

A Literature Review on Integrating Quality and Safety into Hospital Pricing Systems

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Kathy Eagar

Jan Sansoni

Carol Loggie

Anne Elsworthy

Jenny McNamee

Rebecca Cook

Pam Grootemaat

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Glossary of Terms

ABF	Activity Based Funding
ABF/ABM	Activity Based Funding and Management
ACA	Affordable Care Act
ACE	Angiotensin-Converting Enzyme
ACHS	Australian Council of Healthcare Standards
ACSQHC	Australian Commission on Safety and Quality in Health Care – the Commission
AIHW	Australian Institute of Health and Welfare
AMI	acute myocardial infarction
AQ	Advancing Quality Initiative
Aus	Australia
BADS	British Association of Day Surgery
BC	British Columbia
BCBSM	Blue Cross Blue Shield of Michigan
BC-P4P	Breast Cancer Payment for Performance
BPR	Business Process Re-engineering
BPT	Best Practice Tariffs
CABG	Coronary Artery Bypass Graft
CHF	Congestive Heart Failure
CHI	Centre for Health Improvement
CIIP	Clinical Improvement Integration Program
CMO	Chief Medical Officer
CMS	Centers for Medicare and Medicaid Services
COF	Condition Onset Flag
COPD	Chronic Obstructive Pulmonary Disease
COS	Composite Outcome Score
CPI	Clinical Practice Improvement
CPIP	Clinical Practice Improvement Payment System
CPS	Composite Process Score
CQI	Continuous Quality Improvement
CQS	Composite Quality Score
CQUIN	Commissioning for Quality and Innovation Payment Framework
CS	Composite Score
DRG	Diagnosis-related-groups
DRG-PPS	Diagnosis Related Group based Prospective Payment System
ED	Emergency Department
eLMS	Enterprise Liaison Medication System
EQ-5D	European Quality of Life-5 Dimensions
GP	General Practitioner
HAC	Hospital Acquired Condition
HAPI	Health Activity Purchasing Intentions
HRG	Health Related Group
IAHP	Independence at Home Demonstration Project

ICD-9-CM	International Classification of Diseases, Ninth Revision, Clinical Modification
IHI	Institute for Healthcare Improvement
IHPA	Independent Hospital Pricing Authority
IPPS	Inpatient Prospective Payment System
ISO 9001	International Organisation for Standardization – Quality Management Systems Requirements
LHD	Local Health District
LHN	Local Hospital Network
MassHealth	Massachusetts Health
MedPAC	Medicare Payment Advisory Commission
NCCC	National Casemix and Classification Centre
NEP	National Efficient Price
NHFD	National Hip Fracture Database
NHI	National Health Insurance
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
NSQHS	National Safety and Quality Health Service Standards
P4P	Payment for Performance
P4P-DM	Pay For Performance - Diabetes Mellitus
PACS	Picture Archiving/Communication Systems
PbR	Payment by Results
PHA	Participating Hospital Agreement
PHQID	Premier Hospital Quality Incentive Demonstration
POA	Present on Admission
QALY	Quality-Adjusted Life Year
QIP	Quality Improvement Payments
QLD	Queensland
QuIP	Quality Improvement Program Western Australia
RRST	Radiology Reporting Signature Times
RTAT	Radiologist Report Turnaround Times
SCoH	Standing Council on Health
SEP	State Efficient Price
SQuIRE	Safety and Quality Investment for Reform
TB	Tuberculosis
TQM	Total Quality Management
UK	United Kingdom
US	United States
USA	United States of America
VTE	Venous-thromboembolism
WA	Western Australia

Executive Summary

This literature review is part of a larger work program being managed jointly by the Australian Commission on Safety and Quality in Health Care (the Commission) and the Independent Hospital Pricing Authority (IHPA). The purpose of this literature review is to review the evidence on existing mechanisms in operation which aim to integrate quality and safety into the pricing or funding arrangements for health care. This literature review will also inform a consultation paper that will explore the options the IHPA and the Commission may recommend to its boards for including quality and safety in its future iterations of the Pricing Framework for Australian Public Hospital Services. The focus of both this literature review and the subsequent consultation paper is on quality and safety in relation to pricing and not on quality and safety per se.

Given the limited time frame for this project, a rapid but rigorous search strategy (consistent with the conduct of systematic reviews) was used to identify literature related to integrating quality and safety into healthcare pricing or funding systems. The literature search included both peer reviewed Australian and international academic literature as well as material outside the academic literature such as government reports and web based information. It was limited to publications in English that could be accessed in the limited time frame.

Four overarching models are considered in this literature review. These are:

- Best practice pricing – i.e. evidenced based decisions on what constitutes “best practice” for treatment of a particular condition, then applying a price to the provision of this best practice package of service or model of care
- Normative pricing - i.e. use of price to influence the delivery of care (e.g. provide more in-home care for certain conditions)
- Quality structures pricing models – e.g. linkage of the accreditation standards to funding in the private hospital system
- Payment for Performance (P4P) or Safety and Quality pricing - i.e. linkage of quality, safety and funding through the imposition of financial incentives and / or disincentives for certain behaviours or outcomes

In addition the use of information on performance (including casemix data) to drive safety and quality will also be considered.

There is a rich literature arguing the case that health care pricing models should reward quality and safety. Many of the arguments in this literature may be perceived as inherently appealing. However, while strong on argument, it was found that most of the literature is weak on evidence.

There is currently limited evaluation or published research data to support Best Practice Pricing. The few research studies report modest gains or a beset with methodological inadequacies (Casale et al., 2007; Kuo et al., 2011; Nahra et al., 2006). The most major scheme is the introduction of Best Practice Tariffs in England. Some initial findings from the National Hip Fracture Database in the UK (National Hip Fracture Database, 2012) show some improvements but there needs to be conclusive evidence that this approach is actually delivering meaningful gains in both safety and quality and that the scheme represents value for money in comparison to other potential incentive initiatives.

There is limited published data concerning the Normative pricing approaches. The use of normative approach by the National Health Service (UK) to incentivise day surgery procedures is yet to be evaluated. Queensland Health is proposing to introduce a similar strategy in 2012-2013 (Steele and Wright, 2012) and there are a number of new US initiatives to reduce readmissions and to provide greater home based care but these are only at their initial stages and will need to be evaluated. Some research studies examining normative approaches in the radiology area have

reported substantial improvements in performance (Andriole et al., 2010; Boland et al., 2010) although due to weaknesses in the research design the level of evidence is weak.

With regard to Quality Pricing Structures the most common approaches are accreditation, clinical quality registries linked to clinical benchmarking and other quality/safety improvement activities and the funding approach involves paying for participation in such activities. The most evidence for these approaches is to provide funding to allow clinical services to participate in clinical quality registries linked to clinical benchmarking (Birkmeyer and Birkmeyer, 2006; McNeil et al., 2010; Share et al., 2011). The evidence for this approach is strong in terms of achieving improvements in quality and safety. However, there is no direct evidence on the links between performance and the level of funding. Powell et al. (2008) note the lack of studies concerning cost effectiveness although the more recent study by Share et al. (2011) reports impressive savings for a clinical collaborative in Michigan although the cost for the initiative was also high.

With regard to incentive or pay-for performance schemes while there have been many research studies conducted on the Premier Hospital Quality Incentive Demonstration (PHQID) project in the USA there is no convincing evidence that demonstrates any beneficial outcomes that can be attributed to the program (Ryan 2009a; Jha et al., 2012). The most recent study (Jha et al., 2012) is the most definitive. It found no impact on patient outcomes for hospitals in the Premier pay-for-performance program compared with non-Premier hospitals. Thus, participation in the pay-for-performance was not associated with a decline in mortality above and beyond those reported for hospitals that participated in public reporting alone. No difference was found in outcomes even for conditions in which mortality rates were explicitly incentivised.

The Advancing Quality Initiative in England (see page 50) shows greater evidence concerning the reduction in short-term in-hospital mortality and improvement in hospital quality scores (Sutton et al., 2011; 2012). Some models implemented in other countries and locally also show some evidence but require more rigorous evaluation.

However, given the state of the evidence, a review paper on incentive systems (Glasziou et al., 2012) recently identified 9 key questions that need to be asked before the introduction of any incentive scheme designed to change clinician behaviour. These include:

Part A: Is a financial incentive appropriate?

- Does the desired clinical action improve patient outcomes?
- Will undesirable clinical behaviour persist without intervention?
- Are there valid, reliable and practical measures for the desired clinical behaviour?
- Have the barriers and enablers to improving clinical behaviour been assessed?
- Will financial incentives work, and better than other interventions to change behaviour, and why?
- Will benefits clearly outweigh any unintended harmful effects, and at an acceptable cost?

Part B: Implementation

- Are systems and structures needed for the change in place?
- How much should be paid to whom, and for how long?
- How will the incentives be delivered?

Appleby et al. (2012) indicate the same factors should be considered at a system level when considering the introduction of payment by results schemes. Many of these issues apply equally well to the other models discussed, including the imposition of disincentives.

Use of financial disincentives to drive quality/safety improvement appears to be gaining momentum. However these models have only recently been implemented or are still in development stages and there is currently little evidence regarding the outcomes of this approach (refer Section 7.9). While some conditions, such as those on 'never lists', can definitely be determined to be a complication of the patient's care, the categorising of many other conditions as

'hospital acquired' can be difficult (Fuller et al., 2011). Therefore, the complexities of classifying conditions as 'hospital acquired' is a significant consideration of a model that penalises for hospital acquired conditions.

Information on performance (including casemix data) can be used to drive quality and safety. Sutherland et al. (2011) report that some empirical work in Australia by Sharma (2007) suggests ABF may encourage hospitals to provide higher quality of care to reduce costly complications or readmissions. Implementation of ABF has also been associated with increased efforts to monitor hospital quality (Duckett, 1995; Ettelt et al., 2006) and the clinical and administrative data used to support ABF are being used for hospital quality improvement initiatives (McNair et al., 2009; Iezzoni 2009; Hagen et al., 2006).

An examination of the effects of the introduction of Activity Based Funding indicates there has been no reduction in hospital quality of care associated with ABF implementation (Sutherland, 2011). The incentives under ABF are for hospitals to decrease lengths of stay, increase volume and reduce cost but it is important that these gains are not made at the cost of a reduction in quality of care (Sutherland, 2011). There is little evidence for a decline in the quality or safety of care associated with the introduction of ABF with studies indicating mortality remains much the same or is slightly lower (Forgione et al., 2005; Louis et al., 1999; Moreno-Serra and Wagstaff, 2009). Readmission rates remain similar and hospital quality indicators have also shown no decline (Farrar et al., 2009; Jencks et al., 2009; Kahn et al., 1990; Kahn et al., 1993).

However, overall, it is noted that much of the current research literature reviewed reflects poor research designs with inadequate controls making attribution of the effects uncertain. The conclusion is that there is insufficient international evidence at present to support the 'off the shelf' adoption of any existing pricing model that incorporates financial incentives and/or sanctions for quality and safety.

The literature review provides evidence that a range of factors need to be considered in the implementation of any pilot scheme or field trial. These, in summary, are:

- Incentives need to be substantial if the model is to have any effect (Jha et al., 2012)
- Incentives need to be delivered to the level of the clinical department to have any effect (Glasziou et al., 2012; Jha et al., 2012; Ryan 2009; Stockwell, 2010; Sutton et al., 2011; 2012)
- The impact of any proposed model needs to be modelled and carefully evaluated both prior to and at regular intervals during implementation
- The impact analysis should include consideration of the potential for regional disparities, as there is some evidence in the literature that some payment for performance models have disadvantaged rural hospitals (Stockwell, 2010)
- Incentive structures need to focus on engendering improvement across all hospitals rather than just rewarding hospitals/services that are already performing well (Karve et al., 2008; Nicholas et al., 2011; Ryan 2009, Ryan et al., 2012; Van Herck et al., 2010)
- Potential perverse incentives need to be carefully considered (Sutherland, 2012; Glasziou et al., 2012) and
- Methodologies for risk adjustment need to be developed and incorporated (Sutherland 2012; Birkemeyer and Birkemeyer 2006; Ryan 2009; Ryan et al 2012)

These findings have important implications in the Australian context. The Independent Hospital Pricing Authority (IHPA) is determining the price that the Commonwealth pays Local Health Networks for the Commonwealth contribution to public hospital funding. The Commonwealth contribution is approximately 40% of public hospital funding and any incentive that the IHPA might build into the model would impact only on the Commonwealth contribution.

Further, the Commonwealth funding is directed to Local Health Networks (regional health authorities) rather than to specific hospitals or to clinical departments within hospitals. Based on

the evidence in the international literature (Jha et al., 2012; Ryan 2009; Sutton et al., 2011; 2012; Stockwell, 2010), it is unlikely that incentives built into the model at this level would work unless there was agreement for these incentives to flow down to the level of the clinical department.

Finally, the focus on traditional hospital activity (largely inpatient medicine and surgery) in P4P models has important implications in relation to allocative efficiency and in terms of incentives to develop new models of care. 'Best practice' and 'normative' pricing models are better than P4P in creating incentives for new models of care but, like P4P, most reported models are currently narrow in scope (refer Sections 4.5 and 5.7).

However, despite the limited evidence base, the concept of shifting the focus from cost to value for money may be perceived as inherently appealing and the idea of linking funding to quality and safety will continue to attract the interest of many stakeholders including consumers, clinicians and system managers. Accordingly, it is important that Australia learns the lessons of the international experience in considering how to progress this issue in the future.

In doing so, it is important to note that the strongest evidence overall on how to genuinely improve quality and safety exists for clinical quality registry and benchmarking systems (see page 30) and these systems typically have no evidence that examines links to funding at all. Instead, clinical quality registry and benchmarking systems use clinical registry data to compare the performance of providers, to identify best practice and to drive improvements in quality and patient outcomes. The evidence base for these models is stronger than for any reported funding model.

1 Introduction

This literature review is part of a larger work program being managed jointly by the Australian Commission on Safety and Quality (the Commission) and the Independent Hospital Pricing Authority (IHPA). The purpose of this literature review is to review the evidence on existing mechanisms in operation which aim to integrate quality and safety into the pricing or funding arrangements for health care. This literature review will also inform a consultation paper that will explore the options the IHPA and the Commission may recommend to its boards for including quality and safety in its future iterations of the Pricing Framework for Australian Public Hospital Services. The focus of both this literature review and the subsequent consultation paper is on quality and safety in relation to pricing and not on quality on safety per se.

The National Efficient Price (NEP) is now being used to determine the Commonwealth contribution to public hospital funding. The Commonwealth contribution represents approximately 40% of public hospital funding although the actual percentage varies by jurisdiction and by the proportion of public patients in each hospital.

The Commission and the IHPA have together established a Joint Working Party - Safety and Quality. The IHPA had already begun investigations of these issues including the commissioning of a broader literature review, of which quality and safety was only one small component (Health Policy Solutions, Casemix Consulting and Aspex Consulting 2012). The IHPA's first pricing determination did not incorporate adjustments for quality and safety but noted that further work would be required over time on this issue. This literature review forms an important part of that additional work.

Four overarching models are considered in this literature review. In *best practice pricing*, the price is based on a "best practice package of service or model of care". These packages are typically based on clinical pathways that are developed using both empirical evidence and expert opinion. Under this model, a standard price is set for the care that is specified in the pathway. The pathway itself is typically defined for a casemix class. The price can be prospectively determined and may be paid regardless of whether the care for any specific patient is actually provided in accordance with the pathway. Alternatively, the standard price may be set (usually reflecting average national cost) and the additional incentive is paid once all, or a percent (e.g. 80-90%), of best practice criteria have been shown to be met. In practice, such pathways exist only for a limited range of conditions and this is an important limitation when considering such a funding model.

Normative pricing, whereby the price is used to influence the delivery of care, also uses prospectively determined pricing. The goal is to provide incentives to deliver care that is defined as being inherently desirable and to create disincentives to deliver inappropriate care. Thus, for example, the price for a normal obstetric delivery can be set to make such deliveries slightly "profitable" while the price for an elective caesarean section can be set to make such deliveries slightly "unprofitable". In normative pricing the unit of purchase is again the casemix class and the price is often determined prospectively although in some cases a retrospective adjustment may be made for performance against the target. Normative pricing can also be used to create incentives to deliver care in alternate settings including outpatients and home care. The difference to BPP is that it incentivises particular activities (e.g. increase day surgery rates, reduce emergency department waiting times, reduce radiology turn around times) rather than it being tied to a detailed set of best practice guidelines developed for a particular disease. In practice, normative pricing can only be used when there is agreement about what constitutes desirable and undesirable care.

The third alternative for prospective pricing is to *link pricing to structural approaches to quality and safety* such as linking funding to accreditation or to participation in benchmarking activities. Under this approach, for example, accredited hospitals would be funded at a higher rate than non-accredited hospitals. In practice, most of these systems measure processes as proxies for patient

outcome rather than measuring patient outcomes directly and assume that good processes automatically result in good outcomes (Sutherland et al., 2011).

The final alternative is *Paying for Performance (P4P)* or “safety and *quality pricing*”. P4P aims to create a direct link between quality and safety on the one hand and funding on the other. Under these models good patient outcomes can be rewarded and / or poor patient outcomes can be penalised. As per the third prospective approach outlined above, the intention is to create incentives for good quality and disincentives for poor quality. The difference is that, in P4P, the price is adjusted retrospectively depending on the outcomes actually achieved for an individual patient. For example, an episode of care during which an adverse event occurs might be funded at a lower rate than a normal or unremarkable episode.

In practice, the concept of *P4P* or *safety and quality pricing* is inherently complicated from a technical perspective. In particular if the pricing model does not include risk-adjustment, it may create incentives to care for only low risk patients and to deny care to higher risk patients. Imagine the case of a rehabilitation unit that receives two patient referrals on the one day and only has one bed available. Patient A, despite having no risk factors, has experienced a stroke. Patient B is overweight and a heavy smoker and has also experienced a stroke. If the rehabilitation service will receive bonus payments for good outcomes and financial sanctions for poor outcomes, what incentive would they have to accept Patient B? While the intention of a P4P model is to provide incentives for good quality care, this example illustrates that it may also create incentives to select healthier (‘easier’) patients.

Further it is often technically complex to determine the onset of a particular health condition (Fuller et al., 2011; Provonost et al., 2008; Zhan et al., 2007). For example, take the case of a patient who develops an infection on day two of a hospital admission. Such an infection could have been ‘brewing’ prior to the admission. Equally the patient may have developed the infection in the 48 hours since admission. Recent work undertaken by the National Casemix and Classification Centre in relation to the revision of the Condition Onset Flag (COF) definitions is testimony to the technical complexity of these issues (AIHW, 2012).

In considering each of these four options, it is important to take account of the level at which the funding model actually works, as the context in which funding models operate is critical. The Independent Hospital Pricing Authority (IHPA) is determining a global price for a total quantum of activity delivered by a local health network or similar. It is not pricing the care of an individual patient, a specific clinical department or even an individual hospital. It is also not determining the payments made to individual clinicians.

The level at which the funding flows is critical because it directly influences whether any intended consequences are likely to be achieved. For example, *P4P* or *safety and quality pricing* would only have an impact if the local health network decided to use the same funding model to fund its individual hospitals or clinical units within individual hospitals. Even then, there is not a lot of evidence to suggest that hospital clinicians respond to such incentives when dealing with individual patients (Glasziou et al., 2012). This is in contrast to some evidence that exists in relation to fee-for-service medicine which suggests that pricing can affect some aspects of clinical practice at the level of the individual (Flodgren et al., 2011).

2 Methods

Given the limited time frame for this project, a rapid but rigorous search strategy (consistent with the conduct of systematic reviews) was used to identify literature related to integrating quality and safety into healthcare pricing or funding systems (refer Appendix 1). The literature search included both peer reviewed Australian and international academic literature as well as material outside the academic literature such as government reports and web based information. It was limited to publications in English that could be accessed in the four week time frame.

2.1 Electronic Database Searches

The following strategies were applied to identify published literature:

- Search of relevant bibliographic databases including Medline, Psycinfo, Cinahl, Scopus, EconLit and Cochrane Collaboration for original contributions and review papers;
- Using “snowballing” techniques including scanning references, using Google Scholar to identify citations and searching by key authors in the field;
- Communication with authors of relevant studies and other experts in the field, especially those who have carried out in-depth studies or systematic analyses in the field;
- Electronic searching of web based materials including identification of government studies, and reports, relevant review articles, and electronic citation searches including ISI web of knowledge.

Initial search terms included such elements as efficient pricing and hospital quality and safety, the integration of quality and safety into healthcare funding and pricing systems, activity based funding and pricing models (best practice, normative, structural/accreditation and safety and quality pricing models including pay for performance), funding incentives and hospital pricing, health funding reform. These search strategies were refined and elaborated during the course of the project.

Where peer-reviewed research evidence was available, the literature review included a summary of the key features of each study (e.g. research purpose, design, methods, findings and any identified problems with the study).

2.2 Identification of other published literature (non peer reviewed material)

Strategies for obtaining relevant research from the ‘grey’ or practice literature via the internet included the searching of grey literature electronic databases including the searching of relevant State and National Health Department sites, relevant health quality and safety conference sites, international health care and evidence based health care sites and Australian organisations concerned with patient safety and quality and health services research.

- Reports and articles available on the world wide web were searched through search engines;
- Authors who presented abstracts on topics during national and international conferences were contacted (where possible) to obtain information on their initiatives;
- Jurisdictional experts involved in the development and implementation of quality and safety related activity based funding initiatives were contacted where possible. This included writing to relevant contacts in each jurisdiction to request the provision of any relevant material.

For material relevant to the topic that was not peer-reviewed research, the literature review included a brief summary of information relevant to the key issues and questions of interest.

2.3 Inclusion and exclusion criteria

The scope of the review included Australian and international published literature regarding integrating quality and safety into healthcare pricing/funding systems. The cut off date for electronic searches was early October although a couple of articles that came to our attention after that time and have been incorporated.

Material from the last ten years was of primary interest to the literature review. However, where information from earlier literature was identified as relevant, this was pursued as necessary.

Although there is an extensive literature relating to normative models for encouraging best practice at the individual practitioner level in the primary care sector (e.g. GP payments in UK – paying for immunisation) this literature was excluded as the literature review focused on system level initiatives related to hospital pricing. However, if particular elements of a model were identified that may have been of particular significance in a broader context, they were included in the review.

Following the searches two staff independently rated the abstracts obtained as to their relevance to the research question (highly relevant/ relevant/ marginally relevant and not relevant). Where there was disagreement between staff on their ratings these abstracts were double checked and the reference obtained for further assessment as necessary. All articles with a rating of marginally relevant or above were retrieved.

An extensive bibliography is included in this report (see page 77). This includes many papers that were reviewed but not included in the body of the report. Papers were not included in the body of the report if they dealt only with quality/safety or funding (and not both). Papers were only included if they addressed the specific issue of the relationship between quality/safety and funding.

2.4 Review summaries

The literature was reviewed and classified based on various criteria as set out below.

Country of origin

1. Australia
2. New Zealand
3. USA
4. UK
5. Canada
6. International
7. Other (specify)

Area of focus

1. Acute care
2. Sub-acute care
3. Mental health care
4. Emergency care
5. Ambulatory care
6. Other (specify)

Strength of evidence

1. **Well-supported practice** – evaluated with a controlled trial (including cluster control) and reported in a peer-reviewed publication
2. **Supported practice** – evaluated with a controlled trial group and reported in a government report or similar
3. **Promising practice** – evaluated with a comparison to another comparable health system or service

4. **Acceptable practice** – evaluated with an independent assessment of outcomes, but no comparison group (e.g., pre- and post- comparisons, post-reporting only or qualitative methods only)
5. **Emerging practice** – evaluated without an independent assessment of outcomes (e.g., formative evaluation, qualitative evaluation conducted internally)
6. **Routine practice** (e.g., analysis of routine data)
7. **Expert opinion** (e.g., peak bodies, government policy, individual opinion pieces)

Level of health system

Each paper was classified according to the level of the health system that is being funded using the model being reported:

1. Funding goes to state/territory or similar
2. Funding goes to Local Health Network or similar
3. Funding goes to hospital or similar
4. Funding goes to clinical stream, speciality or department within hospital
5. Funding goes to individuals (e.g. clinicians) within hospital

Sector

1. Public
2. Private not for profit
3. Private for profit

Significance of impact/effect(s)

Is there evidence in the article of any actual improvements (positive) or unintended (negative) impacts or effects on quality and/or safety?

1. Conclusive – positive/negative
2. Inconclusive
3. No
4. Not applicable

What is the (self-reported) strength of any reported improvement?

1. High
2. Modest
3. Low
4. Not applicable

Is there evidence of service/system change?

1. Yes, short term
2. Yes, long term
3. No
4. Not applicable

Overall applicability to Australia and to IHPA pricing for ABF purposes

1. Yes

2. Yes, with caveat/s (e.g. incidental lessons learnt - with public reporting)
3. No

These features have been combined to produce five summary tables for each of the four models (or parts thereof). The tables incorporate additional features such as key points, the type of funding mechanism, the measures of quality/safety and the context and setting. These are outlined below:

Summary Table 1 Details

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
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Summary Table 2 Focus and context

Article name	Area of focus	Context and setting	Magnitude of the incentive
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Summary Table 3 Results

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
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Summary Table 4 Key points

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
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Summary Table 5 Evidence and applicability

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
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All leading evidence-based articles, review papers and relevant government reports consulted have been included in these tables which provide a useful summary of the relevant information pertaining to each of the models.

In addition to these, there is a significant literature outlining the personal opinion of many authors on the perceived advantages and/or disadvantages of linking pricing/funding to quality and safety. While some of these opinion pieces were reviewed as part of the current project, we limited the scope of the more systematic review to papers (both academic and practice) that purported to report on evidence rather than opinion.

3 Models for Integrating Quality and Safety into Health Care Pricing

Most of the models below which examine the integration of quality/safety into health care pricing are operating within the context of Activity Based Funding for hospitals. Activity Based Funding (ABF) (or case-based funding) funds hospitals on the basis of the type and volume of services they provide as well as patient characteristics. Diagnosis-related-groups (DRG) are used to classify and quantify hospital output and funding is tied to this. Each DRG represents a group of clinically similar patients whose costs are expected to be similar and each hospitalisation is assigned to a single DRG based on the patient's combination of procedures and diagnoses (Sutherland, 2011). Many countries have designed their own DRG system an example of which is the Australian AR-DRG system.

Fetter (1991), the originator of DRGs, intended to stimulate utilisation review in hospitals to allow better review and management of costs and care outcomes. There are economic incentives associated with ABF because efficient hospitals 'pocket' the difference between the payment amount and the hospital's actual cost of production. Sutherland et al. (2011) in a review of the effects of the introduction of ABF internationally, notes that by providing incentives for shorter

hospital stays, ABF was associated with increasing technical efficiency although the reduction in cost per discharge but was not associated with aggregate cost savings to the health care system due to increasing volumes of patients treated.

Appleby et al. (2012) note a number of adverse effects and limitations of ABF payment systems have been identified (increased hospital admissions, uncoordinated care across settings, under treatment, cost shifting, cherry picking and up-coding or misreporting). Many of these have been addressed by policy responses, refinements of the payment system or by contractual controls (e.g. audit). Appleby et al. (2012) note many countries are dissatisfied with the limitations of ABF for patients with chronic conditions and with multiple conditions and/or complex ongoing needs. A number of countries (e.g. USA, UK) are experimenting with 'bundling' payments across the continuum of care (Appleby et al., 2012; Sutherland et al. 2011) to address these issues. A number of these initiatives are reported in the sections below.

With regard to quality/safety the incentives under ABF are for hospitals to decrease lengths of stay, increase volume and reduce cost but it is important that these gains are not made at the cost of a reduction in quality of care (Sutherland et al., 2011). There is little evidence for a decline in the quality or safety of care associated with the introduction of ABF with studies indicating mortality remains much the same or is slightly lower (Forgione et al., 2005; Louis et al., 1999; Moreno-Serra and Wagstaff, 2009), readmission rates remain similar and hospital quality indicators have shown no decline (Farrar et al., 2009; Jencks et al., 2009; Kahn et al., 1990; Kahn et al., 1993).

Sutherland et al. (2011) report that some empirical work in Australia by Sharma, (2007) suggests ABF may encourage hospitals to provide higher quality of care to reduce costly complications or readmissions. Implementation of ABF has also been associated with increased efforts to monitor hospital quality (Duckett, 1995; Ettelt et al., 2006) and the clinical and administrative data used to support ABF are being used for hospital quality improvement initiatives (McNair et al., 2009; Iezzoni 2009; Hagen et al., 2006). A study from Norway indicated that the introduction of ABF was associated with improved patient satisfaction due to reduction in waiting times (Hagen et al., 2006).

Although these studies indicate there has been no reduction in hospital quality of care associated with ABF implementation many countries (e.g. UK, USA, Australia etc.) using ABF systems have become increasingly interested in trying further approaches that may stimulate quality and safety improvements in hospital care.

Four pricing models to integrate quality and safety have been considered in this literature review. These are Best Practice Pricing, Normative Models, Quality Structure Models and Safety and Quality Pricing. They are described in the sections below and the key initiatives and studies relating to these models are discussed. In practice the difference between some of these models is subtle, as for example between some pay for performance and best practice pricing studies. Some studies have mixed elements and therefore could fit in either model and in these cases the study has been allocated to the model that provides the closest fit.

Health Policy Solutions et al. (2011) also considers Best Practice Pricing to be 'normative' in the sense that the incentives used, like Normative Pricing, are used to drive changes in the pattern of care. However, Normative Pricing, although also based on information concerning the desirability of a pattern of care is usually set to incentivise, for example, higher rates of day surgery across a range of appropriate conditions. Within any health system it is likely that there will be components that relate to a range of the pricing models. For example the National Health Service (United Kingdom) includes components of Best Practice Pricing, Normative Pricing and Safety and Quality Pricing; the latter including both the use of incentives and disincentives.

4 Best Practice Pricing

Best practice pricing models involve an evidence based decision on what constitutes best practice for a treatment for a particular condition and then applying a price to the provision of this best practice pathway. The critical feature is that an evidence based best practice pathway is elaborated and payment is related to the adoption of the pathway rather than a diverse set of safety and quality indicators or relative hospital performance in relation to these. Another difference to other models described in further sections of this report (e.g. safety and quality pricing or pay-for-performance schemes) is that the incentive is for following the pathway. Payments are made where it can be verified that care has been delivered in accordance with the pathway. In contrast, many safety and quality pricing / pay for performance schemes only reward those hospitals that are performing in the top percentiles in what is often described as 'tournament-based pay'.

4.1 Best Practice Pricing (UK)

The National Health Service in England (Dept. Health 2011) has applied best practice tariffs (BPTs) for casemix payments for a range of conditions. Activity Based Funding in England is known as Payment by Results (PbR). It was initially phased in from 2004/5 to reduce waiting times, to increase activity and to increase financial discipline and transparency by NHS organisations (Appleby et al., 2012). The currency unit is the Health Related Group (HRG). A national fixed price or tariff for each HRG was established on the basis of the average level of costs for each HRG. Some variation in what hospitals receive compensates for 'unavoidable' cost variations due to regional variations (pay and price) as calculated by the Market Forces Factor (Appleby et al, 2012). A further adjustment was introduced to allow for the higher costs of services in specialist centres and has been refined over time (Appleby et al., 2012). Over time the proportion of activity included has risen and now represents about 60% of an average hospital's activity and comprises about 1,300 mandatory tariffs. As Appleby et al. (2012) indicate the Department of Health further reduces all tariffs each year to reinforce the cost-reducing incentives of a tariff fixed at average cost to improve efficiency. In order to reduce the risk that the reductions in tariffs would reduce the quality of care a number of changes have been made to explicitly promote quality of care. These include the introduction of Best Practice Tariffs, withholding funds for 'never events' (refer Appendix 2) and the introduction of the Commissioning for Quality and Innovation (CQUIN) payment framework (See Section 7.4.2) if providers meet specified standards for a range of services.

The services areas selected for Best Practice Tariffs were based on the following criteria:

- High impact (e.g. high volumes, significant variation in practice, or significant impact on outcomes)
- A strong evidence base and clinical consensus on the characteristics of best practice.

From 2010 prices for cholecystectomy (gall bladder removal), fragility hip fracture, cataracts and stroke are no longer funded based on the average cost. Instead, providers are paid according to the costs of 'excellent care' (Dept. of Health, 2010). A specific approach has been developed for each BPT, tailored to the clinical characteristics of best practice and the availability, quality and flow of data. Annex F of the Payments by Results Guidance for 2010-11 (Dept. Health, 2010) provides the supporting documentation and evidence for these best practice pathways and guidelines. From 2011/2012 best practice tariffs are to be extended to adult renal dialysis, interventional radiology, transient ischaemic attack, paediatric diabetes and primary total hip and knee replacements (Dept. Health, 2011).

As an example of a BPT, the fragility hip fracture BPT (Dept. Health, 2011) applies to a subset of patients aged over 60 admitted non-electively within the hip procedure for trauma Health Related Groups (HRGs)¹ where the following clinical conditions are met:

- (a) Time to surgery within 36 hours from arrival in an emergency department, or time of diagnosis if an inpatient, to the start of anaesthesia
- (b) Admitted under the joint care of a consultant geriatrician and a consultant orthopaedic surgeon
- (c) Admitted using an assessment protocol agreed by geriatric medicine, orthopaedic surgery and anaesthesia
- (d) Assessed by a geriatrician in the perioperative period (within 72 hours of admission)
- (e) Postoperative geriatrician-directed multi-professional rehabilitation team
- (f) Fracture prevention assessments (falls and bone health).

As Scott et al. (2011) indicate, incentives are applied to national fixed tariffs (based on the average cost of care) for particular HRGs and are mandatory for all hospitals. The previous national tariff has been replaced by a higher best practice tariff and a lower non best practice tariff. An additional payment applies on top of the appropriate base tariff if all (or an agreed target, for example, 90%) of the best practice compliance criteria are met.

In 2010-2011 the additional payment for fragility hip fracture was set at 455 pounds higher than the base tariff. In 2011-2012 this additional payment was doubled to 890 pounds and the base tariff was reduced by the same amount to strengthen the incentives for the adoption of best practice. As Scott et al. (2011) state, initially there may be real gains in income for commissioners and providers undertaking best practice but over time the base tariff will be reduced in line with the efficiency gain achieved. As the base tariff declines over time, this could also be viewed as a 'penalty for non performance' for those that have not adopted or achieved the target for the best practice pathway.

The BPTs are paid by commissioners to NHS trusts, NHS foundation trusts, independent sector extended choice networks and independent sector free choice network providers. How the trusts devolve the additional funding to the actual clinical areas concerned is unclear.

The payment by results (PbR) team has commissioned an evaluation of the 2010-2011 best practice tariffs (www.dh.gov.uk/health/2011/12/bpt-update/; Dept. Health, 2011) to inform future practice. Although currently scheduled for release, this publication is not yet available. The National Hip Fracture Database (NHFD), however, has produced a recent report (NHFD, National Report 2012). This indicates that there have been improvements since 2009/2010 in the percentage of patients given a falls assessment (from 24% to 43%), and having a pre-operative assessment by an orthogeriatrician (57% to 69%). More patients are also now discharged on bone protection medication (24% to 43%) and there is a lower rate for patient developing pressure ulcers (6% to 3.7%). More patients are also receiving surgery within 48 hours (from 75% to 83%) but in 2011 the rate was 87% so this recent drop is viewed as disappointing. Also the indicator relating to admission to the orthopaedic ward within 4 hours has dropped slightly (55% to 52%). Appleby et al. (2012) suggest that some of this change might be attributed to the publication and audit of standards.

Across the four quarters of 2011 57% to 71% of hospitals achieved the Best Practice Tariff and in 2012 this ranged from 77% to 87% which reflects the increasing number of hospitals taking part. This would suggest that overall the BPT is producing some improvements in the quality of care although the degree of improvement varies by indicator.

¹ HRGs are the UK equivalent to Diagnosis Related Groups (DRGs)

Each year draft guidelines and guidelines for the forthcoming year are published (Dept. Health, 2010) based on the review of operational findings for the previous period and these provide some details of the changes to the Best Practice Tariff system but do not comprise a formal or independent evaluation. An example of an outcome of this review process is the recent increase in best practice tariffs for fragility hip fracture and stroke which might suggest that the incentive needed to be strengthened in an endeavour to obtain the required performance across the indicators.

4.2 Participating Hospital Agreement (PHA) Incentive Program (US)

Blue Cross Blue Shield of Michigan (BCBSM) implemented a quality improvement incentive program for 85 participating Michigan hospitals as part of the Rewarding Results demonstration in the US. It is known as the Participating Hospitals Agreement (PHA) Incentive Program and this pay for performance program provides direct incentives to hospitals to increase adherence to health care related guidelines for two cardiac conditions - acute myocardial infarction (AMI) and congestive heart failure (CHF). It commenced in 2000 and was fully implemented in 2001 (Nahra et al., 2006; Reiter et al., 2006).

Hospitals are evaluated on:

- a) Provision of aspirin orders at discharge for AMI
- b) The prescription of beta-adrenergic blockers at discharge for AMI
- c) The prescription of angiotensin-converting enzyme (ACE) inhibitors at discharge for CHF

Hospital performance is defined as the proportion of all eligible patients who receive a particular treatment.

Incentive payments are calculated as a percentage add-on to a hospitals' inpatient DRG reimbursements and the maximum possible was 2% in 2003 (Nahra et al., 2006). By 2006 it had risen to 3-5% (BCBSM, 2006). The actual add-on is determined by multiplying the maximum possible add-on by the individual hospital's score. To receive any incentive payment from 2002 the hospital score had to reflect at least a threshold of the median performance level of all participating hospitals. Prior to 2002 a tournament-based pay scheme was utilised.

From 2004 (BCBSM, 2006) some changes were made to the scheme but the limited evaluation data pertains to the earlier stage of the scheme. Under the revised 2006 BCBSM incentive program, hospitals can earn an incentive of 3% of their combined inpatient and outpatient operating payments in the first year, up to 4% in the second year and up to 5% in the third year. Each hospital's incentive score is now based on a composite score of quality, patient safety and health of its community. From 2004 these components were weighted in forming the total score (quality 50%, safety 40%, health of community 10%)

As the scheme has evolved it has included incentives and associated indicators for the treatment of pneumonia, use of medication safety practices, surgical infection protection and the appropriate utilisation of high cost/ high variation surgical procedures (BCBSM 2006; Scott et al., 2011)

Nahra et al. (2006) undertook an evaluation of the costs of the incentive scheme and the improvements in compliance with heart condition care elements (see above) between 2000 and 2003. This study used a prospective observational design but had methodological weaknesses due to the lack of a control group and the absence of baseline data prior to the scheme's implementation. It used 2000 as their baseline year but at this time the hospitals were already enrolling in the scheme. As Scott et al. (2011) also suggest, this means the measure of effect over time is likely to be biased as trends in performance may have occurred in the absence of the scheme. Nahra et al. (2006) report that compared to 2000 data in 2003 the rate for appropriate use of aspirin had increased by 8%, use of beta-blockers by 12% and ACE inhibitors by 10%. They estimated that 24,418 patients had received improved care between 2001 and 2004 as part

of the PHA program. Four year incentive system costs were US\$22,059,383 and these included system administration costs.

Nahra et al. (2006) also examined the cost per Quality-Adjusted Life Year and estimated a relatively low cost per QALY (US\$12,967 for the lower estimate to \$30,081 for the higher estimate). The authors state that these figures are well below the then low value consensus estimate of \$50,000 to consider an intervention cost-effective. However, the reader should be aware that there are a number of technical assumptions used in these calculations that could be queried. Scott et al. (2011) also note that they examined only the costs of the incentive schemes and not the costs of changes in utilisation, prescribing or hospital visits.

Reiter et al. (2006) surveyed 66 hospital CEOs in the PHA scheme to determine whether there had been organisational / structural changes to support the improvements of quality and safety due to the incentive program and whether process changes had been implemented due to the incentive program. Of the 66 hospitals surveyed, approximately 75% reported making structure and/or process changes as a result of the incentive scheme. Hospitals that reported structural changes reported more involvement and leadership by the board of trustees. Hospitals that reported making process changes reported using the PHA incentives to increase leverage with physicians to assist in aligning physician objectives with the process goals. Hospitals that made process changes also reported being motivated by competitive and financial considerations. By comparisons hospitals that made no process changes were more likely to indicate that these factors had little effect on their motivation. The authors suggest that the effects of incentives on hospital effort may not be universal and may depend on characteristics of the hospital and the hospital's market.

4.3 Other Best Practice Pricing Initiatives

4.3.1 A Provider Driven Pay for Performance Program for Acute Episodic Cardiac Surgical Care

Casale et al. (2007) implemented a pilot study of a provider driven best practice approach for coronary artery bypass graft patients in three hospitals within the Geisinger Health System in Pennsylvania. The program consisted of 3 components – establishing implementable best practices; developing risk-based pricing and establishing a mechanism for patient engagement.

Surgeons reviewed the class 1 and class 11a 2004 American Heart Association/American College of Cardiology Guidelines for CABG surgery and translated them into 40 verifiable behaviours. These were embedded in the ProvenCare program and the patient electronic record. An adjusted best practice price was developed for purchasers by examining historical performance data on case volume and the predicted rates of adverse events and then bundling preoperative, inpatient and post-operative care over a 90 day period into a fixed price. However, it is unclear how this pricing related to the prior payment structure. Successful adherence to the ProvenCare processes was included as one component of surgeon's individual compensation – up to 20% of total compensation for physicians was predicated on the achievement of predefined goals including measures of clinical care quality and safety. It is unclear whether this incentive was already operational prior to the introduction of the scheme.

There were 117 elective CABG patients in the year of implementation (2006) and these were compared with 137 Conventional Care patients treated prior to the introduction of the ProvenCare scheme (Casale et al., 2007). There was no concurrent control group. Before initiation of the program only 56% of elective patients received all 40 best practice care elements but at 3 months after implementation this had risen to 100% and fluctuated between 86%-100% for the remainder of the year. This overall trend was significant ($p < 0.001$). Analysis of the preoperative and operative characteristics of the groups was fairly similar. Thirty day trends showed improved trends for outcome related indicators and lower rates for adverse events for the intervention group compared to the historical comparison group but this was only significant for the likelihood of discharge to home.

Financial outcomes indicated the average total length of stay for the ProvenCare group was slightly lower reflecting a 5% reduction in hospital charges. All ProvenCare participating surgeons earned the incentive compensation for quality of care.

Commentary provided with this article indicated that the scheme was considered a unique health care system within the US context and its applicability to Australia might also be limited. The sample size was very small, and it used a fairly homogenous sample, considered atypical by commenter's, which may limit the generalisability of the modest findings. In addition, the information that is provided is unclear about which particular incentive factors may be associated with these improvements in performance (e.g. bundling of care, physician incentives, or shifted attention to care processes?)

4.3.2 Taiwan: Best Practice Pay for Performance Program for Breast Cancer

In 2001 the Bureau of National Health Insurance in Taiwan implemented what it called 'pay for performance programs' for diabetes mellitus, tuberculosis, breast cancer, cervical cancer and asthma (Kuo et al., 2011, Li et al., 2010, Lee et al., 2010). The study by Kuo et al. (2011) incorporated adjusted price payment for guideline adherence within a pay for performance program in Taiwan and thus is reported here under best practice pricing. Other Taiwanese P4P initiatives are reported in the Safety and Quality Pricing/Pay for Performance Section.

Kuo et al. (2011) report on the breast cancer program known as BC-P4P. This is a retrospective population-based observational study with a cross-sectional design. A total of 4,528 patients with Stage 1 or Stage II breast cancer diagnosed in 2002 or 2003 who received curative surgery were observed until the end of 2008. Retrospective analysis of population based cancer registration and claims data was used.

This program covered both medical costs and drug fees for both inpatient and outpatient services. Hospitals with more than 100 cases of breast cancer annually, a multidisciplinary team for breast cancer care and an in-hospital database that routinely collected survival and recurrence information were eligible to participate in the P4P program. Patients receiving palliative care or hospice care without any curative therapy were excluded. Payment for caring for BC-P4P enrollees is a bundled payment called 'treatment mix' which groups treatment options (surgery, chemotherapy, radiotherapy etc.) based on guideline recommended treatment for the specific stage of breast cancer. The guideline(s) used are not specified.

Payment for these 'treatment mixes' are set higher than for the original case-based payment scheme for surgery and the fee for service scheme for other related services and in this aspect it resembles a best practice pricing model. For the hospital to receive the P4P payment for the treatment mix the patient needs to complete the full range of treatments in the plan, not part thereof. Kuo et al. (2011) state that as a result of this the BC-P4P shares financial risk under the payment scheme and there is an incentive to improve patient's compliance with treatment plans in addition to minimising any complications during treatment. One might assume that if the patient does not complete the 'treatment mix plan', payment reverts to the original case-based payment. However, this is quite unclear.

A second incentive was that BC-P4P hospitals earn an annual bonus if they met the goals for a set of stage specific survival rates. However, the 'treatment-mix' might only be one of many factors that influence 5 year survival rates (e.g. severity, life style factors of patients etc.).

The indicators for quality of care were derived through consultations with clinicians using a Delphi technique to build consensus within an expert group - but these indicators are not actually detailed in the paper. The selected measures were coded as binary variables at the patient level and were then aggregated as patient level quality scores.

The study compared the quality of care provided by enrolled and non enrolled hospitals and evaluated the effects of the BC-P4P program on patient survival and recurrence. The authors concluded that after controlling for age, stage, type of surgery and other potentially confounding factors BC-P4P enrollees were found to have better quality of care than non enrollees. Regression models indicated that after controlling for patient characteristics quality of care was related to a better 5-year overall survival and a lower rate of recurrence.

The study has a number of methodological weaknesses. The authors note that high surgical volume was positively related to the quality of care and yet all enrollees were higher volume establishments. It would have been preferable to have had a longitudinal design where the hospital performance before and after the introduction of BC-P4P was examined, where the hospital became its own control. Due to these and other weaknesses in the study design, which the authors acknowledge, this study can only provide at best suggestive, rather than conclusive, evidence of a positive effect.

4.4 Summary of the Evidence on Best Practice Pricing

The following tables summarise the papers and studies reviewed.

Table 1 *Best Practice Pricing - details*

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
Payment by Results Guidance for 2010-2011	Dept. Health	2010	Govt. paper	Adherence to practice pathway	Adjusted Price	UK
Payment by Results 2011-2012	Dept. Health	2011	Govt. paper	Adherence to practice pathway	Adjusted Price	UK
Equity and Excellence Liberating NHS	Dept. Health	2010	Govt. policy paper	Various	Various	UK
National Hip Fracture Database (NHFD): National Report 2012	Currie C. et al.	2012	Govt. paper	Adherence to practice pathway	Adjusted Price	UK
England: The Healthcare Resource Group System	Mason A, Ward P & Street A	2011	Book Chapter in Busse et al., (2011) Diagnosis Related Groups in Europe	Activity Based Funding and Adjusted Price/ Best Practice Pricing	Activity Based Funding	UK
Literature Review: Efficiency, International best practice in ABF and Future Payment Reform	Health Policy Solutions, Casemix Consulting and Aspex Consulting	2011	Review Paper	Various	Various	Aus.
Using Financial Incentives to Improve Performance of Hospital Clinicians	Scott A & Ouakrim D	2011	Evidence Review Paper	Various	Various	Aus.
BCBSM Participating Hospitals Agreement 2006 Incentive Program	Blue Cross Blue Shield of Michigan	2006	Hospitals Agreement Document	Adherence to practice pathway	Adjusted Price	US
Cost Effectiveness of Hospital Pay-for-Performance Incentives	Nahra T et al.	2006	Research Study	Adherence to practice pathway	Adjusted Price	US
Hospital Responses to Pay-for- Performance Incentives	Reiter K et al.	2006	Research Study-Survey of Hospitals	Adherence to practice pathway	Adjusted Price	US
A Provider Driven Pay-for-Performance	Casale et al. (2007)	2007	Research Article	Adherence to Practice pathway	Adjusted Price	US

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
Program for Acute Episodic Cardiac Surgical Care						
Effect of Pay-for Performance Program for Breast Cancer in Taiwan	Kuo et al.	2011	Research Article	Adherence to practice pathways, incentives P4P	Adjusted Price – bundling; incentives for performance	Taiwan

Table 2 *Best Practice Pricing - focus and context*

Article name	Area of focus	Context and setting	Magnitude of the incentive
Payment by Results Guidance for 2010-2011	ABF in the UK most sectors	UK National Health System –System wide reform and mandatory	Substantial incentive payment in Best Practice Tariff
Payment by Results 2011-2012	ABF in the UK most sectors	UK National Health System – System wide reform and mandatory	Substantial incentive payment for Best Practice Tariff
Equity and Excellence Liberating NHS	ABF in the UK most sectors	UK National Health System – System wide reform and mandatory	Substantial incentive payment for Best Practice Tariff
NHFD National Report 2012	ABF and Best Practice Tariff in relation to hip fracture	UK National Health System	Substantial incentive payment for Best Practice Tariff
England: The Healthcare Resource Group System	ABF in the UK most sectors	Description of ABF in UK with a brief mention of Best Practice Tariffs	NA
Literature Review: Efficiency, International best practice in ABF and Future Payment Reform	Review of ABF – primarily acute care	Review to advise future payment reform in Australia	NA
Using Financial Incentives to Improve Performance of Hospital Clinicians	Review of Incentive schemes – mainly acute care	Review of international and local quality incentive and disincentives schemes with reference to Australia	NA
BCBSM Participating Hospitals Agreement 2006 Incentive Program	Acute care and outpatient	BCBSM PHA Michigan –Health Insurer	Between 3-5% of combined inpatient and outpatient operating payments depending on hospital quality score
Cost Effectiveness of Hospital Pay-for-Performance Incentives	Acute care and outpatient	BCBSM PHA Michigan	2% of combined inpatient and outpatient operating payments depending on hospital quality score
Hospital Responses to Pay-for- Performance Incentives	Acute care and outpatient	BCBSM PHA Michigan	2% of combined inpatient and outpatient operating payments depending on hospital quality score
A Provider Driven Pay-for-Performance Program for Acute Episodic Cardiac Surgical Care	Acute care and outpatient	Pilot program for Geisinger Health System Pennsylvania -Cardiac	Adjusted price for Best Practice and incentives paid – magnitude unclear
Effect of Pay-for Performance Program for Breast Cancer in Taiwan	Acute Care and outpatient	Demonstration project for P4P in Taiwan Health System – large sample	Adjusted price for a bundle of care and other incentives paid – magnitude of incentive is unclear

Table 3 Best Practice Pricing - results

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
Payment by Results Guidance for 2010-2011	Unclear – emerging practice, routine data	Trusts / hospital	Public and Private	Best practice indicators relating to adherence to pathway. (See also normative pricing aspects re day surgery rates and never events)	No conclusive evidence as yet re BPT. Evaluation to be published shortly.
Payment by Results 2011-2012	See above	See above	See above	See above	Changes in Best Practice Tariffs over time are indicative that changes are occurring. The strengthening of tariffs for some conditions might suggest the initial tariffs did not result in the required changes. Awaiting independent evaluation.
Equity and Excellence Liberating NHS	See above				
NHFD National Report 2012	Emerging practice, routine data	Trusts/ Hospital	Mainly Public	A range of best practice process indicators	Overall the BPT is producing some improvements in the quality of care but this varies by process indicator. A greater % of hospitals are achieving the BPT standard.
England: The Healthcare Resource Group System	NA	NA	NA	Briefly describes Best Practice Tariffs for UK	NA
Literature Review: Efficiency, International best practice in ABF and Future Payment Reform	NA	Various – but mainly National / State / Territory	Mainly Public	Various approaches to quality/safety measurement described	NA
Using Financial Incentives to Improve Performance of Hospital Clinicians	Review article	Various	Public and Private	Various approaches to quality/safety measurement described	A 2011 review that examined 9 research studies on the use of incentives to improve performance – insufficient evidence to recommend any scheme. Suggest adoption of adjusted pricing mechanism for best practice and never events could be considered.
BCBSM Participating Hospitals Agreement 2006 Incentive Program	See below	Large Hospital Group	Private- Not for Profit Health Insurer	Hospital quality score in relation to pathway for best practice	Evaluation studies are the 2 studies following below
Cost Effectiveness of Hospital Pay-for-Performance Incentives	Acceptable practice	Large Hospital Group	Private- Not for Profit Hospital group	Hospital quality score in relation to pathway for best practice	Found limited, suggestive evidence that the intervention was cost effective and that practice improvements of 8-12% occurred following implementation.
Hospital Responses to Pay-for- Performance Incentives	NA -Survey	Large Hospital Group	Private- Not for Profit Hospital Group	Survey of Participating hospitals CMO's attitudes to scheme implementation and changes made	Hospitals making process changes were more motivated by competitive and financial considerations. Effects of the incentives were not universal and depended on the characteristics of the hospital and its market.
A Provider Driven Pay-for-Performance Program for Acute	Acceptable practice	Hospital	Private	Adherence to 40 care activities based on guidelines	There was a time trend for improved performance re full adherence to care elements. Very

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
Episodic Cardiac Surgical Care					limited evidence of change in outcome measures when compared to historical controls. Incentives unclear. Small sample. Weak design.
Effect of Pay-for-Performance Program for Breast Cancer in Taiwan	Acceptable practice	Hospital	Public	Adherence to treatment mix pathway	Authors claim BC-P4P patients had better quality of care. Weaknesses in design make this suggestive evidence at best.

Table 4 Best Practice Pricing - key points

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
Payment by Results Guidance for 2010-2011	This is a manual for Payment by Results in the UK	Inconclusive as no independent evaluation as yet	Inconclusive	Does not discuss
Payment by Results 2011-2012	This is manual for Payment by Results in the UK	Inconclusive as no independent evaluation as yet	Inconclusive	Does not discuss directly but tariff changes from the previous year imply some change in performance has taken place
Equity and Excellence Liberating NHS	This is a white paper on strategic directions for NHS	Not applicable as recently released	NA	NA
NHFD: National Report 2012	Shows changes in rates of adherence to best practice standards over time	Shows improvement across process indicators but varies by indicator	positive	Overall substantial improvement on some, but not all, indicators is shown
England: The Healthcare Resource Group System	A descriptive paper on the approach to ABF in UK	NA	NA	NA
International best practice in ABF and Future Payment Reform	Review of ABF to advise future reform in Australia.	NA	NA	NA
Using Financial Incentives to Improve the Performance of Hospital Clinicians	A 2011 review that examined 9 research studies on the use of incentives to improve performance – insufficient evidence to recommend any scheme. Suggest adoption of adjusted pricing mechanism for best practice and never events could be considered.	Indicates the effects of any particular scheme were of low impact	Inconclusive	The review indicates the effects of any particular scheme were of low or modest impact
BCBSM Participating Hospitals Agreement 2006 Incentive Program	This is a user agreement	NA	NA	NA – see 2 studies below
Cost Effectiveness of Hospital Pay-for-Performance Incentives	An evaluation of the BCBMC Participating Hospitals Agreement Demonstration Project (Cardiac Care). It examined the cost effectiveness of the scheme and improvements in adherence to care elements from 2000 to 2003	Weaknesses in the design make this study inconclusive	Inconclusive	Claims modest to high impact for cost effectiveness; shows modest improvements in adherence to care elements
Hospital Responses to Pay-	Survey of participating hospitals CMO's attitudes to scheme implementation and	NA	NA	NA

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
for- Performance Incentives	changes made. Hospitals making process changes were more motivated by competitive and financial considerations. Effects of the incentives were not universal and depended on the characteristics of the hospital and its market.			
A Provider Driven Pay-for-Performance Program for Acute Episodic Cardiac Surgical Care	There was a time trend for improved performance re full adherence to care elements. There is very limited evidence of change in outcome measures when compared to historical controls. Incentives unclear. Weak design.	Inconclusive although some positive findings are reported	Inconclusive	Modest
Effect of Pay-for Performance Program for Breast Cancer in Taiwan	<p>Authors claim:</p> <ul style="list-style-type: none"> ▪ BC-P4P patients received better quality of care. ▪ BC-P4P patients had better overall 5 year survival and less recurrence. ▪ Financial incentives in the payment design had a positive impact on outcomes <p>Weaknesses in design make this suggestive evidence at best.</p>	Inconclusive although some positive findings reported	Inconclusive	High – but see key points

Table 5 Best Practice Pricing - evidence and applicability

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
Payment by Results Guidance for 2010-2011	NA	Awaiting independent evaluation report	While such a scheme could be introduced in Australia evidence would need to be seen that the changes to the tariff system for best practice led to a significant improvement as measured by the quality/safety indicators. Some initial evidence.
Payment by Results 2011-2012	Suggestive evidence as BP tariffs are changing over time	Awaiting independent evaluation report	See above
Equity and Excellence Liberating NHS	This is a strategic plan	NA	This is a strategic plan rather than an evaluation document
NHFD: National Report 2012	Some evidence of system change but varies by indicator	In the context of overall improvement, some minor drops in performance on some indicators occurred between 2011 and 2012 which raises issues of sustainability	Yes. The best practice tariff appears to have led to improvements on some, but not all, indicators
England: The Healthcare Resource Group System	NA	NA	NA
Literature Review: Efficiency, International best practice in ABF and Future Payment Reform	NA	Discusses some approaches related to quality/safety adjustments in ABF	This is a review related to ABF and raises some relevant issues
Using Financial Incentives to Improve the Performance of Hospital Clinicians	NA	NA	A useful reference as it summarises the rather limited evidence base for many of the initiatives up to 2011
BCBSM Participating Hospitals Agreement 2006 Incentive Program	NA	NA	See 2 evaluation studies below

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
Cost Effectiveness of Hospital Pay-for- Performance Incentives	Some evidence of system change but of modest magnitude	Some issues with regard to the design and the way QALYs were calculated	Yes with caveats concerning methodological issues
Hospital Responses to Pay-for- Performance Incentives	NA	A survey which raises some issues with regard to differences in hospital characteristics re whether they are motivated by incentive systems	No but raises issues re incidental lessons learned e.g. hospital management structures and participation in change
A Provider Driven Pay-for- Performance Program for Acute Episodic Cardiac Surgical Care	Some evidence of change but of modest magnitude	A very small sample	No but some minor positive findings reported
Effect of Pay-for Performance Program for Breast Cancer in Taiwan	Some evidence of change but there are research design issues	A lack of clarity about the incentive system makes attribution of the effect unclear	No – this study is inconclusive but some positive findings reported

4.5 Conclusion: Best Practice Pricing

The National Health Service of the United Kingdom has introduced the largest health system initiative to incorporate a range of best practice tariffs as adjusted prices within its healthcare related groups/ activity based funding model. Although the NHS has made a substantial start in a range of clinical areas, evidence based pathways exist only for a limited range of conditions and this is an important limitation when considering such a funding model.

Although it is due, the formal evaluation of the Best Practice Tariffs scheme is not yet available although a review of Payments by Results (PbR) has recently been published (Appleby et al., 2012). However; a report from the National Hip Fracture Database (National Hip Fracture Database Report, 2012) has been released. Before committing to such an approach there would need to be conclusive evidence that this approach is actually delivering meaningful gains in both safety and quality and that the scheme represents value for money in comparison to other potential incentive initiatives. The adoption of this approach would require a substantial initial and ongoing investment particularly as best-practice guidelines and pathways can change quite substantially in responses to changes in the evidence base over time. The Western Australian Health Department (HAPI, 2012) is planning to implement from 2012-2013 Performance-based Premium Payments for a number of clinical conditions (e.g. fragility hip fracture) which has been based on the UK Payment by Results Best Practice Tariff scheme (see Section 8).

5 Normative Pricing

In this model price is used to influence the patterns of delivery of care. This may include, for example, creating incentives for more home care or to incentivise day surgery procedures over in-patient overnight stays where there is evidence to consider this appropriate. The Section below describes international activities and information concerning Australian proposals can be found in Section 8.

5.1 National Health Service (UK)

In the National Health System for the UK the Payment by Results Scheme (Dept. Health 2011; Payment by Results for 2010-2011 and 2011-2012) prices have been set to incentivise day case surgery over in-patient admissions for a range of appropriate procedures suggested by the British Association of Day Surgery (BADS), covering:

- (a) breast surgery
- (b) hernia repair
- (c) female incontinence
- (d) minor orthopaedic surgery
- (e) urology

BADS publishes a directory of procedures that are amenable to day case or short stay admissions along with rates they believe are achievable (BADS Directory of Procedures, 2012). The current BADS directory provides data reflecting day surgery rates and outcomes for England for the 2011 calendar year.

The prices have been set to incentivise providers to increase their day rates while ensuring that overall best practice does not cost commissioners more (Dept. Health 2011; Payment by Results for 2011-2012). This has been achieved by:

- Introducing separate prices with the day case prices relatively higher than the ordinary elective prices
- Decreasing the absolute level of day case and ordinary elective prices to reflect the lower price of providing the BADS day case rate compared to the national average rate. This means the day case rates are lower than if they had been set conventionally on current day case rates.

An example is using a day case procedure for sentinel node mapping and resection for breast cancer. The BADS case rate to be achieved is 80% and the Day Case Tariff is 300 pounds higher than the ordinary elective prices.

There is also a BPT applying to Interventional Radiology which applies to two particular procedures (Endovascular aortic repair and Uterine fibroid embolisation). The stated benefits of minimally invasive procedures facilitated by interventional radiology are said to include decreased lengths of stay, reduced risk of hospital acquired infections and faster rehabilitation and they are an alternative to open surgery. However, it is recognised that they do not represent best practice in every circumstance because clinical considerations and patient choice may make open surgery alternatives legitimate. (Dept. Health 2011; Payment by Results for 2011-2012)

5.2 British Columbia

In British Columbia (Canada) from 2010 approximately 20% of hospital funding was shifted from global funding (fixed annual budget) to activity based funding (patient based funding) largely for acute inpatient and same day care. The partial introduction of ABF was seen as a way to address surgical waiting lists by incentivising more day surgery procedures (Cohen et al., 2012) due to

payment based on activity. In this context an incentive program has recently been introduced to reduce Emergency Department transit times (BC Health Services Purchasing Organization, 2010; <http://www.bcpsqc.ca/about/documents/meetings/HQN-Nov102010HSPO.pdf>). An additional \$600 per admitted patient is paid if they are admitted within 10 hours and there are \$100 incentives for meeting target transit times for both high and low acuity patients who do not require admission. There is no evaluation available on the effectiveness of this incentive strategy.

5.3 Recent US Initiatives

Kocher and Adashi (2011) report on a number of new initiatives in the US which target a reduction in hospital readmission rates. Payment incentives to avoid readmissions have been cited in the Department of Health and Human Services strategic plan for 2010-2015. The Centers for Medicare and Medicaid Services National Strategy for Quality Improvement in Health Care strategy aims to obtain a 20% reduction in readmission rates by the end of 2013. In order to assist in reaching such goals more funding is also being directed to programs that facilitate continuity of care between the hospital and the community and by funding more home care programs.

The Community Care Transition Project aims to reduce hospital readmissions by addressing continuity of care between inpatient and outpatient settings and will provide funding for partnerships between hospitals and community based organisations. A related initiative is the Independence at Home Demonstration Project (IAHP), which will provide comprehensive and coordinated care for home-bound chronically ill Medicare beneficiaries. The IAHP will test novel payment methods wherein revenue sharing by health care teams can be realised subject to meeting specified quality and savings targets.

Another initiative is the National Pilot Program on Bundling which will test the bundling of Medicare payments into a single comprehensive fee for an episode of care which ranges from 3 days before admission to 30 days post admission. In this scheme participating clinicians and health care organisations will be entitled to revenue sharing in any or all savings garnered while assuming the risk for any excess cost incurred.

These US initiatives are only just commencing and so it will be some time before any data are available to reflect on these changes in the patterns of care, and whether the incentives implicit in some of these programs achieve the goals of a reduction in readmissions and greater continuity of care.

5.4 Specific Clinical Area: Radiology Reporting Times

Andriole et al. (2010) examined whether radiology reporting signature times (RRST) could be improved by technology adoption combined with a financial incentive. Poor turn around times resulting from lengthy signature time can adversely affect patient care. The technology was a notification paging system that alerted radiologists when reports were ready for signature and an integrated speech recognition report generation system (PACS).

Following the technology introduction period a financial incentive was added for target performance. A \$4000 p.a. bonus was added semi-annually to the regular salary awarded to radiologists who met the departmental signing goal of a median signature time of less than 8 hours or 80% of reports signed within 16 hours during the 6 months prior. Signature times were evaluated prior to the technology interventions, following the technology interventions and prior to the introduction of the financial incentive and following the introduction of the financial incentive. Although there is comparison to a baseline period there is no concurrent control group which makes the attribution of the trend changes to the intervention uncertain.

Median signature times and target performance improved following the introduction of the technology but improved even further following the introduction of the financial incentive. The median 6 month 80th percentile signature time was 15-18 hours following the technology introduction period. It then reduced to 4-8 hours following the introduction of the financial

incentive. The authors concluded that the addition of the financial incentive led to better performance than was achievable through technology alone. This is one of the few schemes where the incentive is directly paid to the clinician.

Boland et al. (2010) undertook a similar study where radiologist report turnaround times (RTAT) was examined before and after the introduction of a pay-for performance scheme. The incentive was a \$5000 p.a. bonus on top of salary paid every 6 months for radiologists meeting RTAT targets. Data were examined at baseline, at the beginning and at the end of the incentive period. Once again there is no concurrent control grouping, which makes attribution uncertain. RTAT times decreased significantly across these periods.

5.5 Summary of the Evidence on Normative Pricing

The following 5 tables summarise the findings of these studies. It should be noted that it is highly probable that in most health systems/departments there will be some elements of normative pricing but very few of these may be reported in the academic and practice literature. This is also the case in the Australian private sector.

Table 6 Normative Pricing - details

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
Payment by Results Guidance for 2010-2011	Dept. Health	2010	Govt. Paper	Normative targets for day surgery rates	Adjusted Price	UK
Payment by Results 2011-2012	Dept. Health	2011	Govt. Paper	Normative targets for day surgery rates	Adjusted Price	UK
Beyond the Hospital Walls: Activity Based Funding Versus Integrated Health Care Reform	Cohen et al.	2012	Paper from Canadian Centre for Policy Initiatives (BC Office)	Various	Various	Canada
Patient Focussed Funding: Better Enabling Health providers to Do what is Best for Patients	BC Health Services Purchasing Organization	2010	PowerPoint file on web	Activity Based Funding and Adjusted Price	Activity Based Funding – adjusted price	Canada
Hospital Readmissions and the Affordable Care Act: Paying for Coordinated Quality Care	Kocher and Adashi	2011	Journal article identifying new US initiatives	Various –incentives associated with reducing readmissions and provision of more home care and continuity of care	Various	US
Augmenting the Impact of Technology Adoption with Financial Incentive	Andriole et al.	2010	Research study	Normative – incentives for radiology reporting times	Salary bonus	US
Radiologist Report Turnaround Time: Impact of Pay-for-Performance Measures	Boland et al.	2006	Research study	Normative – incentives for radiology reporting times	Salary bonus	US

Table 7 Normative Pricing - focus and context

Article name	Area of focus	Context and setting	Magnitude of the incentive
Payment by Results Guidance for 2010-2011	ABF in the UK most sectors	UK National Health System –System wide reform and mandatory	Substantial incentive payment in Best Practice Tariff for meeting day surgery rate targets
Payment by Results 2011-2012	ABF in the UK most sectors	UK National Health System –System wide reform and mandatory	Substantial incentive payment for Best Practice Tariff for meeting day surgery rate targets
Beyond the Hospital Walls: Activity Based Funding Versus	ABF and Integrated Health Care schemes	British Colombia’s partial introduction of ABF to reduce surgical throughput	NA

Article name	Area of focus	Context and setting	Magnitude of the incentive
Integrated Health Care Reform		which is a country wide problem. Some resistance to introducing ABF in Canada	
Patient Focussed Funding: Better Enabling Health providers to Do what is Best for Patients	British Colombia's partial introduction of ABF	British Colombia's partial introduction of ABF and introduction of incentives related to reduction of Emergency Department transit times	A range of adjusted price incentives varying from \$100-\$600 per patient to reduce ED transit times for both admitted and non admitted patients
Hospital Readmissions and the Affordable Care Act: Paying for Coordinated Quality Care	Review of planned US government initiatives and strategic targets to reduce readmission rates	High readmission rate in the US which has not dropped since 2007. A range of new programs with incentives and also the introduction of penalties for excess readmission rate	Various e.g. payments based on the bundling of inpatient and outpatient services and the provision of more home based Care. Revenue sharing by health care teams/ partnerships where targets and quality standards met
Augmenting the Impact of Technology Adoption with Financial Incentive	Using a salary bonus to facilitate technology adoption and also to reduce radiology reporting signature times	A Radiology Department within a hospital, also servicing a local area which performs @ 750,000 examinations per annum	A salary bonus of \$4000 per annum
Radiologist Report Turnaround Time: Impact of Pay-for-Performance Measures	Using a salary bonus to reduce radiology reporting turnaround times	A Radiology Department within Massachusetts General Hospital with a throughput of @ 300,000 examinations during the study period	A salary bonus of \$5000 per annum

Table 8 Normative Pricing - results

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
Payment by Results Guidance for 2010-2011	Unclear – emerging practice, routine data	Trusts/ hospital	Public and Private	Normative pricing aspects within BPTs re day surgery rate targets	No conclusive evidence as yet re BPT. Evaluation to be published shortly
Payment by Results 2011-2012	See above	Trusts/ hospital	Public and Private	As above	Further surgical areas being included in these Best Practice Tariffs for day surgery may suggest that the approach is working - but awaiting an independent evaluation
Beyond the Hospital Walls: Activity Based Funding Versus Integrated Health Care Reform	NA: Discussion / review	State/ Territory	Public	NA	Discussion article which questions the value of ABF in general to address such issues as surgical throughput
Patient Focussed Funding: Better Enabling Health providers to Do what is Best for Patients	As no evaluation this cannot be assessed	State/ Territory	Public	The targets are ED transmission times	No evaluation
Hospital Readmissions and the Affordable Care Act: Paying for Coordinated Quality Care	NA	National Health System Initiatives	Public and Private	NA	NA. Describes a number of recent US initiatives to reduce readmissions and increase home-based care. Many of these are only just commencing
Augmenting the Impact of Technology Adoption with Financial Incentive	Acceptable practice but weaknesses	Clinical area within	Unsure	Median radiology reporting signature times and target of 80	Substantial reduction in radiology reporting signature times

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
	in study design	hospital		% of reports signed within specified target time	
Radiologist Report Turnaround Time: Impact of Pay-for-Performance Measures	Acceptable practice but weaknesses in study design	Clinical area within hospital	Unsure	Radiology Reporting Turnaround times	Radiology Reporting Turnaround times decreased significantly

Table 9 Normative Pricing - key points

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
Payment by Results Guidance for 2010-2011	This is manual for Payment by Results in the UK	No independent evaluation (as yet)	Inconclusive	Does not discuss
Payment by Results 2011-2012	This is manual for Payment by Results in the UK	No independent evaluation (as yet)	Inconclusive	Does not discuss directly but tariff changes from the previous year imply some change in performance has taken place
Beyond the Hospital Walls: Activity Based Funding Versus Integrated Health Care Reform	Discussion article which questions the value of ABF in general to address such issues as surgical throughput in Canada.	NA	NA	NA
Patient Focussed Funding: Better Enabling Health providers to Do what is Best for Patients	Describes an adjusted price incentive system related to ED transit times in British Columbia	No independent evaluation (as yet)	Inconclusive	Does not discuss
Hospital Readmissions and the Affordable Care Act: Paying for Coordinated Quality Care	A summary of new initiatives in the USA concerning reducing readmission rates - through more coordinated care and home based care, bundling of inpatient and outpatient episodes, and also penalties for poor performance.	Too soon to tell	NA	NA
Augmenting the Impact of Technology Adoption with Financial Incentive	An intervention to introduce new technology for radiology reporting, followed by a salary bonus incentive system which was found to both facilitate the acceptance of the new technology and substantially decrease radiology reporting signature times.	Although there was a substantial drop in radiology signature times there was no concurrent control group so results are not definitive	1.5 - Inconclusive but suggestive of a positive effect	High
Radiologist Report Turnaround Time: Impact of Pay-for-Performance Measures	An intervention to reduce radiology reporting turnaround times by offering a salary bonus incentive	Although there was a substantial drop in radiology reporting turnaround times there was no concurrent control group so results are not definitive	1.5 – Inconclusive but suggestive of a positive effect	High

Table 10 Normative Pricing - evidence and applicability

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
Payment by Results Guidance for 2010-2011	Suggestive evidence as BP tariffs are changing over time	Awaiting independent evaluation report	While such a scheme could be introduced in Australia, there is no published evidence at present that changes to the best practice tariff system for day surgery have led to a decrease in inpatient surgical rates
Payment by Results 2011-2012	Suggestive evidence only as BP tariffs change over time	Awaiting independent evaluation report	See above
Beyond the Hospital Walls: Activity Based Funding Versus Integrated Health Care Reform	NA	Specific to the Canadian situation, which with its limited introduction of ABF funding	NA
Patient Focussed Funding: Better Enabling Health providers to Do what is Best for Patients	NA	Awaiting evaluation report or evidence	No
Hospital Readmissions and the Affordable Care Act: Paying for Coordinated Quality Care	NA	New initiatives which will require evaluation	As these new schemes are introduced and evaluated it would be desirable to monitor their progress
Augmenting the Impact of Technology Adoption with Financial Incentive	Short term evidence of service change for a Radiology Department	Suggestive evidence that salary bonus systems work in radiology but inconclusive	Suggestive but inconclusive
Radiologist Report Turnaround Time: Impact of Pay-for-Performance Measures	Short term evidence of service change for a Radiology Department	Suggestive evidence that salary bonus systems work in radiology but inconclusive	Suggestive but inconclusive

5.6 Conclusion: Normative Pricing

The use of normative approach by the National Health Service (UK) to incentivise day surgery procedures is yet to be evaluated. Queensland Health is proposing to introduce a similar strategy in 2012-2013 (Steele and Wright, 2012) and this proposal is discussed in Section 8. Similarly a number of new US initiatives to reduce readmissions and to provide greater home based care are only at their initial stages.

Some research studies in the radiology area have reported substantial improvements in performance, although due to weaknesses in the research design the level of evidence is weak. However, it is notable that in these schemes the incentive payment is paid directly to the clinician.

6 Quality Structures Pricing Models

This model of prospective pricing *links pricing to structural approaches to quality and safety* such as linking funding to **accreditation** or to **participation in benchmarking activities or clinical quality registries**. Under this approach, for example, accredited hospitals are funded at a higher rate than non-accredited hospitals. This is what occurred, for example, when casemix funding was introduced into Victoria (Duckett, 1995) where participation in the Australian Council of Healthcare Standards (ACHS) accreditation process was encouraged by the provision of an annual grant to each accredited hospital.

In contrast to ‘payment for performance’, this model is best described as ‘payment for participation’.

6.1 Accreditation

The Commission has recently released *National Safety and Quality Health Service Standards* (NSQHS) to “drive the implementation of safety and quality systems and improve the quality of health care in Australia. The ten NSQHS Standards are intended to provide a nationally consistent statement about the level of care consumers can expect from health services” (ACSQHC, 2011).

The Standards provide a nationally consistent and uniform set of measures of safety and quality for application across a wide variety of health care services. They propose evidence-based improvement strategies to deal with gaps between current and best practice outcomes that affect a large number of patients.

The Standards (ACSQHC, 2011; p. 2) address the following areas:

- Governance for Safety and Quality in Health Service Organisations
- Partnering with Consumers
- Preventing and Controlling Healthcare Associated Infections
- Medication Safety
- Patient Identification and Procedure Matching
- Clinical Handover
- Blood and Blood Products
- Preventing and Managing Pressure Injuries
- Recognising and Responding to Clinical Deterioration in Acute Health Care
- Preventing Falls and Harm from Falls

In September 2011 Australian Health Ministers endorsed these NSQHS Standards and agreed on a new national accreditation scheme. Under this new national approach to accreditation, state and territory health departments have agreed that public hospitals across Australia will be progressively accredited to the NSQHS Standards from 1 January 2013.

Given that all public hospitals will be progressively accredited against these new standards, nothing would be gained by the IHPA setting prices linked to participation in this process as all public hospitals will already be participating. Accordingly, while we reviewed some evidence on accreditation as part of the current project, we have not included this evidence in table form as we have done in other sections.

However, to summarise the evidence, most hospital accreditation systems typically measure processes (compliance with standards) rather than patient outcomes. The underlying assumption seems to be that good processes automatically result in good outcomes (Sutherland et al., 2011).

There have been a number of systematic reviews of the evidence on accreditation and the study by Greenfield and Braithwaite (2008) is representative of the broader literature. They reported on a systematic review to identify and analyse research into accreditation and accreditation processes. A total of 66 studies reported using empirical evidence. The impacts of accreditation were classified into 10 categories: professions' attitudes to accreditation, promote change, organizational impact, financial impact, quality measures, program assessment, consumer views or patient satisfaction, public disclosure, professional development and surveyor issues. In two categories (promote change and professional development) consistent positive findings were recorded. The evidence on the other quality measures was inconsistent across the various studies.

There were also insufficient studies looking at the relationship between accreditation and consumer views/patient satisfaction to draw any conclusion (Greenfield and Braithwaite, 2008). A more recent study by Sack et al. (2011) indicated that accreditation was not linked to measurable better quality of care as perceived by the patient. However, an Egyptian study by Al Tehewy et al. (2009) did report that the accreditation of non-governmental health units had a positive effect regarding patient satisfaction and the continuation of performance according to the accreditation standards compared with non-accredited health units. This study only examined data for the first year of accreditation.

Shaw et al. (2010) examined systematic differences in quality management compliance scores between hospitals that were accredited or certified or neither. The data indicated that quality and safety structures and procedures were more evident in hospitals that were accredited or certified (ISO 9001) versus those that were not. Although there were some differences between accredited versus certified hospitals it did not substantially differentiate between hospitals that were accredited and those with certification only.

A study by Scmaltz et al. (2011) examined the association between Joint Commission accreditation status and hospital performance on publicly reported quality measures for common diseases from 2004 to 2008. Accredited hospitals had larger gains over time and were significantly more likely to have high performance in 2008 on 13 of 16 standardised clinical performance measures and on all summary scores. A Japanese survey of teaching hospitals conducted in 2004 and 2005 (Sekimoto et al., 2008), with regard to infection control processes, suggested that hospital accreditation had an impact on hospital's infection control infrastructure and performance. Surveillance was implemented more frequently in hospitals with adequate infection control staffing. However, the survey response rate of 52% places limitations on these findings.

Pomey et al. (2010), using a multiple case-study approach, examined how the accreditation process helps to introduce organizational changes that enhance the quality and safety of care. The authors concluded that the accreditation process is an effective leitmotiv for the introduction of change but is nonetheless subject to a learning cycle and a learning curve. Institutions invested greatly to conform to the first accreditation visit and reaped the greatest benefits in the next three accreditation cycles (3-10 years after initial accreditation).

In the light of this equivocal evidence to support accreditation as a tool to drive improvements in quality and safety, embedding evidence-based clinical standards into accreditation systems represents a significant advance. However, it is obviously too early to tell whether this will result in measurable improvements in quality and safety.

6.2 Clinical Quality Registries and Benchmarking

A clinical registry is a system that collects uniform data to evaluate specified outcomes for a population. This population can be defined by a particular disease or condition (e.g. Australian Stroke Clinical Registry) or by the type of service provided (e.g. the Australasian Rehabilitation Outcomes Centre). Clinical benchmarking uses clinical registry data to compare the performance

of providers, to identify best practice and to drive improvements in quality/safety and patient outcomes.

There is already a significant number of clinical quality registry and benchmarking systems in Australia (around 30 at present) and more are planned. The Commission is currently drafting national arrangements for clinical quality registries including data and clinical governance arrangements and costed infrastructure options for best-practice technical design and operation of clinical quality registries (<http://www.safetyandquality.gov.au/our-work/information-strategy/clinical-quality-registries>) and a Registry Special Interest Group has been formed to develop skills and experience in their management (<http://www.med.monash.edu.au/sphpm/depts-centres-units/registries/registriesig.html>).

Despite this growing interest, we did not find any studies on the relationship between the level of funding on the one hand and participation in clinical registries and in clinical benchmarking systems on the other. However, we did find evidence that participation in clinical registries and in clinical benchmarking systems can improve quality and safety. An important aspect of clinical registries is that clinicians can review the (case-mix adjusted) performance of their service in comparison with other similar services which in itself may be an important driver for clinical practice improvement. A selection of that evidence is included in the summary tables below.

We also investigated the evidence on the relationship between funding and other quality/safety improvement activities such as Clinical Collaboratives, Total Quality Management (TQM)/ Continuous Quality Improvement (CQI), Business Process Re-engineering (BPR), The Institute for Healthcare Improvement (IHI)'s rapid cycle change, Lean thinking and Six Sigma. Again, we found no studies on the relationship between funding and these quality improvement activities.

However, as summarised in the systematic reviews of clinical collaboratives and quality improvement models in health care reported below, the evidence for these approaches is, at best, mixed and inconclusive and not nearly as strong as for data-based clinical quality registries and benchmarking.

6.3 Summary of the Evidence on Quality Structures Pricing

Table 11 Quality Structures Pricing - details

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
Strategies for Improving Surgical Quality — Should Payers Reward Excellence or Effort?	Birkmeyer N & Birkmeyer D	2006	Journal article	Review of 3 models – centres of excellence, Pay for Performance & Pay for Participation	For Pay for Participation, payer underwriting the costs of clinical-outcome registries and improvement activities on the part of providers	USA
How A Regional Collaborative Of Hospitals And Physicians In Michigan Cut Costs And Improved The Quality Of Care	Share D, Campbell D, Birkmeyer N et al	2011	Journal article	Regional collaboratives of hospitals and physicians working in them	Blue Cross and Blue Shield of Michigan/Blue Care Network fund nine regional collaborative improvement programs.	USA
Clinical-quality registries: their role in quality improvement	McNeil J, Evans S, Johnson N and Cameron P	2010	MJA Editorial	Clinical registries	Not stated	International
Evidence for the impact of quality improvement collaboratives: systematic review	Schouten L, Hulscher M, Everdingen J et al	2008	Journal article	Clinical collaboratives	Not stated	International
A systematic narrative review of quality improvement models in health care	Powell A, Rushmer R and Davies H	2008	Systematic review report	Five models of quality improvement: 1: TQM/CQI 2: Business Process Re-engineering (BPR) 3: IHI and rapid cycle change 4: Lean thinking 5: Six Sigma	Not stated	International

Table 12 Quality Structures Pricing - focus and context

Article name	Area of focus	Context and setting	Magnitude of the incentive
Strategies for Improving Surgical Quality — Should Payers Reward Excellence or Effort?	Surgery	Review of different approaches citing evidence from a variety of studies in the USA	There are no direct financial incentives to take part in such plans. Payers cover the costs of data collection and quality improvement activities, but no one profits financially from pay-for-participation programs
How A Regional Collaborative Of Hospitals And Physicians In Michigan Cut Costs And Improved The	Surgery	The Michigan regional collaborative improvement program is paid for by a large private insurer. About 5 percent of its total reimbursements to hospitals (\$160 million annually) are currently reserved for its Participating Hospital Agreement Incentive Program. This program includes elements of traditional pay-for-performance plans. However, 20 percent of the	There are no direct financial incentives to take part in such plans. Payers cover the costs of data collection and quality improvement activities, but no one profits financially from pay-for-participation programs

Article name	Area of focus	Context and setting	Magnitude of the incentive
Quality Of Care		program's overall budget is devoted to nine regional collaborative improvement programs, whose annual costs range from \$1.2 million to more than \$5 million each, according to financial documents from fiscal year 2010.	
Clinical-quality registries: their role in quality improvement	Not specified	Australia had 28 clinical registries in 2010, which continuously collect patient-level health-related data, including outcomes, and operates across many health care sites.	No incentives
Evidence for the impact of quality improvement collaboratives: systematic review	Not specified	International systematic review. Of 1104 articles identified, 72 were included in the study. Twelve reports representing nine studies (including two randomised controlled trials) used a controlled design to measure the effects of the quality improvement collaborative intervention on care processes or outcomes of care.	No incentives
A systematic narrative review of quality improvement models in health care	Not specified	International systematic review of both the academic and the practice literature. The material was reviewed by six reviewers with expert knowledge of the field (three from health care organisations and three from academic institutions)	None specified

Table 13 *Quality Structures Pricing - results*

Article name	Strength of evidence	Health system level	Sector	Quality /Safety measurement	Results
Strategies for Improving Surgical Quality — Should Payers Reward Excellence or Effort?	Promising practice	Clinical speciality or department	Private	Patient outcomes (various)	Program in interventional cardiology showed significant improvement in providers' adherence to evidence-based best practices. Reductions in mortality, unplanned coronary-artery bypass surgery, myocardial infarctions, nephropathy induced by the administration of contrast medium, and stroke after percutaneous coronary interventions reported
How A Regional Collaborative Of Hospitals And Physicians In Michigan Cut Costs And Improved The Quality Of Care	Promising practice	Clinical speciality or department	Private	Patient outcomes (various)	In general and vascular surgery alone, complications from surgery dropped almost 2.5%, a change that translates into 2,500 fewer patients with surgical complications each year and the estimated annual savings from this one collaborative are approximately \$20 million
Clinical-quality registries: their role in quality improvement	Promising practice	Clinical speciality or department	All	Patient outcomes (various)	Cites as one example the registry set up by the Danish Lung Cancer improvement in 30-day, 1-year and 2-year survival rates for people with lung cancer of 1.6%, 8% and 10%, respectively
Evidence for the impact of quality improvement collaboratives: systematic review	Acceptable practice	Clinical speciality or department	All	Patient outcomes (various)	Systematic review of nine controlled studies showed moderate positive results. Seven studies (including one randomised controlled trial) reported an effect on some of the selected outcome measures. Two studies (including one randomised controlled trial) did not show any significant effect.
A systematic narrative	Emerging to	Various	All	Various	In part because of variations in implementation, and in part because of

Article name	Strength of evidence	Health system level	Sector	Quality /Safety measurement	Results
review of quality improvement models in health care	acceptable				the methodological challenges of studying any complex intervention, there is limited evidence available to assess how effective these approaches are in health care (or, indeed, in industry). Data on the cost-effectiveness of such approaches are largely lacking

Table 14 *Quality Structures Pricing - key points*

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
Strategies for Improving Surgical Quality — Should Payers Reward Excellence or Effort?	These programs are effective but difficult to organise (at least in the USA) context. Hospitals and surgeons are more accustomed to competing against one another than to collaborating. Programs are also expensive. In Michigan alone, 3 programs in surgery combined cost approximately \$5 million a year.	Improvements in mortality and morbidity	Conclusive - positive	Strong
How A Regional Collaborative Of Hospitals And Physicians In Michigan Cut Costs And Improved The Quality Of Care	Annual costs range from \$1.2 m to more than \$5 m each (2010).	Improvements in mortality and morbidity	Conclusive - positive	Strong
Clinical-quality registries: their role in quality improvement	In Australia, new registries are required in a range of areas where improved quality of care is likely to lead to significant improvements in safety and outcomes. With high-quality data from clinical registries, there is a strong potential to engage clinicians more intensely in quality improvement activities.	Improvements in mortality and morbidity	Conclusive - positive	Strong
Evidence for the impact of quality improvement collaboratives: systematic review	The evidence underlying quality improvement collaboratives is positive but limited and the effects cannot be predicted with great certainty. Considering that quality improvement collaboratives seem to play a key part in current strategies focused on accelerating improvement, but may have only modest effects on outcomes at best.	Mixed	Conclusive but not strong	Weak
A systematic narrative review of quality improvement models in health care	Regardless of the strength of the evidence overall, many studies provides insight into the experiences of implementing these quality improvement approaches in different health care settings, and broad lessons can be drawn about the potential for successful adoption in health care.	Mixed	Conclusive but not strong	Weak

Table 15 *Quality Structures Pricing - evidence and applicability*

Article name	Evidence of service/ system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
Strategies for Improving Surgical Quality — Should Payers Reward Excellence or Effort?	Yes	Requires high quality clinical-outcomes data, which include procedure-specific information on patient characteristics required for risk adjustment, processes of care, and relevant outcomes. Clinicians need to receive timely feedback on their performance relative to that of their peers. Participants develop plans for specific interventions to achieve improvements. These interventions are later evaluated empirically, discussed at follow-up meetings, and refined.	Yes
How A Regional Collaborative Of Hospitals And Physicians In Michigan Cut Costs And Improved The Quality Of Care	Yes	As above	Yes
Clinical-quality registries: their role in quality improvement	Yes	Clinical-quality registries aim to improve quality of care through benchmarking clinical outcomes and stimulating competition in achieving best practice. In addition to providing information on safety and efficacy of treatment, data from registries can also be used to determine whether patients have timely access to care, and whether care is delivered in line with best practice and evidence-based guidelines.	Yes
Evidence for the impact of quality improvement collaboratives: systematic review	Some	Evidence is promising but further knowledge of the basic components effectiveness, cost effectiveness, and success factors is crucial to determine the value of quality improvement collaboratives.	Yes
A systematic narrative review of quality improvement models in health care	Some	There is a broad set of 'necessary, but not sufficient' conditions that need to be in place for successful implementation. These include: provision of practical and human resources; the active engagement of health professionals, especially doctors; sustained managerial focus and attention; the use of multi-faceted interventions; coordinated action at all levels; substantial investment in training and development; and the availability of robust and timely data through supported IT systems.	Yes

6.4 Conclusion: Quality Structures Pricing

This model of pricing *links pricing to structural approaches to quality and safety*. The most common approaches are accreditation, clinical quality registries linked to clinical benchmarking and other quality/safety improvement activities and the funding approach involves paying for participation in such activities.

The most evidence for these approaches is to provide funding to allow clinical services to participate in clinical quality registries linked to clinical benchmarking (Birkmeyer and Birkmeyer, 2006; McNeil et al., 2010; Share et al., 2011). The evidence for this approach is strong in terms of achieving improvements in quality and safety. However, there is no direct evidence on the links between performance and the level of funding. Powell et al. (2008) note the lack of studies concerning cost effectiveness although the more recent study by Share et al. (2011) reports impressive savings for a clinical collaborative in Michigan although the cost for the initiative was also high.

In relation to accreditation, there is already a national agreement that all public hospitals will be progressively accredited against the new *National Safety and Quality Health Service Standards*. Accordingly, nothing would be gained by the IHPA setting prices linked to participation in this process as all public hospitals will already be participating regardless.

In relation to other structural approaches to quality improvement, the evidence is not sufficiently strong that these approaches actually do result in improvements in quality and safety. There is also no evidence examining the links between these approaches and funding.

7 Payment for Performance (Safety and Quality Pricing)

In Payment for Performance (P4P) or what are sometimes called “quality pricing models”, quality, safety and funding are linked through the payment of funding incentives for a high level of performance in relation to safety and quality indicators or through disincentives for a poor level of performance.

7.1 Premier Hospital Quality Incentive Demonstration (PHQID)

This is a major demonstration project by the Centers for Medicare and Medicaid Services (CMS) that examines quality of care performance in heart failure, acute myocardial infarction (AMI), community acquired pneumonia, coronary artery bypass grafts (CABG) and hip and knee replacements. Thirty three specific clinical indicators are used to reflect quality and safety performance and a composite score (CS) is derived for each clinical area.

CMS is a federal agency within the US Department of Health and Human Services which is responsible for Medicare, the federal health insurance program for seniors and the disabled; Medicaid, a needs-based health care program jointly funded with the states; and various other programs and services. The Medicare Premier Hospital Quality Incentive Demonstration (PHQID) was a nationwide program that was run in collaboration with Premier Inc, a national alliance of non-profit hospitals. Participation in the scheme was voluntary with approximately 60% of the Premier Inc. member hospitals agreeing to be involved (Ryan and Blustein, 2012).

In the PHQID, hospitals are paid a bonus from Medicare according to their ranking of performance on the specified indicators compared with other hospitals in the scheme. The model is known as ‘tournament based pay’ because hospitals compete against each other to be in the top-performing group that receives additional payments. For example, if hospitals performed in the top 10% for meeting the P4P clinical measures, a bonus payment equivalent to 2% of their annual diagnosis-related group payment is paid. If the hospitals’ performance ranking is in the top 11-20%, a 1% bonus is paid. All hospitals in the top 50% are acknowledged by public reporting.

The first phase of the program began in 2003 and the incentive system was redesigned for Phase 2 which commenced in 2007. Penalties for very low performing hospitals were introduced in 2006 (Ryan, 2009; Ryan and Blustein et al., 2012) and continued into the second phase.

The aim of the change to the incentive system in Phase 2 was to encourage greater quality improvement particularly among lower performing hospitals (Ryan and Blustein et al., 2012). During Phase 2 hospitals were eligible to receive attainment awards, top performer awards, and improvement awards. An attainment award applied to hospitals whose composite scores in the current year exceeded the median of demonstration hospitals two years prior to the current year. The top performer award was paid to hospitals that scored in the top 20% in the current year. The improvement award was given to hospitals with scores above the median of demonstration hospitals in the current year that ranked in the top 20% of demonstration hospitals for quality improvement (Ryan, 2012). The amount paid for incentives increased from an average of about 8 million per year in Phase 1 to 12 million per year in Phase 2.

The indicators are largely process measures and remained very similar across both phases. For example for AMI these included provision and administration of aspirin on arrival and discharge, beta blocker at arrival and discharge, angiotensin converting enzyme inhibitor for left ventricle systolic dysfunction and smoking cessation counselling. Eight additional process measures (e.g. performing an electrocardiogram within 10 minutes of emergency department presentation, lipid-lowering medication at discharge, dietary modification counselling, and referral for cardiac rehabilitation) are now also included.

Although the hospitals receive the bonus payments Ryan (2009) suggested these bonuses were not effectively distributed within the hospital’s clinical areas or to physicians, thus potentially lessening the impact of the incentives to change clinical behaviour. Ryan (2009a) undertook an

analysis of mortality for the PHQID scheme in the USA and found no evidence that the PHQID scheme had a significant effect on risk-adjusted mortality for AMI, heart failure, pneumonia or CABG.

A more recent study (Jha et al., 2012) analysed data provided by 252 hospitals and examined 30-day mortality rates for more than 6 million patients with acute myocardial infarction, congestive heart failure, pneumonia, or coronary artery bypass graft surgery between 2004 and 2009. The purpose of this study was to compare the effects of public reporting alone against a pay for performance model combined with public reporting. All hospitals in the study were participating in Medicare Hospital Compare, a public reporting program which was running concurrently with the PHQID. Non-Premier hospitals — those not part of PHQID — were used as a control group.

The authors report that there was no impact on patient outcomes for hospitals in the Premier pay-for-performance program compared with non-Premier hospitals. Thus, participation in the pay-for-performance scheme was not associated with a decline in mortality above and beyond those reported for hospitals that participated in public reporting alone. Importantly, no difference was found in outcomes even for conditions in which mortality rates were explicitly incentivised (acute myocardial infarction and coronary bypass graft surgery). This remained the case when measuring differences in improvements between poor-performing hospitals in the two groups.

The authors concluded that both the size of the incentives and the targets matter. They argued that, in the Premier demonstration, the incentives were small and patient outcomes were not the major focus. They concluded that it is not surprising (in retrospect) that this program failed to improve patient care (Jha et al., 2012).

7.2 Summary of the Evidence for PHQID and other USA Incentive Schemes

The following tables summarise the papers and studies reviewed.

Table 16 *Incentive Schemes - PHQID and other USA schemes - details*

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
The Long-Term Effect of Premier Pay for Performance on Patient Outcomes	Jha, A et al	2012	Research study	PHQID	Adjusted price	USA
Hospital-based pay-for-performance in the United States	Ryan, A	2009	Editorial	PHQID	Adjusted price	USA
Effects of the Premier Hospital Quality Incentive Demonstration on Medicare Patient Mortality and Cost	Ryan, A	2009a	Research study	PHQID	Adjusted price	USA
Has Pay-for-Performance decreased access for minority patients?	Ryan, A	2010	Research study	PHQID	Adjusted price	USA
The Effect of Phase 2 of the Premier Hospital Quality Incentive Demonstration on Incentive Payments to Hospitals Caring for Disadvantaged Patients	Ryan, A et al	2012	Research study	PHQID	Adjusted price	USA
Medicare's Flagship Test of Pay-for-Performance did not spur more rapid quality	Ryan, A Blustein, J and Casalino, L	2012	Research study	PHQID	Adjusted price	USA

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
improvement among low-performing hospitals						
What's the Return? Assessing the Effect of "Pay-for-Performance" Initiatives on the Quality of Care Delivery	Grossbart, S	2006	Research study	PHQID	Adjusted price	USA
Potential unintended financial consequences of pay-for-performance on the quality of care for minority patients	Karve, A et al	2008	Research study	PHQID	Adjusted price	USA
Public Reporting and Pay for Performance in Hospital Quality Improvement	Lindenauer, P et al	2007	Research study	PQHID	Adjusted price	USA
Results from the first 4 years of pay for performance	DeVore, S	2010	Feature story	PHQID	Adjusted price	USA
The Effect of Financial Incentives on Hospitals That Service Poor Patients	Jha, A, Orav, E and Epstein, AM	2010	Research study	PHQID	Adjusted price	USA
Making the Best of Hospital Pay for Performance	Ryan, A and Blustein, J	2012	Article	PHQID	Adjusted price and	USA
Do Hospitals Alter Patient Care Effort Allocations under Pay-for-Performance?	Nicholas, L, Dimick, J and Iwashyna, T	2011	Research study	PHQID	Adjusted price	USA
Association of Patient case-Mix Adjustment, Hospital Process Performance Rankings, and Eligibility for Financial Incentives	Mehta, R et al	2008	Research study	PHQID	Adjusted price	USA
Hospital Size, Uncertainty, and Pay-for-Performance	Davidson, G, Moscovice, I and Remus, D	2007	Research article	PHQID	Adjusted price	USA
Systematic review: Effects, design choices, and context of pay-for performance in health care	Van Herck, P et al	2010	Literature review	P4P various	Adjusted price	Belgium
Pay for performance in the Hospital Setting: What is the State of the Evidence?	Mehrotra, C et al	2009	Literature review	P4P Various	Adjusted price and Negation/ Withhold	USA
Snapshot of Hospital Quality reporting and Pay-for Performance Under Medicare	Kahn, C et al	2006	Research study	PHQID and proposed MedPAC P4P	As above for PHQID and withhold for MedPAC	USA
Alternative Pay-for-Performance Scoring Methods, Implications for Quality Improvement and Patient Outcomes	Glickman, S et al	2009	Research study	CMS P4P	Adjusted price	USA
Hospital Performance, the Local Economy, and the Local Workforce: Findings from a US	Blustein, J, Borden, W and Valentine, M	2010	Research article	CMS P4P	Adjusted price	USA

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
National Longitudinal Study						
The Effect of the MassHealth Hospital Pay-for-performance Program on Quality	Ryan, A and Blustein, J	2011	Research study	MassHealth	Adjusted price	USA

Table 17 Incentive Schemes - PHQID and other USA schemes - focus and context

Article name	Area of focus	Context and setting	Magnitude of the incentive
The Long-Term Effect of Premier Pay for Performance on Patient Outcomes	Acute care	Assessed long term data	As above
Hospital-based pay-for-performance in the United States	Acute care	Value-Based Purchasing model in development in the US	Bonus payments to hospitals based on condition-specific composite measures, primarily process with some outcome measures. Initially paid to top ranking hospitals then changed to also reward high improving hospitals. Penalties applied to low performing hospitals.
Effects of the Premier Hospital Quality Incentive Demonstration on Medicare Patient Mortality and Cost	Acute care	Value-Based Purchasing model in development in the US	As above
Has Pay-for-Performance decreased access for minority patient?	Acute care	Review of PHQID	As above
The Effect of Phase 2 of the Premier Hospital Quality Incentive Demonstration on Incentive Payments to Hospitals Caring for Disadvantaged Patients	Acute care	Value-Based Purchasing model in development in the US	As above
Medicare's Flagship Test of Pay-for-Performance did not spur more rapid quality improvement among low-performing hospitals	Acute care	Reviews impact of PHQID on low performing hospitals	As above
What's the Return? Assessing the Effect of "Pay-for-Performance" Initiatives on the Quality of Care Delivery	Acute care	Evaluation of the Catholic Healthcare Partners' hospitals that participated in PHQID	As above
Potential unintended financial consequences of pay-for-performance on the quality of care for minority patients	Acute care	Review of PHQID	As above
Public Reporting and Pay for Performance in Hospital Quality Improvement	Acute care	Comparison of hospitals participating in the Hospital Quality Alliance (HQA) (a voluntary national public-private collaboration to collect and publicly report data) and those participating in PHQID.	As above
Results from the first 4 years of pay for performance	Acute care	Review of PHQID	More than \$36.5million was awarded in incentive payments in the first four years of the project, with \$12million awarded during year four (2006-7 - the most recent year for which statistics are available) across the five clinical areas.
The Effect of Financial Incentives on Hospitals That Service Poor Patients	Acute care	Review of to determine if there was any disadvantage to those hospitals that treat more poor	As above

Article name	Area of focus	Context and setting	Magnitude of the incentive
		patients.	
Making the Best of Hospital Pay for Performance	Acute care	Pre-implementation of the Medicare Hospital Value-Based Purchasing (VBP) program following the PHQID.	Commencing in 2013 1% of DRG payments to be withheld (est \$850 million) increasing to 2% (est \$1.91 billion) in 2017
Do Hospitals Alter Patient Care Effort Allocations under Pay-for-performance?	Acute care	Review of PHQID	As above
Association of Patient case-Mix Adjustment, Hospital Process Performance Rankings, and Eligibility for Financial Incentives	Acute care	Specifically evaluated cardiac care	As above
Hospital Size, Uncertainty, and Pay-for-Performance	Acute care	Data from year one of the PHQID was used augmented by Hospital Compare data for other hospitals for acute myocardial infarction, heart failure and community acquired pneumonia.	As above
Systematic review: Effects, design choices, and context of pay-for performance in health care	Acute care and primary care	NA	Various
Pay for performance in the Hospital Setting: What is the State of the Evidence?	Acute care	Literature review focusing on three P4P programs including PHQID, following release of planned Medicare P4P program to be considered by Congress.	Various
Snapshot of Hospital Quality reporting and Pay-for Performance Under Medicare	Acute care	Review of PHQID and proposed MedPAC	As above
Alternative Pay-for-Performance Scoring Methods, Implications for Quality Improvement and Patient Outcomes	Acute care	Used 2004 to 2005 data from the Hospital Compare database, and process measures from the CMS P4P.	Not applicable
Hospital Performance, the Local Economy, and the Local Workforce: Findings from a US National Longitudinal Study	Acute care	Value-Based Purchasing model in development in the US.	Not applicable
The Effect of the MassHealth Hospital Pay-for-performance Program on Quality	Acute care	The MassHealth P4P program was implemented in 2008 over the existing Hospital Compare, Medicare's public reporting program. During the study period hospitals were also required to report clinical quality measures for maternity care and measures of health disparities as part of the pay-for-reporting program in MassHealth.	Masshealth distributed \$2.6 million for pneumonia process quality, an average of \$40,000 per hospital, for 2008, however hospitals were eligible to earn much more.

Table 18 Incentive Schemes - PHQID and other USA schemes - results

Article name	Strength of evidence	Health system level	Sector	Quality measurement	Results
The Long-Term Effect of Premier Pay for Performance on Patient Outcomes	Well supported practice	Hospital	Private	As above	The composite 30 day mortality at baseline was similar for the PHQID hospitals and the control hospitals, as were the rates of decline in

Article name	Strength of evidence	Health system level	Sector	Quality measurement	Results
					mortality. There was no significant difference among the conditions that were incentivised (acute myocardial infarction and CABG) and those not linked to incentives (congestive heart failure and pneumonia).
Hospital-based pay-for-performance in the United States	NA	Hospital	Private	Process and outcomes for a range of specific conditions.	The PHQID appears to have improved process performance, however it does not appear to have decreased mortality (which was incentivized for AMI and CABG) nor has it decreased inpatient cost growth (which was not incentivized).
Effects of the Premier Hospital Quality Incentive Demonstration on Medicare Patient Mortality and Cost	Promising practice	Hospital	Private	As above	PHQID has had no causal effect on mortality or Medicare cost for AMI, heart failure, pneumonia and CABG and evidence for the causal effect of the PHQID on outlier classification for heart failure and pneumonia is weak. Risk adjusted mortality for AMI and heart failure is significantly lower for PHQID hospitals in 2006, however this does not appear to be a result of the PHQID.
Has Pay-for-Performance decreased access for minority patient?	Promising practice	Hospital	Private	As above	No association found between PHQID and reduced access for minority patients.
The Effect of Phase 2 of the Premier Hospital Quality Incentive Demonstration on Incentive Payments to Hospitals Caring for Disadvantaged Patients	Promising practice	Hospital	Private	As above	Changes in Phase 2 of PHQID resulted in a more diverse group of hospitals receiving incentive payments. Payment for improvements was the largest share of total payments to hospitals with more disadvantaged patient populations.
Medicare's Flagship Test of Pay-for-Performance did not spur more rapid quality improvement among low-performing hospitals	Promising practice	Hospital	Private	As above	Quality improvement relative to that in matched comparison hospitals was significantly less for PHQID hospitals in Phase 2 than in Phase 1 of the intervention. Additionally it did not lead hospitals whose performance had been lower to achieve greater improvement in quality.
What's the Return? Assessing the Effect of "Pay-for-Performance" Initiatives on the Quality of Care Delivery	Well-supported practice	Hospital	Private	As above	P4P had a positive impact on some of the clinical measures rewarded by the programs, and the impact increased with the size of the average expected reward.

Article name	Strength of evidence	Health system level	Sector	Quality measurement	Results
Potential unintended financial consequences of pay-for-performance on the quality of care for minority patients	Routine practice	Hospital	Private	As above	Found that hospitals caring for large African American populations had poorer outcomes on process performance for certain conditions, i.e. acute myocardial infarction and community-acquired pneumonia, but not for heart failure (the 3 diseases reviewed in the study). The difference in the heart failure disparities were thought to be related to limitations in the quality measurements for this condition.
Public Reporting and Pay for Performance in Hospital Quality Improvement	Promising practice	Hospital	Private	As above	The study was conducted over a two year period, and both the PFP hospitals and control hospitals (no financial incentives) demonstrated evidence of improvement in each of the measures of performance, although PFP hospitals showed greater improvement in some of the performance measures. However the incremental effect of financial incentives was reduced when adjusted for differences in baseline performance and other characteristics between the groups.
Results from the first 4 years of pay for performance	NA	Hospital	Private	As above	NA
The Effect of Financial Incentives on Hospitals That Service Poor Patients	Promising practice	Hospital	Private	As above	Study found that both nationally and among P4P hospitals, those that served poor patients had lower quality performance at baseline, however hospitals responded effectively to financial incentives, in AMI and pneumonia care and by the end of the program's third year for all three conditions.
Making the Best of Hospital Pay for Performance	NA	Hospital	Private	As above	NA
Do Hospitals Alter Patient care effort Allocations under Pay-for-performance?	Acceptable practice	Hospital	Private	As above	Compliance with all reported performance measures improved in both groups of hospitals, for both easy and difficult measures. Hospitals in the incentivised program demonstrated slightly greater effort on easy tasks for heart attacks. There was no indication that improvement in effort in easy tasks compromised effort on more difficult tasks.
Association of Patient case-Mix Adjustment, Hospital Process Performance Rankings, and Eligibility for	Acceptable practice	Hospital	Private	As above	Hospitals may perform poorly on process performance assessments because of their patient case mix, including a higher frequency of patients from minority groups.

Article name	Strength of evidence	Health system level	Sector	Quality measurement	Results
Financial Incentives					Adjusting for case mix and the process measures used in the program would moderately change hospital relative rankings.
Hospital Size, Uncertainty, and Pay-for-Performance	Acceptable practice	Hospital	Private	As above	Smaller hospitals were found to have five to seven times more uncertainty regarding their true ranks.
Systematic review: Effects, design choices, and context of pay-for performance in health care	NA	Various	Various	Various	NA
Pay for Performance in the Hospital Setting: What is the State of the Evidence?	NA	Hospital	Private	All programs include clinical process measures of specified conditions, outcomes, cost-efficiency, structure, patient safety and patient experience. Some set an absolute threshold for performance; others use relative performance.	NA
Snapshot of Hospital Quality reporting and Pay-for Performance Under Medicare	Acceptable practice	Hospital	Private	As above	Variations between the models were found for all measures of quality for the three conditions (heart attack, heart failure and pneumonia) among all types of hospitals.
Alternative Pay-for-Performance Scoring Methods, Implications for Quality Improvement and Patient Outcomes	Acceptable practice	Hospital	Private	Study used 7 process measures for AMI and 4 for heart failure.	A scoring system measuring the organisation of clinical and administrative activities, rather than a composite score where processes are weighted by treatment opportunity numbers, demonstrates a stronger association with mortality outcomes.
Hospital Performance, the Local Economy, and the Local Workforce: Findings from a US National Longitudinal Study	Acceptable practice	Hospital	Various	Clinical process of care measures analysed	An association was demonstrated between the level of economic and human resources and process scores, with less advantaged hospitals scoring lower. Hospital performance was found to improve generally, with early low performing hospitals increasing the most. However, disadvantaged hospitals did not reach the scores of advantaged hospitals over the 2004 to 2007 period studied.
The Effect of the MassHealth Hospital Pay-for-Performance Program on Quality	Well supported practice	Funding goes to hospital or similar	Not clarified	Combines quality attainment and improvement for clinical process scores (pneumonia and surgical infection prevention). Program expanded to other conditions in 2010 (based on a proposed	Quality improvement for pneumonia was the same rate in both the study and control group, and for SIP the quality was about equivalent in 2009, even though the Massachusetts hospitals had been higher by 12 percentage points in 2004.

Article name	Strength of evidence	Health system level	Sector	Quality measurement	Results
				design for Medicare's Value-Based Purchasing program).	

Table 19 Incentive Schemes - PHQID and other USA schemes - key points

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
The Long-Term Effect of Premier Pay for Performance on Patient Outcomes	Study evaluated the long term effects of the 252 hospitals in the PHQID, using a control group of 3363 hospitals that were participating in public reporting alone. Outcomes were assessed using 30 day mortality data of over 6 million patients between 2003 and 2009. While study concluded little effect from PHQID other P4P programs may be more effective.	There was no evidence of effect from the PHQID in decreasing 30 day mortality.	No improvement	Not reported
Hospital-based pay-for-performance in the United States	P4P programs should maximise incentives for meaningful quality improvement while minimising incentives for gaming and patient avoidance, including risk adjustment.	NA	NA	NA
Effects of the Premier Hospital Quality Incentive Demonstration on Medicare Patient Mortality and Cost	P4P programs are being rapidly introduced, with the PHQID frequently used for modelling other programs. This study found that PHQID has little impact on the value of inpatient care purchased by Medicare, therefore a variety of P4P designs should be considered as part of Value-Based Purchasing.	Mortality and cost growth was not reduced.	No	Low - Nil
Has Pay-for-Performance decreased access for minority patient?	Potential negative consequences of P4P programs include the allocation of resources towards measured activities and away from unmeasured activities, and patient avoidance or 'cream-skimming'. Theoretically, risk adjustment can counteract incentives to 'cream skim', however it must be based on observable patient characteristics and must sufficiently compensate.	Despite minimal evidence of minority patient avoidance in the PHQID, monitoring of avoidance should continue for P4P programs.	Conclusive – no negative impact	NA
The Effect of Phase 2 of the Premier Hospital Quality Incentive Demonstration on Incentive Payments to Hospitals Caring for Disadvantaged Patients	Concerns have been raised that P4P may increase the quality gap between rich and poor hospitals. Where lower performing hospitals receive lower incentive payments, or face penalties, they will be less able to fund quality improvement initiatives. P4P programs that reward both performance and improvement in performance may avoid unintended consequences of P4P.	Changes in Phase 2 reduced disparity in payments between hospitals with the most and least disadvantaged patient populations.	Conclusive - positive	Not reported
Medicare's Flagship Test of Pay-for-Performance did not spur more rapid quality improvement among low-performing hospitals	Changes in the PHQID in late 2006 were designed to encourage greater quality improvement, particularly among lower-performing hospitals. However, there was no evidence that the change achieved these goals and therefore questions whether hospitals respond to the specific structure of economic incentives in P4P programs.	No evidence of quality improvement in hospitals was found in this study, consistent with findings from a study on MassHealth (with larger financial incentives).	No	Not reported
What's the	Hospitals in the Catholic Healthcare Partners	Improvement in quality	Conclusive -	Not clearly

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
Return? Assessing the Effect of "Pay-for-Performance" Initiatives on the Quality of Care Delivery	group had participated in other quality improvement programs, such as National Quality Forum and National Hospital Quality Initiative, and its strategic plan included increasing quality and patient safety goals. Four hospitals from the group participated in PHQID. A slight increase in pace of quality improvement was found in the P4P hospital compared with the control group, with program described as 'sharpening the focus' of the participating hospitals.	of clinical processes and uptake of evidence-based practices.	positive	stated
Potential unintended financial consequences of pay-for-performance on the quality of care for minority patients	The intention of P4P is to improve care for all patients, however the hospitals that treat large populations of African American (AA) patients may be disproportionately penalised under P4P, due to both patient and hospital characteristics. This can be avoided by adjusting for case mix and demographic factors and rewarding improvement rather than setting targets.	Financial pressures faced by poor performing hospitals may impede them from achieving improvement.	Inconclusive	Not reported
Public Reporting and Pay for Performance in Hospital Quality Improvement	The outcomes of using public reporting and P4P are largely unknown, including the effect of using them in combination with other programs. This study analysed changes in measures of quality from hospitals that participated in both, compared to those who participated in public reporting only (control group).	The effect of the incentives was found to be modest, however it is suggested that P4P may increase quality improvements when combined with public reporting.	Inconclusive	Not reported
Results from the first 4 years of pay for performance	Value-based purchasing (VBP) models should reward both attainment of quality of care benchmarks and overall improvements, and should phase in payment incentives gradually to provide disadvantaged hospitals time to adjust. Assistance and resources should be provided to hospitals that fall below national thresholds, and savings should be shared with hospitals to avoid perverse incentives that exist into the current system.	Article reports that average composite scores of all quality measures within each clinical area have improved by 17.2% in the first four years, and that by March 2008, participating hospitals scored, on average, 6.9% points higher than nonparticipants with respect to 19 Hospital Compare measures.	NA	NA
The Effect of Financial Incentives on Hospitals That Service Poor Patients	There are concerns that hospitals that care for poor patients may be disadvantaged under P4P in comparison with those that have fewer poor patients; however these findings suggest that such financial incentive programs may improve quality for hospitals that care for more poor patients.	Study concluded that there were no negative impacts on performance between hospitals that serve poor patients and others.	Conclusive – positive in reducing disparity between hospitals	Not reported
Making the Best of Hospital Pay for Performance	Early results from the CMS program indicated that there were modestly higher rates of improvement for the diagnoses for which incentives were provided, however studies from the PHQID, and another P4P program in Massachusetts, did not demonstrate improved care. Concerns regarding negative unintended consequences of P4P, such as 'cream skimming', have not been founded.	The quality of acute care has been reported by the Agency for Healthcare Research and Quality in 2010 as improving nationally, which may be attributed to the increasing awareness of quality issues and the means required to address them through	NA	NA

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
		the various P4P programs.		
Do Hospitals Alter Patient Care Effort Allocations under Pay-for-Performance?	P4P could provide perverse incentives to concentrate efforts on low cost improvements that provide bonus payments, and away from high cost efforts. Measure of process compliance in PHQID was classified as either easy or difficult to improve in relation to additional per-patient costs.	Where P4P incentives resulted in increased effort on easy tasks it was not to the detriment of effort on difficult tasks, however generally the financial incentives were not large enough to motivate response.	No	Low improvement on some easy tasks
Association of Patient case-Mix Adjustment, Hospital Process Performance Rankings, and Eligibility for Financial Incentives	Evaluation of the impact of hospital patient demographics, clinical case mix and mix of performance measures on process performance ratings (using data for acute myocardial infarction). It was found that moderate change in ranking would occur when accounting for these factors.	Eligibility for financial incentives may be impacted if patient case mix and the mix of performance measures are not accounted for in the P4P model.	Conclusive - negative impact	Not reported
Pay for Performance in the Hospital Setting: What is the State of the Evidence?	Limited peer-reviewed articles were found, and most lacked a control group. PHQID has been found to provide a 2 to 4 percentage point improvement above control hospitals, however there is still a lack of knowledge about the effects of P4P programs, and its benefits compared to other quality improvement interventions.	NA	NA	NA
Hospital Size, Uncertainty, and Pay-for-Performance	The impact of hospital size on ranking in P4P could be expected to be greater in smaller hospitals due to greater sampling variability. Development of P4P programs should address this uncertainty.	Small hospitals may be more impacted by the use of simple ranks of composite scores, such as in PHQID, than larger hospitals.	Conclusive - negative impact on smaller hospitals	NA
Systematic review: Effects, design choices, and context of pay-for performance in health care	Negative effects from P4P are rarely seen, including feared consequences such as gaming and inequity. P4P can improve quality of care with optimal design and alignment with context.	NA	NA	NA
Pay for performance in the Hospital Setting: What is the State of the Evidence?	There is limited evidence about the effects of P4P, and those evaluations that were reviewed were found to have methodological flaws. The most rigorous studies demonstrated a 2 to 4% greater improvement than what was observed in the control hospitals, however it is not known if the costs of running such programs outweigh the gains.	NA	NA	NA
Snapshot of Hospital Quality reporting and Pay-for Performance Under Medicare	Investigation of the potential impact of the PHQID and the P4P recommended by the Medicare Advisory Commission (MedPAC). Concluded that P4P could result in reporting issues or a focus on seeking bonus payments rather than improving care in a broad sense.	Ranking varied according to model	NA	Not reported
Alternative Pay-for-Performance Scoring Methods, Implications for Quality	While P4P programs are commonly based on a single summary measure from a number of performance indicators, an alternative method for measuring performance may more accurately reflect patient outcomes and	Care for cardiac patients is organised by both clinical and administrative processes, therefore	Inconclusive	Not reported

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
Improvement and Patient Outcomes	result in improved adherence to clinical measures.	P4P programs that focus on administrative process measures may decrease adherence to clinical processes.		
Hospital Performance, the Local Economy, and the Local Workforce: Findings from a US National Longitudinal Study	An association between low performing hospitals and economic and human resource disadvantage was found. Low scoring hospitals demonstrated greater increases in performance however were unable to attain the levels of base-line higher performers. This indicates that P4P programs that credit improvement from base-line, or improvements over long timeframes could be more equitable.	P4P programs could exacerbate inequalities between hospitals.	Conclusive - negative	NA
The Effect of the MassHealth Hospital Pay-for-performance Program on Quality	Although Medicare's Value-Based Purchasing Program is to be implemented in 2013 there has been very few studies done on P4P programs and there is limited evidence to support their effectiveness. This is the first study evaluating the effect of the MassHealth P4P program which was introduced in 2008.	There was no evidence of improvement in quality of care for pneumonia or surgical infection prevention.	No improvement	Not reported

Table 20 Incentive Schemes - PHQID and other USA schemes - evidence and applicability

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
The Long-Term Effect of Premier Pay for Performance on Patient Outcomes	No	One of the few studies using a contemporary control group and long term data. Outcomes limited to 30 day mortality rates.	Yes, with caveats. Stated limitations including inability to control for differences in study and control group
Hospital-based pay-for-performance in the United States	NA	Concludes that emerging evidence suggests that, to date, P4P has not improved value for Medicare.	Yes
Effects of the Premier Hospital Quality Incentive Demonstration on Medicare Patient Mortality and Cost	No	Study suggests that P4P models could be of benefit, however focus on process measures may not maximise benefits.	Yes
Has Pay-for-Performance decreased access for minority patient?	No	Some stated limitations in study, including that sample of hospitals in PHQID may not be generalisable. However analytical method could be utilised.	Yes – with caveats. Very specific to the US healthcare context – questionable whether relevant to Australia
The Effect of Phase 2 of the Premier Hospital Quality Incentive Demonstration on Incentive Payments to Hospitals Caring for Disadvantaged Patients	Yes – short term	Evidence of some benefit in incentivising improvement from baseline in addition to ranking.	Yes
Medicare's Flagship Test of Pay-for-Performance did not spur more rapid quality improvement among low-performing hospitals	No	Although some positives were found from the Phase 2 changes in Ryan's study above, this study questions the value of P4P programs.	Yes

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
What's the Return? Assessing the Effect of "Pay-for-Performance" Initiatives on the Quality of Care Delivery	Yes – short term	Used pre-intervention and post-intervention data and a control group. Sample of only 4 hospitals compared data across one 2 years.	No –issues with study
Potential unintended financial consequences of pay-for-performance on the quality of care for minority patients	NA	There were issues with the methodology and scope of the study, which was performed early in the intervention.	No
Public Reporting and Pay for Performance in Hospital Quality Improvement	Yes, short term - minimal	There were stated limitations with the study, including lack of comparison between no incentives and a single incentive. Difficulty with generalisability.	No
Results from the first 4 years of pay for performance	NA	Bias evident towards a particular model of P4P (or value-based purchasing), evident in the analysis of the P4P projects. Opinion piece.	No
The Effect of Financial Incentives on Hospitals That Service Poor Patients	Yes - minimal	Study only reviewed three conditions and had many stated limitations, including the sample of hospitals. Generalisability from the US to the Australian setting could be limited.	No
Making the Best of Hospital Pay for Performance	No	Article provides an overview of the various P4P programs implemented in the US, confirming the lack of evidence demonstrating positive outcomes.	Yes
Do Hospitals Alter Patient care effort Allocations under Pay-for-Performance?	No	Study conducted on the early years of PHQID.	Yes, with caveats. No pre-intervention data available and only subset of measures in three conditions analysed.
Association of Patient case-Mix Adjustment, Hospital Process Performance Rankings, and Eligibility for Financial Incentives	NA	Evaluation was only of patients with acute AMI using 8 performance measures from the CMS program, however highlights issues with adjusting for variations in hospital characteristics	Yes, with caveats. Limited performance measures analysed
Pay for Performance in the Hospital Setting: What is the State of the Evidence?	NA	Literature review confirming lack of evidence of benefits of P4P.	Yes
Hospital Size, Uncertainty, and Pay-for-Performance	NA	Findings were stated as being generalisable, although based on one year's data only.	Yes – with caveats. Analysed data from the first year only
Systematic review: Effects, design choices, and context of pay-for performance in health care	NA	Six recommendations were concluded from this review however future research was recommended.	NA
Pay for performance in the Hospital Setting: What is the State of the Evidence?	NA	This literature review identifies the limited evidence base that existed in 2007 in the US.	No
Snapshot of Hospital Quality reporting and Pay-for Performance Under Medicare	NA	Comparative data includes only two quarters which were released in 2005, therefore is very preliminary.	No - issues with study
Alternative Pay-for-Performance Scoring Methods, Implications for Quality Improvement and Patient Outcomes	NA	Study evaluated AMI and heart failure, however only one outcome measure was used (inpatient mortality secondary to AMI).	No
Hospital Performance, the Local Economy, and the Local Workforce: Findings from a US National Longitudinal Study	NA	Analysed data for two conditions only; acute myocardial infarction and heart failure, and disadvantaged hospitals were under-represented in the study, although study was longitudinal.	Yes

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
The Effect of the MassHealth Hospital Pay-for-performance Program on Quality	No	Suggestive evidence that there was no improvement in quality of care, however evaluation was in the early stage of the program with only 2 'conditions' incentivised.	Yes, with caveats. Analysed pneumonia (2 years data) and surgical infections (1 year data) only

7.3 Conclusion: PHQID and other USA Incentive Schemes

The setting for the PHQID is significantly different to the Australian setting as the US hospital system is primarily owned and operated by the private sector, as both for-profit and not-for-profit organisations. The public hospitals that operate are not part of a nationwide system but rather are owned by various levels of government from federal through to city. Funding is generally provided directly to the provider from the patient and the health insurer, with government funding being only available to those who are eligible under the various programs, such as Medicare.

While there have been many research studies conducted on the PHQID, there is no convincing evidence that demonstrates any beneficial outcomes that can be attributed to the program. It should be noted that many of the studies are limited by issues with generalisation, due to the fact that there were less than 300 participating hospitals and these facilities volunteered to take part in the program (Grossbart, 2006). In addition, the project was limited to only a few conditions, and as CMS had also implemented a public reporting program, the individual effect of the P4P incentives was difficult to determine.

The most recent study (Jha et al., 2012) is also the most definitive. It found no impact on patient outcomes for hospitals in the Premier pay-for-performance program compared with non-Premier hospitals (i.e. no difference in patient outcomes above and beyond those reported for hospitals that participated in public reporting alone). Importantly, no difference was found in outcomes even for conditions in which mortality rates were explicitly incentivised and this remained the case when measuring differences in improvements between poor-performing hospitals in the two groups.

Many concerns had been raised about unintended, negative consequences of the PHQID project, such as patient avoidance, disadvantage to hospitals with larger minority patient populations and neglect of unmeasured processes. However, there was no evidence found to support such claims (Jha et al, 2010; Nicholas et al, 2010; Ryan, 2010; Ryan et al, 2012), although the change in Phase 2 of the project that rewarded improvements in care was a means of addressing these concerns.

In the US, Medicare is continuing with the P4P strategy with the implementation of the Value-Based-Purchasing Program in 2013, largely based on the PHQID project (Blustein et al, 2010).

7.4 Other International Incentive Schemes

This section deals with other international schemes and information on Australian initiatives can be found in Section 8.

7.4.1 Advancing Quality Initiative (AQ; England)

This is very similar to, and based on, the PHQID scheme. Similar clinical areas were utilised (acute myocardial infarction, pneumonia, heart failure, hip and knee replacement and coronary artery bypass grafts). It has been running in 24 acute Hospital Trusts in North-West (NW) England since 2008. Twenty-eight specific indicators and a Composite Quality Score (CQS) within each of the five clinical areas were utilised (NHS Northwest and Premier Advancing Quality Program, 2010). In recent times there has been an expansion of the scheme into areas such as mental health and stroke and 32 trusts are now involved.

All hospitals in NW England were mandated to participate in the scheme. This is a tournament based scheme where bonuses are paid on relative performance in comparison with other trusts in the scheme. The trusts are sorted in descending order by their CQS. The top 25% of all Trusts participating in each clinical area receive a 4% quality incentive payment for these conditions. Trusts in the 2nd quartile receive a 2% quality incentive payment. There were no penalties incorporated into the AQ.

In the second year of the program the incentives changed so that hospitals could earn “attainment”, “improvement” and “achievement” bonuses based on three different indicators of improvement from the first year to the next, which include both individual and comparative outcomes (Sutton, 2012). Additional funds from these bonuses are directed internally to the relevant high achieving clinical teams for clinical care quality improvement schemes. The decision regarding bonus utilisation was made collectively by the hospitals, and the hospitals also collaborated in regular meetings where their experiences were shared, and the public reporting of results (Sutton, 2012). Other support was provided for quality improvement, including centralised data support and QI activities within the hospitals.

The payment incentives in the AQ are somewhat greater than for the PHQID scheme (4% compared to 2% for top performing hospitals) and apply to a greater band of relative performance (top 50% versus top 20%). In the PHQID only the top 10% of hospitals received the highest bonuses, compared to the top 25% in the AQ. Another significant difference is that the PHQID scheme in the USA was not mandated leading to the potential for selection effects.

The manual for calculating composite scores (NHS Northwest and Premier Advancing Quality Program, 2010) indicates that the calculation is quite complex. It involves a weighting system and it varies by clinical area. For conditions such as CABG, Pneumonia and Heart Failure, the CQS is based on the Composite Process Score as only process measures apply to these areas. However, for the clinical areas of AMI and hip/knee replacements the indicators include both process and outcome measures.

$$\text{AQ CQS} = \text{Composite Process Score (CPS)} + \text{Composite Outcome Score (COS)}$$

The Composite Outcome Score (COS) for AMI takes into account the actual and expected mortality rates and the actual and expected survival rates and for hip/knee includes 28 day expected and actual readmission rates and actual and expected readmission avoidance rates. The COS accounts for a smaller proportion of the CQS than do the process measures. For example, for AMI there are 7 process indicators and 1 combined outcome measure and these are of equal weight. The technical background to the development of these scores is not provided and thus we were unable to ascertain whether these are valid and reliable measures and whether the combining rules and weights are appropriate.

There is a website which provides data on the composite quality scores for each trust, by clinical area, over a three year period (www.advancingqualitynw.nhs.uk). Improvement shifts in the Composite Quality Scores by quartile can be observed between the first year of operation (April 2008-March 2009) and the third year of operation (April 2010-March 2011). For example the average improvement CQS percent scores increased by 1.48% for CABG and up to 21.45% for heart failure (www.advancingqualitynw.nhs.uk/news). The University of Nottingham is responsible for the evaluation of the scheme which commenced in March 2009 and the Final Report of this evaluation is due in 2014 (www.netssc.ac.uk/hsdr/projectdetails.php?ref=08-1809-250).

Sutton et al. (2011), in a report of some preliminary findings from the evaluation team, examined whether the AQ program had an impact on short-term in-hospital mortality. They compared in-hospital mortality for the NW hospitals with the rest of England and related changes in the AQ quality indicators to changes in risk adjusted outcomes within the NW hospitals.

Data from three clinical areas were analysed: pneumonia, acute myocardial infarction and heart failure. Using a “difference-in difference analysis” the results suggest that the introduction of the AQ program was associated with reduced short-term mortality risk amongst patients with pneumonia and heart failure but not with AMI. Heart failure mortality declined by 1.2% and pneumonia mortality declined by 1.8%. The authors estimated that, in the first year of the scheme, 520 deaths were averted for bonuses totalling 3.2 million pounds.

A more recent paper by Sutton et al. (2012) which analysed data for the first 18 months of the scheme in relation to the 18 months prior to scheme commencement and found a risk adjusted 1.3% drop in 30 day in-hospital absolute mortality across these three conditions when compared with 132 other hospitals in England. The relative reduction in mortality was equivalent to 6% or 890 fewer deaths in the period. The largest absolute reduction for pneumonia (1.9%) was significant with non significant reductions for AMI (0.6%) and heart failure (0.6%). Following the first 18 months the program was absorbed into a new pay for performance program that applied across all of England and the new program involved withholding of payments rather than bonuses so further longitudinal data is not available.

Ryan (2009) undertook a similar analysis of mortality for the PHQID scheme in the USA and found no evidence that the PHQID scheme had a significant effect on risk-adjusted mortality for AMI, heart failure, pneumonia or CABG. It is noted, however, that the incentives in the UK were much higher and there were some other differences between the schemes (e.g. voluntary versus mandatory).

However, the composite quality scores (CQS) for the NW hospitals for the three conditions were not significantly associated with these changes in patient mortality (Sutton et al., 2011). As this might indicate problems in how the composite scores were calculated, the authors analysed each quality indicator separately. Sutton et al. (2011) found that only one of the fourteen individual indicators was significantly negatively associated with the mortality rate. The authors suggest that the beneficial effects of the scheme may not be largely captured by the specific and composite quality indicators, which raises some questions concerning the meaning of the improvement of the CQS scores that have been reported.

Notwithstanding the above, there is more evidence available to assess the operation and outcomes of this scheme as contrasted with others. It is worthy of more detailed exploration.

7.4.2 Commissioning for Quality and Innovation Payment Framework (CQUIN)

This scheme, introduced in 2009, links payments to locally agreed quality improvement programs and outcomes. In 2008 the impact of a range of quality improvement models was considered and the model chosen was making payment for activity reflect quality in a national framework with local discretion (Dept. Health 2008, CQUIN 08 Impact Review). Local commissioners withhold a small proportion of total contract revenue conditional on the provider achieving locally agreed quality improvements.

CQUIN applies to all acute, ambulance, community, mental health and learning disability services in England. For acute hospitals there were also two national goals in 2010/11 – reducing the avoidable effects of venous-thromboembolism (VTE) and improving responsiveness to patient’s needs. In 2011/12 two additional goals of were added – (a) improving awareness of and diagnosis of dementia (using risk assessment) and (b) data collection to measure harms caused to patients in the areas of pressure ulcers, falls, urinary tract infection (in patients with a catheter) and VTE.

The national goals are to account for 1/5 of the value of local schemes or 0.3% of provider income (Scott et al. 2011). In 2010/11 the size of the incentive paid to each organisation was 1.5% of total revenue and for 2012-2013 it is 2.5% (CQUIN Summary Sheet 2011/12). Fifty percent of the payments are made in advance (to avoid cash flow problems) and the remaining payment is reconciled with actual performance later in the year. As such the incentive payments appear to be

as much for participation in local quality initiatives and for reporting specified indicators as for actual performance.

In addition to the national data, many of the local programs also involve the collection of data to measure harms caused to patients. As well there is a regionally mandated CQUIN scheme which examines the measurement of patient experience including asking patients whether they would recommend the service to their friends and family. This presumably is an endeavour to meet the goal of improving responsiveness to patient needs and for the services to be patient centred but the usefulness and validity of such a global indicator has yet to be evaluated. Literature concerning the assessment of patient satisfaction would suggest that there may be high rates of endorsement for such items regardless of the quality of care received (Hawthorne et al. 2006). Recently, a more substantive Outcomes and Experiences Questionnaire has been developed by the NHS which may be used in a number of NHS initiatives including CQUIN. This contains a number of items on patient experience (5 items) and outcomes (5 items) but also contains within it a health status index (the EQ-5D) which has the potential for use in economic analyses. This questionnaire is currently undergoing validation (Gibbons et al., 2012).

CQUIN goals cannot be minimum standards. A goal is tied to an indicator and an associated payment threshold. The following example demonstrates these aspects:

Goal: to improve the health of babies and mothers in the 14 days after birth

Indicator: rate of emergency admissions/readmissions to hospital of the baby within 14 days per 1000 live births

Payment Threshold: fewer than 8 emergency admissions per 1000 live births.

These thresholds are informed by available evidence (e.g. NICE Quality Standard, National Service Framework or benchmarking) and by the providers own baseline. This standard will probably increase over time and be reviewed annually.

An independent academic evaluation report on this scheme was due at the end of March 2012 (Department of Health 2010, CQUIN Summary Guide) but is unavailable as yet. However, a summary of the CQUIN scheme for 2011/12 has recently been published (CQUIN 2011/12 Summary Sheet). It reported that the key outcomes for patients were as follows:

1. Over 90% of all patients admitted to acute hospital environments received a VTE risk assessment.
2. More people nearing the end of their life had an opportunity to express their wishes about their preferred place of death.
3. There was a reduction in the number of grade 3 and 4 pressure ulcers across the health economy and all category 3 and 4 ulcers are investigated as Serious Incidents.
4. Smoking is the most important preventable cause of ill health, deaths and use of health care service. Providers were able to identify people who smoked and provide key information which offered opportunities to make a quit attempt.
5. Access to Mental Health Services is now streamlined to ensure that appropriate provision is made by a single point of entry into the service leading to care being provided along care pathways.
6. Improved patient experience has been central to the service provision across all providers.

This summary is notably lacking in detailed evaluation data. The forthcoming evaluation report may provide the substantive evidence that would be required to clarify these claims and to address any findings concerning the impact of this scheme.

7.4.3 Pay for Performance Initiatives from Taiwan

In 2001 the Bureau of National Health Insurance in Taiwan implemented pay for performance programs for diabetes mellitus, tuberculosis, breast cancer, cervical cancer and asthma (Kuo et al., 2011, Li et al., 2010, Lee et al., 2010). Some of these programs later became national initiatives. Initial reports on diabetes, tuberculosis and breast cancer have recently been published. The breast cancer initiative has been reported in the section on best practice pricing as it seems closest to that model. None of these studies have sufficient detail as to the nature of financial incentives provided and, although the hospitals receive the incentive funding, it is unclear how this is distributed to the participating clinical areas. As well, all the studies are retrospective natural or field observational studies with recognised methodological weaknesses limiting the generalisability of their findings.

Tuberculosis

In order to make tuberculosis (TB) treatment more effective and to lower the transmission rate of the disease a pay for performance demonstration project for tuberculosis was introduced in 2001 by the Bureau of National Insurance. The national P4P-TB program was officially implemented at the beginning of 2004 (Li et al., 2010). TB cases identified during 2002 – 2003 constituted the pre-programme group cases (N = 24,754) and excluded any cases that had been in the prior demonstration project. TB cases identified after the 1 January 2004 were defined as the post-programme group (N = 33,536). Cases with ICD-9-CM code 010-018 were included but other cases of tuberculosis (e.g. multi-drug resistant TB) were excluded.

This is a retrospective study which compared TB cases in the national datasets of Taiwan before and after the full implementation of P4P-TB in relation to the cure rate and the average length of treatment. It is actually a cross-sectional study as the performance of each hospital before and after the implementation is not assessed. As with the cancer initiative the hospitals/ physicians in Taiwan could choose to participate in the P4P program if the participating physicians had specialist licensing in infectious disease/tuberculosis and the hospital had more than 100 new cases under treatment and a full-time TB Case Manager. The authors used various statistical techniques to endeavour to overcome this selection bias.

The incentive scheme was designed around 4 chronological stages of treatment for TB over a 12 month period. The first stage was identification and points were earned by hospitals, physicians and case managers for the number of cases identified in this stage and then cured during the following three stages of treatment. The points gained related to the financial incentives paid to the hospitals but the metric that relates the points to payment dollars is not described. Thus we were unable to gauge the size of the incentive.

Li et al. (2010) report evidence from all the hospitals that during this period the identification rate increased by 30% and the length of treatment for all hospitals was reduced (from 58.3 days to 55.4 days). They reported that P4P hospitals had a higher cure rate than non P4P hospitals (68.1% vs. 48.4%) but did not present data with reference to before and after the scheme was introduced and thus as Scott et al. (2011) indicate it is not possible to say whether these changes in cure rates were higher for P4P enrollees compared with non P4P hospitals.

This study has a number of methodological weaknesses. Although improved rates of identification and cure have been reported it is not possible to clearly attribute these to the introduction of the P4P scheme and as a result the data are suggestive but inconclusive.

Diabetes

Lee et al (2010) report on the pay for performance for diabetes care in Taiwan. This study used a retrospective population based natural experiment design with intervention and comparison groups to examine the effects of the P4P program in relation to health service utilisation and health care costs. The intervention group comprised all patients with diabetes who were enrolled in a P4P

program in 2006 (N = 12,499). To create a comparison group, all patients since 2001 who had never joined the P4P program were identified and then were randomly sampled to form a comparison group (N = 26,172). Comparisons were made of indicators pre intervention (e.g. 2005 data) and post intervention (e.g. 2006 data) for both groups.

Hospitals and community clinics with physicians qualified in metabolic disorders can voluntarily apply to participate in the NHI P4P program. The participating physicians can then enrol individual patients in the program. On top of the usual reimbursements for health care services, the P4P program compensates physicians for 'enlarged physician fees' and for case-management fees. Case management fees include a) an initial enrolment visit b) comprehensive follow-up visits and c) an annual evaluation visit, and there are required and recommended services included in these visits (e.g. diabetes specific eye examination, laboratory evaluation, self-care education) as outlined in the scheme guidelines. The actual size of the monetary incentives for participating hospitals and clinics was not described.

At baseline (2005) data there was no difference between the groups – the average number of essential exams/tests performed in a year were similar across the groups. After the P4P introduction there were increases in the number of tests for both groups but they were much greater for the intervention group ($p < 0.001$). This was also the case for the number of physician visits ($p < 0.001$). The average number of hospitalisations for the intervention group increased slightly per year ($p > 0.05$) but the increase in hospitalisations for the comparison group was higher across the year ($p > 0.01$).

As a result there was a much greater increase in cost for physician visits for the intervention group ($p < 0.001$). However, both groups showed a decrease in inpatient costs but this was far greater for the intervention group ($p < 0.01$). The total cost of diabetes related health care expenses in 2006 vs. 2005 were higher for the intervention group - amounting to an additional \$104 per patient per year.

As previous local studies had reported health services for patients with diabetes to be insufficient, the incentive was designed to encourage more regular follow up visits and exams/tests for better monitoring and control of diabetes. The authors conclude that the P4P program effectively improved the evidence based service utilisation of enrolled patients and that this, by inference, might be expected to improve patient outcomes.

The authors acknowledge the study has several important limitations including the non random selection of physicians and patients in the program. As the physician can select which of their patients are enrolled in the program there may be the potential for them to only include 'easier' or less seriously ill patients. The possibility arises that the comparison group may have had more severe illness. An analysis of the severity of patients in the intervention and the comparison groups was unable to be made using the retrospective service utilisation and the cost data available. However, an analysis of co-morbidity undertaken indicated that the intervention group had a higher number of patients with 2 or more co-morbidities. For age, however, it was found the comparison group was significantly older and, in particular, the intervention group had fewer patients 71 years or older. Selection bias thus may cast some doubt on the generalisability of these findings.

Chen et al. (2011) in a later study used 2007 data to test whether seriously ill diabetes patients were disproportionately excluded from the P4P-DM program in Taiwan and reports evidence that older patients, more severe patients and those with more co-morbidities were prone to be excluded. As a result they suggested the importance of mandated participation and risk adjustment in P4P programs. However, it should be noted that there were some changes to the Taiwan P4P-DM incentive payment scheme at the end of 2006 making their findings not directly comparable with the 2006 data reported by Lee et al. (2010).

7.5 Summary of the Evidence – Other International Incentive Schemes

The following tables summarise the papers and studies reviewed.

Table 21 Other International Incentive Schemes – details

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
Composite Quality Score and Outcome Methodologies Year One	NHS Northwest and Premier Advancing Quality Program	2010	Report	Incentive – bonus added to the National Tariff Price depending on the level of performance	Adjusted price	England
Advancing Quality Initiative www.advancingqualitynw.nhs.uk	NHS	2012	Website	As above	Adjusted price	England
Impact of a pay-for-performance programme in the North West of England on patient mortality risk	Sutton et al.	2011	Conference Paper – Int. Health Economics Association	As above	Adjusted price	England
Reduced mortality with hospital Pay for Performance in England	Sutton et al.	2012	Journal article	As above	Adjusted price	England
Using the Commissioning for Quality and Innovation (CQUIN) payment framework	Dept. Health	2008	Govt. Paper	Provider bonus of up to 1.5% total revenue as in standard contract with NHS.	Bonus for meeting local quality goals & some national goals for acute sector	England
CQUIN Impact Review	Dept. Health	2008	Govt. Paper	As above	As above	England
CQUIN Summary Guide 2010	Dept. Health	2010	Govt. Paper	As above	As above	England
CQUIN 2011/12 Summary Sheet	Dept. Health	2011	Govt. Paper	Bonus now 2.5% of total revenue	As above	England
Using the Commissioning for Quality and Innovation (CQUIN) payment framework	Dept. Health	2012	Govt. Paper	As above	As above	England
The effects of pay-for – performance on Tuberculosis treatment in Taiwan	Li et al.	2010	Journal article	Incentive – points gained across 4 stages of treatment equate to dollars	Fee for service incentive payments	Taiwan
A Pay-for- Performance Program for Diabetes Care in Taiwan	Lee et al.	2010	Journal article	Incentive – enlarged physician and case management fees	Fee for service – incentive payments	Taiwan

Table 22 Other International Incentive Schemes – focus and context

Article name	Area of focus	Context and setting	Magnitude of the incentive
Composite Quality Score and Outcome Methodologies Year One	Adjusted price incentives for hospital quality in NW England	Similar to PHQID scheme in USA with larger and broader incentives, mandatory participation and public reporting	Substantial incentive payment
Advancing Quality Initiative www.advancingqualitynw.nhs.uk	As above	As above	Substantial incentive payment
Impact of a pay-for-performance programme in the North West of England on patient mortality risk	Evaluation of the AQ initiative	Early evaluation results for AQ	As above
Reduced mortality with hospital Pay for Performance in England	Evaluation of the AQ initiative	Early evaluation results for AQ	As above
Using the Commissioning for Quality and Innovation (CQUIN) payment framework	Most health sectors	Strengthening local participation in National policy directions for quality and safety through the ability to address local needs	Bonus of up to 0.5% of total provider revenue dependent on participation in local quality initiatives

Article name	Area of focus	Context and setting	Magnitude of the incentive
			with identified performance targets
CQUIN Impact Review	Most health sectors	As above	As above
CQUIN Summary Guide 2010	Most health sectors	As above	Bonus of up to 1.5% of total provider revenue dependent on participation in local quality initiatives with identified performance targets
CQUIN 2011/12 Summary Sheet	Most health sectors	As above	Bonus of up to 2.5% of total revenue dependent on participation in local quality initiatives with identified performance targets
Using the Commissioning for Quality and Innovation (CQUIN) payment framework (2012)	Most health sectors	As above	As above
The effects of pay-for –performance on Tuberculosis treatment in Taiwan	Acute and ambulatory care	High incidence of tuberculosis compared with other countries	Unclear
A Pay-for- Performance Program for Diabetes Care in Taiwan	Acute and ambulatory care	Introduction of P4P programs in Taiwan	Unclear

Table 23 Other International Incentive Schemes – results

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
Composite Quality Score and Outcome Methodologies Year One	Acceptable/emerging	LHN/hospital	Mainly Public	Process indicators and some outcome indicators forming a Composite Quality Score (CQS)	Shifts occurring in CQS but relationship to outcomes uncertain. The average improvement (%) in the CQS scores ranged from 1.45% for CABG up to 21.45% for heart failure
Advancing Quality Initiative www.advancingquality.nw.nhs.uk	See above	LHN/hospital	Mainly Public	Website shows CQS results for each trust over a 3 year period and for the scheme overall	As above
Impact of a pay-for-performance programme in the North West of England on patient mortality risk	Acceptable practice	LHN/hospital	Mainly Public	Process indicators and some outcome indicators forming a Composite Quality Score (CQS) and 30 day in-hospital mortality	Showed reduction in mortality for heart failure & pneumonia but not for AMI. However, CQS not strongly associated with these changes
Reducing mortality in hospital Pay for Performance in England	Acceptable practice	LHN/hospital	Mainly Public	Process indicators and some outcome indicators forming a Composite Quality Score (CQS) and 30 day in-hospital mortality	Showed risk adjusted decline of 1.3% in 30 day for the 3 conditions combined. The decline in mortality for pneumonia was also significant but not for AMI and heart failure.
Using the Commissioning for Quality and Innovation -(CQUIN) payment framework -	Emerging practice/routine	LHN	Acute, Ambulance, Community, Mental Health, Learning Disability	-2 national goals for acute care -Goals, targets and indicators specified for varying local initiatives -Global question on patient experience	In 2008 the scheme was about to commence.
CQUIN Impact Review (2008)	As above	LHN	As above	As above	The Impact Review is an analysis of potential policy impact of the

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
					introduction of CQUIN
CQUIN Summary Guide 2010	As above	LHN	Mainly Public	As above	Although an independent evaluation is due to report in 2012 no results are available as yet
CQUIN 2011/12 Summary Sheet	As above	LHN	Mainly Public	Added two additional national goals – improve awareness of and diagnosis of dementia	A set of global claims are made (see text) concerning effectiveness without substantiating evidence
Using the Commissioning for Quality and Innovation (CQUIN) payment framework (2012)	As above	LHN	Mainly Public	As above	As above
The effects of pay-for-performance on Tuberculosis treatment in Taiwan	Acceptable practice/routine data	Clinical area/individual	Public and Private	Cure rates for TB Length of treatment Identification of TB cases	Higher cure rate and reduced length of treatment for TB after implementation of P4P. P4P hospitals had a higher cure rate than non P4P hospitals
A Pay-for-Performance Program for Diabetes Care in Taiwan	Acceptable practice/Routine data	Clinical area/individual	Public and Private	No. of diabetes follow-up visits and tests, no. of hospitalisations	More follow-up visits and tests for P4P group and fewer hospitalisations. Cost increase equates to US\$ 104 per P4P patient

Table 24 Other International Incentives Schemes – key points

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
Composite Quality Score and Outcome Methodologies Year One	Describes the methodology for calculating the hospital quality scores (CQS) and general information about the scheme	There is conclusive positive evidence for change in CQS scores since AQ introduction but it is unclear how this is related to outcome	Conclusive - positive	Moderate to High -the average improvement (%) in the CQS scores ranged from 1.45% for CABG up to 21.45% for heart failure
Advancing Quality Initiative www.advancingquality.nhs.uk	The website provides a range of information about this scheme including the performance of individual trusts over time in relation to CQS and for the scheme overall	As above	Conclusive - positive	See above
Impact of a pay-for-performance programme in the North West of England on patient mortality risk	Showed small reductions in mortality for heart failure & pneumonia but not for AMI -520 deaths averted at bonus cost of 3.2 million pounds. Found that the CQS were not strongly associated with these mortality changes	Evidence of impact but interpretation uncertain	Conclusive - positive	Moderate
Reduction in mortality for hospital Pay for Performance in England	Showed a 1.3% reduction in risk adjusted 30 day mortality for the three conditions but only significant in the case of pneumonia	Evidence of impact but interpretation uncertain	Conclusive positive	Moderate
Using the Commissioning for Quality and Innovation	Description of scheme and its background (also user manual)	Too early to tell	NA	NA

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
(CQUIN) payment framework				
CQUIN Summary Guide 2010	Guidance for 2011/12 implementation including updates and changes, user resources	Too early to tell	NA	NA
CQUIN 2011/12 Summary Sheet	Guidance for 2011/12 implementation including updates and changes, user resources (summary). Includes statements concerning achievements of the scheme	Unclear	Inconclusive	High
Using the Commissioning for Quality and Innovation (CQUIN) payment framework (2012)	Guidance for 2011/12 implementation including updates and changes, user resources	NA	NA	NA
The effects of pay-for – performance on Tuberculosis treatment in Taiwan	12 month cure rates and length of treatment for TB patients in P4P program compared with historical controls and non P4P hospitals	Inconclusive due to design flaws	Inconclusive	Moderate to High
A Pay-for- Performance Program for Diabetes Care in Taiwan	Costs and service utilisation for diabetes patients in P4P program vs. control	Inconclusive	Inconclusive	Moderate

Table 25 Other International Incentive Schemes – evidence and applicability

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
Composite Quality Score and Outcome Methodologies Year One	Yes over 3 year period	Some methodological issues relating to the calculation of CQS need to be explored. Further evaluation data are required	Yes with caveats concerning some methodological issues and need for further evaluation data.
Advancing Quality Initiative www.advancingquality.nhs.uk	As above	As above	Yes - As above
Impact of a pay-for-performance programme in the North West of England on patient mortality risk	Yes over a 12 month period	As above	Yes - As above
Reduction in mortality in hospital Pay for Performance in England	Yes over an 18 month period	As above	Yes – As above
Using the Commissioning for Quality and Innovation (CQUIN) payment framework	NA – background documents	Some lack of clarity concerning payment and incentive mechanisms	NA – background document
CQUIN Impact Review (2008)	As above	As above	As above
CQUIN Summary Guide 2010	Not at this time	As above	No results provided at this time
CQUIN 2011/12 Summary Sheet	A summary of (unsubstantiated) claims concerning achievements since 2009	Some lack of clarity concerning payment and incentive mechanisms	Unclear as no evidence available as yet to substantiate initial claims of improvement. Claims relate to process rather than outcome. Awaiting independent evaluation report
Using the Commissioning for Quality and Innovation (CQUIN) payment framework (2012)	NA	NA-a briefing manual concerning the new National goals	See above

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
The effects of pay-for – performance on Tuberculosis treatment in Taiwan	Yes – over 1 year period post introduction of P4P	A number of design issues. No severity adjustment when comparing outcomes by type of hospital.	No – details of incentives are unclear and health system characteristics appear to be quite different to Australia
A Pay-for- Performance Program for Diabetes Care in Taiwan	Yes – over 1 year period post introduction of P4P	Increased service utilisation is a desired outcome but is associated with a small increased per patient cost. Increase in follow-up care is seen as a proxy for quality and patient outcome	No – details of incentives are unclear and health system characteristics appear to be quite different to Australia

7.6 Conclusion: Other International Incentive Schemes

The Advancing Quality initiative in the NW of England, which is quite similar to the PHQID scheme outlined in Section 7.1, has the most evidence. However for the NW scheme participation is mandatory vs. voluntary for this area and the incentives paid are larger and apply to more hospitals (50% vs. 20%). There is limited evaluation data available but the limited evaluation data are suggestive of a positive effect in terms of both shifts in hospital quality scores for the clinical areas and outcomes such as short term mortality rates. Accordingly, this scheme warrants further investigation.

Similarly, the Queensland CPIP scheme in Australia (refer Section 8) has shown some indications of a positive effect in some areas such as mental health. However, there are limited evaluation data available in the public domain as yet.

Claims are made concerning the CQUIN initiative in England but the summary of results provided does not include any actual or verifiable evidence. An independent evaluation of this scheme is currently due.

The studies from Taiwan report various positive effects but attribution is uncertain given study design issues and selection bias factors.

However, given the state of the evidence, a review paper on incentive systems (Glasziou et al. 2012) recently identified 9 key questions that need to be asked before the introduction of any incentive scheme designed to change clinician behaviour. These include:

Part A: Is a financial incentive appropriate?

- Does the desired clinical action improve patient outcomes?
- Will undesirable clinical behaviour persist without intervention?
- Are there valid, reliable and practical measures for the desired clinical behaviour?
- Have the barriers and enablers to improving clinical behaviour been assessed?
- Will financial incentives work and better than other interventions to change behaviour, and why?
- Will benefits clearly outweigh any unintended harmful effects, and at an acceptable cost?

Part B: Implementation

- Are systems and structures needed for the change in place?
- How much should be paid to whom, and for how long?
- How will the incentives be delivered?

Appleby et al. (2012) indicate the same factors should be considered at a system level when considering the introduction of payment by results schemes.

7.7 Disincentive Models: Penalties for Poor Practice

Disincentives are included as a component in some funding models that also include incentives, such as pay for performance and normative pricing. Examples were described previously in some of the US initiatives. Primarily, disincentives are based on outcomes of care, and the measures used include hospital readmissions, hospital acquired conditions (HACs), and low rankings on composite quality scores. As can be seen from the summary tables below (Section 7.9) there is no evidence of the specific effects of disincentive models as they are either a minor component of a broader strategy (such as in PHQID), or are in the early stages of implementation or still in development.

Hospital readmissions within 30 days of discharge have been identified as a large and potentially preventable cost (Kocher and Adashi 2011) and have been specifically addressed in the US Patient Protection and the Affordable Care Act. The US will be implementing the Hospital Readmission Reduction Program in 2013 which will apply penalties based on an outcome measure of a 30 day excess readmission ratio, initially for acute myocardial infarction, heart failure and pneumonia, and then expanding to include other conditions.

Use of disincentives by withholding or reducing payment for HACs is clearly complex due to the difficulty in attributing these events to the care provided with absolute certainty. As noted by Fuller et al. (2011) the implication is that HACs are always preventable, and therefore the number of conditions can be limited. In addition to being preventable, the complications must be measurable (Pronovost et al., 2008). In the narrowest model, only those that can be classified as 'never events' are included, such as wrong patient/site surgery and foreign object retained after surgery. An example of this is the NHS Payment by Results scheme in the UK which includes a list of 'Never events', which are defined as 'largely preventable' and paid at the discretion of the commissioners (Dept. Health 2011) (refer Appendix 2).

As part of their Healthcare Purchasing Framework, Queensland Health has identified six 'Never events', that will receive no payment, and additionally two adverse events that will result in a reduction in payment (see Section 8.1.2 and 8.3; Steele and Wright, 2012).

The Acute Inpatient Prospective Payment System (IPPS) in the US has also expanded from only using 'never events', including conditions that 'could reasonably have been prevented through the application of evidence-based guidelines' (Centers for Medicare and Medicaid Services, 2012). This includes some surgical site and catheter associated infections (refer Appendix 2).

A consideration of a disincentive strategy using HACs is the collection and reporting of reliable data. As discussed by Zhan et al. (2007) there can be inconsistencies in the assigning of 'present on admission' ((POA) codes, (or 'Condition Onset Flags', (COFs) as they are called in the Australian setting (AIHW, 2012)), which can be used to identify HACs. Therefore, ensuring accurate and complete clinical documentation, code assignment, and reporting for both COF and the conditions arising, presents a challenge.

As outlined previously, a penalty for poor performance, or 'payment adjustment', was part of the PHQID in the US, where hospitals that ranked in the lower two deciles at the end of the third year could be penalised 1% to 2% of their Medicare reimbursement for that condition (Davidson et al., 2007). However, much of the literature on the PHQID focuses on the incentive aspect of this program and the extent or impact of the penalties is not known.

7.8 Summary of the Evidence on Disincentives

The following tables summarise the papers and studies reviewed.

Table 26 *Disincentive Models - details*

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
Modifying DRG-PPS to Include Only Diagnoses Present on Admission	Zhan, C et al.	2007	Research study	Disincentives - IPPS	Adjusted price	USA
Hospital-Acquired Conditions (HAC) in Acute Inpatient Prospective Payment System (IPPS) Hospitals	Department of Health and Human Services, Centres for Medicare & Medicaid Services	2012	Fact Sheet	Disincentives - IPPS	Adjusted price	USA
A New Approach to Reducing Payments Made to Hospitals with High Complication Rates	Fuller, R, McCullough, E, and Averill, R	2011	Research study	Disincentives - IPPS	Adjusted price	USA
Nonpayment for Performance? Medicare's New Reimbursement Rule	Rosenthal, M	2007	Article	Disincentives - IPPS	Adjusted price	USA
The Wisdom and Justice of Not Paying for "Preventable Complications"	Provonost, P, Goeschel, C and Wachter, R	2008	Article - Commentary	Disincentives - IPPS	Adjusted price	USA
Hospital Readmissions and the Affordable care Act	Kocher, R, and Adashi, E	2011	Journal article	Disincentives – various initiatives mandated by the US Patient Protection and Affordable care Act (ACA)	Adjusted price	USA
Healthcare-Associated Infections as Patient Safety Indicators	Gardam, M at al.	2009	Essay	Disincentives	Negation/withhold	Canada

Table 27 *Disincentive Models - focus and context*

Article name	Area of focus	Context and setting	Magnitude of the disincentive
Modifying DRG-PPS to Include Only Diagnoses Present on Admission	Acute inpatient	Inconsistent use of POA coding in US.	Predicted an \$800 million saving nationwide
Hospital-Acquired Conditions (HAC) in Acute Inpatient Prospective Payment System (IPPS) Hospitals	Acute inpatient	List of HAC codes updated for FY 2011 for IPPS.	Payment does not include cases that are acquired during hospitalisation.
A New Approach to Reducing Payments Made to Hospitals with High Complication Rates	Acute inpatient	Review of IPPS	As above
Nonpayment for Performance? Medicare's New Reimbursement Rule	Acute inpatient	Prior to implement of IPPS	As above
The Wisdom and Justice of	Acute inpatient	Prior to implement IPPS	As above

Article name	Area of focus	Context and setting	Magnitude of the disincentive
Not Paying for "Preventable Complications"			
Hospital Readmissions and the Affordable care Act	Acute care	Initiatives as outcomes of the US Patient Protection and Affordable Care Act (ACA)	Aiming to reduce hospital readmission rates by 20% by the end of 2013 with a potential saving of \$15 billion.
Healthcare-Associated Infections as Patient Safety Indicators	Acute care	Increasing use of national patient safety initiatives, including healthcare-associated infections (HAIs) in driving quality healthcare.	Not applicable

Table 28 Disincentive Models - results

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
Modifying DRG-PPS to Include Only Diagnoses Present on Admission	Routine practice - analysed routine data and regrouped excluding non-POA diagnoses	Funding goes to the hospitals	Public - Medicare	Status of conditions as present on admission or arising during admission.	Stated that Medicare could have saved \$56 million in California, \$51 million in New York, and \$800 million nationwide in 2003 had it paid hospital claims based only on POA diagnoses. Some problems in coding POA were identified.
Hospital-Acquired Conditions (HAC) in Acute Inpatient Prospective Payment System (IPPS) Hospitals	NA	Hospitals (under the Inpatient Prospective Payment System (IPPS))	Public	Hospital acquired condition codes	NA
A New Approach to Reducing Payments Made to Hospitals with High Complication Rates	Acceptable practice	Hospital or similar	Public	Hospital acquired condition codes	A payment reduction based on a best practice norm would be sufficient to lower overall hospital payments by 8.14% while still providing additional payment to 16 (0.6%) of the 2,600 hospitals.
Nonpayment for Performance? Medicare's New Reimbursement Rule	NA	Hospital	Public	Hospital acquired condition codes	NA
The Wisdom and Justice of Not Paying for "Preventable Complications"	Expert opinion	Hospital	Public	Hospital acquired condition codes	NA
Hospital Readmissions and the Affordable care Act	Expert opinion	Various	Public	Hospital readmission rates	NA
Healthcare-Associated Infections as Patient Safety Indicators	Expert opinion	Various	NA	Hospital acquired infection rates	NA

Table 29 Disincentive Models - key points

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
Modifying DRG-PPS to Include Only	Use of POA codes to reduce payment could result in substantial savings for Medicare, in addition to resulting	NA	NA	NA

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
Diagnoses Present on Admission	in more useful data for quality and safety research.			
Hospital-Acquired Conditions (HAC) in Acute Inpatient Prospective Payment System (IPPS) Hospitals	NA	NA	NA	NA
A New Approach to Reducing Payments Made to Hospitals with High Complication Rates	Always excluding HACs implies these conditions are always preventable, thus limiting the complications that can be included. List of HAC codes could be broadened using POA codes and a risk-adjusted best practice norm which could then target hospitals with excessive rates of 'potentially preventable complications'.	NA	Conclusive – positive regarding additional savings.	Not reported
Nonpayment for Performance? Medicare's New Reimbursement Rule	Excluding HAC codes from DRGs will not impact where there are other additional factors that cause a case to be assigned into a more expensive DRG. Conditions included are very limited due to a lack of risk adjustment in the model. Notes a lack of empirical support.	NA	NA	NA
The Wisdom and Justice of Not Paying for "Preventable Complications"	Broadening the list of HOA codes to other complications is complex as there must be certainty that they are important, measurable and truly preventable. Model should be used to stimulate quality improvement and reduce costs. Benefits and risks should be evaluated following implementation.	NA	NA	NA
Hospital Readmissions and the Affordable care Act	Reducing hospital readmission rates is a major focus of the US Patient Protection and Affordable Care Act (ACA) and is considered an example of quality of care improvement. Various strategies using both financial incentives and penalties are to be implemented including applying penalties to excess readmission ratios.	NA	NA	NA
Healthcare-Associated Infections as Patient Safety Indicators	HAIs are gaining significance as a patient safety indicator of quality healthcare. HAI rates could be incorporated into accountability agreements such as those that exist currently for Ontario hospitals, with a focus on facilities that have ongoing unacceptable rates of HAIs due to noncompliance with validated strategies.	NA	NA	NA

Table 30 *Disincentive Models - evidence and applicability*

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
Modifying DRG-PPS to Include Only Diagnoses Present on Admission	NA	Article is from 2007, POA coding has since been implemented nationally and a non-pay for non-performance system essentially operates, with further penalties to be introduced next year. Model is not risk adjusted.	Yes – with caveats. (Article published prior to the implementation of the HAC and POA Indicator. Reporting uses data from 2003 – for discussion only)
Hospital-Acquired Conditions (HAC) in Acute Inpatient Prospective Payment System (IPPS) Hospitals	NA	Fact sheet only	No (fact sheet for information)
A New Approach to Reducing Payments Made to Hospitals with High Complication Rates	NA	Model provides a 'disincentive' against excessive poor performance. Also encourages hospitals to benchmark quality performance against their peers.	No –for discussion only

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
Nonpayment for Performance? Medicare's New Reimbursement Rule	NA	Opinion piece only identifying issues with the use of non risk adjusted HAC codes.	No
The Wisdom and Justice of Not Paying for "Preventable Complications"	NA	Opinion piece only identifying issues with the limitations on classifying conditions as 'preventable'.	No (for discussion only)
Hospital Readmissions and the Affordable care Act	NA	Strategies not yet implemented	No
Healthcare-Associated Infections as Patient Safety Indicators	NA	Broad discussion about HAIs and possible strategies for reducing HAI numbers.	No (for discussion only)

7.9 Conclusion: Disincentive Models

Use of financial disincentives to drive quality/safety improvement appears to be gaining momentum. However, as can be seen from the summary tables (Section 7.8) these models have only recently been implemented or are still in development stages and there is currently no evidence regarding the outcomes of this approach.

It is clear, however, that penalising poor performance is increasingly being used as a part of a comprehensive funding model, which may also provide incentive funding for discharge planning and care, and quality improvement programs. The Medicare model in the US is an example of this approach (Centers for Medicare and Medicaid Services, 2012).

8 The Australian Experience

This chapter draws together the evidence on the Australian experience in linking quality and safety to funding and pricing. This experience includes the models discussed in the previous chapters such as best practice pricing, normative pricing, quality structures pricing models and Payment for Performance (P4P).

This chapter on the Australian experience includes a description of Australian models that have been implemented but not evaluated. It also includes Australian models that are proposed in the early phases of implementation and where it is too early to assess impact.

8.1 Queensland Health

Queensland Health is currently in the process of introducing a number of normative strategies for incentivising day case surgery and reducing length of stay. A range of DRGs will be funded at a price as if they were undertaken as a day case or an extended day case (Steele and Wright, 2012). Lists have been identified based on current Queensland practice and targets have been set. It is planned to eliminate unnecessary pre-operative bed days by not funding bed days for elective surgery in the outlier period to a value equivalent to any pre-operative bed days (Steele and Wright, 2012).

8.1.1 Clinical Practice Improvement Payment System (CPIP)

Following the introduction of casemix payment for hospitals in 2007, the Clinical Practice Improvement Program was introduced in Queensland, Australia in 2008 and this provides incentive payments for clinical improvement activities. The provision of incentive payments is largely related to achieving performance for which there is a set of safety and quality indicators. In 2008, during a pilot phase, seven process indicators were introduced for a range of clinical areas including mental health (2), stroke (2), emergency department (1), discharge medication for patients (1) and chronic pulmonary obstructive disease (1) (Duckett et al., 2008). These indicators were developed in consultation and collaboration with clinical networks.

The indicators focussed on areas such as continuity of care, prescribing and recording of medication and assessment. The initial indicators were largely process measures. For example, they include such elements as patients with a DRG of schizophrenia being seen by a community mental health professional within 7 days following discharge; patients with acute ischaemic stroke receiving antiplatelet medication within 48 hours; an eLMS Discharge Medication Record (or equivalent form for Residential Aged Care) being completed; and for COPD patients in receipt of a Pulmonary Rehabilitation program which meets a recommended evidence based standard. In 2010 the indicators were reviewed and expanded to 10 indicators. There were new indicators for diabetes (1) intensive care (1) maternity (3) and renal (2) and one of the stroke indicators was removed (Scott et al., 2011).

In 2011 (Queensland Health, 2012) new indicators for 2011-2012 were added across a range of new areas including cancer, pressure injury reporting and radiology; additional indicators have been added for some areas (e.g. respiratory conditions) and some existing indicators were refined or replaced. There now appear to be over 30 indicators and the scheme is set to continue until 2013 (Stockwell, 2010).

Since 2008 Queensland Health has dedicated around 1% of its hospital expenditure to the pilot scheme representing about \$8 million each year. Payments are currently made per indicator with an annual cap for each indicator. For example, for each patient with a diagnosis of cancer who receives a multidisciplinary review and for whom the agreed minimum dataset has been completed for Queensland Oncology, a payment of \$50 per indicator is paid with a cap of \$300,000 per annum.

The evaluation of the Phase 1 implementation of this scheme is reported in a doctoral thesis by Stockwell (2010) which is available on the internet (eprints.qut.edu.au/42427/1/Alexis_Stockwell_Thesis_.pdf).

This thesis examined the implementation of the scheme from January 2008 until March 2009. A clinician survey (with a 62% response rate) indicated that 73% of clinicians felt the scheme should continue and was useful. Other data provided by Stockwell (2010) indicated, however, that most clinicians only had a moderate degree of knowledge about the scheme.

The incentive payments were made to the District Health Service and then were to be passed on to the relevant clinical areas. The survey indicated that only 37% of the clinicians thought they had received the incentive payment for achieving the specified performance. A main issue of contention was that although the District Health Service might receive the funds it was thought that these were not being passed down to the relevant clinical areas.

As a result the business rules for the scheme were revised to address this issue. More recent trend data could not be located and it would be interesting to see whether this resulted in increased achievement of the indicators in Phases 2 (April 2009 –September 2010) and 3 (October 2010-2013).

Another issue of concern for clinicians was that at the start of the scheme there was no level playing field so that areas that already had better resources would not find the reporting requirements difficult to achieve and thus would be more likely to meet the reporting targets and to gain the incentive payments. The data from Stockwell (2010) indicated that in the initial phase hospitals in the metropolitan and SE of Queensland were receiving more incentive funding than rural and remote areas.

Stockwell (2010) also examined the initial trend data from January to September 2008 which was compared to pre-implementation data collected in 2007 prior to the introduction of the scheme. There were some significant data issues such as no or limited baseline data for some indicators.

For those areas where there were adequate baseline data, the improvement in the indicators was modest and ranged from 5% for the discharge medication indicator to 10% for the Mental Health indicator. Stockwell (2010) notes that Mental Health incentive payments of \$397,050 were made during the period whereas the costs for reporting and analysing the indicator were estimated at \$7,346. The benefit earned, minus cost, was reportedly \$389,703.

Pleaver et al. (2012) examined data for 16 Mental Health Services participating in the CPIP scheme from January 2009 – June 2011. State wide results showed steady and continual improvement on the mental health indicator (Schizophrenia post discharge 1-7 day follow-up) with an increase in state-wide averages from 39% to 62% in two and a half years. In terms of the trajectory of improvement greater gains occurred in the latter half of 2010 despite a brief dip associated with a natural disaster during this period.

A minimum target for services to be achieved was introduced at this time. CPIP funding could not be secured until this minimum target was met. However, given contextual factors the authors conclude that it is unlikely that incentive payments, with or without targets, were totally responsible for improvement in the follow-up indicator. For example, the Mental Health Clinical Collaborative introduced a state-wide service improvement methodology over the same period.

A more recent draft PowerPoint presentation (Steele and Wright, 2012) to be given to a Finance Network Forum was provided to us by Queensland Health. This identifies some non-recurrent increase in ABF funding for Quality Improvement Payments (QIP). The targets relate to elective surgery (patients seen within clinically recommended timescales); time from admission to theatre for patients admitted as an emergency for repair of fractured neck of femur, ED patient's length of stay and time for ED ambulance patients to be taken off stretcher.

Queensland Health also has a commitment to monitoring patient experience and they undertook an Emergency Department Survey (http://www.health.qld.gov.au/psq/hemt/webpages/patsat_emerg.asp) focussing on what occurred (e.g. how long the patient waited, information concerning the reasons they were given for waiting etc.) rather than just overall patient satisfaction.

8.1.2 Queensland and other disincentive models

As part of their Healthcare Purchasing Framework, Queensland Health has identified six 'Never events', that will receive no payment, and additionally two adverse events that will result in a reduction in payment (Steele and Wright, 2012).

A simulation study (McNair et al., 2009) in Victoria examined the potential effects of a redistribution of DRG payments between discharges with hospital acquired infections and those without. This showed that this strategy had the potential to provide higher rewards for hospitals that had fewer hospital acquired diagnoses - but this has not, as yet, been implemented.

8.2 Western Australia

Since 2010-2011 the Western Australian Health Department has been progressively implementing Activity Based Funding for funding acute in-patient episodes in hospitals. In 2011-2012 the out-patient work stream was added to ABF and it is proposed this will include sub-acute care, mental health and other non-admitted services such as community services by 2013-2014 (HAPI, 2012). They have established a State Efficient Price (SEP) for hospitals.

A number of quality/safety initiatives have been introduced within this context. In 2011-2012 the Safety and Quality Investment for Reform (SQUIRE) was introduced which dedicated \$8m per annum of recurrent funding to assist Health Services to:

1. Continue to develop and maintain clinical governance systems and processes;
2. Incorporate safety and quality activities into permanent roles;
3. Continue to roll out the eight evidence-based clinical practice improvement (CPI) initiatives (venous embolism, pressure ulcers; AMI, falls prevention, medication reconciliation, surgical site infections, central venous catheter infections and hand hygiene)
4. Implement State and National safety and quality policies and programs, including those initiatives developed by the Commission and endorsed by the Standing Council on Health (SCoH); and
5. Continue existing clinical governance activity and reporting arrangements

Basically this initiative provides funding to implement the relevant quality and safety policies and to report on a range of indicators related to these initiatives (refer point 4 above).

Another initiative is the QuIP Clinical Improvement Integration Program (QuIP CIIP) where a funding pool has been established for allocation of project grants to accelerate the uptake and spread of innovative ABF/ABM reforms within WA.

In 2012-2013 (HAPI, 2012) a performance-based Premium Payment Program for WA Health Services will be introduced to:

- Recognise and reward services which provide a very high level of best evidence-based care;
- Reimburse service providers for any additional costs associated with best evidence-based care; and
- Reimburse service providers for the additional tasks required to participate in the scheme, including the collection and submission of data.

Clinical areas have been, or will be selected for inclusion in the program based on:

- A strong evidence base and clinical consensus on the characteristics of best practice;
- High impact, i.e. variation in practice, gap between best evidence and current practice, high volumes or significant impact on outcomes; and
- Availability and quality of data.

In the initial year five (2014-2015) payments will be trialled, using both a reimbursement for care planning incentive model and a quality bonus incentive model. The clinical areas include fragility hip fracture, stroke, adult central line associated bloodstream infections and healthcare associated *staphylococcus aureus* bloodstream infection. Participation in the program initially will not be mandatory but sites and services will be eligible for payment only if they submit the required data on the key indicators. Some aspects of this proposal could be considered as fitting the Best Practice Pricing Model. For example, the fragility hip fracture premium payment has been based on the United Kingdom's Payment by Results Best Practice Tariff program (Department of Health, 2011).

8.3 Summary of Australian Models

Table 31 Australian Models - details

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
ABF and Queensland Healthcare Purchasing Framework	Steele and Wright	2012	PowerPoint Presentation for Finance Network Forum	Incentives associated with day case surgery. Withholding payment for some pre-operative day stays, adverse and never events	Proposed: Adjusted price and withholding	Aus
Pay for performance in Australia: Queensland's new Clinical Practice Improvement Payment	Duckett et al.	2008	Journal article	Incentives paid to hospitals (@ \$50-100 per patient) related to the achievement of clinical process /reporting indicators	Adjusted price	Aus
CHI Clinical practice improvement CPIP user guide Phase 111	Queensland Health	2011	Govt. Paper	As above but including additional indicators	Adjusted price	Aus
Evaluation of Financial Incentives in the Public Hospital Context	Stockwell	2010	PhD thesis	Incentive -CPIP	Adjusted price	Aus
Clinical Practice Improvement Payments: incentives for delivery of quality of care	Pleaver et al.	2012	Journal article	Incentive -CPIP	Adjusted price	Aus
Designing incentives for good-quality hospital care	Duckett, S	2012	Journal article	Disincentives (predominantly)	Adjusted price	Australia
Letter to the Editor re Stephen Duckett's article entitled 'Designing incentives for good-quality hospital care'	Sketcher-Baker, K, Wakefield, J, and Partridge, J Queensland Health, Brisbane, QLD	2012	Letter to Editor in MJA	Disincentives/Incentives - also describes extra quality improvement payment over ABF which is an incentive	Adjusted price, specifically that QLD in addition to ABF also applies a 'purchasing framework model' with the aim of improving safety and quality for the	Australia

Article name	Authors	Date	Medium	Model	Funding mechanism	Country of origin
					same or lower cost	
Health Activity Purchasing Intentions 2012-2013	Department of Health WA	2012	Government paper	ABF and proposed reforms including quality and safety aspects	Adjusted price, grants	WA, Australia
Literature Review: Efficiency, international best practice in ABF and future payment reform	Health Policy Solutions	2011	Literature review	ABF and payment reform	Various	Australia
Prospective Payment to Encourage System Wide Quality Improvement	McNair, P et al	2009	Research study	Disincentives - IPPS	Adjusted price	Australia

Table 32 Australian Models - focus and context

Article name	Area of focus	Context and setting	Magnitude of the incentive
ABF and Queensland Healthcare Purchasing Framework	Proposed introduction of normative strategies	Broader issue of State budget issues	Proposed incentive to increase day surgery procedures and to reduce pre-operative stays
Pay for performance in Australia: Queensland's new Clinical Practice Improvement Payment	Mainly acute care	Following reviews of Queensland Health Dept. related to regional hospital care issues	Payment rates at @ \$50 - \$100 per patient represent an increase in marginal revenue of @ 1-3% per patient treated
CHI Clinical practice improvement CPIP User Guide Phase 111	Mainly acute care	As above	Vary by indicator e.g. \$50 but with a cap per each indicator (e.g. \$300,000). Total funds available are 8 million per annum
Evaluation of Financial Incentives in the Public Hospital Context...	Mainly acute care	As above	As above
Clinical Practice Improvement Payments: incentives for delivery of quality of care	Acute mental health care and outpatient follow-up	-Minimum target setting introduced 2010 -Concurrent Mental Health Clinical Collaborative -Natural disasters	Payment tariffs ranged from \$125 to \$200 per patient with schizophrenia for follow-up post-discharge within 7 days. (January 2009 to June 2011)
Designing incentives for good-quality hospital care	Acute inpatient	Introduction of ABF in Australia following the National Health Reform agreement and formation of the Independent Hospital Pricing Authority (IHPA)	Offers several options for which the magnitude of incentive/disincentive varies
Letter to the Editor re Stephen Duckett's article entitled 'Designing incentives for good-quality hospital care'	Acute inpatient	Qld Health model	No payment under ABF for 'Never events', or low frequency events associated with severe harm or death with very high preventability with existing controls. Discounted payment for other events with mid to high level preventability. Some incentive payment is incorporated - not detailed.
Health Activity Purchasing Intentions 2012-2013	Acute inpatient and outpatient	Ongoing implementation of ABF in WA	Proposed incentive tariffs for Best Practice, magnitude unclear
Literature Review: Efficiency, international best practice in ABF and future payment reform	Acute inpatient	Development work for a comprehensive Pricing Framework	Various
Prospective Payment to Encourage System Wide Quality Improvement	Acute inpatient	Models an IPPS for Australia	NA

Table 33 Australian Models - results

Article name	Strength of evidence	Health system level	Sector	Quality/Safety measurement	Results
ABF and Queensland Healthcare Purchasing Framework	NA proposed	State/LHD to Hospital	Public	Day surgery rates; Pre-operative stay rates Specified 'never' and 'adverse events'	Proposed – no evaluation
Pay for performance in Australia: Queensland's new Clinical Practice Improvement Payment	NA - Descriptive article	LHD	Public and some Private	7 process indicators focussing on areas such as continuity of care, prescribing and recording of medication and assessment across a range of clinical areas	No evidence of impact at this time e.g. at scheme commencement
CHI Clinical practice improvement CPIP User Guide Phase 111	See article below	LHD	Public and some Private	As above – additional indicators added over time	No independent evaluation report identified for post March 2009. More recent performance of the Scheme would be of interest
Evaluation of Financial Incentives in the Public Hospital Context	Acceptable Practice	LHD	Public and some Private	Phase 1 implementation focus - 7 indicators	Clinician acceptance of the scheme was good. Modest increases in reporting for some indicators of 5-10% over 9 months. Comparative baseline data not available all areas. Issues concerning clinical areas not receiving the incentive payments as intended from the District Health Services
Clinical Practice Improvement Payments: incentives for delivery of quality of care	Acceptable Practice	LHD	Public and some Private	Mental Health process measure re follow-up post discharge for Schizophrenia	An increase in state-wide averages from 39%-62% over 2.5 years. Cannot be attributed solely to incentive intervention
Designing incentives for good-quality hospital care	NA-discussion paper	Funding goes to state, territory (in the first instance)	Public	'Never event' and other events associated with temporary or permanent injury	NA
Letter to the Editor re Stephen Duckett's article entitled 'Designing incentives for good-quality hospital care'	Expert opinion - QLD Health	Funding goes to state, territory (in the first instance)	Public hospital funding	Not documented in detail	NA
Health Activity Purchasing Intentions 2012-2013	NA	LHD	Public	Performance indicators associated with Best Practice Tariffs	NA
Literature Review: Efficiency, international best practice in ABF and future payment reform	NA	Various	Public	Various	NA
Prospective Payment to Encourage System Wide Quality Improvement	Expert opinion	Hospital or similar (but could be applied to LHN or similar)	Public	Not-present-on-admission and other complication diagnoses codes	Excluding specific complication codes resulted in 1.37% being ungroupable, 1.56% being grouped to another DRG and 14.86% with at least one complication code.

Table 34 Australian Models - key points

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
ABF and Queensland Healthcare Purchasing Framework	Describes a proposed adjusted price incentive to increase day surgery rates and reduce pre-operative stay rates and withholding for never events and adverse events	Proposed	NA	Proposed
Pay for performance in Australia: Queensland's new Clinical practice Improvement Payment	Description of the development of the Queensland CPIP program	Too early to tell at introduction	Inconclusive	NA
CHI Clinical practice improvement CPIP User Guide Phase 111	Provides background on and definition of indicators – particularly those recently introduced	NA	NA	NA
Evaluation of Financial Incentives in the Public Hospital Context	Only applies to 9 months of the initial implementation of the scheme Some modest improvements (5-10%) in reporting for some indicators Clinicians quite positive but not fully engaged	Inconclusive – but only as a limited period of implementation reported. Some positive trends	Inconclusive	Low - Moderate
Clinical Practice Improvement Payments: incentives for delivery of quality of care	Performance of Mental Health Services in Queensland in relation to incentivised indicator relating to follow-up within 7 days post discharge	Conclusive - positive	Conclusive - positive	Moderate
Designing incentives for good-quality hospital care	Increasing focus on use of financial disincentives to discourage poor quality patient care. Payments should not be withheld for readmissions in Australia due to difficulty in attribution. US list of hospital acquired conditions (HAC) could be used, or preferably develop a list based on The Commission's standards. Excluding HACs from the DRG classification could penalise hospitals with a higher rate of HACs, reward those with low rates and have no impact on hospitals with average rates.	NA	NA	NA
Letter to the Editor re Stephen Duckett's article entitled 'Designing incentives for good-quality hospital care'	QLD Health in addition to ABF applies a 'purchasing framework model' to improve safety and quality for same or lower cost.	NA	NA	NA
Health Activity Purchasing Intentions 2012-2013	Proposed plans for incentivising quality and safety within ABF in WA	NA	NA	NA
Literature Review: Efficiency, international best practice in ABF	While P4P is generally still in development, non-payment for non-performance is moving into implementation. Conditions can range from 'never events' to a broad range of	NA	NA	NA

Article name	Key points from article	Impact	Significance of impact / effects	Self-reported strength of any reported improvement
and future payment reform	conditions, and payment impacts range from impacting DRG assignment to applying penalties to a broader range of cases. The US Medicare payment system excludes a list of HACs from the activity-based payment.			
Prospective Payment to Encourage System Wide Quality Improvement	Case mix based IPPS without exclusions for avoidable complications do not provide incentives to improve quality.	NA	NA	NA

Table 35 Australian Models - evidence and applicability

Article name	Evidence of service/system change	Comments	Overall applicability to Australia and to IHPA for ABF purposes
ABF and Queensland Healthcare Purchasing Framework	NA-proposed	NA	Proposed so no evaluation as yet
Pay for performance in Australia: Queensland's new Clinical Practice Improvement Payment	NA –refers to development and initial implementation phase	Many indicators are pay for reporting although some indicators may be more outcome related	Unclear as no substantive evidence reported as yet
CHI Clinical practice improvement CPIP User Guide Phase III	NA	NA – user manual provides details of additional indicators	No current evaluation data available
Evaluation of Financial Incentives in the Public Hospital Context	Yes – short term and minor	Identifies some useful implementation issues for incentive style schemes	Yes with caveats concerning the short period of data analysed
Clinical Practice Improvement Payments: incentives for delivery of quality of care	Yes over 2.5 year period	Some unavoidable weaknesses in design (field experiment) make clear attribution difficult	Yes with caveats concerning study design
Designing incentives for good-quality hospital care	NA	Opinion piece offering a proposal for a disincentive model of penalising for hospital acquired conditions.	No
Letter to the Editor re Stephen Duckett's article entitled 'Designing incentives for good-quality hospital care'	No evidence, anecdotal letter to editor	QLD appear committed to paying for quality/safety and describe a payment model that has components of not paying or reducing payment for poor outcomes and also a quality improvement payment above ABF as a short term financial incentive.	Apparently being used in QLD but not enough detail to assess overall applicability for Australia
Health Activity Purchasing Intentions 2012-2013	NA	Proposed activities including the introduction of some Best Practice Tariffs	Proposed so no evaluation available
Literature Review: Efficiency, international best practice in ABF and future payment reform	NA	Literature review including information about disincentives	Yes
Prospective Payment to Encourage System Wide Quality Improvement	NA	Proposed model penalises at the hospital level, therefore is not applicable at the national level.	Yes – with caveats. Simulation study only.

9 Summary and Conclusions

There is a rich literature arguing the case that health care pricing models should reward quality and safety. Many of these arguments may be perceived as inherently appealing. However, while strong on argument, most of the literature is weak on evidence.

There is currently limited evaluation or published research data to support Best Practice Pricing. The few research studies report modest gains or a beset with methodological inadequacies (Casale et al., 2007; Kuo et al., 2011; Nahra et al., 2006). The most major scheme is the introduction of Best Practice Tariffs in England. Some initial findings from the National Hip Fracture Database in the UK (National Hip Fracture Database, 2012) show some improvements but there needs to be conclusive evidence that this approach is actually delivering meaningful gains in both safety and quality and that the scheme represents value for money in comparison to other potential incentive initiatives.

There is limited published data concerning the Normative pricing approaches. The use of normative approach by the National Health Service (UK) to incentivise day surgery procedures is yet to be evaluated. Queensland Health is proposing to introduce a similar strategy in 2012-2013 (Steele and Wright, 2012) and there are a number of new US initiatives to reduce readmissions and to provide greater home based care but these are only at their initial stages and will need to be evaluated. Some research studies examining normative approaches in the radiology area have reported substantial improvements in performance (Andriole et al., 2010; Boland et al., 2010) although due to weaknesses in the research design the level of evidence is weak.

With regard to Quality Pricing Structures the most common approaches are accreditation, clinical quality registries linked to clinical benchmarking and other quality/safety improvement activities and the funding approach involves paying for participation in such activities. The most evidence for these approaches is to provide funding to allow clinical services to participate in clinical quality registries linked to clinical benchmarking (Birkmeyer and Birkmeyer, 2006; McNeil et al., 2010; Share et al., 2011). The evidence for this approach is strong in terms of achieving improvements in quality and safety. However, there is no direct evidence on the links between performance and the level of funding. Powell et al. (2008) note the lack of studies concerning cost effectiveness although the more recent study by Share et al. (2011) reports impressive savings for a clinical collaborative in Michigan although the cost for the initiative was also high.

With regard to incentive or pay-for performance schemes while there have been many research studies conducted on the Premier Hospital Quality Incentive Demonstration (PHQID) project in the USA there is no convincing evidence that demonstrates any beneficial outcomes that can be attributed to the program (Jha et al., 2012; Ryan 2009a). The most recent study (Jha et al., 2012) is the most definitive. It found no impact on patient outcomes for hospitals in the Premier pay-for-performance program compared with non-Premier hospitals. Thus, participation in the pay-for-performance was not associated with a decline in mortality above and beyond those reported for hospitals that participated in public reporting alone. No difference was found in outcomes even for conditions in which mortality rates were explicitly incentivised.

The Advancing Quality Initiative in England (see page 50) shows greater evidence concerning the reduction in short-term in-hospital mortality and improvement in hospital quality scores (Sutton et al., 2011; 2012). Some models implemented in other countries and locally also show some evidence but require more rigorous evaluation.

However, given the state of the evidence, a review paper on incentive systems (Glasziou et al., 2012) recently identified 9 key questions that need to be asked before the introduction of any incentive scheme designed to change clinician behaviour. These include:

Part A: Is a financial incentive appropriate?

- Does the desired clinical action improve patient outcomes?
- Will undesirable clinical behaviour persist without intervention?

- Are there valid, reliable and practical measures for the desired clinical behaviour
- Have the barriers and enablers to improving clinical behaviour been assessed?
- Will financial incentives work and better than other interventions to change behaviour, and why?
- Will benefits clearly outweigh any unintended harmful effects, and at an acceptable cost?

Part B: Implementation

- Are systems and structures needed for the change in place?
- How much should be paid to whom, and for how long?
- How will the incentives be delivered?

Appleby et al. (2012) indicate the same factors should be considered at a system level when considering the introduction of payment by results schemes. Many of these issues also apply equally well to the other models discussed including the imposition of disincentives.

Use of financial disincentives to drive quality/safety improvement appears to be gaining momentum. However these models have only recently been implemented or are still in development stages and there is currently little evidence regarding the outcomes of this approach (refer Section 7.9). While some conditions, such as those on 'never lists', can definitely be determined to be a complication of the patient's care, the categorising of many other conditions as 'hospital acquired' can be difficult (Fuller et al., 2011). Therefore, the complexities of classifying conditions as 'hospital acquired' is a significant consideration of a model that penalises for hospital acquired conditions.

Information on performance (including casemix data) can be used to drive quality and safety. Sutherland et al. (2011) report that some empirical work in Australia by Sharma, (2007) suggests ABF may encourage hospitals to provide higher quality of care to reduce costly complications or readmissions. Implementation of ABF has also been associated with increased efforts to monitor hospital quality (Duckett, 1995; Ettelt et al., 2006) and the clinical and administrative data used to support ABF are being used for hospital quality improvement initiatives (McNair et al., 2009; Iezzoni 2009; Hagen et al., 2006).

An examination of the effects of the introduction of Activity Based Funding indicates there has been no reduction in hospital quality of care associated with ABF implementation (Sutherland, 2011). The incentives under ABF are for hospitals to decrease lengths of stay, increase volume and reduce cost but it is important that these gains are not made at the cost of a reduction in quality of care (Sutherland, 2011). There is little evidence for a decline in the quality or safety of care associated with the introduction of ABF with studies indicating mortality remains much the same or is slightly lower (Forgione et al., 2005; Louis et al., 1999; Moreno-Serra and Wagstaff, 2009), readmission rates remain similar and hospital quality indicators have shown no decline (Farrar et al., 2009; Jencks et al., 2009; Kahn et al., 1990; Kahn et al., 1993).

However, overall, it is noted that much of the current research literature reviewed reflects poor research designs with inadequate controls making attribution of the effects uncertain. The conclusion is that there is insufficient international evidence at present to support the 'off the shelf' adoption of any existing pricing model that incorporates financial incentives and/or sanctions for quality and safety.

There are several important conclusions which cut across those models that have been carefully evaluated. The first is that the incentives must be of sufficient size to generate a change in behaviour and practice (Jha et al., 2012). Those models which have involved only very small amounts or percentages of money have not been demonstrated to be effective. This is the case regardless of other details of the model.

The second is that funding incentives need to get down to the level of the clinical department if they are to have any effect (Glasziou et al., 2012; Jha et al., 2012; Ryan, 2009; Sutton et al., 2011;

2012; Stockwell, 2010). If the intention of the model is to create incentives to improve the quality and/or safety of clinical care, the clinical department that delivers that care needs to be incentivised. Models that focus funding incentives at the hospital or regional health authority level only have largely not been demonstrated to improve clinical care.

The third is the scope and comprehensiveness of the model. In relation to scope, most models reported in the literature focus on inpatient care and there is little focus in the literature on outpatients, emergency department or hospital outreach care.² Within inpatient care, most models focus on medicine and elective surgery and there is very little in the literature on other clinical areas such as non-elective surgery, paediatrics, obstetrics, palliative care and rehabilitation. Very few models are hospital-wide and comprehensive (refer Sections 4.5 and 5.7).

These conclusions have important implications in the Australian context. The Independent Hospital Pricing Authority (IHPA) is determining the price that the Commonwealth pays Local Health Networks for the Commonwealth contribution to public hospital funding. The Commonwealth contribution is approximately 40% of public hospital funding and any incentive that the IHPA might build into the model would impact only on the Commonwealth contribution.

Further, the Commonwealth funding is directed to Local Health Networks (regional health authorities) rather than to specific hospitals or to clinical departments within hospitals. Based on the evidence in the international literature (Glasziou et al., 2012; Jha et al., 2012; Ryan, 2009; Sutton et al., 2011; 2012; Stockwell, 2010), it is unlikely that incentives built into the model at this level would work unless there was agreement for these incentives to flow down to the level of the clinical department.

Finally, the focus on traditional hospital activity (largely inpatient medicine and surgery) in P4P models has important implications in relation to allocative efficiency and in terms of incentives to develop new models of care. 'Best practice' and 'normative' pricing models are better than P4P in creating incentives for new models of care but, like P4P, most reported models are currently narrow in scope (refer Sections 4.5 and 5.7).

Accordingly it is important that Australia learns the lessons of the international experience in considering how to progress this issue in the future. In doing so, it is important that Australia take into account key recommendations from the literature including (but not limited to) the following:

1. The impact of any proposed approach needs to be modelled and carefully evaluated both prior to implementation and at regular intervals during the intervention.
Many models reported in the literature have not been carefully evaluated. Others have been implemented without any evaluation built in from the onset. Instead, evaluation has occurred several years after implementation which has made it almost impossible to determine attribution.
2. Potential perverse incentives need to be carefully considered. The two most common perverse incentives in the literature are incentives to select the easiest patients and not those with the greatest needs ('cream skimming') and incentives to change what hospitals report rather than what they do (e.g., to not report adverse events) (Glasziou et al., 2012; Appleby et al., 2012; Sutherland et al., 2011).
3. In order to address the incentive to 'cream skim', there is a need for patient risk-adjustment to be incorporated. This requires the development of appropriate patient risk-adjustment methodologies, which are still in an embryonic stage of development (Sutherland, 2012; Birkmeyer and Birkmeyer 2006; Ryan, 2009; Ryan et al., 2012)

² The scope of this literature review excluded office-based primary and specialist care but included hospital outreach care.

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Appendix 1: Search Strategy

The searching was conducted across the following databases:

- Cinahl
- Medline
- EconLit
- Scopus
- PsychINFO
- Science Direct

All searching was limited to the years 2000-current. The search was separated into the four areas of pricing:

1. Best practice
2. Normative
3. Accreditation / Structural
4. Quality / Pay for performance

Combinations of search terms used for each area of pricing were as followed:

1. Best practice

“best practice”, pricing, hospital, incentive, cost*, “evidence based”, funding, health care

2. Accreditation / structural

Accredit*, funding, hospital, structural, benchmark*, pricing, health care

3. Normative

Normative, pricing, hospital, funding, incentive, health care

4. Quality / Pay for performance

“Efficient pricing”, “pay for performance”, “activity based funding”, quality, hospital, pricing, incentive, health care, funding, patient outcome

Search sets	Databases	Dates	Hits	Downloads
Accreditation, structural pricing	Medline, Cinahl, EconLit	2000+	503	15
Accreditation, structural pricing	Scopus	2000+	91	9
Accreditation, structural pricing	PsychINFO	2000+	28	0
Best practice, ABF, pricing	Medline, Cinahl, EconLit	2000+	401	29
Best practice, ABF, pricing	Scopus	2000+	88	11
Best practice, ABF, pricing	PsychINFO	2000+	33	0
Normative pricing	Medline, Cinahl, EconLit	2000+	157	23
Normative	Scopus	2000+	4	0
Pay for performance	Medline, Cinahl, EconLit	2000+	506	66
Quality pricing	Medline, Cinahl, EconLit	2000+	194	31
Quality, pay for performance	Scopus	2000+	44	14
Quality, pay for performance	PsychINFO	2000+	59	16

Appendix 2: Listing of Hospital Acquired Conditions

NHS PbR UK

<p>Never events: 'serious, largely preventable patient safety incidents that should not occur if the available preventative measures have been implemented by healthcare providers' Must fulfill the following criteria; The incident has clear potential for or has caused severe harm/death.</p> <ul style="list-style-type: none"> • There is evidence of occurrence in the past (i.e. it is a known source of risk). • There is existing national guidance and/or national safety recommendations on how the event can be prevented and support for implementation. • The event is largely preventable if the guidance is implemented. • Occurrence can be easily defined, identified and continually measured.
<p>Financial penalty: Paid at the discretion of the Commissioners</p>
<p>Never events for 2011/2012:</p> <p>Surgical</p> <ol style="list-style-type: none"> 1. Wrong site surgery 2. Wrong implant/prosthesis 3. Retained foreign object post-operation <p>Medication events</p> <ol style="list-style-type: none"> 4. Wrongly prepared high-risk injectable medication 5. Maladministration of potassium-containing solutions 6. Wrong route administration of chemotherapy 7. Wrong route administration of oral/enteral treatment 8. Intravenous administration of epidural medication 9. Maladministration of Insulin 10. Overdose of midazolam during conscious sedation 11. Opioid overdose of an opioid-naïve patient 12. Inappropriate administration of daily oral methotrexate <p>Mental Health</p> <ol style="list-style-type: none"> 13. Suicide using non-collapsible rails 14. Escape of a transferred prisoner <p>General Healthcare</p> <ol style="list-style-type: none"> 15. Falls from unrestricted windows 16. Entrapment in bedrails 17. Transfusion of ABO-incompatible blood components 18. Transplantation of ABO or HLA-incompatible organs 19. Misplaced naso- or oro-gastric tubes 20. Wrong gas administered 21. Failure to monitor and respond to oxygen saturation 22. Air embolism 23. Misidentification of patients 24. Severe scalding of patients <p>Maternity</p> <ol style="list-style-type: none"> 25. Maternal death due to post partum haemorrhage after elective caesarean section

(Department of Health, 2011)

Queensland Health

<p>Never events: Serious, largely preventable patient safety incidents that should not occur if the available preventative measures have been implemented.</p>
<p>Financial penalty: No payments will be made for these events or any related follow up work</p>
<p>Never events in 2012-2013:</p> <ul style="list-style-type: none"> • Haemolytic blood transfusion reaction resulting from blood type incompatibility,

<ul style="list-style-type: none"> • Death or likely permanent harm as a result of bed rail entrapment or entrapment in other bed accessories, • Infants discharged to the wrong family, • Death or neurological damage as a result of Intravascular gas embolism, • Procedures involving the retention of instruments or other material after surgery, and • Procedures involving the wrong patient or body part resulting in death or major permanent loss of function.
<p>Adverse Events</p> <ul style="list-style-type: none"> • Hospital acquired bloodstream infection (\$10k reduction) and/or a • Stage 3 or 4 pressure injury (\$30k or \$50k reduction respectively).

(Queensland Health, 2012)

IPPS, US

<p>Hospital Acquired Conditions (HACs): Could reasonably have been prevented through the application of evidence-based guidelines.</p>
<p>Financial penalty: Hospitals do not receive additional payment for cases in which one of the selected (HAC) conditions was not present on admission. That is, the case is paid as though the secondary diagnosis were not present.</p>
<p>HACs for 2013:</p> <ul style="list-style-type: none"> • Foreign Object Retained After Surgery • Air Embolism • Blood Incompatibility • Pressure Ulcer Stages III & IV • Falls and Trauma: Fracture, Dislocation, Intracranial Injury, Crushing Injury, Burn, Other Injuries • Catheter-Associated Urinary Tract Infection (UTI) • Vascular Catheter-Associated Infection • Manifestations of Poor Glycemic Control • Surgical Site Infection, Mediastinitis, following Coronary Artery Bypass Graft) • Surgical Site Infection Following Certain Orthopedic Procedures • Surgical Site Infection Following Bariatric Surgery for Obesity • Surgical Site Infection Following Cardiac Implantable Electronic Device (CIED) • Deep Vein Thrombosis and Pulmonary Embolism Following Certain Orthopedic Procedures • Iatrogenic Pneumothorax with Venous Catheterization

(Centers for Medicare & Medicaid Services, 2012)