent of performers.

Other studies do not conclude whether absolute targets are better than relative performance targets.[8] While absolute targets are more transparent, easier to interpret, and less uncertain, they can suffer from a ceiling effect and may not be suitable for hospitals with different capacities to improve performance.[6],[12] Relative performance targets can ameliorate these limitations, thereby better encouraging low performing hospitals, although they may provide less ongoing information on whether a hospital is performing well if measured against its peers.[12]

Effectiveness

Objectives of the eight selected schemes varied considerably, along with their effectiveness (see Table 3.3). HACRP and HVBP had no effect on quality, PHQID and BPT had mixed effects, and AQNWE, HRRP, BPCI and OrthoChoice had some positive effects. Evaluations of HACRP concluded that removing reimbursement for ‘never events’ in hospitals (e.g., catheter infections), was unlikely to reduce event rates.[13]

Positive effects within some schemes (PHQID, AQNWE and HRRP) were generally small and dissipated over time. This may be due to short timeframes between implementation and evaluation.[34] One study suggests evaluations should be undertaken between 5 to 10 years after implementation to allow hospitals to change their workforce and infrastructure mix in response to incentives.[35]

There was little evidence that PROMs improved across the selected schemes. PROMs were measured for hip patients in OrthoChoice but without any observed change. Measuring and reporting PROMs was not mandatory in BPCI,[29] which led to potential bias in reporting. There were no evaluation results on whether PROMs improved for AQNWE or HVBP.

PREM effectiveness also varied. OrthoChoice positively impacted patient experience,[30] whereas AQNWE and HVBP showed no improvement.[25] OrthoChoice resulted in a mixed provider experience, with providers supporting the scheme but highlighting the increased administrative burden.[30]

Other systematic literature reviews that highlighted evaluations with a control found outcomes based funding model schemes were less effective.[25] Hospital performance improved before some schemes were introduced, suggesting hospitals acted on forward looking expectations.[6]

One study suggests variation in effectiveness is due to differences in patient and catchment factors, organisational structure and capabilities, and scheme design characteristics. It suggests hospitals serving more disadvantaged populations faced worse financial consequences from outcomes based funding model schemes, due to lower baseline quality performance and inadequate risk adjustment.[26]

Table 3.3: Summary of effectiveness and unintended consequences

| Scheme | Effectiveness | Unintended consequences |
|--|---|--|
| Hospital Acquired Conditions Reduction Program (HACRP) | <ul style="list-style-type: none"> No evidence of any measurable effect on central catheter-associated bloodstream infections and catheter-associated urinary tract infection rates.[15] Not reimbursing hospitals for ‘never events’ was unlikely to reduce the incidence of such events.[16] | <ul style="list-style-type: none"> May have changed coding practices to reduce reported HAC events.[15] Medicare non-payment policy resulted in greater organisational awareness and reported improvements in process measures.[16] |
| Advancing Quality in the North West of England (AQNWE) | <ul style="list-style-type: none"> The introduction was associated with a clinically significant reduction in mortality.[18] Compared with a similar US program (PHQID), the UK program had larger bonuses and a greater investment by hospitals in quality-improvement activities.[18] Short-term improvements in quality measures were sustained in the long term, but relative reductions in mortality over the long term for conditions linked to financial incentives were not maintained.[17] The incentive was changed from bonuses for good performance to withholding a percentage of reimbursement for poor performances, which may have impacted results.[17] | <ul style="list-style-type: none"> Potential positive spillover effects in care quality to control hospitals and, within participating hospitals, from conditions linked to incentives to those not linked to incentives.[17] |
| Premier Hospital Quality Incentive Demonstration (PHQID) | <ul style="list-style-type: none"> Results from initial studies of Phase 1 implementation were promising: two studies reported that participating hospitals experienced modestly greater rates of quality improvement for process of care measures for each of the incentivised diagnoses examined in the first three years of the program.[35] Another evaluation found no evidence of effectiveness.[36] Detailed re-analyses of the initial data suggested that early program success may have been due to selection of stronger hospitals into the program. A later slowdown in improvement may have resulted from many of the incentivised performance measures becoming ‘topped out’.[8] | <ul style="list-style-type: none"> Control hospitals demonstrated significant quality improvement. While the cause is unknown, it was suggested that the Medicare public reporting initiative had a role.[37] |
| Hospital Readmissions Reduction Program (HRRP) | <ul style="list-style-type: none"> Readmissions among Medicare patients decreased sharply for approximately two years after implementation. Improvements continued, but at a substantially lower rate.[38] | <ul style="list-style-type: none"> Hospitals may have recoded patients with potential readmission to observation codes, but there is no conclusive evidence.[38] Hospitals servicing low SES populations were disproportionately impacted by penalties due to lack of risk adjustment.[39] |

| Scheme | Effectiveness | Unintended consequences |
|--|---|---|
| Hospital Value-Based Purchasing (HVBP) Program | <ul style="list-style-type: none"> No improvements in clinical care processes or patient outcomes.[40] Did not decrease mortality or improve patient experience.[41] No effects on quality after first year.[42] | <ul style="list-style-type: none"> Safety net hospitals were more likely to be negatively impacted financially.[43] |
| Best Practice Tariffs (BPT) for NHS Hospitals | <ul style="list-style-type: none"> Positive effect on day surgery rates for cholecystectomy within the first year, however no impact on quality of care for stroke.[27] Providers responded to BPTs, but changes to pathways took time to be implemented, which may explain the absence of a beneficial effect.[27] For hip fracture there was a positive effect on surgery times, a fall in mortality rates and an increase in the number of patients discharged to the usual place of residence.[44] | <ul style="list-style-type: none"> Different tariff structures within the stroke and hip fracture BPTs created different effectiveness.[44] |
| Bundled Payment for Care Improvement (BPCI) Initiative | <ul style="list-style-type: none"> Evaluations showed decreased Medicare episode payments with no changes in claims-based quality outcomes measures.[45] Three evaluations found reduced costs, LOS and discharge to skilled care facilities. One also saw reduced catheter-associated urinary tract infections, reduced 30-day readmissions and improved patient experiences. Another additionally found reduced all cause readmission rates and 90-day costs.[46] | <ul style="list-style-type: none"> Deemed unattractive for low-cost and high-performing hospitals with little room for improvement to offset operational costs after the mandatory 2–3% discount to CMS.[29] Potential participation bias due to target prices and bonuses mainly based on improvement over past performance.[29] |
| Choice of Care in Hip and Knee Replacements (OrthoChoice) [30] | <ul style="list-style-type: none"> Risks of complications and reoperations were significantly reduced. Reduced length of stay. Reduced waiting times and equally improved access to care for all patients. Reduced costs over the full cycle of care (total costs fell despite increase in volume). Only marginal PROMs improvement for patients undertaking hip surgery. | <ul style="list-style-type: none"> Increased administrative burden. Increased capacity to conduct more complicated procedures, better access for sicker patients and opportunity to improve acute care. |

Notes: CAUTI = catheter-associated urinary tract infections; CMS = Centers for Medicare and Medicaid Services; HAC = hospital acquired condition; LOS =Length of stay; PREMs =patient reported experience measures; PROMs =patient reported outcome measures; SES = socioeconomic status.

Source: MUCHE.

The impact of hospital baseline performance on effectiveness is unclear. One study suggests low baseline performers should perform worse given they may experience greater costs to improve performance,[26] while others argue low performers may have 'low hanging fruit', with some evaluations of US Medicare's hospital outcomes based funding model schemes showing a significant reduction in hospital readmissions for hospitals performing poorly at baseline.[12]

Teaching hospitals have performed worse in outcomes based funding model schemes, although the reason is unclear. Information technology has not significantly impacted effectiveness and there are conflicting results for prior experience with performance improvement programs, staffing levels and financial strength.[26] Hospital competition was not found to impact effectiveness, despite the suggestion that schemes should be more effective in markets with less competition.[26]

There is some uncertainty whether outcomes based funding model schemes incentivise transitory actions or investment activities. If transitory actions occurred (e.g., employing temporary labour), improved quality may fall when incentives are removed. If investment activities occurred (e.g., new infrastructure), improved quality may remain when financial incentives are removed.[19]

One systematic literature review has concluded the relationship between scheme effectiveness and design characteristics are generally weak due to three potential reasons.

- Schemes are implemented within a rapidly changing hospital environment, including other quality improvement programs such as performance benchmarking and electronic decision support, limiting the potential to demonstrate incremental benefits.
- Designing schemes is complex, with each essentially built from scratch without opportunity to test alternative design characteristics before implementation.
- Hospital support is often lacking, as schemes may impose an additional administration burden in collecting and processing data, and can threaten clinical autonomy.[25]

Another study has suggested that limited scheme effectiveness may result from using financial incentives to motivate an intrinsically valuable activity, as financial incentives have been found to undermine intended behaviour for those undertaking complex cognitive tasks.[6]

Cost effectiveness

Only one evaluation estimated the cost effectiveness of a selected scheme. It concluded AQNWE was cost effective, leading to a reduction of 649 deaths, a gain of 5,227 Quality Adjusted Life Years (QALYs), and 22,082 fewer days in hospital. Savings were estimated to be £110 million, compared to £13 million in administration costs.[19]

One systematic literature review of outcomes based funding model schemes found little evidence of cost effectiveness, although most evaluations only undertook partial evaluations and failed to capture all relevant costs.[48] While evaluations account for incentive costs, there has been less measurement of development costs, administration costs, participation costs for providers, and cost savings from improved health outcomes.[19] Opportunity cost estimates have also been excluded, although studies have used a cost-effectiveness threshold to reflect opportunity cost. One study suggests provider perspectives should be considered to highlight whether the program may reduce provider sustainability even if cost effective from the payer's perspective.[19]

Unintended consequences

Unintended consequences may occur within a hospital outcomes based funding model scheme given hospital performance is being measured within a complex system with imperfect data. One study grouped these unintended consequences into four categories, including:

- poor measurement (e.g., measurement fixation);
- misplaced incentives and sanctions (e.g., overcompensating behaviour);
- breach of trust (e.g., misrepresenting data); and
- politicisation of performance systems (e.g., political grandstanding).[32]

There was limited evidence to suggest unintended consequences were widespread within selected schemes. Some of this may be explained by scheme evaluations not explicitly searching for unintended consequences,[6],[32] and the immaturity of schemes when evaluations took place.[29, 49]

Some unintended consequences were identified within selected schemes. Negative unintended consequences included changing coding practices to reduce reported HACs and readmissions (e.g., HRRP, HACRP), an unfair scoring system due to inadequate risk adjustment (e.g., HACRP), and hospital selection bias (e.g., PHQID). Positive unintended consequences included improved quality within hospitals not participating in the scheme (e.g., AQNWE), driven by competitive pressure.

Other systematic literature reviews have not found widespread unintended consequences. Those found include cherry picking less complex patients, refusing to treat minority patients, and inaccurately reporting outcome measures.[7] Selection of high-cost and low-performing hospitals was raised as a concern for bundled payment schemes.[29] Other concerns included patient selection due to inappropriate risk adjustment, high performing hospitals taking advantage of potential margins, and smaller institutions shying away from bundled payment models due to financial uncertainties.[29]

Key design characteristics

Many stakeholder perspectives and trade-offs must be considered when designing a hospital outcomes based funding model scheme. Hospitals must also have clinician support to be successful, despite many hospitals facing different workforce cultures, patient populations, and capacity to invest in organisational and infrastructure change.[8]

Conclusions on the relationship between design characteristics and effectiveness are weak. Evaluations have not captured the interaction between design characteristics and context, nor measured a change in one design characteristic while holding all others constant.[26] Most evaluations focus on patient and provider characteristics given there is greater variation within schemes

Despite the difficulties evaluations have faced in separating the impacts of individual scheme characteristics on effectiveness, two studies have recommended criteria to improve the chances of success. One study suggests:

- select performance targets based on prior performance, and capacity to improve performance within the constraints of the provider;
- use process measures and intermediate outcome measures (risk adjusted) as targets;
- engage stakeholders throughout the design, implementation and evaluation stages;

- ensure the scheme is implemented uniformly across providers;
- reward both quality improvement and quality achievement; and
- distribute incentives at the individual and/or team levels, recognising the increased difficulty in measuring performance at these levels due to smaller samples.[31]

Another study developed a modified list of seven criteria deemed 'best practice' for designing outcomes based funding model schemes.[8] It suggests changing three recommendations within the list above, including the following.

- Remove the need to use both process and intermediate outcome measures, recognising that process improvement may be easier to measure and attribute to behavioural change.⁸
- Replace the need to engage stakeholders throughout the design, implementation and evaluation stages, with the need to promote widespread awareness of the campaign.
- Remove the need to distribute incentives at the individual and/or team levels, depending on the behaviours the scheme is trying to change.

Tailoring design characteristics to different types of hospitals may also improve effectiveness.[8]

Implementation

Studies have also explored characteristics leading to successful implementation of schemes. Policy makers must develop clear objectives, based on the health care system context, structural limitations of hospitals, and the needs of policy makers. Performance targets and financial incentive structures should be agreed between providers and policy makers.[6]

One study suggests hospitals should be given support to change staffing mix, improve team functioning, use of quality improvement tools and infrastructure support (e.g., information technology and decision support systems), although this was not supported by empirical evidence.[31] Some schemes have suffered from a lack of leadership commitment, with doubts on whether financial incentives can improve outcomes. Effective leadership is therefore required for successful implementation, including commitment from hospitals to scheme objectives.[7]

Successful implementation also requires clinical and management leaders acting as champions to usher in implementation (when the administrative load is more burdensome), and provide educational resources for hospitals and training for staff.[7] One study suggests clinicians should be consulted in scheme design to generate buy-in and greater adoption, and to avoid the perception that behaviours are being imposed on clinicians from the top down.[6]

⁸ Outcome measures are best suited to measuring the quality of homogenous procedures that strongly impact health outcomes.[50]

4. Outcomes based funding for NSW public hospitals

Outcomes based funding model schemes are being used in healthcare systems around the world, despite their limited success to date. Some schemes have shown modest improvements in quality, with research suggesting schemes must be uniquely developed around a specific objective and hospital operating context. This chapter outlines the potential to use an outcomes based funding model scheme within the NSW public hospital system, and potential barriers for success.

Alignment with NSW government objectives

Governance and funding for NSW public hospitals have undergone significant change recently, with the introduction of the National Health Reform Agreement (NHRA) in 2011 and subsequent changes to governance structures through the formation of local health districts (LHDs), and the introduction of activity based funding (ABF) in 2014.

The NSW Ministry of Health has since improved funding and performance frameworks, moving towards an activity based management (ABM) approach whereby the annual mix and volume of services are negotiated with LHDs to achieve objectives set out in the NSW State Plan and NSW Health State Plans.

The NSW ABM model is also underpinned by other policy levers. These are outlined within LHD Service Agreements, including a performance management framework that contains a suite of performance metrics across service priorities set by the NSW government.

While the NSW government has performance review meetings and escalation methods embedded in Service Agreements, there is no formal relationship between performance metrics and the annual level of funding allocated to LHDs. However, the NSW Ministry of Health has used activity adjusters to promote better performance in unplanned readmissions and potentially preventable hospitalisations.

The NSW Ministry of Health is also exploring alternative pricing arrangements to blend with their ABM model, including best practice pricing and normative pricing. Best practice pricing establishes a care pathway considered best practice, and providers are paid to adopt the model, rather than reaching performance targets. Normative pricing introduces incentives to shift the pattern of care, for example, to the community rather than hospital.[51]

While evidence is still being collected, evaluations from the UK's Best Practice Tariff (BPT) scheme (which includes best practice pricing and normative pricing) suggest these approaches can improve health outcomes and process measures, and are generally supported by clinicians. However, evidence on their effectiveness is mixed across different conditions, with some hospitals experiencing no improvements in health outcomes (e.g., stroke). Some problems include low uptake by providers,

difficulty in defining 'best practice' and poor data quality. There are also potential unintended consequences.[52]

Given some limitations associated with ABF, and the innovation and willingness the NSW Ministry of Health has already demonstrated in continually developing the ABM model, further use of an outcomes based funding model scheme to enhance the ABM model could potentially align with NSW Ministry of Health and NSW government objectives.

Can outcomes based funding model schemes improve value in NSW?

The NSW Ministry of Health is currently pursuing value based health care (VBHC) by reorganising services that will improve health outcomes that matter to patients, improve the experience of receiving and providing care, and improve the effectiveness and efficiency of care.⁹

While outcomes based funding model schemes are used to pursue a broad range of objectives, most focus on improving health outcomes and efficiency. Few schemes aim to explicitly improve patient experience, although patient experience has been incorporated into composite performance measures.[40]

No evaluations of selected schemes outlined impacts on providers. However, one systematic literature review suggested health care leaders perceive few benefits associated with hospital outcomes based funding models compared to ABF.[7]

Potential barriers for outcomes based funding model schemes in NSW

Conclusions cannot be made on whether the current ABM model should be extended to include outcomes based funding model schemes to support initiatives of the NSW Ministry of Health and NSW government.

Research on ABF models used in other countries suggests their capacity to improve some objectives is limited. ABF does not provide an explicit incentive to improve care quality, and can reward poor health outcomes through greater volumes (albeit below the negotiated volume cap). In addition, ABM does not provide an incentive for improved patient and provider experience.

The NSW Ministry of Health has refined the traditional ABF model through volume management, and the reliance on performance management frameworks contained within LHD Service Agreements, which could mitigate some limitations. However, there is no focus on patient reported outcome measures (PROMs) or patient reported experience measures (PREMs).

⁹ See www.health.nsw.gov.au/value, accessed 17 December 2018.

Results from this study suggest an outcomes based funding model scheme may improve ABM arrangements, although the evidence is weak, there is a significant risk of failure, and may not be cost effective. Questions to address include:

- Who's performance should be measured (e.g., the hospital or individual clinician)?
- What performance should be measured (e.g., process measures, PROMs or PREMs)?
- How should financial incentives be structured (e.g., rewards vs penalties, incentive size)?[54]

While evidence is still being collected on bundled payment models, challenges already identified include significantly high administrative costs, defining care bundles with clinicians, increased risk for cherry picking (given financial risk is transferred to providers), and the potential for monopoly markets to develop as dominant providers emerge in local markets.[55]

Implementation of an outcomes based funding model scheme in NSW is likely to be challenging. Approaches potentially useful for implementation include clinical engagement, investment in data management and IT infrastructure, trusted risk adjustment to outcome measures, and creating appropriate signals from hospital executives to clinicians. Other key criteria include committed leadership to achieve positive outcomes, adequate resources to support implementation, and strategies to reduce impacts from potential unintended consequences.[7]

Hospital outcomes based funding model schemes are complex, varying across the number and type of outcomes used, size and type of incentive structures, and the frequency of payment. These interact uniquely with patient and hospital characteristics, the type of setting (primary vs hospital care) and workplace culture.[33]

Evaluating scheme effectiveness requires varying design characteristics while keeping constant patient characteristics, organisational structure and capabilities, and scheme design characteristics. Scheme characteristics should be changed one at a time, while holding other characteristics constant, to minimise any confounding effects.[26]

However, evaluations do not adequately attribute effectiveness to schemes due to the complex interaction of design characteristics with context, and the observational nature of studies. Controlled before and after studies also suffer from limitations because patients and hospitals within intervention groups are often different from those in control groups, with limited opportunity to account for those differences due to data limitations.[25]

There has been little evaluation of how financial incentives transfer from hospital management to clinicians within hospital outcomes based funding model schemes, nor how extrinsic financial incentives motivate intrinsically valuable outcomes, particularly within complex organisations that use teams, such as hospitals.[6]

There have also been few cost effectiveness evaluations of outcomes based funding model schemes. Considerable design, implementation and administration costs within an outcomes based funding model scheme, and their opportunity costs, have not been properly considered. Uncertainty exists on whether introducing a hospital outcomes based funding model scheme would be cost effective compared to performance benchmarking, clinical quality registers and best practice guidelines.[51]

If an outcomes based funding model scheme was developed for NSW public hospitals, it should be trialled and evaluated using intervention and control groups. The evaluation should focus on health outcomes, cost effectiveness, and unintended consequences. It should allow for potential learning effects over the adoption phase, and identify potential areas for further improvement.

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Appendix A – Protocol

Review question

A literature review was undertaken to research hospital outcomes based funding model schemes used in other health care systems, which are relevant to the NSW public hospital system. The literature review question was:

Do hospital outcomes based funding model schemes improve value relative to activity based hospital funding models?

The objectives of the literature review were to identify:

- existing international funding models or approaches to funding hospitals on the basis of value based health care;
- the effectiveness of these funding models in achieving their intended objectives;
- the risks and unintended consequences of such outcomes based funding models; and
- design features of the outcomes based funding models considered critical for effectiveness.

Definitions

An outcomes based funding model scheme was defined as a direct payment for improved outcomes, whether through clinical outcomes, patient reported outcome measures (PROMs), process measures used as proxies for health outcomes, or a combination of these.

This definition included payment for performance (P4P) models, where performance is defined around outcomes and payment is made after achieving that outcome threshold. The definition also included bundled payment models, where a provider receives funding for an entire episode of care, and not just components within that episode.

Inclusion and exclusion criteria

Table A.1 summarises the inclusion and exclusion criteria used for the literature review. Systematic literature reviews were used to identify articles on outcomes based funding model schemes that are relevant to the NSW public hospital context. Schemes were included if they were:

- funded by one single payer,
- implemented across many hospitals;
- ABF operated prior to, or in combination with, the scheme; and
- had been operating for more than three years.

Schemes were excluded if their evaluations did not employ a control, or if their evaluations had been conducted prior to 2000.

Table A.1: Inclusion and exclusion criteria

| Area | Inclusion | Exclusion |
|---------------------------|--|---|
| Study design | Randomised Control Trials Before/after studies with control | No control |
| Methodology / perspective | Quantitative Qualitative | Expert opinion |
| Publication | Full text peer-reviewed articles | Opinion pieces Editorials Abstracts only Comments Grey literature |
| Setting / Context | Hospital setting High income countries ^(a) | Primary care Community care Middle and low income countries |
| Funding models | Pay for performance Bundled payments Fee for service Activity based funding Payment by results Case-mix funding Diagnosis-related group payments | Accountable Care Organisations Block funding Capitation Case-based funding Per diem funding Models to reduce cost only |
| Years | 2007 to 2017 | Published before 2007 Evaluations conducted before 200 |
| Language | English | Non-English |

Note: (a) World Bank 2017 list.

Search strategy

Databases searched

Databases searched included PubMed and Econlit.

Search terms

Search terms used to extract articles are listed below.

1. Value based purchasing [tw]
2. Pay for performance [tw] OR P4P [tw]
3. Outcome* based funding [tw]
4. Performance based funding [tw]
5. (Value based healthcare [tw] OR value based health care [tw] OR VBHC [tw])

6. (Bundled payment* [tw] OR episode-based payment* [tw] OR episode payment* [tw] OR episode-of-care payment* [tw] OR case rate [tw] OR evidence-based case rate [tw] OR global bundled payment* [tw] OR package pricing [tw] OR packaged pricing [tw])
7. (Hospital [tw] or hospitals [tw])
8. Elective surgery [tw]
9. #1 OR #2 OR #3 OR #4 OR #5 OR #6
10. #7 OR #8
11. #9 AND #10

Data extraction categories

A systematic data extraction process was undertaken to ensure the same type of data were extracted from each article (see Table A.2). Where information on scheme characteristics were missing, further research was undertaken by reviewing additional grey literature and websites to complete the data extraction.

Table A.2: Data extraction categories

| Area | Description |
|---|--|
| Reference | Author, title, year |
| Countries | Countries included in the review |
| Setting | Description of hospital setting |
| Publication type | Systematic review, review |
| Type of funding model/s | Pay-for-performance, bundled payment |
| Schemes | Schemes evaluated in the review |
| Citation | Citation of schemes |
| Study design | Randomised Control Trials, Before/after with control |
| Design characteristics | Scheme objectives Number of hospitals within the scheme Years the scheme has been operating Country of operation Funder Types of outcome measures Size of incentive Reward vs penalty Absolute vs relative targets Design of rewards/penalties Size of payments Outcomes measures linked to funding model |
| Interaction with other funding models | Interaction with fee for service models or activity based funding or not reported. |
| Effectiveness delivering outcomes designed to achieve | The extent to which outcomes based funding models have been successful in achieving improved hospital efficiency and quality |
| Unintended consequences | Observed and/or discussed |
| Critical design feature that impacted success / failure | Control group, measurements used, size of the intervention etc. |
| Implementation level | Patient Disease System |
| Other | Definition of value Author's conclusions References to other relevant studies Additional notes by review authors Transferability of results |

Note: (a) Using the World Bank 2017 list.

Appendix B – Evaluations

Table B.1: Quality of evaluations for the eight selected schemes

| Scheme | References | Evaluation focus | Study design |
|--|-----------------------|--|---|
| Hospital Acquired Conditions Reduction Program (HACRP) | Lee, 2012 [15] | Changes in patient outcomes (reduced hospital acquired infections) | Before and after design comparing targeted outcomes with non-targeted outcomes adjusting for baseline trends |
| | Kawai, 2015 [16] | Changes in patient outcomes reflected in billing rates | Before and after design comparing billing rates for targeted and non-targeted conditions with control variables |
| Advancing Quality in the North West of England (AQNWE) | Sutton, 2012 [18] | Changes in patient outcomes (30-day mortality); short term effects | Before and after design with control hospitals |
| | Kristensen, 2016 [17] | Changes in patient outcomes (30-day mortality); long term effects | Before and after design with control hospitals |
| Premier Hospital Quality Incentive Demonstration (PHQID) | Grossbart, 2006 [36] | Changes in clinical process and patient outcomes | Before and after design with control hospitals |
| | Glickman, 2007 [56] | Changes in clinical process and patient outcomes | Observational patient-level analysis with control hospitals |
| | Lindenauer, 2007 [37] | Changes in clinical process and patient outcomes | Before and after design with control hospitals |
| | Ryan, 2009 [35] | Changes in patient mortality, cost and outlier classification | Before and after design with control hospitals |
| | Ryan, 2012 [8] | Changes in clinical process and patient outcomes | Before and after design with control hospitals |
| | Jha, 2012 [57] | Changes in clinical process and patient outcomes | Before and after design with control hospitals |
| | Kruse, 2012 [58] | Changes in costs | Before and after design with control hospitals |
| | Shih, 2014 [59] | Changes in surgical mortality, complications rates following phase 2 incentive design changes | Before and after design with control hospitals |
| Hospital Readmissions Reduction Program (HRRP) | Gilman, 2014 [39] | Changes in patient outcomes in safety net hospitals compared to other hospitals | Before and after design with control hospitals |
| | Shih, 2015 [60] | Changes in patient outcomes and comparative performance of minority serving hospitals v. other hospitals | Analysis of observed-to-expected readmission ratios |
| | Desai, 2016 [38] | Changes in readmission targets for target and non-target conditions | Before and after design with control hospitals |

| Scheme | References | Evaluation focus | Study design |
|---|----------------------|---|---|
| | Zuckerman, 2016 [61] | Changes in readmission targets for non-target conditions | Before and after design with control hospitals |
| | Wasfy, 2017 [62] | Changes in patient outcomes and performance improvement of low performing hospitals compared to high performing hospitals | Before and after design with control hospitals |
| Hospital Value-Based Purchasing (HVBP) Program | Ryan, 2013 [43] | Changes in hospital payments | Observational study without control variables |
| | Gilman, 2014 [39] | Changes in patient outcomes in safety net hospitals compared to other hospitals | Before and after design with control hospitals |
| | Ryan, 2015 [42] | Changes in clinical quality and patient experience during initial implementation period | Observational study with control variables |
| | Figuroa, 2016 [41] | Changes in patient outcomes | Before and after design with control hospitals |
| | Ryan, 2017 [40] | Changes in patient outcomes | Before and after design with control hospitals |
| Best Practice Tariffs (BPT) for NHS Hospitals | McDonald, 2012 [44] | Changes in clinical process and patient outcomes | Before and after design with control hospitals |
| | Allan, 2016 [27] | Changes in clinical process and patient outcomes | Before and after design with control hospitals |
| Bundled Payment for Care Improvement (BPCI) Initiative | Froimson, 2013 [63] | Descriptive overview of scheme | Not applicable |
| | Navathe, 2017 [46] | Changes in quality, hospital costs and post-acute care spending | Before and after design without control hospitals |
| | Dummit, 2016 [45] | Changes in quality and Medicare payments | Before and after design with control hospitals |
| Choice of Care in Hip and Knee Replacements (OrthoChoice) | Wohlin, 2016 [30] | Effects of the reform from a patient value perspective Changes in costs, quality and processes | Before and after design with control hospitals |

Source: MUCHE.