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Science to accelerate universal health coverage

Managing incentives for health providers and patients in the move towards universal coverage

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Table of contents

Executive Summary	5
1. Background	8
1.1. Introduction.....	8
1.2. Conceptual framework.....	9
1.3. Scope of the paper	12
2. Methodology.....	13
3. Paying individual providers.....	15
3.1. Reimbursement mechanisms and related incentives.....	15
3.2. Experiences to date.....	16
3.3. Evidence of effects.....	17
3.4. Discussion	20
4. Paying facilities.....	21
4.1. Reimbursement mechanisms and related incentives.....	21
4.2. Experiences to date.....	23
4.3. Evidence of effects.....	24
4.4. Discussion	27
5. Paying for Performance	29
5.1. P4P mechanisms and related incentives.....	29
5.2. Experiences to date.....	30
5.3. Evidence of effects.....	31
5.4. Discussion	34

6. Conditional Cash Transfers	36
6.1. CCTs and related incentives.....	36
6.2. Experiences to date.....	36
6.3. Evidence of effects.....	37
6.4. Discussion.....	38
7. Discussion	39
7.1. Summary of findings	39
7.2. Implications for policy.....	41
7.3. Implications for research.....	43
8. References	46
9. Appendices.....	55

Key messages

INTRODUCTION

- To advance towards universal coverage, decision-makers have to determine ways to incentivise providers and patients alike to increase access to good quality health services and promote efficient modes of delivery that can be sustainable.

PAYING INDIVIDUAL PROVIDERS AND HEALTH CARE FACILITIES

- According to how they are designed, payment mechanisms generate different economic signals which theoretically influence the behaviour of providers.
- There is little rigorous evidence to guide policymakers on how the theoretical incentives created by different payment mechanisms for individual providers (salary, FFS, capitation) or facilities (budgets, case-based payments, per diem) operate in practice.
- The available data does indicate that FFS systems (for individuals or facilities) result in higher rates of utilisation and resource use. These mechanisms can therefore be used if the primary objective is to increase the volume of services provided, with little concern for cost escalation.
- Limited evidence on reimbursement mechanisms for facilities suggests that case-based payments are efficiency enhancing; however, important questions remain about their impact on quality of care and the possibility of implementing them in systems or facilities where capacity is low.
- The impact of different payment mechanisms depends not only on the incentives generated, but also on the capacity of local legal, financial and administrative systems.

PAYING PROVIDERS FOR PERFORMANCE

- Doubts concerning the effects of these efficiency-enhancing mechanisms on quality of care have paved the way for the emergence of pay-for-performance (P4P) mechanisms as a tool to improve both quality of care and efficiency of health providers.
- The evidence in support of P4P at present is mixed. Few significant impacts on quality of care have been reported and where they have been found, they have tended to be small in magnitude.
- Policymakers seeking to implement P4P schemes are advised to proceed with caution. Financial incentives have the potential to do harm and careful attention should be given to the design of schemes to mitigate these risks.
- More evaluations of P4P schemes are warranted that estimate impacts on both intended and unintended outcomes, and give consideration to the cost of implementing such schemes.

PAYING PATIENTS

- Conditional cash transfers (CCT) are payments made to households or patients contingent upon their completion of certain requirements (e.g. regular check-ups, assisted delivery)
- CCTs have proved to be effective demand-side incentives to increase the uptake of health services in countries where they have been implemented, but this success is likely to be dependent on adequate infrastructure, reliable funding and technical capacity.
- Key questions remain about the desirability and cost-effectiveness of CCTs, in particular in low-income settings.

Key messages

RESEARCH GAPS

- The tradeoffs between efficiency of resource use and quality of care for different reimbursement mechanisms remain unproven, and need further research.
- In general, there is a lack of empirical evidence on payment mechanisms from countries that are currently concerned with moving towards universal coverage. Evidence from high-income countries might not be informative for other settings which differ in terms of resources and policy objectives.
- The large body of evidence reviewed here suffers from three main methodological gaps: a lack of robust evidence on the relative impact of different payment mechanisms; a lack of cost-effectiveness studies; and a lack of implementation research to inform the favourable contextual conditions for change.

Executive summary

Health systems that move towards universal coverage seek to provide access to good quality health services to all, in a way that promotes an efficient use of resources to remain sustainable. To achieve these objectives, decision-makers will have to determine how to pay providers to align their interests with those of the patient and the purchaser. In addition, to increase the uptake of health services, decision-makers might also want to shape the incentives that are faced by patients.

This background paper presents an overview of the relative merits and pitfalls of four types of mechanisms available to health authorities to pay health care providers or patients in order to improve a range of outcomes: remuneration arrangements to pay individual providers; payment mechanisms directed at facilities; pay-for-performance incentives; and conditional cash transfers. For the sake of clarity, these four mechanisms are presented and discussed separately. But they should not be seen as mutually exclusive options given that they often co-exist in a given health system.

The results presented in this paper draw primarily on existing (systematic) literature reviews of the evidence, complemented by recently published experimental or quasi-experimental studies. When such rigorous evidence was not available, we considered the findings from controlled observational studies or before and after studies.

The three main methods of reimbursing individual health care workers are salary, fee-for-service (FFS) and capitation. In theory, each provider payment mechanism results in economic signals which influence provider behaviour in different ways. Salaries provide no incentive to increase effort or the outputs produced, but do not encourage over-servicing or patient selection (cream-skimming). FFS payment reimburses health providers for each specific service they provide, which gives a clear incentive to increase consultations, even if unnecessary. Finally, capitation provides a set payment for each person registered with providers which aims to counteract supplier-induced demand and incentivise efficiency, but bears the risk that providers might provide lower quality care or avoid enrolling patients who are less healthy.

The available results from empirical studies are mixed, but broadly, FFS remuneration does appear to result in higher rates of consultation and increased use of resources when compared with capitation or salaried payment. The differences between reimbursement by capitation or salary have been relatively trivial. The available studies have not shown any differences in health outcomes among the three reimbursement mechanisms.

There are five main mechanisms that can be used to pay health facilities: budgets (line-item or global ones); fee-for-service; payment per day; or case-based payments. There is a dearth of evidence on hospital payment mechanisms, with hardly any rigorous evidence and the majority of studies based on the experience of a shift from one system to another (mostly from global budgets to adjusted case-based payments). Still, a few lessons emerge from recent experiences and theory. Line-items budgets essentially offer a simple and straightforward way to control allocation of resources, but they are likely to lead to a waste of resources, and may promote under-provision of care. Global budgets are useful tools to contain costs while allowing some flexibility to facilities, but they may not encourage efficiency

of resource use either. Fee-for-service and per-diems will encourage providers to increase the volume of inpatient care provided, to the detriment of efficiency of resource use. This can lead to unnecessary hospital admissions and, specifically for per-day payments, longer lengths of stay. Case-based payments improve efficiency of resources but their impact on quality, volume of care provided and overall costs is uncertain.

Pay for performance (P4P) schemes refer to payment methods that give financial incentives to health care providers for improved performance on measures of quality and efficiency. The idea behind P4P is that it aligns the incentives of various parties (patients, health providers, purchasers) involved in the provision of health care. There has been experience with P4P in the US, the UK and, to a lesser extent, other OECD countries. P4P schemes are increasingly being promoted in developing countries, with several large pilot schemes under way or in preparation.

Based on the literature identified, evidence on the effectiveness of P4P mechanisms targeting quality improvements is at best mixed and there are substantial methodological weaknesses with existing studies. Few significant impacts have been reported and where they are found, they tend to be small in magnitude. There are two notable exceptions. High profile P4P schemes in the UK and Rwanda show evidence of a positive effect on quality of care, albeit for only a few health conditions. There is almost no evidence on the effect of P4P schemes on health outcomes and efficiency. Although limited, evidence is beginning to emerge on unintended, typically undesirable, effects of P4P. Examples have been reported of gaming, cream-skimming, and detrimental effects on quality of care for health conditions not targeted by the incentives.

Seeking to address financial and cultural barriers preventing people from seeking care, conditional cash transfers (CCT) consist in making a transfer of money to households contingent upon their completion of certain requirements. Although they are now spreading to lower-income settings, the majority of CCT programmes have been implemented in middle-income countries, where they have often been introduced as a broad social transfer mechanism investing in human capital. However, CCTs are increasingly used to increase the uptake of specific health services, such as assisted deliveries. Relying on impact evaluations of an overall good quality, conditional cash transfer programmes have demonstrated a series of positive effects on the uptake of health care interventions, although there are mixed results on the impact of CCTs to increase immunisation rates. Yet key questions remain with regard to their cost-effectiveness and their replicability to poor settings.

The review of this empirical literature underlines a number of research and methodological gaps in the literature. In terms of research questions, there are three areas that have been insufficiently investigated. First, there is a lack of empirical evidence from low- and middle-income countries, which are the countries primarily concerned with moving towards universal coverage. Evidence on provider payment mechanisms from high-income countries might not be informative for these settings, where different short-term policy objectives, as well as information, resource and capacity constraints, indicate that alternative approaches are required. Second, there remains ample scope for further understanding of whether or not P4P schemes work, how they work, and what features are most important in determining their effectiveness. Finally, the jury is still out on the desirability (and cost-effectiveness) of

using conditional cash transfers in settings where targeting is problematic and monitoring is potentially difficult and costly.

In terms of type of studies used, there are three methodological gaps in the literature reviewed. First, there is a scarcity of (randomised) controlled studies on the effects of payment mechanisms, which is likely driven by significant political and logistical difficulties. Second, there are no cost-effectiveness studies comparing alternative mechanisms for paying individual providers, or hospitals. Finally, there is a lack of studies describing how best to implement financing reforms and the conditions required to support change from one system to another.

Despite these gaps, a series of policy recommendations emerge from this empirical evidence. FFS remuneration (for individuals or hospitals) and per diem should be used if the primary objective is to increase the volume of services provided. However, these mechanisms typically increase the use of resources and are unlikely to provide sustainable options. When policy-makers are concerned primarily by gains in efficiency and cost control, the use of hospital case-mix adjusted global budgeting and capitation for primary care providers have often emerged as good options. Doubts concerning the effects of these efficiency-enhancing mechanisms on quality of care have paved the way for the emergence of pay-for-performance mechanisms as a tool to improve both quality of care and efficiency of health providers. Yet, given how little is still known on the effects of P4P, policymakers should proceed with caution as they can trigger unintended effects and gaming behaviours. Besides, the idea of paying incentives on the basis of quality of care is technically demanding, requiring highly sophisticated information technology and monitoring systems. The same caveat should be borne in mind when considering the implementation of conditional cash transfers. Although they are appealing solutions, their cost-effectiveness remains unproven and they should only be considered as a policy option if barriers to universal access to health primarily lie on the demand-side. Ultimately, a mixture of reimbursement mechanisms and incentives is required to mitigate the unintended consequences of single mechanisms. This requires careful design, tailored to the local health system and market realities, as well as active monitoring and management.

Following this overview of the current state of evidence, a number of research priorities should be taken forward to inform the policy debates on universal coverage. On individual payment mechanisms, the two urgent questions relate to the relative (yet unproven) advantage of capitation over salaries for public sector employees, and to the potential trade-off between the efficiency gains generated by some remuneration systems and quality of care. For hospital payment mechanisms, more rigorous research is needed from low- and middle-income countries to understand the effects of different mechanisms on quality of care, and to assess the relative impact of budgets versus case-based payments. Researchers interested in P4P should contribute to the currently small number of well-designed interventions, in particular from low-resource countries, and extend that to investigate the cost of P4P and its impact on health workers' intrinsic motivation. Finally, research on CCTs should focus on their cost-effectiveness compared to other (supply-side) interventions and on the relative advantages of conditioning transfers or not.

Managing incentives for health providers and patients in the move towards universal coverage

1. Background

1.1. Introduction

Moving towards universal coverage usually means that countries aim to embrace a new health financing architecture in order to provide access to health services for all. This new architecture can refer to health systems adopting predominantly one or a mix of two health financing models. The first is a health system where tax revenue is the main source of funding for health services that are typically delivered by public and sometimes contracted private providers. The second one relies on a system where workers and employers are required to pay contributions into a social health insurance fund that employs and/or contracts health care providers to deliver services.

In low-resource settings, various social and macro-economic obstacles prevent countries from establishing social health insurance or relying on tax-financed systems to cover the entire population. Yet, with growing pressure to achieve the Millennium Development Goals, all countries have been encouraged to ensure universal access to cost-effective public health interventions, such as the delivery of insecticide-treated nets or immunisation programmes [1]. Hence the term “universal coverage” has sometimes been used in this context, referring to the objective of actions taken to scale up priority interventions (i.e., providing access to all) [1, 2].

Although they are radically different in terms of scope and the organisational changes they involve, both approaches to “universal coverage” ultimately have similar objectives. First, they aim to offer equitable access to essential health services, so that fundamental health needs can be met for all. Second, they promote an efficient use of resources, encouraging, for example, the adoption of cost-effective interventions [1]. Finally, they both aim to provide health care services of good quality. In order to achieve these objectives, policy-makers need to determine the most adequate health care delivery system, which consists of choosing the organisational and financial arrangements that will create the desired incentives for all actors involved. This background paper focuses on issues raised by some aspects of the financial arrangements.

The behaviour of health care providers determines to a large extent the quality and efficiency of health services provided in a system. Therefore, moving towards universal care requires creating the appropriate incentives for health care providers (either individuals or institutions) that will ensure that an adequate quantity of services is provided, that the quality of these services is good, and that an efficient use of financial resources is made. To achieve this triple objective, governments can use different approaches to remunerating health care providers and incentivising patients.

At the same time, granting access to health for all means that all categories of the population must have equal opportunities to access care when they need it. To achieve this, it may sometimes be necessary to overcome the barriers preventing disadvantaged groups from accessing services. Financial mechanisms can be used to increase the demand of health services to a level deemed beneficial for society as a whole. This is particularly true for preventive services, such as immunisations, that are typically undervalued by individuals but whose consumption creates beneficial spillovers (or externalities) to the whole population.

In other words, when thinking about ways to disburse funds to pay for or purchase health services, decision-makers might consider mechanisms that target either the demand or the supply of health services. In order to inform policy-makers who seek to move towards universal coverage, we set out to review the evidence on the effects of the main payment mechanisms used on the supply-side and the demand-side. Ultimately, this overview paper seeks to bring to the attention of policy-makers the incentives directed at providers or patients that are created by certain payment mechanisms and recent health financing innovations, with a view to understanding the extent to which they can contribute to the achievement of universal coverage.

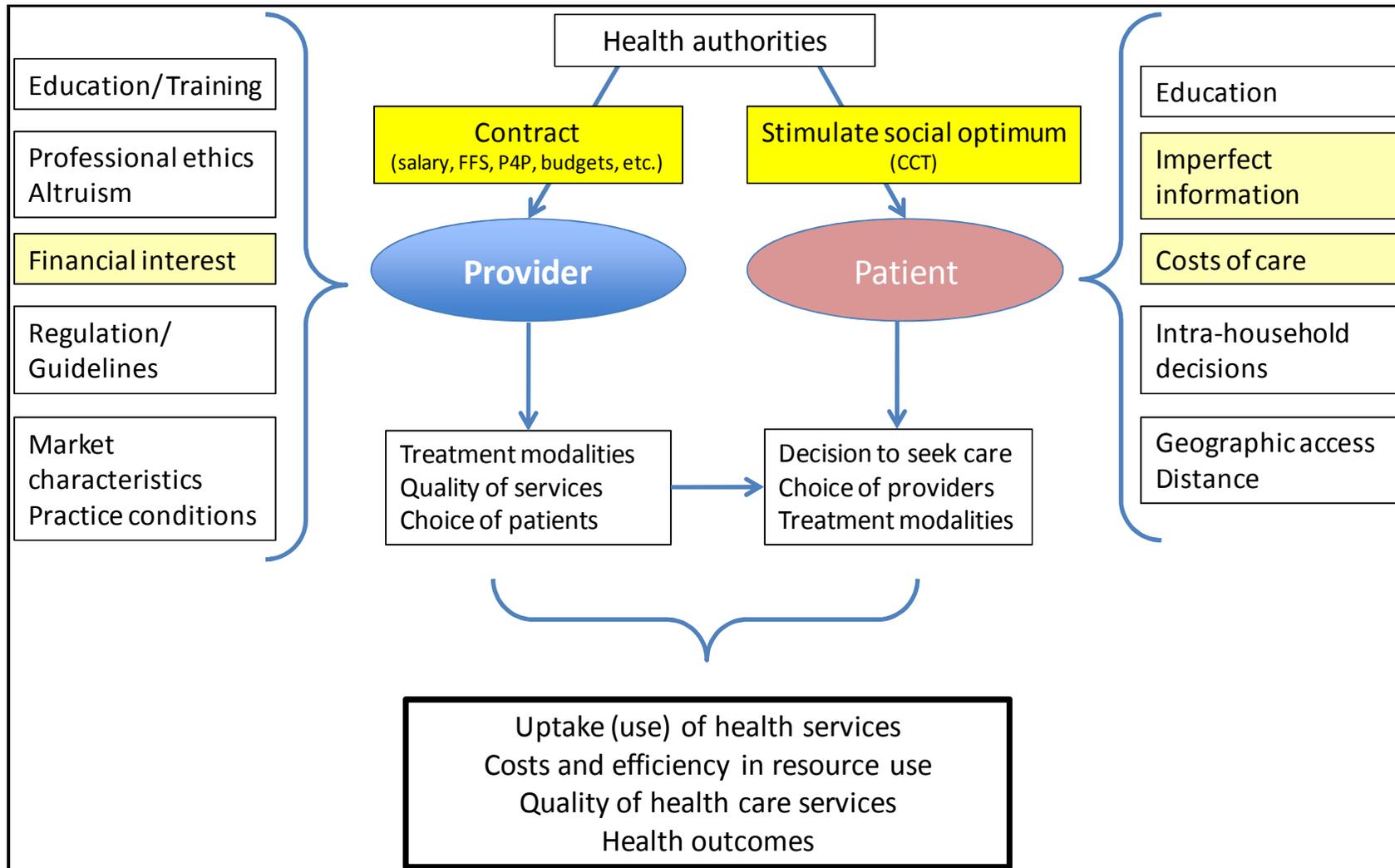
1.2. Conceptual framework

The behaviours of providers and patients are driven by a wide range of factors. Figure 1 provides a conceptual framework showing these different determinants schematically for both providers and patients.

To deliver health services to the population, governments (or public entities) rely on health care providers to deliver services. The effort health workers make to provide such services is driven by a large series of factors, including training, regulation, professional and ethical norms, financial incentives, working conditions, reputation effects and altruism. In addition, providers' decisions are also shaped by the characteristics of the broader environment of the health care market, such as its degree of competition. These different factors form a broad network of incentives, which can be influenced more or less easily and quickly by governments to improve providers' performance and achieve particular policy objectives [3].

According to the principal-agent theory, health care providers act as agents for the principal who hires them to deliver health services to the population on his behalf. Economic theory identifies several problems arising from the principal-agent relationship that can compromise the objectives of universal coverage. First, if agents act according to their self-interest, they might try to shirk or work less diligently for a given level of remuneration. This can have a detrimental impact on the quality of services and the volume of services offered to the population. Second, if they have a financial incentive to cut costs, agents might avoid treating patients that require more resource-intensive treatment. This problem, called "cream-skimming", can arise if agents receive a fixed amount of money per patient treated, while there might be a wide distribution of costs and efforts required to attend patients. This obviously threatens equal access to health services.

Figure 1: Conceptual framework



Third, although the principal expects them to provide good quality services using the most cost-effective approaches, if providers do not bear the financial costs of the services provided, they will not necessarily take costs into account or try to use resources efficiently. Finally, if the agent derives a direct financial benefit each time she delivers a medical service or performs a clinical procedure, she may be encouraged to perform or prescribe unnecessary medical acts, by using her influence on patients and the asymmetry of information to her advantage. This phenomenon is called supplier-induced demand and could lead to escalating health care costs.

All of these issues are likely to compromise the efficient use of resources and to impede universal coverage. To try to reduce these risks, a contract should be drawn up between the two parties to align the objectives of the principal (the purchaser) and the agent. Although contracts between purchasers of services and providers encompass various critical aspects (scope of the contract, regulatory framework, etc.), payment modalities are often seen as the most critical aspect [4]. There is a wide variety of payment mechanisms that policy-makers can choose to purchase health services from health care providers. Payments can be linked to inputs, services provided, population covered or particular performance targets, and they differ in how and when the payment is set and made (see typology in Table 1). Each of these mechanisms is expected to exert different types of incentives on providers, generating both potential benefits and drawbacks.

Table 1: Typology of payment mechanisms

	Input-based payments	Service-based payments	Population-based payments	Performance-based payments
Primary care / individual providers	Salary	Fee-for-service	Capitation	Pay-for-performance
Secondary care / health facilities	Fixed (annual) budget	Fee-for-service, per-day or case-based payments	Block contract	Pay-for-performance

Source: adapted from [5]

Obstacles to reaching universal coverage of health care interventions can also appear on the demand-side, when, despite the availability of good quality essential services, parts of the population may be unable or choose not to use health services. For example, there is ample evidence from industrialised and developing countries depicting the low use of preventive and curative health services by disadvantaged populations [6].

The framework in Figure 1 highlights some of the factors that are known to drive the demand for health services. Patients' decisions are driven by a wide range of factors, such as education, knowledge of the benefits of interventions, cultural factors, costs associated with seeking care, and supply-side aspects such as quality of care or geographical access of health services. The cost of accessing health care has received a lot of attention in the literature on demand for health services [7]. In addition to the direct costs of care when individuals are charged user fees, the demand for health services can be negatively affected by indirect costs (e.g. travel time) or the opportunity cost incurred whilst seeking care (corresponding to the loss of revenue sustained during the visit to the

health provider). For preventive services, lack of awareness of their benefits has often been found to be another major obstacle to universal coverage of essential preventive interventions, such as immunisation or pre-natal services [8]. Finally, intra-households dynamics and women's lack of bargaining power can lead to under-consumption of health services by children or women [8].

In order to address these issues and the resulting under-utilisation of services, some countries have made use of demand-side conditional financial incentives designed to encourage individuals or households to increase use of health services, in particular preventive services. With such mechanisms, usually referred to as "conditional cash transfers" (CCTs), individuals receive some payments if they use health services.

With respect to achieving universal coverage of interventions, CCTs can be seen as a useful complementary tool to broader health care delivery interventions and provider payments. When households are required to bring their children for regular check-ups in order to receive the cash transfer, the programme expects that this will allow cost-effective interventions, such as immunisation programmes, to reach those populations that would not otherwise come to health facilities. In this way, the authorities ensure that a socially optimal uptake of essential interventions is reached [9].

1.3. Scope of the paper

This background paper aims to present an overview of the relative merits and pitfalls of some of the financial mechanisms available to health authorities to allocate or transfer their financial resources to purchase health services from providers or increase the coverage of public health interventions. In the health systems literature, "strategic purchasing" usually refers to arrangements that determine the allocation of funds to provider organizations. These arrangements are typically broken down into a series of individual elements such as contracts employed, payment systems or provider competition [10]. Considering the vast body of work potentially related to this topic, this overview is **restricted to a specific aspect**, namely the **payment systems used** in various purchasing arrangements. Consequently, several areas from the broader health financing literature are excluded from this review. For example, the literature on contracting out was beyond the scope of this paper. Indeed, contracting out refers more to the organisational and contractual arrangement agreed between health authorities and private providers to deliver health services. Within this contractual arrangement, different types of payment mechanisms can be used by the fund-holder (in this case the private organisation that has been contracted out) to pay individual providers or health facilities.

In addition, this paper focuses on the different ways purchasers can pay health care providers (or patients) to improve a range of outcomes. Therefore, user charges, which are payments made by patients at the point of delivery of services, are excluded from this overview, although we acknowledge that they are an important health financing arrangement that has consequences for universal coverage and access to health services in general [11, 12]. Evidence on the effects of decreasing or removing user fees can be found in a number of recent literature reviews [13-15].

To summarise, this overview is restricted to the following specific issues:

Firstly, the scope of the paper is restricted to certain payment mechanisms, those that are most widely used or have recently attracted significant attention:

- **Remuneration arrangements used to pay** health care providers, either **individual providers** (namely salary, fee-for-service or capitation) or **health facilities** (budgeting, case-based payments);
- **Payment mechanisms conditional on specific performance targets, also called pay-for-performance** mechanisms; these mechanisms have been used as payment mechanisms for individuals as well as facilities.
- **Financial incentives directed at patients** to increase the uptake of specific health services (conditional cash transfers).

This choice is justified by the importance these payment mechanisms have had in the strengthening of health systems in developed or developing countries.

Secondly, mechanisms used to purchase services from health care providers usually refer to processes “*by which those who hold financial resources allocate them to those who produce services*” [4]. As such, they are influenced by a wide range of characteristics that shape their functioning and their effects: institutional arrangements; accountability mechanisms; reimbursement system; market environment; etc. Although this overview sometimes touches on some of these other aspects, in particular the contexts in which mechanisms have been operating, we mainly focus on the **incentives and effects created by payment systems** on health care provider or patient behaviour.

Finally, although this paper discusses the different payment mechanisms separately for the sake of clarity, this is not to imply that purchasers of health care in any health system should use predominantly one mechanism or another. In fact, many health systems around the world are characterised by multiple payment mechanisms that co-exist together, linked to a plurality of actors and objectives.

2. Methodology

The financial incentives of focus in this chapter are mechanisms for reimbursing individual providers, different ways of paying health facilities, pay-for-performance initiatives, and conditional cash transfers. We set out to review the available empirical evidence on the effects of these various incentive mechanisms on health system outcomes of relevance to achieving universal coverage (see Figure 1). The impact on the uptake and coverage of health services was relevant for all four types of mechanisms, while for provider payment mechanisms, we also investigated the effects on the efficiency and quality of services provided.

The overview presented in this paper draws primarily on existing reviews of the evidence. We prioritised reviews that could be considered systematic in that they undertook a thorough search for relevant papers and critically evaluated the methodological quality of the studies identified.

The databases and search terms used to identify relevant literature reviews and empirical studies are summarised in Box 1. The searches were not limited in geographical scope, as evidence was sought from both high-income as well as low- and middle-income countries. Identified reviews for

each mechanism are described and briefly presented in the Appendix in Tables A2 (individual provider remuneration methods), A4 (hospital payment mechanisms), A6 (pay-for-performance) and A9 (conditional cash transfers).

Box 1: Review search strategy

Search terms:	Remuneration mechanisms	“reimbursement mechanisms”, “fee for service”, “salary”, “capitation”, “fee payments”, “case-based payment”, “diagnosis-related groups”, “DRG”, “hospital reimbursement”
	Pay-for-performance	“pay for performance”, “performance-based”, “results-based”, “output-based”, “performance incentive”, “conditional payment”
	Conditional cash transfers	“conditional cash transfer”, “cash transfer”, “output-based financing”, demand-side incentives”, “results-based incentives”.
Databases:	PudMed, Cochrane Database of Systematic Reviews, Ovid, Econlit, Science Direct, Popline, EMBASE	

We also tried to identify recently-published studies that had not been included in the reviews. In addition to sifting through the results of the literature searches, a snow-balling approach was used to identify related studies. Articles deemed relevant were reviewed and their bibliographies used to identify further articles.

Since we were mostly interested in assessing the effects of different mechanisms on a range of outcomes, we considered the rigorous study designs recommended by the Effective Practice and Organisation of Care Group (EPOC); namely, randomised controlled trials (RCTs), interrupted time series (ITS), and controlled before-and-after studies (CBAs). When we failed to identify such studies, or when they failed to investigate certain aspects, we also considered the findings from controlled observational studies or before and after studies.

Each of the financial incentives of interest is discussed in turn, and each section follows a similar structure. First, we present the mechanisms, their rationale and expected effects – both positive and negative. Following a brief overview of experiences to date, we then summarise the available empirical evidence of their effects on relevant outcomes (health care utilisation, quality of health care, cost and efficiency of resource use, and health outcomes). We conclude each section by reflecting on issues that may influence the effects of each mechanism (modifying factors), and factors that might mitigate their feasibility and acceptability (local applicability) [16]. The discussion section of this chapter concludes by drawing together the findings, implications for policy, and the implications for research across all four areas.

3. Paying individual providers

This section aims to describe the features of the different mechanisms that have been used to reimburse individual health providers, review the available evidence on the relative impact of different mechanisms on key health outputs and outcomes, and highlight some important remaining issues when it comes to choosing the best mechanism for paying individual providers.

3.1. Reimbursement mechanisms and related incentives

The three main methods of reimbursing individual health care workers are salary, fee-for-service (FFS) and capitation. Other mechanisms such as sessional payment, case payment or withhold payment are possible but are encountered less frequently [17]. Paying individual providers for achieving specified results, or targets (pay for performance), is a newer reimbursement mechanism increasing in popularity which is discussed in detail in Section 5 below.

Each provider payment mechanism results in economic signals which influence provider behaviour in different ways. Table 2 summarises the key characteristics of the different reimbursement mechanisms as well as the intended and unintended incentives they create.

Salary

In this approach, health care providers are paid for the time that they work (time-based payment), such as when they are employed by the national health system or health funder and are paid a fixed salary each month to provide health care services. Providers are paid for the inputs they provide rather than the outputs or health outcomes they produce. The payment is made at a rate agreed upon in advance.

Since salaries do not link remuneration to the volume of activities provided, there is no incentive to increase effort or the outputs produced. However, the opportunity for promotion (and increased salaries) could be related to performance and, as such, would introduce an incentive for increasing physicians' efforts. Advantages of salaried remuneration are that, unlike FFS, there is no incentive to provide unnecessary health services; and that, unlike capitation, there is no incentive for providers to compete for patients or select patients who require less expensive treatment.

Fee-for-service

This involves reimbursing health care providers for each specific service they provide (service-based payment). The health professional is usually paid a basic consultation fee to which are added the costs of each additional service provided to the patient (diagnostic tests, surgical procedures etc). Reimbursement occurs after the service has been provided. The schedule of fees to be paid may or may not be standardised, and may or may not be agreed upon in advance between the provider and the health care funder or patient.

Providers are paid for each consultation and all of their inputs. Therefore, in order to maximise their revenue, there is a clear incentive for providers to increase the number of consultations and to

provide more services. If unchecked, FFS health professionals may provide more services than are medically necessary (over-servicing). Patients typically do not have the medical knowledge to counteract this supplier-induced demand, but may also have no incentive to do so if the services provided are covered by health insurance, which is usually the case in FFS systems (a problem known as moral hazard).

Capitation

Capitation is a population-based payment system where providers are paid an amount of money for each member registered with them. The provider is contracted to provide a specified package of services to their members continuously over a specified period of time (generally one year). The capitation rate is set in advance and payment also usually occurs prospectively. Provider revenue is not related to the inputs used but to the number of members covered.

The intention of capitation systems is to counteract supplier-induced demand and to incentivise providers to use resources as efficiently as possible in providing care. But, in order to maximise their profit, there are now incentives for providers to increase the number of members covered, to decrease the amount and cost of services provided to each member, and to try and refer members requiring expensive care to other providers. However, capitation systems usually have controls on the number of members registered with each provider and restrictions on referrals. Also, excessive under-servicing would be counter-productive as it could lead to more complicated health problems requiring more expensive treatment later. Indeed, there would clearly be an incentive for providers to keep their members healthy and to prevent health problems before they occur. But this would also mean that providers would try and be selective in the members accepted for capitation reimbursement, preferring younger and healthier members (risk selection).

3.2. Experiences to date

The provider reimbursement mechanism is a key characteristic of a country's health financing system. However, it is not uncommon for a mixture of different provider payment mechanisms to be used in one country – in different sectors or even within the same sector. Provider reimbursement has also been the target of health sector reform initiatives in a range of countries, resulting in significant changes in the remuneration of individual health providers over time. In the United Kingdom, for example, FFS is used in the private sector, while the National Health System (NHS) pays hospital doctors a salary and primary care general practitioners by capitation [18], although general practitioners have also been paid by FFS and salary at different points in the history of the NHS [19].

Payment by salary is used to pay hospital doctors providing inpatient care in many countries. Salary is also used for public-sector primary care providers in a range of countries, including Finland, Portugal, India, Indonesia and Israel [20]. Not surprisingly, most countries in this group have significant restrictions on the private practice of full-time salaried doctors. However, performance-related bonuses have been used to incentivise certain clinical activities.

Fee-for-service remuneration is typical of countries relying on the private sector such as the United States, but is also used in countries such as France, Belgium and Germany that have social health insurance systems which contract with self-employed doctors for primary care [21], and it is even how primary care doctors are paid in the national health systems of Canada and Norway. The fee

schedule in classical FFS systems such as the United States is determined by the market. However, publicly-funded FFS remuneration usually occurs according to a predetermined fee schedule. The fee schedule may be compulsory, such as in Germany, or only a recommended price list, such as in France and Belgium [22]. Other initiatives to reduce over-servicing and control costs in open FFS systems include pre-authorisation requirements, utilisation review, and limiting patient choice to selected providers. In mixed remuneration systems, FFS may be used to incentivise priority preventive services such as immunisation or the provision of health care in under-served areas. Interestingly, some of the performance-based financing (PBF) schemes being promoted in low-income countries are essentially FFS systems, with or without additional quality stipulations [23]. It has been argued in these contexts that FFS is an improvement over traditional salary remuneration, because it focuses on outputs rather than inputs [24].

Capitation is a more recent reimbursement mechanism and is used to pay primary care providers in the United Kingdom, Denmark, the Netherlands and Italy [25]. Simple capitation systems pay the same rate for all members, but risk-adjusted capitation systems are more typical [22]. In many middle- and high-income countries, the focus of financing reforms has been on shifting the financing risk from funder to provider, through the bundling of services or the use of capitation [26]. For example, capitation has been introduced in Canada and for Medicaid services in the United States, where FFS has previously been the dominant model [27, 28]. The expansion of universal coverage through the introduction of social health insurance systems in many middle-income countries in Eastern Europe, Latin America and Asia has only been possible by shifting to capitation-based systems for paying primary care providers [29-34]. For example, Thailand, Korea, Indonesia, Kazakhstan, Tajikistan, Slovakia, Hungary, Costa Rica and Argentina have all significantly increased the proportion of individual provider remuneration occurring through capitation.

3.3. Evidence of effects

In this section, we review the available empirical evidence in support of the expected effects summarised in Table 2.

There are a number of reviews on alternative mechanisms for paying individual providers [For example: 25, 34, 35, 36-40], but only four that could be considered systematic reviews (see Table A2 in Appendix). A Cochrane review was last conducted in 2000 [41], but an updated review is currently being conducted by Scott *et al* [42].

There are only a small number of primary empirical studies comparing the effects of payment by salary, FFS or capitation [43]. Only six studies with rigorous study designs could be identified (see Table A3 in Appendix). All of these studies focused on primary care doctors in high-income countries. Four of the available studies compare FFS with salary, one contrasts FFS with capitation, and the final study compares salary with capitation (Table A3). There is also a larger group of studies which have investigated these questions using observational designs.

Impact on service use

Overall, the studies summarised in Table A3 show that the behaviour of doctors is influenced by how they are paid, though the demonstrated effects have not always corresponded with theoretical

predictions. In terms of the possible impacts of different reimbursement mechanisms, the available studies have largely focused on clinical service provision.

When compared with salaried payment, FFS did result in higher rates of consultation [44]. However, patients of salaried physicians had more emergency room visits than those of FFS doctors. The studies comparing FFS with capitation showed that FFS resulted in significantly more clinical consultations. In Denmark, for example, GPs dramatically increased the number of diagnostic and curative services per patient when they changed from capitation to FFS [45]. The differences in rates of referral and hospitalisation between FFS and capitation were less consistent. One study showed significantly higher rates of specialist and hospital referral for capitation physicians consistent with the predicted theoretical incentives [45], but two studies found lower rates in the capitation group [46, 47], and the last study found no significant difference between capitation and FFS [48]. In the study by Gosden *et al* [19] in the UK, salaried general practitioners (GPs) has shorter consultations and lower prescribing rates than GPs paid by capitation, but these differences were not statistically significant. The referral rates of the two groups were also similar.

Observational studies have confirmed that FFS is associated with more consultations, shorter consultations, more procedures, and less preventive care when compared with payment by salary or capitation [17]. For example, the case-control study by Johnsen and Holtedahl [49] in Norway confirmed that general practitioners (GPs) paid by FFS had more face-to-face and telephonic consultations, shorter consultations on average, and fewer home visits than salaried GPs. Aubin *et al* [50] compared salaried and FFS GPs over two years in Canada and found that the salaried doctors were 3.7 times more likely to provide hypertensive screening. In one of the few empirical studies from low- and middle-income countries, Broomberg and Price [51] demonstrated that GPs paid by salary in an health maintenance organisation in South Africa had fewer consultations, requested fewer diagnostic tests, and had lower hospitalisation rates than GPs in a traditional FFS scheme.

Weaker evidence derives from studies that have asked doctors how they would manage certain hypothetical clinical scenarios under different reimbursement mechanisms [52, 53]. However, these studies clearly demonstrate that doctors modify their clinical decision-making when faced with financial incentives to reduce resources.

Impact on quality of care

Few studies have attempted to evaluate the impact of different provider reimbursement mechanisms on quality of care. When compared with salaried payment, FFS has been shown to improve the continuity of care [44], and increase compliance with guidelines on the number of patient visits. The same study found no significant differences in overall patient satisfaction, but FFS patients did report lower satisfaction with access to their physician. The UK GP study found no differences in patient reports of the quality of care between the capitation and salary groups.

There is no evidence indicating differences in health outcomes between the different payment mechanisms. In a randomised controlled trial, Lurie *et al* [47] demonstrated that health outcomes did not differ between elderly Medicaid patients randomised to capitation versus FFS plans. A number of observational studies have also investigated the health outcomes of Medicaid patients in the United States in prepaid capitation schemes compared to FFS [27, 34, 54, 55]. Overall, these

studies have not shown significant differences in health outcomes despite the cost-cutting incentives of capitation [56].

Table 2: Theory and evidence on the effects of mechanisms to reimburse individual providers

Mechanism	Expected benefits	Expected pitfalls
Salary	<ul style="list-style-type: none"> Cheaper remuneration and no supplier-induced demand result in lower system costs \emptyset 	<ul style="list-style-type: none"> Decreased motivation and effort of providers \emptyset No financial incentive to improve the quality of care provided \emptyset Expenditure has no impact on provider remuneration, so there is no incentive to use resources efficiently \emptyset
Fee-for-Service	<ul style="list-style-type: none"> Increased motivation and effort of providers \oplus Increased quantity of services provided $\oplus\oplus$ Provide higher quality of care because no incentive to cut costs \emptyset Patients are more satisfied with the services they receive \oplus 	<ul style="list-style-type: none"> Providers will provide unnecessary services to increase revenue (over-servicing) \emptyset Usual association with insurance system results in moral hazard problems and further over-servicing \emptyset No incentives to use more efficient mix of resources \emptyset Providers will decrease costs of the inputs they use in order to maximise profit \emptyset No incentive to provide unremunerated services such as preventive care \oplus
Capitation	<ul style="list-style-type: none"> Incentive to increase coverage \emptyset Providers will use more efficient mix of resources \emptyset Increased attention to prevention \oplus Improved health outcomes in the long-run \emptyset 	<ul style="list-style-type: none"> Incentive to decrease services provided; results in under-servicing and lower quality of care \otimes Providers will decrease costs of the inputs they use in order to maximise profit \emptyset If possible, providers will refer costly patients to other providers \emptyset Providers will attempt to select healthier enrollees (risk selection) \emptyset Patient concerns about cost-containment results in lower satisfaction with the services they receive \oplus

Source: Expected effects based on [34]

Note: \emptyset means there is no evidence supporting the hypothesis ; \oplus means there is limited evidence of low/moderate quality supporting the hypothesis ; $\oplus\oplus$ means there is good quality evidence supporting the theoretical assumption; \otimes means there is limited evidence of low/moderate quality contradicting the hypothesis ; $\otimes\otimes$ means there is good quality evidence contradicting the theoretical assumption

Impact on efficiency

There is also no rigorous evidence on the impact of provider reimbursement on costs or efficiency. Davidson et al [46] undertook some modelling based on their results which suggested, counter-intuitively, that capitation was more expensive than FFS. The study by Lurie et al [47] in the US found the opposite, but again did not test whether or not the difference was statistically significant.

Other impacts

In terms of the possible impacts of different reimbursement mechanisms, the available studies have largely focused on clinical behaviour (Table A2 and A3 in the Appendix), so there is very little available evidence on the impact of provider reimbursement mechanisms on provider satisfaction, patient selection or equity [17].

3.4. Discussion

Not only is the existing evidence base rather limited, but a number of important issues have received inadequate attention in the literature to date. There is no perfect system for remunerating individual providers – all mechanisms have advantages and disadvantages, and there are well-functioning country systems based on salary, FFS and capitation [20]. The actual impact of different reimbursement mechanisms depends on the details of their design, their suitability to local contexts, and the management of their implementation.

Modifying factors

The design of individual provider reimbursement mechanisms has become increasingly complex and few countries use the simple salary, FFS or capitation models described in Section 3.1. As discussed in Section 3.2, health systems have modified the basic reimbursement designs in an attempt to manage the known negative incentives produced by each mechanism. Some common adjustments include adding performance bonuses to salary payment, reimbursing bundles of services by FFS, or using risk-adjusted capitation systems.

Mixed reimbursement systems are frequently encountered in Europe, Asia and Latin America. In Hungary, for example, primary care providers are mainly remunerated through a risk-related capitation system, but also get a core allowance for infrastructure, receive case-based payments for non-registered members, and are paid FFS for specified preventive services [30]. In a number of countries there are also multiple purchasers of care each with their own reimbursement systems and rules [25]. The incentives for providers in these complex reimbursement designs are much more complicated to predict and manage.

An important determinant of the effects of reimbursement mechanisms is the actual rate of reimbursement. The strength of the economic signal depends on the relative difference between income and costs. For example, in a FFS environment, the incentive for over-servicing is only present if the fees are higher than the input costs, and in a capitation system, there is little incentive for efficiency if the capitation rate is too high. Getting the prices right is a critical aspect of reimbursement design whichever mechanism is used.

The impact of different reimbursement mechanisms will be influenced by local market characteristics, such as the degree of competition among providers, or the relative power of funders and doctors [39]. For example, quality improvements in capitation systems are driven by the competition among providers for members, and it may be difficult to negotiate a cost-efficient fee schedule in FFS systems where providers are organised and powerful.

Local applicability

Whatever the perceived advantages of a particular payment mechanism, policymakers do not, unfortunately, have a completely free hand in designing provider reimbursement systems. The historical development of a country's health system and the current institutional arrangements are a significant constraint on radical reform [10]. In all reimbursement systems, providers get used to the way they are paid, and are opposed to change [20]. Health professionals are a powerful lobby group in many countries so the implementation of reimbursement reform will require skilled actor management [57].

The impact of a particular reimbursement mechanism is not only determined by the incentives produced, but also by the legal, financial and management systems required to support it [58]. Most changes in provider reimbursement require political authority, legislative reform, and quality information for decision-making. In terms of administration, different mechanisms have significantly different transaction costs; salaried payments are relatively simple to design and administer, capitation fees may be complicated to calculate but the system is not too difficult to administer, while FFS systems require agreement on a fee schedule and complex administration systems for both providers and purchasers [22, 58]. The feasibility of implementing reimbursement reforms will depend on the local capacity to manage such processes.

There are questions, also, about the generalisability of findings from one setting to another. Individual provider behaviour is not only influenced by financial incentives, but by professional and ethical norms that may vary between contexts. So FFS systems may work well where ethical standards against over-servicing are enforced, but where norms and regulation are weak, FFS could result in fraudulent behaviour and excessive costs.

4. Paying facilities

This section presents the main mechanisms that have been used to pay health facilities (hospitals or clinics) for the services they deliver.

4.1. Reimbursement mechanisms and related incentives

Five main mechanisms can be used to pay health facilities: budgets (line-item or global ones); fee-for-service; payment per day; or payment per case. Facilities can refer to hospitals providing secondary care, but also, in low-income settings, to health centres providing primary care services.

Budgets

With budget payments, the facility receives prospectively a set amount of money to provide health services for a given period of time (typically a year). The amount allocated is generally calculated on the budget allocated the year before, adjusted for inflation. There are two types of budgets, which differ in the degree of flexibility they grant to facilities: line-item and global budgets.

Line-item budgets specify prospectively the amount of money that can be spent for the various inputs used in the delivery of health services (e.g. salaries, medical supplies, medicines, food, etc.). Since they generally include rules limiting the ability of managers to move money across budget lines, such budgets prevent initiatives that could seek to use the most efficient input mix. Positive aspects of line-item budgets might include strong central control when management capacity at facility level is considered weak, predictable levels of spending, and allowing facilities to meet minimum standards.

Global budgets constitute a more flexible alternative since hospital managers are free to define the mix of resources they want with the lump sum of money they receive to provide services for a given period. Like line-item budgets, the payment is set and made prospectively, and the overall amount can be fixed according to historical levels of inputs or outputs. Despite their greater flexibility, global budgets do not provide much incentive to optimise efficiency.

In both systems, a critical question is whether facilities are allowed to keep any remaining surplus at the end of the period (or cover any shortfall). If they have such financial autonomy, hospitals might be encouraged to ration health services to make sure that their expenses remain within their budget, and/or refer to other health care providers.

Fee-for-service or cost-based payment

Facilities that are paid FFS receive a set amount of money from the purchaser (e.g. the third party payer) for every service they provide (e.g. consultations, drugs used, examinations carried out, food provided, etc.). Since it is meant to cover the facility costs, this mechanism is sometimes called “retrospective cost-based” payment. In some cases, services can be bundled together and a fee is set prospectively to reimburse a set of services that contributes to a particular output (e.g. ante-natal pregnancy care).

The incentives for facilities are the same as the ones created for individual providers: facilities are encouraged to increase the number of services provided, possibly beyond the necessary level of care (supplier-induced demand). This is why this system is often thought to lead to escalating costs, since providers have no incentive to try and contain the costs borne by the payer. On the other hand, FFS can be used to promote utilisation of services, as has been the case in some low-income countries.

At the same time, for each service provided, facilities can be encouraged to minimise efforts and inputs, to maximise the difference between their costs and the fixed fee.

Per-day payments

When hospitals receive per-day payments (or per diem), they receive a fixed amount of money for each day spent by patients in hospitals. The amount they receive is set prospectively, based on an average cost per bed-day, which can sometimes be adjusted to reflect regional, patient or clinical characteristics.

The dominant incentive in this system is to increase unnecessarily the number of days of inpatient care. This translates into more admissions of less seriously-ill patients and longer average lengths of hospital stay, in particular as inpatient care consumes fewer resources towards the end of a stay. To limit these perverse incentives, per-day payments can be differentiated according to stages in the

hospital stay (earlier days being paid at a higher rate). Per-day payments also encourage the reduction in intensity of care and resources used during each bed-day, although this could also be seen as increasing the efficiency of care.

Case-based payments

In this system, facilities receive a payment, usually after the services have been delivered, for every case or discharge, regardless of the actual costs incurred. As with per-day payments, there are two simultaneous incentives. First, facilities are encouraged to minimise the inputs used on each case, for example by limiting the length of stay. There is a risk that this behaviour might compromise quality of care. Second, the payment mechanism might encourage hospitals to discriminate amongst patients, by increasing admissions of less severe cases (for whom the fixed-price per case is above their marginal cost) and/or decreasing admissions of more resource-intensive cases (for whom the fixed-price per case is below their marginal cost) [59].

To limit this latter problem, most of these payment systems have introduced complex adjustments to reflect variations in the efforts and costs incurred by different pathologies or cases (case rates, fixed prospectively, can also adjust for variations in regional costs). In such cases, facilities allocate each patient to a particular case group (called Diagnostic-Related Group in the US system). In turn, this might create an incentive for hospitals to game the coding system of cases. Indeed, by allocating patients to more rewarding groups than they actually belong to (a practice often called “DRG creep”), they can increase their revenue without increasing efficiency [60].

4.2. Experiences to date

Line-item budgets were very popular in the former Soviet Union, Central Asian and Eastern European countries before they embarked on a transition from a centrally planned health service model to more decentralised systems [5, 61]. Due to the rigidity and the inefficiencies they create, line-item budgets have largely been abandoned, although they are still used in many low-income settings where inadequate management capacity at facility-level and limited information systems restrict the possibility of implementing more complicated payment mechanisms.

Until the 1980s, global budgets reflecting historical expenditures were the main payment mechanism for public hospitals in high-income countries [62, 63] or for decentralised systems such as Mexico [63]. With greater concerns for efficiency of resource use, pure global budgeting has been abandoned in many settings and other payment mechanisms, such as sophisticated case-based payments, have been introduced to reimburse facilities for a significant part of their costs.

Fee-for-service or (retrospective) cost-based reimbursement is widely used in high-income countries for paying for services delivered by private hospitals or private patients in public hospitals [62]. It has also been used in systems characterised by multiple insurers and private providers [63], such as Japan, some regions in Switzerland, and the US, Germany and Canada before case-based payments were introduced. On the other hand, there has recently been a growing interest in low-income countries for these types of facility payment systems to stimulate the delivery of health services. In such settings, they have often been termed performance-based financing, since the amount of money received by facilities is directly related to the services delivered (according to a schedule of fees agreed in advance).

Per-day payments have been adopted by many Eastern European countries when they moved away from centrally-planned systems, as their design and implementation required little data or capacity [61].

Following the pioneering introduction of Diagnostic-Related Groups (DRGs) for Medicare inpatients in the US, most high-income countries introduced case-based payments accounting for case-mix in the 1990s [62]. Concerned with cost escalation and efficiency gains in hospital care, a number of middle-income countries have followed the same path, including Taiwan, China, Brazil, Colombia or Mexico [64-66].

It is important to underline that, similar to individual provider payments, reimbursement mechanisms for facility-based care have evolved towards blended systems mixing different approaches as purchasers have tried to fine-tune the objectives of their health care policies. For example, most European countries have moved away from pure budgets to increase the share of case-based reimbursements adjusting for case-mix.

4.3. Evidence of effects

Six literature reviews were identified that present empirical evidence on the impact of hospital payment mechanisms [67-72]. However, none of them adopted a systematic review approach, and most provided very partial details on the included studies (see Table A4 in the Appendix). All studies reviewed were set in high-income countries, most of them concerning the switch that occurred in the United States, when fee-for-service reimbursement was replaced by a case-based prospective payment system for Medicare inpatients. Most included studies were before and after (non-randomised) studies, having taken advantage of the change from one system to another.

In addition to the reviews, we identified additional studies that used a control group when pilot experiments of a particular reimbursement mechanism were implemented [64, 73]. However, issues of selection bias (when participation in the pilot was voluntary) or small sample size may limit the external validity of these findings. Finally, two studies were identified that assessed the effects of a facility payment mechanism, one using a randomised-control trial to evaluate the impact of fee-for-service payments for particular services on top of the traditional line-item budgets provided to facilities in Rwanda [74], and a quasi-experimental study comparing global budgets to fee-for-service payments in China [75, 76].

To complement this literature focusing essentially on the effects of case-based payments, we report evidence from two additional types of studies. First, we sometimes refer to reviews of country experiences [77-79] that draw on descriptive studies and present some characteristics associated with different payment mechanisms. Second, in countries where multiple payment mechanisms coexist in the health care system, researchers have tried to compare their relative performance, although 'control' and 'intervention' facilities are not strictly comparable (they typically differ in the organisational and/or market structures in which they operate).

Impact on service use

There is mixed evidence suggesting that introducing case-based payments (adjusting for case-mix) leads to increases in the number of hospital admissions. Several studies from the US reported such

an effect [68], as did a study from Hungary [66]. However, there was also evidence from the US that when the FFS system was replaced by DRGs [71], the number of hospital admissions decreased (these findings might be due to a high level of supplier-induced demand before).

In the Czech Republic, the switch from line-item budgets to fee-for-service payments in the early 1990s led to large increases in the volume of care provided, to the extent that the corresponding rise in health care expenditures led to the bankruptcies of several insurance companies [77].

In Rwanda, the introduction of a fee-for-service system of reimbursement for primary health care facilities for eight services provided (e.g. curative consultation, first pre-natal visit, delivery) was associated with an increase in service utilisation [74], compared to traditional line-item budgets.

Compromising equity in access to care, there is partial evidence of cream-skimming behaviours by medical institutions once they start being remunerated by efficiency-inducing mechanisms such as global payments in China [75], Germany and France [80], as well as with case-based payments in the US [71].

Impact on efficiency

In most eastern European countries and former communist countries before the transition, line-item budgets have been associated with the development of inadequate supply characteristics, as there was no incentive to reduce excess capacity (large buildings, large staff) or economise on inputs [31]. Similar anecdotal evidence from Costa Rica before hospital payment reforms were implemented suggests that line-item budgets did not create any incentive to economise [81].

Evidence from countries adopting per-diem payments confirms the incentive of the mechanism to increase artificially the length of stay. In Slovak Republic, anecdotal evidence suggests that moving from budgets to per-diem payments in 1998 led to an increase in hospital length of stay by two days, and encouraged hospitals to unnecessarily admit patients who were less severely-ill [77].

There are numerous studies from the US and other countries showing that the switch from FFS to case-based payment adjusting for case-mix led to reductions in length of average stay in hospitals [69, 71, 72, 82]. Other studies have reported similar reductions in measures of resource use (such as number of consultations per patients [83] or antibiotic use [64]) with case-based payment systems.

A natural experiment in Hainan province in China also showed that compared to FFS, global budgets were associated with a slower increase in spending on expensive drugs, high technology services [76] and overall expenditures [75].

In Norway, no difference was found between four pilot hospitals funded with a combination of case-based payments and global budgets, and reference hospitals under pure global budgets; there was a greater efficiency of resource use and a decline in length of stays in both groups [73]. In contrast, in Sweden, case costs in counties using prospective case-based payments were 13% lower than those of other counties with global budgets [84].

However, with case-based retrospective payments, there are concerns - somewhat confirmed by evidence - that efficiency gains may have been artificially created by shifting patients from inpatient to other hospital services or care facilities [68, 70].

Finally, it should be noted that greater efficiency in resource use per case may not necessarily lead to cost containment at the system level, since efficiency gains can be compensated by greater volume of activities [68]. For example, the introduction of case-based payments in Stockholm County led to a sharp rise in the volume of services and therefore, on overall spending [63]. Early assessment of the introduction of DRGs for Medicare patients suggested that they had contributed to halting the growth rate of costs [72]. However, there was hardly any change in Germany [85] following the introduction of DRGs. In Sweden, a comparison of hospitals that had adopted case-based payments and hospitals that had not [86] concluded that introducing case-based payments had contributed to increasing the number of diagnoses. In addition, there is partial (anecdotal) evidence of gaming behaviours with case-based payments, with providers allocating patients to more costly groups than those to which they actually belong (DRG-creep) [68].

When they have been strictly enforced, global budgets have automatically allowed a better control of overall expenditures [70]. For example, researchers have attributed the slow inpatient expenditure growth in France to the adoption of strictly enforced fixed budgets between 1960 and 1990 [87].

Impact on quality of care and health outcomes

Considering their set objectives to increase efficiency of resource use and control (if not reduce) costs, there are theoretical reasons to believe that case-based payments or global budgets might adversely affect quality of care. Studies from high-income countries that have looked at such issues have used a wide array of quality measures including mortality rates, re-admission rates, complications and shifts from inpatient to ambulatory care for difficult procedures.

For global budgets, there is only very limited anecdotal evidence from China suggesting that quality of care may have been affected adversely by the introduction of global budgets [75], as opposed to a FFS system.

Regarding case-based payments, the empirical literature has produced mixed evidence supporting the potentially adverse effect on such quality measures following a change from FFS to case-based reimbursement. While early before-and-after studies showed signs that patients were released from hospitals “quicker and sicker” [68], later studies did not find evidence of worsening health outcomes [88-95]. However, other sophisticated econometric studies have argued that reductions in length of stay were partly associated with lower quality measured by ‘intensity of care’ [82]. More worryingly, there is evidence from the US suggesting that moving from FFS to case-based payment led to increased strategic behaviour by hospitals, which shifted some patients from inpatient services to outpatient visits [96] or long-term care facilities [97]. There is anecdotal evidence from Poland [77] that case-based payments have led to patient-dumping (resisting admission for complicated and costly cases) and cream-skimming through admission of easier cases.

We found no study reporting evidence on the link between quality of care or health outcomes and line-item budgets or per-diem payments.

Table 3: Summary of evidence on effects of hospital payment mechanisms

Mechanism	Expected benefits	Expected pitfalls
Line-item budget	<ul style="list-style-type: none"> •Simplicity ∅ •Cost containment ∅ 	<ul style="list-style-type: none"> •Under-provision of services ⊕
Global budgets	<ul style="list-style-type: none"> •Greater efficiency of resource use ⊕ •Cost containment ⊕ 	<ul style="list-style-type: none"> •Under-provision of services ∅ •Lower quality of care ⊕ •Patient-dumping or risk selection ⊕ •Cream-skimming ⊕
Fee-for service	<ul style="list-style-type: none"> •Increase providers' motivation ∅ •Increase quantity of services provided ⊕ 	<ul style="list-style-type: none"> •Over-servicing ⊕ •Inefficiency of resource use ⊕
Per-day payments	<ul style="list-style-type: none"> •Incentive to provide more services ⊕ 	<ul style="list-style-type: none"> •Lower efficiency of resource used ⊕
Case-based payments	<ul style="list-style-type: none"> •Greater efficiency of resource use ⊕ •Cost containment ⊕ 	<ul style="list-style-type: none"> •Over-servicing ⊕ •Lower quality of care ⊕ •Cream-skimming (avoid high-cost patients) ⊕ •Patient-shifting (discharge to other services) ⊕ •Cost-shifting (compensate loss with increased costs elsewhere) ⊕

Note: ∅ : there is no evidence supporting the hypothesis;

⊕ : there is limited evidence of low/moderate quality supporting the hypothesis;

⊕⊕ : there is good quality evidence supporting the theoretical assumption.

4.4. Discussion

Modifying factors

Broader differences in management structures, organisation of supply services and patient characteristics are likely to have shaped some of the effects that have been found.

A key aspect in a change in hospital reimbursement mechanisms has been the power relationships between health care professionals and hospital management [98, 99]. A number of case studies have reported important resistance from medical staff that has challenged the implementation and actual effects of hospital payment reforms [81, 98, 99].

As with individual provider payments, when payments are agreed prospectively, the level of the reimbursement agreed (or fee schedule) is likely to have a critical influence on the mechanism effects. In effect, underestimating the costs incurred by facilities to treat patients can have detrimental effects on service provision and quality of care, while over-estimating them will not increase efficiency (even with mechanisms that are supposed to create such incentives). Many criticisms have been made regarding the calculation of case-based payments [71], including the inadequacy of average costs defined in DRGs to adjust for inflation and technology improvements, and the difficulty of estimating adequately all the variables that enter into the hospital cost function.

Local applicability

The capacity and information system required for a good implementation vary a lot from one hospital payment mechanism to another. This point leads to the necessity of evaluating the desirability (and feasibility) of implementing some payment mechanisms in contexts where information systems might not be sophisticated enough to define adequate cost benchmarks. As underlined before, many problems have emerged with case-based payment methods adjusting for case-mix. In addition to their operational complexity, these mechanisms depend on the availability of relatively consistent and comprehensive activity and cost data [77]. Most Eastern European countries have had to update thoroughly their information systems to allow the transition from line-item budgets to DRG-type payment systems. In contrast, per diem or budgets have often been used because they required little data or capacity to design and implement [61].

5. Paying for Performance

In this section, pay for performance (P4P) schemes refer to payment methods that give financial incentives to health care providers for improved performance on measures of quality and efficiency [100, 101]. There has been a recent tendency to expand the definition of P4P from its origins in the US, particularly in the context of schemes in developing countries, to include output-based payments, contracting out and even fee-for-service payments, as discussed above [102]. Because there is no accepted definition of P4P, there is considerable scope for confusion and this is evident in the literature [103]. This is, for example, the case with contracting out, which we regard as a broader health financing approach that may or may not involve the use of performance-based payments in the purchasing of health care services. Thus, we adopt the restrictive definition of P4P given above and maintain an emphasis on the payment mechanism.

5.1. P4P mechanisms and related incentives

The idea behind P4P is that it aligns the incentives of various parties (patients, health providers, purchasers) involved in the provision of health care. By measuring performance, information problems among the various parties are reduced and incentives can be aligned [104, 105]. Based on the experience of P4P, it is possible to lay out the main dimensions along which the design of schemes can vary. These design features bring to attention a number of conceptual issues relevant to how P4P incentives work and their potential pitfalls [106]. Four main elements are likely to be important.

First, P4P schemes are characterised by the measure of performance they use. Almost without exception, schemes use performance measures related to quality of care and/or efficiency. Financial incentives are expected to improve the measures of performance used as the basis for reward. However, the measures of performance *not* targeted by financial incentives could deteriorate, as resources and attention are shifted towards service areas and conditions that are rewarded [107]. Health providers may even go so far as to give preference to patients for whom they are more likely to perform well and neglect those who may respond less well to treatment or be less compliant [56], a behaviour commonly referred to as cream-skimming. Incentives are also unlikely to improve clinical performance if the measure is influenced by factors outside of the health provider's control and poorly reflects clinical effectiveness.

Second, P4P schemes are characterised by the way they set the payment condition. Individuals are more likely to respond to incentives if they are rewarded for each activity undertaken [108]. Health providers can be paid on the basis of:

- Each clinical activity or action undertaken as part of the process of care.
- Reaching a target threshold or a continuum of thresholds that pay increasing amounts of money the higher the rate obtained. With a single threshold, there is no incentive for improvements that fall short or go beyond the threshold [109]. That is, poor performers and exceptional performers may not be incentivised.

- Their own performance relative to other health providers. The intention is to generate healthy competition among providers, but it can introduce uncertainty (payment depends on the performance of others not just on his or her performance) and may sustain gaps in the quality of care between high and low performers [106].
- Their own relative performance over time.

Third, P4P schemes vary in how they define key attributes of the payment. Possible options include:

- The frequency of payment. Theory suggests that more frequent but smaller payments may have a larger effect on behaviour because each payment is considered as a new gain and therefore psychologically more motivating [110].
- The size of the payment. The reward should compensate the recipient of payments for the incremental net cost of his/her action [108]. In this respect, greater rewards can be expected to lead to larger effects.
- The lag time between the provision of care and payment. Shorter lag time might be preferable as the value attached to money received immediately can be perceived as much greater than the equivalent amount received even in the near future [111, 112].
- Whether to offer bonus payments for good performance and/or withheld payments for underperformance. Loss aversion theory suggests that withholding money tends to induce a greater behavioural response than the promise of providing money [113]. There may, however, be negative psychological consequences linked to notions of fairness [114].

Fourth, P4P schemes differ according to whether they reward the health institution or pay individual health workers. Theory suggests that team incentives are weaker because individuals free-ride on the efforts of others, reducing the effort of everyone [115]. However, groups of health workers may play an important risk-sharing function, which may be lost if individuals are incentivised [116].

5.2. Experiences to date

There has been experience with P4P in the US, the UK and, to a lesser extent, other OECD countries. In the US, for example, as many as half of all commercial health maintenance organisations use performance based payments in their contracts with health providers [117, 118]. Although they remain rare, P4P schemes are being increasingly promoted in developing countries, with several large pilot schemes under way or in preparation [119]. Table A5 in the Appendix describes some of the more well-known schemes operating in various countries.

Experience suggests that there has been enormous variation in how P4P schemes operate, although documentation of P4P schemes in the literature is not always very precise. The performance measures specified in the design of a P4P scheme reflect the priority of policymakers in the country. In developed countries, the vast majority of schemes seek to improve quality of care, but consideration is also given to efficiency in light of concerns over cost escalation. In the US, for example, 91% of schemes target quality of care measures and 50% target cost efficiency [120]. In developing countries, where under-provision of priority health services along with quality of care are the main challenges, some schemes have used a payment system that rewards health providers for increases in both utilisation and quality of care by using a combination of fee-for-service and performance incentives. The performance measures also reflect differences in the burden of disease

across countries. For example, the Quality and Outcomes Framework in the UK focuses on a set of chronic diseases, such as heart disease and diabetes [121]. Meanwhile, the P4P schemes in Rwanda and Burundi are primarily concerned with maternal and child health services [74, 122].

Quality of care measures are commonly categorised according to the structure-process-outcome paradigm [123]. Many P4P schemes use structural measures of quality, particularly those in low-income countries, because they are easy to measure. The P4P schemes in Rwanda, Burundi, and Cambodia place a heavy emphasis on measures such as the availability of inputs and cleanliness. Process measures are generally considered the most direct measure of quality and are commonly used in P4P schemes in high-income countries where sophisticated monitoring systems are available. The P4P scheme in Rwanda also uses a number of process measures whereby health workers are directly observed and their performance compared against the benchmark of the national clinical guidelines. Outcome measures related to mortality and morbidity are rarely used in P4P schemes, as they are difficult to measure (patient survival can require many years to measure) and it is not easy to attribute any change to the health provider (many factors influence outcomes). Intermediate outcomes, such as blood pressure and cholesterol level [124], are commonly used in developed countries, as are measures of patient satisfaction, to reflect interpersonal aspects of care.

Most P4P schemes appear to have been targeted at health facilities. In the US, for example, 61% of schemes target groups and 25% target both individual doctors and groups [118]. This is largely because monitoring individual incentives requires an intense and potentially overly burdensome information system. The monitoring burden explains why the scheme in Cambodia shifted from individual payments to health facility payments [125].

5.3. Evidence of effects

The presentation of empirical findings draws upon eight systematic reviews of P4P incentives [56, 117, 126-131] presented briefly in Table A6 in the Appendix. The vast majority of studies included in these articles were conducted in the US and, to a lesser extent, the UK. There was also considerable overlap in terms of the studies included in the reviews. In one of the most recent systematic reviews, of the 36 articles that met the inclusion criteria, at least 32 were done in the US (23) or the UK (9) [132]. A particular focus of the studies in the UK is the Quality and Outcomes Framework (QOF), a nationwide P4P scheme that was introduced for family practices in 2005. Similarly, a number of studies in the US focus on just one scheme, the Premier Ltd Hospital Quality Incentive Demonstration (HQID), which started in 2003 and has attracted the most attention of all P4P schemes in the US. For this reason, particular attention is given to these two P4P schemes in the presentation of findings.

Searches identified a small number of additional studies, including three recent studies on the QOF in the UK [124, 133, 134] and one study on the HQID in the US [135] that were not covered by the systematic reviews, two studies in Rwanda, [136, 137], two studies in Taiwan [138, 139], and one study of limited quality in Cambodia [125]. It is clear from this summary that the literature on P4P in developing countries is limited. However, an evaluation of the scheme in Rwanda represents the most robust, large-scale evaluation of P4P to-date [136].

Impact on quality of care

Evidence on the effectiveness of P4P mechanisms targeting quality improvements is mixed, according to four of the systematic reviews [117, 126, 130, 132]. Few significant impacts have been reported and where they are found, they tend to be small in magnitude. Two of the reviews find even less evidence for optimism, concluding that the empirical foundations for improving quality of care with performance incentives are weak [127, 128]. One review focused specifically on performance incentives in hospitals and found evidence of a positive effect on quality of care only in the case of the HQID in the US [127]. Finally, one review examined the impact of P4P on inequalities in health care and almost all studies identified concern for the QOF in the UK. The review found weak evidence of a reduction in inequalities in chronic disease management among socioeconomic groups due to P4P, but no evidence in relation to age, sex and ethnicity. Almost all authors noted the lack of research on P4P in health and substantial methodological weaknesses with existing studies.

Findings suggest the QOF in the UK improved the quality of care for asthma and diabetes, but had no effect on quality of care for heart disease or interpersonal aspects of care [133]. The scheme reduced disparities in the quality of clinical care across family practices [124]. Practices in the most deprived areas of the country improved the quality of care to a much greater extent than those in less deprived areas, thereby reducing inequalities.

With regards to the HQID in the US, two studies find that programme had a significant but small impact on quality of care [140, 141]. After adjusting for hospital characteristics and baseline performance, the P4P scheme is found to improve quality of care by 2.6 percent to 4.1 percent over two years [141]. The lowest performing hospitals at baseline increased their quality score by 16 percentage points, while the highest performing increased quality by only 1.9 points, suggesting convergence in hospital performance.

The results of an evaluation of a P4P scheme in Rwanda indicate that performance incentives had a significant positive effect on the quality of prenatal care and the chances of women being given a tetanus vaccination during prenatal care [136]. It should be noted that resources were kept constant across the control and treatment groups such that impact estimates isolate the incentive effect.

A national P4P programme in Taiwan focusing solely on tuberculosis was found to improve the cure rate, reduce the average length of treatment and reduce the treatment default rate. The results, however, come from an analysis of the situation before and after implementation of P4P (without a control) and are thus likely to be confounded by other factors outside the programme.

The literature provides some evidence on unintended, typically undesirable, effects of P4P. A systematic review found that four out of 17 studies reported evidence on unintended effects [117]. Three studies observed improvements in documentation, but no improvement in actual clinical quality of care given to patients. One study found strong incentives to game the system in other ways, for example, by claiming to admit extremely disabled patients who recovered unusually quickly. There was also evidence of cream-skimming. Performance incentives appear to have motivated health providers to avoid severely ill patients.

The QOF in the UK reduced quality of care for some conditions which were not incentivised [133]. The performance incentives worsened continuity of care, an aspect of care that is valued by patients. Qualitative evidence suggests that performance incentives worsened patient interaction because physicians were faced with dozens of clinical targets and a requirement to enter data into a computer [134]. In Rwanda, qualitative findings from interviews with health workers about the scheme highlight concerns about the additional workload, which meant that potentially life-saving activities in the intensive care unit were neglected [137]. Various types of gaming were also reported, including the avoidance of drug stock-outs by not distributing remaining drugs and distortion of information for monitoring.

Impact on service use

Evidence of the impact of P4P schemes on the provision of services is mixed. A systematic review of performance incentives for delivering preventive health services found that only one of the eight financial incentives reviewed led to a significant increase in the provision of services. The lack of effect was attributed to the small size of the bonus payments [129]. The QOF in the UK was found to have no impact on patients' reports on access to care [133].

In developing countries, evidence shows positive effects. In Rwanda, results indicate that performance incentives had a significant positive effect on institutional delivery care and child health visits, but no impact on prenatal care visits or immunisation rates [136]. Variation in the effect across these different services is attributed in part to the size of the rewards. However, it should be noted that these effects can be attributed to the overall scheme, which technically consists of a fee-for-service component and a quality indicator judging the performance of providers (see section 4.3). In Cambodia, substantial increases in utilisation of maternal and child health services were reported before and after the start of the intervention [125], but critiques have underlined that, aside from the weak study design, many other interventions implemented in parallel may have contributed to these effects and confounding is likely to have severely biased results [103].

Impact on health outcomes

There is almost no evidence on the effect of P4P schemes on health outcomes. Despite findings suggesting improvements in quality processes, there is evidence that the HQID in the US had no effect on mortality [135, 142]. It is not clear why the improvements in quality of care have not translated into better health outcomes, but it is worth noting that the bonus payments were relatively small. Evidence on health outcomes from the evaluation in Rwanda has yet to be reported.

Impact on efficiency

Only two studies reported effects on the cost of care. In the US, the HQID was found to have no effect on the cost of Medicare [135]. A study included in one of systematic reviews [117] found that there were cost savings as a results of the performance incentives [143].

Table 4: Summary of evidence on P4P mechanisms

Dimension	Expected benefits	Expected pitfalls
Performance measures	<ul style="list-style-type: none"> • Incentives improve the performance indicator ⊕ 	<ul style="list-style-type: none"> • Incentives will not improve and potentially worsen performance on those measures for which there is no reward ⊕ • Incentives will improve performance only insofar as the measure is valid ∅ • Incentives can crowd out intrinsic motivation ∅
Basis for payment		<ul style="list-style-type: none"> • A target threshold means no incentive for improvements that fall short of or go beyond the threshold ⊕
Payment attributes	<ul style="list-style-type: none"> • The larger the size of payment, the more effective the scheme ⊕ • Small frequent payments induce greater behavioural response than one large payment ∅ • Shorter the lag time between the rewarded action and receipt of incentive, the greater the behavioural response ∅ • Withheld payments have a larger effect than bonuses ∅ 	<ul style="list-style-type: none"> • Withheld payments may have negative psychological effects ∅
Recipient of payment		<ul style="list-style-type: none"> • Group incentives to perform are weaker than individual incentives ⊕

Note: ∅ : there is no evidence supporting the hypothesis;
 ⊕ : there is limited evidence of low/moderate quality supporting the hypothesis;
 ⊕⊕ : there is good quality evidence supporting the theoretical assumption.

5.4. Discussion

Modifying factors

Existing coverage of an intervention or compliance with a particular quality of care measure is likely to be an important determinant of impact. If coverage is low, there is more scope for a change in behaviour. If all women, for example, are screened for breast cancer, there is no point in providing incentives for health providers to undertake this clinical activity. It is also reasonable to assume that incentives will only affect health outcomes if they are targeted towards interventions for which there is strong evidence of effectiveness.

P4P schemes are complex and their effects are likely to depend on features of the design, which can vary a lot (see section 5.1). Although the body of research on P4P is currently too limited to provide strong insights about how P4P schemes should be designed to maximise their impact on quality of care [106, 132, 144], some tentative evidence already does exist that suggests that design characteristics matter. For example, in the UK, it appears that once targets were reached,

improvements in the quality of care slowed, suggesting a ceiling effect associated with having a maximum threshold target above which no bonus payments are paid [133]. In other studies in the US, the small size and infrequent payment of the bonus were both regarded as strong contenders for why performance payments had no effect or a small effect [117]. Finally, certain designs may be more appropriate for mitigating the potential for unintended behaviours and negative effects. However, the balance between using the carrot of bonus payments and stick of penalties is far from straightforward [145].

Local applicability

Aside from the issue of impact, there are important questions around implementation challenges and capacity required to set up these schemes. The idea of paying incentives on the basis of quality of care is technically demanding, typically requiring highly sophisticated information technology and monitoring systems. Thus, transferring the concept to health systems with far less capacity than, say, the NHS in UK is likely to require major modifications in the design of schemes. In practice, the selection of performance measures to be monitored and used as the basis for payment must be pragmatic. Measures used, at least in the first instance, are likely to be ones that are already widely available or easy to collect data [106]. But there is no guarantee such measures correspond to appropriate measures of clinical performance. In this regard, it worth reiterating that the HQID programme in the US was shown to improve the process of care but not health outcomes [135, 141].

6. Conditional Cash Transfers

6.1. CCTs and related incentives

Conditional cash transfers consist in making a transfer of money to individuals contingent upon their completion of certain requirements.

CCTs aim to address two types of obstacles to the uptake of essential health care interventions such as immunisations, antenatal care visits or even assisted deliveries. The first one consists of the financial costs individuals must bear when they decide to use health services. They include the potential direct cost of using health services (when they are not completely free), the indirect cost (in particular, the cost of transport can create major obstacles), and the opportunity cost (for example, the loss of revenue incurred by the use of health services instead of spending that time on income-generating activities). Secondly, CCTs also address more entrenched demand-side obstacles, such as cultural barriers or the failure to perceive the benefits of preventive health interventions.

6.2. Experiences to date

Although they are now spreading to lower-income settings, the majority of CCT programmes have been implemented in middle-income countries. With their success and spread beyond Latin America, CCTs have gradually been seen in the health sector as innovative tools that would help address a series of demand-side barriers limiting the use of preventive and/or basic curative health services. Recent programmes with health components have been launched in Turkey [146], Kenya [147], Malawi [148], Indonesia [149], the Philippines [150] and two similar CCTs for maternal health services have been implemented in Nepal [151] and India [152].

Historically, the first CCT programmes were designed and introduced to act as social transfer mechanisms, aiming to provide a safety net to its recipients, and health conditions were only one dimension of several requirements (see Table A8 in the Appendix). A more limited number of CCT programmes have since focused only on improving the uptake of particular preventive health interventions. One CCT programme in Malawi offered financial incentives to increase the uptake of testing for HIV status [148] and two programmes in Nepal [151] and India [152] linked cash transfers to delivering in health facilities.

Another source of variation across programmes has been the extent to which CCTs were implemented in conjunction with interventions strengthening the delivery of health services. Whilst early CCT programmes implemented in Latin American countries consisted of demand-side interventions only, later programmes have sometimes taken specific steps to improve the existing health care delivery system. For example, in Nicaragua, private providers were contracted to ensure an adequate response of supply to an expected increase in the use of services [153], while in India and Nepal, salary incentives were introduced for staff.

Most CCT schemes have sought to target the poor and more vulnerable groups of the population. However, the modalities of targeting have varied across programmes, going from simple geographic targeting of regions or local communities to the use of complex information systems or proxy means-testing to identify the poorest households.

Finally, CCT programmes have varied a lot with respect to the size of incentives used, going from USD1 [148] to USD 50 [154], although these differences also relate to different conditionalities.

6.3. Evidence of effects

This section reviews the evidence on the effects of CCTs on the uptake of health services. It relies on the findings and evidence summarised in four recent reviews of the effects of CCTs on service utilisation [8, 155-157], including one Cochrane systematic review [157], described in Table A9 in the Appendix. In addition, a few descriptive studies and two recent impact evaluations using econometric techniques to assess the programme effects were included in this overview [151, 158].

Many CCT programmes have been designed and implemented following a quasi-experimental or experimental design, or have first introduced a pilot programme, allowing rigorous evaluations of their impact [157]. Consequently, there is a broad and reasonably robust body of evidence on the effects of CCTs.

CCTs have been found to improve significantly the uptake of preventive services in the vast majority of programmes. A small scale project in Malawi [148] found that monetary incentives increased the percentage of individuals collecting HIV test results, and that the effect was increasing with the amount of the cash transfer. In Mexico, families benefiting from Progresa visited health facilities twice as frequently as non-beneficiary families [159]. In Honduras, the PRAF programme significantly increased health service utilization for pre-school children [160], the uptake of routine child check-ups and growth monitoring visits, and the use of antenatal care, even if no effect was found on the uptake of post-delivery check-ups. In Nicaragua, the Red de Protección Social scheme improved the proportion of disadvantaged infants (0-3 years old) taken to health centres in the past 6 months, both one and two years after it had started [153]. In Colombia, CCTs were found to increase the uptake of preventive health care visits for children aged less than 4 years old [154, 161]. The PATH programme in Jamaica was recently found to be effective at increasing the use of preventive health care for children in recipient families [162]. Lastly, the Safe Delivery Incentive Programme in Nepal was found to be effective in increasing use of skilled attendance at delivery and reducing the probability of a woman delivering at home [151]. Only two programmes from Chile and Ecuador were found ineffective at increasing the regular preventive visits of children [8].

Conditional Cash Transfer programmes have sometimes proven to be an effective intervention to increase immunization rates amongst children, although they have also failed to do so in several cases (see Table A10 in the Appendix). Positive effects were found in Mexico on Measles and TB vaccination rates [163], in Honduras on the coverage of the first dose DTP/pentavalent vaccine [160] and in Colombia on the probability that children aged 24 months old had complied with the DPT vaccination schedule [164]. In Mexico, there was no evidence that Progresa had an effect on immunisation rates in the long-run, which might suggest that CCTs are less effective in further improving rates where these have reached a high level [157]. These three programmes have failed to have a significant impact on the vaccination levels of particular age groups, although the reasons behind these differences in findings are unclear. Finally, two programmes found no impact on the uptake of immunisation. In Nicaragua, no difference was found between control and intervention groups that both benefited from high increases in immunisation rates, which may have been caused by contamination problems in the control groups [153]. In Paraguay, there was no difference in the

proportion of children with updated vaccinations between control and intervention groups benefiting from Tekoporã, [158].

6.4. Discussion

Despite the successes obtained by CCTs in several settings, a series of issues needs to be kept in mind in considering the replicability of CCT programmes to other settings.

Modifying factors

As demonstrated by one study where payments varied from \$1 to \$3 [148], the size of the transfer is likely to have an impact on the effects of CCTs. It is likely that if transfers are too low and do not cover indirect and opportunity costs associated with health-seeking behaviours, the effects of CCTs might be limited. On the other hand, the existence of possible threshold effects of incentives levels may lead to inefficiency if cash transfers are unnecessarily high and could have induced the same effects with smaller transfers.

Recent reports from the Nepali and Jamaican schemes [151, 162] show that the lack of communication around the scheme, failure to provide clear guidelines to health workers, and erratic funding resulting in payment delays, can jeopardise the success of CCTs.

Finally, the targeting characteristics of CCTs might affect their equity impact. In particular, if CCTs don't target the poorest, they might disproportionately benefit wealthier groups. Indeed, since utilisation of health services is typically already higher amongst the better-off, CCTs are likely to benefit disproportionately the richer groups [151]. This raises the issue of the benefit incidence of such non-targeted incentive schemes where a disproportionate share of the budget might be spent on wealthier groups, and the marginal cost per additional poor user might be extremely high.

Local applicability

CCTs have proven to be complex interventions that require substantial human and technical capacity, and political support [165]. They have sometimes relied almost exclusively on external funding [156]. Using CCTs to achieve universal coverage of interventions might not necessarily be an easy or a sustainable option for countries that have limited capacity or resources.

Early and successful CCT experiences have been implemented in middle-income countries where they have benefited from the existence of adequate basic infrastructure (banks, roads and health facility networks). However, the lack of such infrastructure is likely to mitigate the success of CCT programmes. In particular, since these programmes try to bridge important gaps in social provisioning for poor households, they are not designed to address problems related to a lack of geographical access to health services (an issue particularly common to sub-Saharan African countries). CCTs can only work where facilities already exist and if they are able to respond to the increase in demand that these programmes might generate.

Most of the successful CCT programmes implemented in Latin American countries have relied on a capability to target the neediest populations. They were able to identify the poorest populations because of up-to-date information systems that provided data on income and population characteristics. In low-income settings, similar detailed databases are usually not available. Under

such circumstances, establishing clear methods and criteria to identify beneficiary groups can be particularly challenging (and subject to varying interpretations), as demonstrated by the pitfalls of experiences of exemption schemes for the poor [166].

7. Discussion

7.1. Summary of findings

This section summarises the evidence of effects found for each type of payment mechanisms, and describes the main research and methodological gaps in this body of research.

Evidence of effects

Despite the lack of detailed empirical evidence, it is clear that the choice of reimbursement mechanisms, using salary, FFS or capitation, will influence the clinical behaviour of individual health care providers. The available results are mixed, but FFS remuneration does appear to result in higher rates of consultation and increased use of resources when compared with capitation or salaried payment. The differences between reimbursement by capitation or salary have been relatively trivial. The available studies have not shown significantly different health outcomes among the three reimbursement mechanisms. There is no available evidence on the impact of provider reimbursement mechanisms on provider satisfaction, efficiency or patient selection.

Despite the dearth and imperfect nature of evidence on hospital payment mechanisms, a few lessons have emerged from experiences and theory. Line-items budgets essentially offer a simple and straightforward way to control allocation of resources, but they are likely to lead to a waste of resources, and may promote under-provision of care. Global budgets are useful tools to contain costs while allowing some flexibility to facilities, but they may not encourage efficiency of resource use either. Fee-for-service and per-diems will encourage providers to increase the volume of inpatient care provided, to the detriment of efficiency of resource use. This can lead to unnecessary hospital admissions and, specifically for per-day payments, longer lengths of stay. Case-based payments improve efficiency of resources but their impact on quality, volume of care provided and overall costs is uncertain.

While it seems intuitive that paying money for better quality of care improves health, the empirical basis in support of P4P is currently far from strong. There are instances of large-scale P4P schemes showing positive effects. But these encouraging findings should be balanced against studies that show performance incentives have failed to work. Where positive results have been found, the magnitude of the impact estimates suggests P4P is no magic bullet. At best, it is likely to be just one of an armoury of interventions that can contribute towards the goal of universal coverage. The findings of this paper have a number of implications for both policy and research. These are summarised below.

Relying on impact evaluations of an overall good quality, conditional cash transfer programmes have demonstrated a series of positive effects on the uptake of health care interventions. Yet key questions remain with regard to their cost-effectiveness and their replicability to poor settings.

Methodological and research gaps

The vast majority of empirical studies on provider payment mechanisms comes from high-income countries. Therefore, not only can one challenge the external validity of conclusions from these settings to more resource-constrained ones, but the focus of this literature reflects the main debates in high-income countries, which are not necessarily relevant for low- and middle-income countries seeking to achieve universal coverage. For example, there are many studies that have investigated the effects of case-based payments in hospitals or the effects of pay-for-performance schemes; however, in many countries such systems might be undesirable due to their complexity (in particular for small facilities), and policy-makers might be more interested in understanding how to improve more traditional budget systems. Similarly, most of the empirical research on individual provider payments has focused on doctors, while in many health systems other health cadres (nurses or clinical officers) might play a critical role in providing primary care services. Finally, whilst this mechanism is increasingly mentioned as a possible policy option to improve staff performance in low- and middle-income countries, the jury is still out on the potential effects and the possibility to implement P4P mechanisms in such settings. Besides, there might be some confusion in the terminology employed as to whether one refers to P4P schemes or fee-for-service initiatives which link remuneration to the services provided.

Regarding conditional cash transfers, the main gap in the literature concerns the capacity of these schemes to provide policy-makers with a cost-effective intervention. Indeed, two characteristics of these programmes raise doubts concerning their capacity to disburse money efficiently. Firstly, Caldes and Maluccio [167] have showed that a large proportion of the costs of CCT programmes comes from steps taken to target poor people effectively and monitor that the conditionalities are satisfied. For example, in the Colombian CCT programme, administrative costs represented half of the value of actual benefits delivered to beneficiaries [168]. Secondly, the cost per additional user can be particularly high (in particular when initial uptake rates are high), since payments will be made to all of those who were already complying with the conditionalities on their own accord [156, 169].

Concerning pay-for-performance mechanisms, because they are recently developed methods for paying providers, there are still several questions that remain pending, even in high-income countries. First, it is unclear to what extent P4P can have a negative impact on providers' motivation. While P4P assume that health providers are motivated primarily by financial gain, theories of motivation tell us that this is not always the case [170], and that intrinsic motivation can be crowded out by performance payment mechanisms. More generally, there remains ample scope for further understanding as to whether or not performance incentives work, how they work, and what features are most important in determining their effectiveness.

In terms of type of studies used, there are three obvious methodological gaps in the literature reviewed.

First, there is a scarcity of rigorous evidence on the effects of payment mechanisms, with very few randomised controlled trials, or even controlled before-and-after studies. This is likely driven by the significant methodological difficulties involved in research on provider reimbursement mechanisms. Randomised controlled trials are often not feasible in this area because providers are not willing to be randomised to different payment groups that directly affect their financial livelihood.

Second, there are no cost-effectiveness studies comparing different alternative mechanisms. This gap is probably explained by two facts: first, because the decision to introduce one provider payment mechanism rather than another is primarily driven by political (sometimes ideological) reasons. Second, as we have shown, these mechanisms have different advantages and drawbacks, and to some extent, they can be seen as serving slightly different purposes. For example, the decision to move away from FFS and introduce capitation payments or case-based payments for hospital payment, was taken primarily to achieve efficiency gains and contain costs. On the other hand, in certain settings, the decision to introduce FFS can be made to increase the use of health services. Nonetheless, there are a number of alternative ways to pay individual providers or health facilities, and each one has potentially different outcomes on quality, efficiency and service use. Since there might be some trade-offs involved in some of them, for example between efficiency and quality gains, it would be important to better understand the economic consequences of different options.

Finally, there is a lack of studies describing how best to implement financing reforms and the conditions which support the change from one system to another. Attention should be given to the critical contextual requirements, the power relationships between hospital managers and clinical staff [98], and strategies and processes supporting successful implementation [57].

7.2. Implications for policy

To advance towards universal coverage, decision-makers have to determine ways to incentivise providers and patients alike to increase access to good quality health services and promote efficient modes of delivery that can be sustainable. This background paper sought to present the various payment mechanisms that can be used by health authorities to reach such objectives. A variety of mechanisms usually co-exist in each health system, and policy-makers should view the different options presented here as complementary tools rather than mutually exclusive choices.

Despite the dearth of empirical evidence, it is safe to say that the choice of reimbursement mechanisms for individuals or facilities is determinant in influencing the behaviour of health care providers. However, there is no single ideal remuneration system as each creates different positive and negative incentives.

FFS remuneration (for individuals or hospitals) and per diem have been used to promote greater productivity by providers, and therefore increase the volume of services provided by generating increased revenues to providers. They can be used to motivate health care providers and increase the delivery of certain interventions or services, or to increase the provision of services in certain under-served areas.

However, these mechanisms are unlikely to provide sustainable purchasing solutions. Having used these mechanisms at the beginning of their transition, a number of countries in Eastern Europe and the former Soviet Union have now shifted policy objectives – initial concerns with revenue enhancement and increased access have given way to goals related to cost containment and efficiency [77]. With this shift, hospital case-mix adjusted global budgeting and capitation for primary care providers have often been considered good options.

Because questions have emerged concerning the effects of these efficiency-enhancing mechanisms on quality of care, pay-for-performance mechanisms have emerged as a tool to improve quality of care and efficiency of health providers. Given how little is still known on their effects, clearly policymakers should proceed with caution. In contrast to many other types of interventions, P4P has considerable potential to do harm (particularly if the scheme is poorly designed). It is particularly susceptible to gaming and so mechanisms should be in place to detect such behaviours. Finally, if the reason for low coverage of care relates to weak demand for health services, or inadequate supply infrastructure, P4P is certainly not the most appropriate policy response.

Due to the positive results of some Conditional Cash Transfer programmes, as well as the high-profile coverage and international donor support they have received, countries wishing to progress towards universal coverage of essential interventions might be tempted to use them. However, the number of pending issues highlighted in this overview underlines the need for careful thought before rushing to implementation.

If supply factors are amongst the primary problems, the demand for services induced by CCTs will not be satisfied and the uptake of the intervention will remain low [156]. Therefore Conditional Cash transfers should only appear on the list of policy options if clear demand constraints are identified, in particular lack of information or budget constraints. Even then, policy-makers should carefully weigh their decisions, since the cost-effectiveness of CCTs has so far not yet been measured against other approaches to improve the uptake of health services.

In any case, P4P and conditional cash transfers should be targeted towards interventions for which there is strong evidence of cost effectiveness. Existing coverage of an intervention or compliance with a particular quality of care measure should also be considered. If coverage is low, there is more scope for a change in behaviour and the mechanism is bound to be more efficient.

Ultimately, a mixture of reimbursement mechanisms and incentives is required to mitigate the unintended consequences of single mechanisms. This requires careful design, tailored to the local health system and market realities, as well as active monitoring and management. A balance must be struck between feasibility, acceptability and potential effects of any mechanism. Since P4P and payment mechanisms affect directly the remuneration of health providers, their development is likely to be a delicate politicised process involving negotiation among interested parties.

7.3. Implications for research

Following this overview of the current state of evidence, we have identified a number of research priorities to be taken up by researchers and policy-makers alike.

Priority research questions

The table below summarises what we consider as being the two most important research questions for each of the four types of mechanisms identified.

Table 5: summary of priority research questions

Type of mechanism	Research questions
Individual provider payment mechanisms	<ul style="list-style-type: none"> • Are capitation systems superior to existing salaried employment contracts in the public sector? • Is there a trade-off between the efficiency gains generated by some remuneration systems and quality of care?
Health facility payment mechanisms	<ul style="list-style-type: none"> • What are the relative advantages and disadvantages of using budgets vs. case-based payments in resource- and capacity-constrained settings (in particular, is there a trade-off between efficiency gains and transaction costs generated by implementation challenges)? • What is the impact of the various facility payment mechanisms on quality of care?
Pay-for-Performance mechanisms	<ul style="list-style-type: none"> • What is the impact of P4P on patients' outcomes and what is the cost of these schemes? • What is the impact of P4P on health workers' intrinsic and long-term motivation?
Conditional cash transfers	<ul style="list-style-type: none"> • What is the cost-effectiveness of CCTs compared to other health systems interventions (e.g. strengthening of the supply-side, outreach activities, etc.)? • What is the relative impact of the transfer (and its size) vs. the conditionality?

Regarding remuneration of individual providers, there is very little research comparing payment by salary with capitation payment, so for public sector employees working in a national health system. There is currently no indication that capitation systems would be superior to existing salaried employment. In addition, the existing data does indicate that salaried or capitation payment is associated with fewer clinical activities, which it can be assumed will result in lower costs. However, lower levels of service provision could compromise quality of care and health outputs, which may make the overall system less efficient. None of the existing studies has quantified the impact of this trade-off [56].

There is hardly any experimental or quasi-experimental evidence on the relative effects of hospital mechanisms, and none whatsoever from low-income countries. Before moving from line-item or global budgets that are currently dominating the funding of primary care facilities in many developing countries, policy-makers would be well-advised to test the relative advantages and

drawbacks of potential alternatives. In addition, there is a lack of systematic research on the effects of facility payment mechanisms on the quality of care and health outcomes. Indeed, most of the available body of evidence relies on before-and-after studies without counterfactual data, which cannot help in understanding whether changes in health or quality outcomes were caused by the shift from one mechanism to the other.

There is currently insufficient evidence on whether P4P schemes will result in improved patient outcomes or, equally importantly, to what extent the cost of implementing them is warranted [145]. Besides, it is far from clear the extent to which P4P payments can have negative effects on providers' performance. A commonly cited concern is that financial incentives in health can have an adverse affect by crowding out intrinsic psychological incentives related to an individual's inner motivations and sense of professionalism [171-173].

Finally, regarding Conditional Cash transfers, the most urgent question to be answered is whether they constitute a cost-effective option to improve the uptake of health services compared to other approaches (supply-side strengthening, unconditional cash transfers, etc.). This is a particularly critical question for countries that have limited resources and might want to use CCTs to improve access to health services. In addition, due to the potential logistical and administrative complexity involved in monitoring compliance with conditionalities, it would be important to understand better the benefits of such mechanisms compared to unconditional transfers or transfers with "softer" conditionalities (i.e. where compliance is less or not monitored).

Methodological research priorities

The scarcity of rigorous evidence on reimbursement mechanisms and P4P schemes in developing countries indicates that this should be a priority area for health systems researchers. Rigorous research should of course give consideration to randomised experiments. But these will rarely be feasible and much can be learnt from well conducted natural experiments and other non-experimental designs. An immediate priority would be to ensure that any new policy interventions in this area be subjected to rigorous monitoring and evaluation. One of the avenues for further research, therefore, lies in a greater commitment of policy-makers who wish to introduce new payment mechanisms or innovative interventions to carry out well-designed pilot experiments. This would provide opportunities for evaluation using a counterfactual, which would often be the prevalent payment mechanism. In such designs, it is particularly important to measure the potential positive effects of new mechanisms as well as their likely adverse effects, or gaming behaviours. For that, outcomes measured must go well beyond the subset of measures for which health providers are rewarded.

More research into the feasibility of new mechanisms should be undertaken. Specifically, pilot projects could be used to investigate the organisational and logistical changes necessary to a good implementation. In addition, process evaluation implemented alongside such pilots would also help understand the positions of all stakeholders involved, and help identify foyers of resistance and potential solutions. In addition to contributing to the evidence base, pilot projects can also be used by policy-makers as a way to combat resistance to change, as it was done in Korea with a hospital payment reform [64].

Research is also required on how best to implement financing policy reforms and the contextual determinants of success. Such research, based on realistic evaluation principles, also presents significant methodological challenges.

Finally, for all interventions, a pressing research area lies in the development of costing studies, which could then pave the way to cost-effectiveness studies where effects can also be measured. To date, the impact of different provider reimbursement mechanisms on system efficiency is uncertain as few studies have compared the costs of different mechanisms and there are no cost-effectiveness studies. It is often unclear to what extent there might not be a trade-off between the costly (and sometimes poor) implementation of sophisticated mechanisms and the use of alternative more simple albeit imperfect mechanisms, in particular when capacity is inadequate. This might apply to hospital payment mechanisms (e.g. a comparison of global or line-item budgets and prospective case-based payments), as well as conditional cash transfers.

8. References

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9. Appendices

Table A1: Main characteristics of included reviews comparing salary, FFS and capitation

	What the review authors searched for		What the review authors found		
	Review objectives	Search strategy	Interventions	Settings	Study designs
Gosden <i>et al</i>, 1999 [17]	To determine the influence of salaried payment on doctor behaviour	Systematic review of published and unpublished literature comparing salary to capitation or FFS	19 studies in total. FFS vs Salary – 13 Capitation + FFS vs Salary – 2 Salary + FFS vs Salary – 3 Salary + Bonus vs Salary – 1	US – 9 Canada – 4 Germany – 1 Norway – 4 South Africa - 1	RCT – 1 ITS – 2 CBA – 1 CC – 15
Chaix-Couturier <i>et al</i>, 2000 [174]	To identify the results of financial incentives on costs, processes or outcomes of care	Systematic review of all financial incentives, including provider reimbursement mechanisms	89 studies in total. Financial incentives included salary, FFS, capitation (fundholding), and managed care contracts.	Not enumerated	8 RCTs Other designs not enumerated.
Gosden <i>et al</i>, 2000 [41] [43]	To review the impact of different payment methods on the clinical behaviour of primary care physicians	Systematic review of published studies meeting EPOC criteria	4 studies in total. Capitation vs FFS – 3 Salary vs FFS – 1	US – 2 Canada – 1 Denmark – 1	RCT – 2 CBA – 2
Christianson <i>et al</i>, 2007 [56]	To review the secondary impacts on quality of care of financial incentives directed at reducing utilisation and costs	Systematic review of published studies	46 studies in total. 12 studies on physician incentives. Incentives included FFS, capitation, GP fundholding, and bonuses conditional on cost reduction.	Not enumerated	For 12 physician studies: RCT – 3 CC – 3 Obs – 6

RCT: randomised controlled trial; ITC: interrupted time series; CBA: controlled before and after; CC: controlled observational; Obs: observational study without controls

Table A2: Summary of evidence from rigorous studies comparing salary, FFS and capitation

Comparison	Study	Setting	Study Design	Outcomes	Relative Differences Between Groups
S vs. Salary	Hickson et al, 1987 [44]	USA Paediatric residents Paediatric patients	RCT C: FFS I: Salary	Enrolled patients	• Salaried group 1.27 times more than FFS group **
				Total visits per patient	• FFS 1.18 x Salary **
				Well-child visits per patient	• FFS 1.30 x Salary ***
				Emergency room visits per patient	• Salary 1.83 x FFS ***
				Continuity of care	• FFS 1.10 x Salary **
				Compliance with guidelines on number of visits	• Missed visits: Salary 3.13 x FFS *** • More visits than recommended: FFS 1.74 x Salary ***
				Patient satisfaction	• No significant differences in overall satisfaction, satisfaction with humanness, satisfaction with continuity. • FFS lower satisfaction with access to physician than Salary **
FFS vs. Capitation	Krasnik et al, 1990 [45]; Krasnik & Gottschau, 1993 [175]	Denmark GPs	CBA C: Capitation I: Capitation→FFS	Face-to-face consultations	• FFS 2.31 x Capitation after 6 months **
				Telephone consultations	• FFS 2.21 x Capitation after 6 months **
				Prescription renewals	• FFS 0.21 x Capitation after 12 months **
				Diagnostic services	• FFS 7.19 x Capitation after 6 months **
				Curative services	• FFS 15.77 x Capitation after 6 months **
				Referrals to specialists	• Capitation 12.1 x FFS after 12 months **
				Referrals to hospital	• Capitation 17.0 x FFS after 12 months **
	Hohlen et al, 1990 [176]; Davidson et al, 1992 [46]	USA Primary care physicians Paediatric patients	RCT C: FFS low rates I1: Capitation I2: FFS high rates	Visits per patient	• Capitation 1.29 x Low FFS ** • High FFS 1.34 x Low FFS **
				Referrals to specialists	• Capitation 0.78 x Low FFS *** • High FFS not significantly different to Low FFS **
				Emergency room visits	• Capitation 0.80 x Low FFS *** • High FFS 0.78 x Low FFS ***

Comparison	Study	Setting	Study Design	Outcomes	Relative Differences Between Groups
				Hospital admissions	<ul style="list-style-type: none"> • Capitation 0.73 x Low FFS ** • High FFS 1.35 x Low FFS **
				Compliance with guidelines on number of visits	<ul style="list-style-type: none"> • Capitation lower than FFS group ‡
				Estimated average expenditure per person per year	<ul style="list-style-type: none"> • Capitation \$75.67 higher than Low FFS ‡ • High FFS \$56.19 higher than Low FFS ‡
	Lurie et al, 1994 [47]	USA Primary care doctors Elderly Medicaid patients	RCT C: FFS I: Capitation	Doctor visits	<ul style="list-style-type: none"> • Capitation 0.93 x FFS **
				Emergency room visits	<ul style="list-style-type: none"> • Capitation 0.90 x FFS **
				Hospital admissions	<ul style="list-style-type: none"> • Capitation 0.87 x FFS ***
				Patient satisfaction with care	<ul style="list-style-type: none"> • No significant difference
				Average Medicaid expenditure per person per year	<ul style="list-style-type: none"> • Capitation 0.78 x FFS ‡
				Health status	<ul style="list-style-type: none"> • No significant difference
				Mortality rate in one year	<ul style="list-style-type: none"> • No significant difference
	Hutchinson & Foley, 1999 [48]	Canada Primary care physicians	CBA C: FFS I: FFS → Capitation	Hospital admissions	<ul style="list-style-type: none"> • No significant difference
				Hospital inpatient days	<ul style="list-style-type: none"> • No significant difference
Salary vs. Capitation	Gosden et al, 2003 [19]	UK GPs	CBA C: Capitation I: Salary	List size	<ul style="list-style-type: none"> • No significant difference
				Consultation length	<ul style="list-style-type: none"> • No significant difference
				Prescriptions	<ul style="list-style-type: none"> • No significant difference
				Referrals	<ul style="list-style-type: none"> • No significant difference
				Preventive care	<ul style="list-style-type: none"> • No significant difference
				Patient assessment of quality of care	<ul style="list-style-type: none"> • No significant difference

RCT: Randomised controlled trial; CBA: Controlled before-and-after study; C: Control; I: Intervention; ***: p < 0.01; **: p < 0.05; ‡: Statistical significance not reported

Table A3: Main characteristics of included reviews assessing evidence on hospital reimbursement mechanisms

	What the review authors searched for		What the review authors found		
	Review objectives	Search strategy	Interventions	Settings	Study designs
Donaldson & Magnussen 1992 [68]	Reviewing the effects of Diagnostic-Related Groups on efficiency, quality of care, and costs.	No information provided	All 13 studies (reported in 18 papers) included reported changes in the reimbursement of Medicare patients in the US, from FFS to case-based payments	United States, inpatient services in hospitals.	12 before and after studies, 2 of which use patient cohorts and 2 of which compare Medicare patients to other patients. 1 cross-sectional study
Donaldson & Gerard, 1991 [67]	To review the empirical literature on how hospitals are reimbursed	No information provided	Global budgets and case-based payments. Also reported are studies on the impact of ownership of hospitals and internal markets.	United States, UK.	14 before and after studies.
Chalkley and Malcomson 2000 [69]	To assess if the effects of recent reforms in the US and UK are consistent with theory	No information provided	Case-based payments.	United States, inpatient services in hospitals.	19 studies are referred to ; no information provided on their design,
Carrin & Hanvoravongchai 2003 [36]	To assess the potential of different instruments (incl. facility reimbursement mechanisms) for cost-containment policies.	No information provided	Global budgets, case-based payments, per-diem and fee-for-service.	High-income countries	11 studies are referred to ; no information provided on their design, but they appear to be case studies only.
Rosenberg and Browne 2000 [71]	To trace the results of past research on the underlying factors of inpatient expenditures (incl. to highlight results from initial studies after the policy change)	No information provided	Case-based payments, more precisely the switch from FFS to DRGs for Medicare patients.	United States, inpatient services in hospitals.	19 studies reported (for various outcomes), many using a before and after study design (but the study design is not systematically reported)
Coulam and Gaumer 2000 [72]	To examine the literature on the effects of PPS on practice patterns, costs, and quality of patient care.	No information provided	Case-based payments.	United States, inpatient services in hospitals.	27 studies reported (for various outcomes), many using a before and after study design (but the study design is not systematically reported).

Table A4: Description of P4P schemes

Country, scheme description and reference	Measures	Basis and attributes of payment	Targeted services	Purchaser
UK (Quality and Outcomes Framework) National financial incentive scheme that remunerates general practices (primary care providers) for performance against a set of quality of care indicators. Doran, Fullwood et al (2008) [124]	Process measures – assessment conducted, diagnostic tests conducted, drugs administered, immunisations given, referrals Outcome measures – intermediate outcomes	Health provider awarded points on a sliding scale on the basis of the proportion of eligible patients for whom it achieves each target. No points are awarded over a maximum threshold. Each point is converted into a bonus payment (£126 in 2007). Providers' income increased by 30-40% during scheme.	Primary health services with focus on asthma, cancer, coronary heart disease, heart failure, chronic obstructive airways disease, diabetes mellitus, epilepsy, hypertension, hypothyroidism, severe mental health and stroke	Government through the national health system
US (Premier Hospital Quality Incentive Demonstration) Large pilot providing bonus payments to hospitals based on a composite measure of inpatient quality. Lindenauer, Remus et al (2007) [141]	Process measures – assessment conducted, diagnostic tests conducted, drugs administered Outcome measures – inpatient mortality	Hospitals performing in the top (second) decile on a composite measure of quality receive a 2% (1% bonus payment in addition to usual Medicare reimbursement rate. Penalty of 1 to 2% of Medicare payment given to hospitals failing to exceed performance of year 1 hospitals in lowest two deciles. Bonuses averaged \$72,000 per year.	Heart failure, acute myocardial infarction, community-acquired pneumonia, coronary artery bypass grafting, and hip/knee replacement	Government via Medicare reimbursements
Rwanda National scheme. Bonus payments to health providers based on quantity and quality of priority health services. Basinga, Gertler et al (2010) [74]	Structural measures – availability of inputs, management, hygiene Process measures – clinical content of care such as tetanus vaccination during delivery care	Payment is based on a fee for service (range \$0.18 - \$4.49) which is multiplied by a health facility quality index (range 0 – 1) to give final payment amount. Bonus payments increased health facility revenues by 22%.	Curative care, prenatal care, family planning, delivery care, child growth monitoring, treatment of child nutrition, and vaccination.	Government through the national health system.
Nicaragua Pilot scheme. Bonus payments to health providers (hospital performance agreement) based on quality of service provision as part of broader scheme of contracting between government and health providers. Jack (2003)	Structural measures – organisation, management Outcome measures – morbidity such as re-infection rates, patient satisfaction	Payment is based on a quality index, which is a weighted total of the different quality measures. No payment is made if a threshold is not achieved. Above the threshold, amount of payment increases with quality index. Maximum bonus represents 17% of health facility revenues.	Hospital health services. Specific services not stated.	Government through the national health system.
Taiwan National scheme. Monetary payments to health	Process measures – treatment default rate, average length of treatment	Payment is based on a points system whereby the hospital and physician gain points if they identify a case and then treat the case	Tuberculosis	Bureau of National Health Insurance in Taiwan

providers based on quality of tuberculosis treatment provided.		successfully.		
Li, Tsai et al (2010)	Outcome measures – treatment cure rate			
Cambodia	Structural measures – punctuality of health workers, revenue from user fees (cost-recovery).	Punctuality incentive based on attendance at work. Cost-recovery incentive based on achievement of tiered thresholds. Basis for payment not stated for other measures.	Not stated. Only examples given – immunisation, tuberculosis treatment.	NGOs through contracts with individual health providers.
Pilot scheme. Bonus payments to health providers based on quality of service provision as part of broader scheme of contracting between government and NGOs.	Process measures – clinical content of care such as correct diagnoses and treatment	Performance incentives represent an increase of 500-800% in official income of health workers.		
Soeters and Griffiths (2003)	Outcome measures – EPI coverage			
China	Structural measures – health records	Basis of payment not stated. 30%-50% of health centre budget withheld then given as bonus payment	Immunisation, hypertension, diabetes mellitus, maternal and child health services	Government district health bureau
Shanghai community health centres. Bonus payments given to health centres based on quality of care, cost containment and patient satisfaction	Process measures – clinical content of care such examinations, procedures, and patient advice			
Yip, Hsiao et al (2010)	Outcome measures – chronic disease management, patient satisfaction			
	Cost containment – expenditure per visit			
Burundi	Structural measures – availability of inputs, management, hygiene	Payment is based on a fee for service which is supplemented by an additional amount (up to 15% of fee for service total) based on a quality of care index.	Curative care, prenatal care, family planning, delivery care, HIV prevention, malaria prevention, treatment of child malnutrition, TB treatment, STI prevention	NGOs through contracts with individual health providers. Purchaser is shifting to Government with nationwide scale-up
Pilot being scaled-up. Bonus payments to health providers based on quantity and quality of priority health services.	Outcome measures –patient satisfaction			
Busogoro and Beith (2010)				

Note: 1) This describes the scheme under individual health worker contracts as opposed to health facility contracts.

Table A5: Main characteristics of included reviews assessing evidence on P4P

What the review authors searched for		What the review authors found			
	Review objectives	Search strategy	Interventions	Settings	Study designs
Alshamsan et al (2010)	To assess the impact of pay for performance on inequalities in the quality of health care in relation to age, sex, ethnicity and socioeconomic status	Systematic search of English language literature in MEDLINE, EMBASE, PsycINFO and the Cochrane library. Reference list search of retrieved articles. Years between 1980 and 2008, inclusive.	22 studies identified, of which 20 concern the QOF in the UK. 16 studies use practice level data rather than patient level data. Socioeconomic status was the most frequently examined inequality	Predominantly UK (20 studies).	Observational studies
Christianson et al (2009)	To assess the quality of the evidence relating to the relationship between financial incentives for providers and quality improvement.	First step searched for high quality systematic literature reviews with wide range of search terms. Second step searched for specific studies with a wide range of study designs but limited number of search terms in the following databases: MEDLINE; Cochrane Central Register of Controlled Trials; EMBASE; EconLit. No language limits used. Years up to 2006.	9 studies of targeted payments to physicians. 20 studies of broader schemes that reward physicians for quality improvement. 7 studies of schemes that reward institutional providers.	Predominantly US (at least 23 studies), but also UK (9 studies), Spain, Australia.	Randomised controlled trial, quasi-experimental study, controlled observational study, observational study with no control.
Petersen et al (2006)	To systematically review studies assessing the effect of explicit financial incentives for improved performance on measures of health care quality.	PubMed search of English-language literature and reference lists of retrieved articles. Years up to 2005	2 studies of financial incentives at payment system level. 9 studies of financial incentives directed at provider groups. 6 studies of financial incentives for physicians.	Not stated but review of references suggest mostly US.	9 randomised trials, 4 controlled before and after studies, 4 cross-sectional studies
Town et al (2005)	To review studies assessing explicit economic incentives for preventive care targeted at specific individual providers, including direct payments or bonuses to the provider or his/her group.	Authors searched EconLit, Business Source Premier, PsychInfo and MEDLINE. Reference lists were reviewed to identify other articles. The search focused on English language articles published up to 2002. Studies using interventions with multiple components were also excluded, as were studies that compared outcomes under different payment systems.	5 studies with bonuses for reaching a target. 2 studies with per input bonuses for immunisation	6 studies in the US primary health care system	6 randomised trials

Rosenthal and Frank (2006)	To review systematically the literature on paying for quality in health care, as well in other fields	Authors searched MEDLINE, EconLit, ABI Inform, PsychInfo and the Social Science Citation Index. Additional citations were found by examining the reference lists of articles	7 studies of payments for quality in health care	[To be confirmed]	[To be confirmed]
Dudley et al (2004)	To systematically review literature of the evidence on strategies to support quality based purchasing	Authors reviewed MEDLINE and Cochrane databases	4 studies of performance based payments targeted at individual providers. 4 studies targeted at provider or group of providers	Not stated	Randomised controlled trials
Mehrotra et al (2009)	To review the literature on the current state of knowledge about the effect of P4P on clinical process measures, patient outcomes and experience, safety, and resource utilization in a hospital setting	Not stated	8 studies identified	US	Observational study with control
Armour et al (2001)	To systematically review the impact of explicit financial incentives at the physician level on resource use and quality measures	Review followed an approach set forth in the Cochrane Collaboration handbook. Further details only available in an appendix that is available from the authors.	Number of studies identified not stated. Financial incentive for improved delivery of preventive services,	US, Northern Ireland	Randomised controlled trial, observational studies with no control,

Table A6: Effects of P4P schemes

P4P scheme	Study design	Outcome	P4P effect	Methodological limitations
Rwanda	Quasi-experimental study (difference-in-difference estimator) Control group receives an equivalent amount of revenue not linked to performance.	Prenatal care utilisation (=1)	0.002 (0.2%)	Problems in randomisation due to political decentralisation
Basinga, Gertler et al (2010)		Institutional delivery care (=1)	0.01** (21.1%)	Potential confounding due to unobservables that change over time
		Quality of prenatal care	0.14** (n/a)	Limited set of outcomes
		Tetanus vaccine at prenatal visit (=1)	0.05** (7.6%)	
		Visit by child age 0-23 months (=1)	0.13*** (63.8%)	
		Visit by child age 24-59 months (=1)	0.11*** (132.5%)	
		Child age 12-23 is fully immunised (=1)	-0.07 (-10.5%)	
Taiwan	Before and after	Tuberculosis cure rate (=1)	0.16*** (34.3%)	No potential confounders other than a single time period controlled for.
Li, Tsai et al (2010)		Average length of treatment for tuberculosis cases cured (days)	-6.5*** (-2.5%)	
Taiwan	Before and after	Tuberculosis treatment default rate (=1)	-0.04** (-26.9%)	No potential confounders other than a single time period controlled for.
Tsai, Kung et al (2010)				
Cambodia	Before and after	Delivery in health facility	0.165 (550%)	No potential confounders other than a single time period controlled for.
Soeters and Griffiths (2003)		Two or more prenatal care visits	0.222 (740%)	
		Knowledge of 4 or more contraceptives	0.47 (224%)	P4P incentives implemented in conjunction with other interventions
		Contraceptive use	0.164 (117%)	
		Child fully immunised	0.279 (116%)	
		Treatment of child diarrhoea with ORS	0.166 (151%)	
UK (Quality and Outcomes Framework)	Post-intervention longitudinal analysis	Gap between least and most deprived quintile of practitioners in the proportion of patients	Year 1: 0.04 Year 2: 0.015	With no baseline, pre-existing trends in inequality are not accounted for

		for whom clinical activity targets achieved (=1) Year 3: 0.008		
Doran, Fullwood et al (2008)				Deprivation score assigned on basis of practice location not patient residence
UK (Quality and Outcomes Framework)	Interrupted time series analysis (shift in level and change in rate)	Clinical quality for: Coronary heart disease (=1)	In 2005: 0.028* In 2007: -0.08*	With only two pre-intervention observations, pre-existing trends not adequately controlled for
Campbell, Reeves et al (2009)		Asthma (=1)	In 2005: 0.094** In 2007: 0.055*	No attempt to rule out (statistically or otherwise) other possible explanations for shift in level or change in rate
		Diabetes (=1)	In 2005: 0.075** In 2007: 0.069**	
		Continuity of care (=1)	In 2005: -0.041** In 2007: -0.043**	
US (Premier Hospital Quality Incentive Demonstration)	Post-intervention longitudinal controlled analysis	Process score for: Acute myocardial infraction (=1)	0.026***	Potential confounding due to unobservables that change over time
Lindenauer, Remus et al (2007)		Heart failure (=1)	0.041***	
		Pneumonia (=1)	0.034***	
US (Premier Hospital Quality Incentive Demonstration)	Difference-in-difference analysis (hospital fixed effects estimator)	Mortality for: Acute myocardial infraction (=1)	-0.002 (-0.9%)	Potential confounding due to unobservables that change over time
Ryan (2009)		Heart failure (=1)	-0.000 (-0.3%)	
		Pneumonia (=1)	-0.001 (-0.8%)	
		Coronary-artery bybass (=1)	0.002 (4.8%)	
		Cost for: Acute myocardial infraction (log)	-0.006 (-0.6%)	
		Heart failure (log)	0.008 (0.8%)	
		Pneumonia (log)	-0.006 (-0.6%)	
		Coronary-artery bybass (log)	0.016 (1.6%)	

Note: *** denotes coefficient is significant at 1%, ** at 5%, * at 10%. No standard errors are reported in Doran [2008] concerning the disparity in quality of care between providers. P4P effect in parentheses indicates relative effect

Table A7: Description of CCT programmes with health components

Country, programme name and reference	Target population	Transfer size	Conditionalities	Parallel intervention(s)
Brazil – <i>Bolsa Alimentação</i> [177] (national project)	Poorest households from selected municipalities (chosen according to infant malnutrition prevalence).	Up to maximum of US\$18.25. US\$6.25 per person beneficiary in the household (pregnant women or children under 7).	For pregnant and lactating women: attending educational workshops, regular check-ups, and vaccinations up-to-date. For children under 7: maintaining vaccinations up-to-date and growth monitoring.	Children received nutrition supplements.
Colombia – <i>Familias en Acción</i> [154, 161] (national project)	Poorest households from selected municipalities (also chosen on poverty criteria).	US\$50 on average US\$20 per family; US\$6 per primary school child; US\$12 per secondary school child. Approximately 30% of household consumption.	For children under 7: attending health and nutrition check-ups. For children aged 8-18 year old: attending school. For mothers: attending health education workshops.	
Ecuador – <i>Bono de Desarrollo Humano</i> [178] (national project)	Children under 16 and households belonging to the first and second quintile of income	US\$15 per month per household; Senior and disabled heads of household receive US\$11.50 per month	For children aged 6-16 year old: attending school regularly (>80%). For children under 5: regular health post visits for growth and development checkups and immunizations.	Institutional strengthening activities (strengthening the beneficiary selection system (SelBen) for social programmes).
El Salvador - <i>Red Solidaria</i> [179] (national project)	Children under 15 and expectant women from families living in extreme poverty within priority municipalities	US\$15 if eligible for health component only, US\$20 if eligible for both health and education components, US\$10 if eligible for education component only (between 15% and 18% of the minimum rural salary, bimonthly)	For women: participating to training courses, and complying with basic protocol concerning preventative health For children aged 6-14 year old: attending school	Strengthening of the education system (improving facilities and teaching material availability), and a US\$19 million programme of contracting out NGOs to ensure the provision of basic health and nutrition services
Honduras – <i>Programa de Asignación Familiar</i> [160] (national project)	Children and women from poor households, living in designated beneficiary municipalities (chosen on socio-economic criteria).	US\$17 on average (US\$4 per family, US\$5 per child). Approximately 10% of household consumption.	Attending primary school and regular health visits.	-
India – <i>Janani Suraksha Yojana</i> [152] (national project)	Pregnant women belonging to poorest households, aged older than 19 years, and for up to 2 live births (extended after the third live birth if the mother chooses to undergo sterilization immediately after the delivery).	Rs700 in rural areas and Rs600 in urban areas.	Attending at least 3 ante-natal and post-birth check-ups and delivering in a public health facility (programme benefits are supposed to be extended to women delivering in private facilities too).	In low-performing States (with low institutional delivery rates), an incentive is paid to the accredited health worker for each delivery (Rs600 in rural areas and Rs 200 in urban areas).
Indonesia – Program Keluarga	very poor households (to be	Every household gets IDR 200.000 (US\$ 18.2) per	For pregnant or lactating mothers: 4 antenatal care	

Harapan (PKH) [149] (pilot project)	eligible to PKH, a household should meet at least 13 of the 14 criteria defining poverty at the national level) which have pregnant women and/or under five children and/or children in school age ³	year as lump sum, and can receive conditional payments: IDR 800.000/year (US\$ 72.7) for pregnant mother and under 6y child (no limit in the number of children) ; IDR 400.000/year (US\$ 36.4) per 7-12 y old child ; IDR 800.000/year (US\$ 72.7) per 13-15 y old child.	visits and taking iron tablet during pregnancy ; Birth assisted by a trained professional ; 2 postnatal care visits for lactating mothers For under 6y children: complete childhood immunization and Vitamin A capsules twice a year ; monthly growth monitoring for infant 0-11 months and quarterly for children 1-6 years. For 6-15 y children: enrolment and regular attendance at school	
Jamaica – <i>Programme for Advancement Through Health and Education</i> [162] (national project)	children under 17 years old, pregnant and lactating women, elderly over 65 years, destitute adults under 65 years.	US\$9/month per child eligible for education component, US\$9/month per household member eligible for the health component.	For children aged 6-17 year old: attending school. For other beneficiaries: complying with required health visits per year(number depends on beneficiary age and status).	-
Kenya [147] (small scale project)	Poor households having Orphan and Vulnerable Children (OVC) aged 0-17 years old as permanent members.	Ksh 1,000 (US\$13.86) for households with <2 OVC, Ksh 2,000 (US\$22.72) with 3-4 OVCs, and Ksh 3,000 (US\$42.58) with 5 or more OVCs.	For children aged 6-17 year old: attending school. For children under 5: regular health centre visits for immunizations for children 0-1 years and for growth monitoring and vitamin A supplement for children 1-5 years.	
Malawi [148] (small-scale project)	Individuals doing a HIV test, in rural areas	US\$ 1.04 on average – vouchers of values between US\$0-3 per individual were randomly assigned.	Collecting HIV test result.	-
Mexico – <i>Progesa</i> (renamed <i>Oportunidades</i>) [159, 163] (national project)	Eligible households (selected on poverty criteria) among selected communities (selected on poverty criteria).	US\$20 on average; US\$13 per family; US\$8-17 per primary school child; US\$25-32 per secondary school child; US\$12-22 grant once a year for school supplies - approximately 25% of household consumption.	For children: attending primary and secondary school attendance; and complying with regular health visits and immunisation schedule. For pregnant women: complying with regular health visits and attending health education workshops.	Children received nutrition supplements – allocation was not random and children in ‘control’ areas could also have received them.
Nepal – <i>Safe Delivery Incentive Programme</i> [151] (national project)	Pregnant women with no more than 2 living children or an obstetric complication.	1,500 NRs in mountain areas, 1,000 NRs in hill areas, 500NRs in the lowlands (30-50% of the mean transport cost to the health facility).	Giving birth in a public health facility.	Trained health workers receive an incentive of NRs 300 for each delivery, and facilities are reimbursed NRs 1,000/delivery to recover the cost (as deliveries are free of charge for women).
Nicaragua – <i>Red de Protección Social</i> [153] (small scale project)	42 municipalities chosen to participate in the pilot phase: ½ randomly selected for intervention.	US\$25 on average US\$18 per family; US\$9 per family with school-age child; US\$20 once a year for supplies. Approximately 20% of household consumption.	For mothers of children under 5: attending educational workshops and bringing children to preventive health programmes For children aged 7-13 year old: attending school.	The programme trained and contracted private providers to deliver the health services required.

Paraguay – <i>Tekoporã</i> [158]	Children aged 0 to 14 (including street children), and pregnant women in extreme poverty.	Health and education transfer of US\$5 per child aged 0-14 years old (up to 4 children per household) + an additional US\$10 per household.	For children aged 25-60 months: attending educational centres (early stimulation). For children aged 5-14 years: attending basic schooling. For children aged 0-24 months: visits to health centre for growth/development monitoring. For children aged 25-60 months: visits for growth monitoring for children aged 5-14 years: medical check-ups and preventative dental care. For pregnant and lactating women: visits to health facility for pregnancy check-ups and post-partum control	-
Peru – <i>Juntos</i> [180] (National project)	Children and pregnant or lactating women from poorest households in rural communities	US\$ 33	For children under 5: preventative health care visits for children 0-5 years. For pregnant and lactating women: complying with pre- and post natal care visits, attending nutrition training sessions. For children aged 6-14 years old: attending school. For all: obtaining birth certificates or ID cards (for individuals older than 18 years).	-
The Philippines - <i>PantawidPamilyangPilipino Program (4Ps)</i> [150] (pilot scaled up nation-wide)	In poorest municipalities and the poorest barangays in cities	P6,000 / year or P500 / month if households comply with the health conditions ; P3,000 / year or P300 / month per child for 10 months a year, to a maximum of 3 children per household if they comply with the education requirements.	For pregnant women: complying with pre- and delivering with a skilled birth attendant and attend post natal care visits, Parents must attend various education seminars Regular preventive health checkups and vaccines for children aged 0-5 y old ; enrolment and regular attendance at schools for children aged 3-14 y old.	
Turkey – <i>Social Risk Management Project</i> [146] (small-scale project)	poor families with children and pregnant women	Bimonthly transfers of education: primary US\$13 for boys, US\$16 for girls; secondary US\$20 for boys, US\$28 for girls Bimonthly transfers of health: US\$12 per month per child, US\$12 per month during pregnancy, US\$39 for birth at health centre.	For school age children: attending school. For children aged 0-6 years: complying with regular visits to health clinics. For pregnant women: regular attendance to pre-natal and post-natal check-ups and giving birth at hospitals.	-

Table A8: Main characteristics of included reviews assessing evidence on conditional cash transfers

	What the review authors searched for		What the review authors found		
	Review objectives	Search strategy	Interventions	Settings	Study designs
Lagarde et al. 2007 [157]	To critically review the evidence on the effects of CCTs on the uptake of health interventions	Literature searched until April 2006; no language limit; 22 databases searched. Inclusion criteria: RCTs, BCA and ITS only.	Cash transfers conditional on a mix of health and education requirements, or health-related behaviours only.	Primary care services in Brazil, Colombia, Honduras, Malawi, Mexico and Nicaragua.	Five cluster-Randomised Controlled Trials, and one controlled before-and-after study
Glassman et al. 2007 [155]	To critically analyze CCT programs with respect to health and nutrition.	No information provided	Cash transfers conditional on a mix of health and education requirements.	Primary care services in Brazil, Colombia, Honduras, Jamaica, Mexico and Nicaragua.	Three cluster-Randomised Controlled Trials, and one controlled before-and-after study
Fiszbein, & Schady 2009 [8]	To review the evidence of effects of CCTs on health-related outcomes (including health utilisation)	No information provided, except on inclusion criteria (experimental and quasi-experimental evidence).	Cash transfers conditional on a mix of health and education requirements.	Primary care services in Chile, Colombia, Ecuador, Honduras, Jamaica, Mexico, Nicaragua, Turkey.	Five randomised interventions, four quasi-experimental studies (3 regression discontinuity designs; one propensity score matching)
Gaarder et al. 2010 [156]	To review the evidence of effects of CCTs on health-related outcomes (health utilisation, health and nutrition)	Builds on existing surveys and extensive search; inclusion criteria (experimental and quasi-experimental evidence).	Cash transfers conditional on a mix of health and education requirements.	Primary care services in Chile, Colombia, Ecuador, Jamaica, Honduras, Malawi, Mexico, Nicaragua, Paraguay, Nepal.	Four randomised interventions, six quasi-experimental studies (4 regression discontinuity designs; one propensity score matching)

Table A9: Impact of CCT programmes on immunization coverage

Programme	Outcome	Initial rate (intervention areas)	Final rate (intervention areas)	CCT effect¶
Colombia – Familias en Acción [164]	Probability of compliance with DPT vaccination, for children under 24 months old	-	-	0.089*
	Probability of compliance with DPT vaccination, for children 24-48 months old	-	-	0.035
	Probability of compliance with DPT vaccination, for children, over 48 months old	-	-	0.032
Honduras – PRAF [160]	% of children under age 3 vaccinated with DPT1/pentavalent	72.0	-	6.9***
	% of children under age 3 vaccinated for Measles	84.0	-	-0.2
	Proportion of mothers vaccinated for tetanus toxoid	56.0	-	4.2
Nicaragua – Red de Protección Social [153]	% of children aged 12-23 months old with up- to-date vaccinations	36.4	71.7	0.61
Mexico - Progresa after 6 months [163]	% of children under 12 months old (at baseline) vaccinated for TB	88.0	89.0	5.2***
	% of children aged 12-23 months old (at baseline) vaccinated for Measles	92.0	96.0	3.0**
Mexico - Progresa after 12 months [163]	% of children under 12 months old (at baseline) vaccinated for TB	88.0	92.0	1.6
	% of children aged 12-23 months old (at baseline) vaccinated for Measles	92.0	91.0	2.8

*** indicates significance at the 1% level; ** at the 5% level; and * at the 10% level.

¶ The treatment effect represent the net effect, e.g. taking into account the comparison with control groups.

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