

Supplement 1

Supplemental Data: Search Strings and List of Academic Databases Searched (Online only)

Provider payment systems	Health facilities	Countries' economic statuses
#1 ab(('reimbursement mechanism*' OR 'reimbursement incentive*' OR 'fee NEAR/3 charge*' OR 'income' OR 'physician incentive*' OR 'provider incentive*' OR 'physician practice pattern' OR 'capitation' OR 'prospective payment system*' OR 'retrospective payment system*' OR 'provider payment' OR 'provider payment system*' OR 'provider payment mechanism*' OR ('salar*' OR 'fixed salar*' AND 'fringe benefit*') OR 'global budget' OR 'budget' OR 'fee-for-service' OR 'fee for service' OR 'blended system' OR 'mixed system' OR 'mixed financing system' OR 'hybrid system' OR 'blended payment' OR 'bundled payment' OR 'per episode' OR 'per diem' OR 'case based payment' OR 'diagnostic related group'))	#2 ab (('general pract*' OR 'family physician*' OR 'family pract*' OR 'primary care' OR 'primary health care' OR 'private pract*' OR 'hospital' OR 'secondary care' OR 'secondary health care' OR 'tertiary care' OR 'tertiary health care'))	#3 ab(('economically developing countr*' OR 'economically developing nation*' OR 'emergent nation*' OR 'emerging econom*' OR 'developing countr*' OR 'developing nation*' OR 'low income countr*' OR 'low income nation*' OR 'middle income countr*' OR 'middle income nation*' OR 'low and middle income countr*' OR 'low and middle income nation*' OR 'third world' OR 'third world countr*' OR 'underdeveloped countr*' OR 'underdeveloped nation*'))

Search: (#1 AND #2 AND #3)

List of academic databases searched: Medline, PubMed, Embase, CINAHL, Science Direct, Web of Science, EconLIT, International Political Science Abstract, PsycINFO, Cochrane Central Register for Controlled Trials, HEA Economic Evaluation Database, Proquest Dissertation and Theses

List of working paper databases searched: Social Science Research Network (SSRN) and IDEAS

List of key health policy journals searched: Health Policy, Health Policy and Planning, Health Affairs, Health Services Research

Supplemental data: Three-stage Evidence Search Process (Online-only)

1. The review started with a first stage systematic evidence search of academic databases. This was followed by a hand search of key health policy journals and grey literature from working paper databases. The title and abstracts of each article from this search process were screened for relevance, and only studies that addressed provider payment reform in developing countries with sufficient details on contexts, mechanisms and/or outcomes were included.



2. The second stage of the evidence search involved contacting and consulting key authors and experts in the field who had published studies on provider payment system evaluation in developing countries. This process was carried out to locate important primary and secondary studies that could potentially be left out in the systematic search process.



3. The third stage of the evidence search process was a purposive process that involved identification of additional relevant literature from the references of primary studies that were filtered and selected from the first stage of the evidence search.

Supplemental Data: Framework for Data Extraction (Online-only)

Concepts	Definitions	Examples
Realist philosophy	There exists an object which is independent of our conceptual frames and understanding of the world (Pawson 2005).	<ul style="list-style-type: none"> • Example of a typical question posed in realist evaluation: what is it about a programme/policy that works for whom under what circumstances (Pawson 2005)?
Aim/ approach	Realist review adopts a ‘generative’ causation in understanding how programme/policy works. There are multiple causal mechanisms that could explain why and how similar programmes/policies manifest in different ways which eventually lead to diverse outcomes. The aim of a realist review is not to understand whether a programme/policy works, but to investigate what are the underlying resources and processes that propel a programme/policy to work as intended by policy makers, or fail to work, in different institutional or structural contexts (Pawson 2005).	
Context	‘Prior set of social rules, norms, values and interrelationships gathered in specific places which sets limits on the efficacy of program mechanisms’ (Pawson and Tilley 1997, p.70).	<ul style="list-style-type: none"> • Individual actors, interpersonal relations, institutional setting and infrastructural system form the contextual layering of the policy intervention (Pawson 2002). • Micro level: Specific types of actions and practices at the individual, interpersonal and organizational level. • Mezzo level: Institutional structure and practices of health system including certain complementary design features and policy components that are associated with the prospective provider payment system reforms. • Macro level: Legal, historical and political contexts of the adoption of provider payment policy reforms at the national or sub-national levels.
Mechanism	‘An account of the make-up, behaviour and interrelationships of those processes which spells out the potential of resources (capacities) and reasoning (choices) which are responsible for the regularity’ (Pawson and Tilley 1997, p.68). It is the engine of explanation in realist synthesis that shed light on why interconnections occur (Pawson 2002).	<ul style="list-style-type: none"> • Most likely to occur at the discussion and implications of empirical papers or working papers. • Process evaluation data from primary studies. • A sequence of events and pattern of behaviours that structure institutional, behavioural and cognitive incentive elements that generate certain uniformities in outcomes as a result of unique contextual characteristics of the prospective provider payment systems (Pawson 2002). • Incorporate both observable mechanisms from the providers’ perspectives and users’ perspectives, as well as implicit mechanisms embedded at the system level (market, bureaucracy and hierarchies).
Outcomes	The explicit and implicit impacts and effects of the policy intervention.	<ul style="list-style-type: none"> • Process outcomes (knowledge, understanding, perception, satisfactory levels). • Development outcomes (efficiency (cost), quality and clinical outcomes).
C-M-O configuration	A chain of resources and reasoning that explain both the observable appearances and inner workings of the outcomes that are contingent upon specific contextual dynamics (Pawson and Tilley 1997, Westhorp 2014).	<ul style="list-style-type: none"> • Can be achieved via both abstract configuration (theory and conceptual works) and focused configuration (empirical case studies) (Pawson and Tilley 1997). • Linking the micro, mezzo and macro contextual dynamics from single or multiple sources to both explicit and implicit outcomes using means of tracing the analytical, stratified and processual particularities (Pawson and Tilley 1997).
Prospective payment systems	Prospective provider payment systems shifts risk and uncertainty from insurer (or third party payer) to the health care providers. The overarching aim is to promote incentives to increase efficiency by reducing costs.	
Capitation	Capitation is per capita payment paid to health providers based on a base rate calculated by the insurer multiply by total number of population within the catchment area.	
Diagnostic related group (DRG)	DRG is calculated based on per case based on classification of group diagnoses according to the homogeneity of resource use and clinical characteristics (Jegers et al 2002).	
Global budget	Global budget is per period payment that includes all operating budget paid in advance to the health providers, under the conditions that providers will have to meet certain output targets most of the time (Roberts et al 2008).	
Salary	Salary is fixed and per period payment paid to the health workers regardless of the outputs and quality outcomes they produce. Sometimes it may be tied with performance based incentives.	
Programme theory	The process or chain of events that explain how a policy intervention leads to the outcomes.	<ul style="list-style-type: none"> • At the preliminary stage, the programme theory will be developed based on the prevailing theoretical understanding of prospective provider payment systems developed in matured and developed health system contexts. • The applicability to maturing and developing contexts of prospective provider payment systems will be developed and fine-tuned at different stages of the synthesis process, and corroborated by several iterations of data triangulation with academic article or grey literatures that describe mainly the contexts. • For instance, the rules inherent in the social health insurance scheme in Thailand (C) resulted in heterogeneities of total cost incurred (O1) and prescribing behaviours among physicians (O2) due to patients’ ability to pay, physicians likely awareness of patients’ payment statuses, which may not be aligned with the organizational incentives (M) (Byrant and Prohmmo 2005).

Middle range theory	Theory developed at a level of abstraction that integrates programme theories and culminates understanding of the diversity of outcomes across contexts (Londenstein 2013)	<ul style="list-style-type: none"><li data-bbox="869 92 2128 178">• Prospective provider payment systems works through either solely or through a combination of individual actors, interpersonal relations, institutional settings or infrastructural systems contextual dynamics (C)to create either desirable or perverse responses among providers' and users' (O) through various institutional, behavioural and cognitive chains of motivations and incentives (M).
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Supplemental Data: Inclusion and Exclusion Criteria (Online-only)

Inclusion Criteria

1. Studies were published within the last 25 years (1991-2016).
2. Studies evaluated the impacts of provider payment reform or of a mixed financing system/blended system with a strong prospective payment component in developing countries.
3. The design was a primary qualitative or mixed-method study with key informant interviews, semi-structured interviews, or secondary studies (case studies, policy documents, book chapters, country-level critical reviews), examining the incentive mechanisms of health providers and users under provider payment reform in developing countries.
4. Studies could be both descriptive and analytical in nature, and provide either all aspects of a context-mechanism-outcome configuration, or partial information with mainly contexts and mechanisms data.
5. For studies reporting outcome measures, only outcomes pertaining to process outcomes and development outcomes pertaining to utilisation, expenditure, health outcomes, prescription outcomes, and service quality appraisals were included in the synthesis.

Exclusion Criteria

1. Studies that examined performance-based financing as a standalone policy reform were excluded.

Supplemental Data: Study Characteristics (Online-only)

No	Article name and author(s)	Target population	Research design/ nature of article	Research objectives/ questions
1	The response of providers to capitation payment: a case study from Thailand. (Mills et al 2000)	Hospitals serving insured populations managed by Social Security Office (SSO) in Bangkok, Thailand.	Case study	To understand (i) how the structure of the health care market in Thailand and particularly in Bangkok was affected by capitation payment by the SHI scheme and in turn affected the consequences of the chosen payment method; (ii) the internal responses of providers to the incentives inherent in the payment mechanism.
2	Patient satisfaction in Bangkok: the impact of hospital ownership and patient payment status. (Tangcharoensathien et al 1999a)	Thailand - nine hospitals (three public, three private for-profit, three private non-profit).	Mixed method (patient satisfaction survey and qualitative interview)	To describe both inpatient and outpatient patients' satisfactions with quality of care in nine hospitals of different ownership in Bangkok based on patients' payment status.
3	The social security scheme in Thailand: what lessons can be drawn? (Tangcharoensathien et al 1999b)	Thailand	Review study (policy documents and published studies)	To review the operation of the scheme, to explore the implications of capitation payment (SSS) and registration for utilisation levels and provider behaviour.
4	Payment mechanisms and prescriptions in four Thai hospitals (Bryant and Prohmmo 2005)	Thailand: 1) primary cross sectional community survey (13 rural and urban communities served by the 4 hospitals) 2) treatment and diagnoses data from the hospitals.	Mixed method (quantitative cross-sectional survey and qualitative interviews)	1) To describe financial and non-financial factors determining whether doctor interests were aligned with those of the hospitals. 2) To formally test whether doctors did in fact provide more expensive treatments to fee-for-service patients as compared to patients belonged to the capitation payment system.
5	Impact of capitation payment: The Social Security Scheme of Thailand (Yip et al 2001)	Thailand (12 public and private main contractor hospitals in the Social Security Scheme (SSS)).	Case study (policy evaluation of provider payment systems in Thailand)	To evaluate the cost experiences of capitation payment reform on expenditures of Social Security Scheme (SSS) enrolees as compared to other forms of social health insurance that are paid using different payment mechanisms (FFS).
6	Does your health care depend on how your insurer pays providers? Variation in utilization and outcomes in Thailand (Hirunrassamee & Ratanawijitrasin 2009)	Thailand- three government hospitals (one in Bangkok, two from other provinces)	Quantitative policy evaluation	To examine access to medicines and other medical technologies, treatment outcomes and efficiency in resource use among beneficiaries of social health insurance systems paid via a different payment mechanism in three government hospitals in Thailand.
7	Using economic levers to change behaviour: The case of Thailand's universal coverage health care reforms (Hughes et al 2010)	Thailand	Case study that involves key informant interviews with national policy makers and interviews and focus group discussion with bureaucrats/health workers at the district level.	To understand why was the capitation funding plan modified and what were the consequences?
8	Universal coverage in the land of smiles: lessons from Thailand's 30 Baht health reforms (Hughes & Leethongdee 2007)	Thailand	Comprehensive literature review and policy analysis	To assess the achievement of Thailand's 30 Baht Scheme- and the purchaser-provider system that Thailand adopted.
9	Achieving universal health coverage goals in Thailand: the vital role of strategic purchasing (Tangcharoensathien et al 2015)	Thailand	Comprehensive literature review via document reviews and review of the minutes of meeting of NHSO Governing Board and its related sub-committees such as Benefits, Finance and Budget).	1) To review the purchasing experiences for which the National Health Security Office (NHSO) that manages UCS had gradually developed. 2) To discuss how these purchasing functions contributed to the achievement of improved and equitable health service and financial risk protection to its members.

10	Implementation of a new standard financial accounting in public hospitals of the Ministry of Public Health, Thailand (Boonyapaisarncharoen et al 2008)	Thailand	Policy document	To report the development and challenges of implementing a new accounting and financial reporting system for public hospitals in Thailand through a formation of a new standard chart of accounts.
11	Thailand Health Financing Review 2010 (Tangcharoensathien et al 2009)	Thailand	Policy document	To describe the health financing configurations and assess overall health financing mechanisms in Thailand.
12	Profit, payment and pharmaceutical practices: perspectives from hospitals in Bangkok (Pitaknetinan et al 1999)	Thailand (9 purposively selected hospitals- 3 public hospitals, 3 private for-profit hospitals and 3 private not-for-profit hospitals).	Mixed method (semi-structured interviews with hospital pharmacists and managers on drug management and prescription analysis of 400-500 randomly selected prescriptions from 4 outpatient departments.)	To investigate how hospital management structures may influence hospital physician prescribing practices in a sample of private for-profit, private non-profit and public hospitals in Bangkok.
13	Getting incentives right? The impact of hospital capitation payment in Vietnam (Nguyen et al 2015)	Vietnam	Quantitative econometric study	To evaluate the switch from fee-for-service to capitation payment of district hospitals in Vietnam.
14	Moving toward universal coverage of social health insurance in Vietnam: assessment and options (Sominathan et al 2014)	Vietnam	Grey literature- a critical analysis of the Vietnamese Health System Reforms.	This is a world bank country report to assess the achievement and performance of various dimensions of social health insurance in Vietnam. The context of purchasing and provider payment mechanisms were extracted from Chapter 7: Strengthening resource allocation and purchasing
15	A critical analysis of purchasing health services in the Philippines: a case study of PhilHealth (Picazo et al 2016)	The Philippines (Philhealth)	Grey literature- Case study	To examine the multiple principal agent relations (purchaser-government, purchaser-member, purchaser-provider) in provider payment mechanisms of PhilHealth in The Philippines.
16	A critical analysis of selected healthcare purchasing mechanisms in Indonesia (Trisnantoro et al 2016)	Indonesia (National Health Insurance Scheme, JKN)	Grey literature- Case study in East Kalimantan, Yogyakarta and East Nusa Tenggara.	To critically assess the performance of healthcare purchasers in Indonesia and to identify potential mechanisms to address these factors by examining the institutional arrangements that embodied principal-agent relations.
17	Health Service Delivery in China: A literature review (Eggleston et al 2008)	China	Comprehensive literature review	To review both Chinese and English literatures on health service delivery in China, determine how well China's health care providers perform and what determines their performance.
18	A critical analysis of purchasing mechanisms in China's rural health insurance scheme (Meng et al 2016)	China (two counties in Qinghai province and two counties in Henan province)	Grey literature using comparative case studies approach (reviewing policy documents and key informant interviews).	To examine the various mechanisms in strategic purchasing of New Cooperative Medical Scheme (NCMS) in two provinces of China.
19	Health provider payment reforms in China: what international experience tells us (The World Bank 2010)	China (seven provinces in China)	Grey literature- a review conducted based on multiple case studies in seven provinces of China, and secondary analysis of primary studies in China.	To analyse the impacts and implementations of two major provider reforms (case-based payment in hospitals and reforming methods of government budget allocations (separation of revenue and expenditure) to primary health providers).
20	Review of health care provider payment reforms in China (Meng 2005)	China	Grey literature- review based on secondary analysis of primary studies and policy documents.	To examine provider payment reforms/experiments and their impacts by reviewing payment-related documents and studies (both published and unpublished).

21	Capitation combined with pay-for-performance improves antibiotic prescribing practices in rural China (Yip et al 2014)	China (Two mountainous counties in Ningxia province, 28 towns, 266 villages)	Matched-pair clustered randomized controlled experiment	To evaluate the effect of capitation combined with pay-for-performance in township health centres and village posts through a social experiment in rural China.
22	Addressing government and market failures with payment incentives: Hospital reimbursement reform in Hainan, China (Yip & Eggleston 2004)	China (Six hospitals in Haikou representing 75% of patient admission under the insurance scheme)	Natural experiment	To evaluate a prospective payment reform on six hospitals on different sub-categories of expenditures.
23	Provider payment reform in China: The case of hospital reimbursement in Hainan Province (Yip & Eggleston 2001)	China (Six hospitals in Haikou representing 75% of patient admission under the insurance scheme)	Natural experiment	To evaluate the impact of mixed payment system (capitated global budget plus a pay-for-performance component) versus a pure prospective payment system (capitated global budget only) on drug prescribing patterns and prescription costs using an experimental study approach.
24	The impact of a pay-for-performance scheme on prescription quality in rural China (Sun et al 2016)	China (29 Township Health Centres (THC) in both counties were randomly assigned to intervention and control group)	Experiment	To evaluate the impact of mixed payment system (capitated global budget plus a pay-for-performance component) versus a pure prospective payment system (capitated global budget only) on drug prescribing patterns and prescription costs using an experimental study approach.
25	An experiment in payment reform for doctors in rural China reduce some unnecessary care but did not lower total costs (Wang et al 2011)	China (two rural townships (Fengshan and Machang) in Guizhou Province, China)	Natural experiment	To evaluate the effectiveness of a prospective payment mechanisms (salary plus performance bonus) in two townships in China.
26	Payment reform and changes in health care in China (Gao et al 2014)	China (Urban Resident Basic Medical Insurance (URBMI) enrollees (number of enrollees for this scheme in Changde city was not reported)).	Natural experiment	To evaluate the impacts of a local provider payment reform (capitation) among Urban Rural Basic Medical Insurance (URBMI) enrollees in Changde city, China to demand-side cost, utilization and satisfaction outcomes.
27	Payment reform pilot in Beijing hospitals reduced expenditures and out-of-pocket payments per admission (Jian et al 2015)	China (14 tertiary general hospitals in Beijing China (6 in intervention group and 8 in control group))	Natural experiment	To evaluate the impact of pilot policy reforms from FFS payment (retrospective payment system) to DRG payment (prospective payment system) to hospitals in Beijing city, China.
28	NRCMS capitation reform and effect evaluation in Pudong New Area of Shanghai (Jing et al 2016)	China (Shanghai Pudong New Area)	Mixed method (institution-based pre-post survey, qualitative interview, policy document analysis)	To examine the design, implementation and effects of capitation combined with GP system reform.
29	Introducing Diagnosis-related groups in Kazakhstan: evolution, achievements, and challenges (Chanturidze et al 2016)	Kazakhstan (national policy reform among hospitals)	Case study	To examine the practicalities of implementing DRGs and how the challenges can be approached or mitigated.
30	Hospital payment systems based on diagnosis-related groups: experiences in low and middle income countries (Mathauer & Wittenbecher 2013)	A review of low and middle income countries.	Comprehensive review of DRG implementation experiences in low and middle income countries.	To examine emerging aspects and trends in the design and implementation of DRG payment systems among hospitals in low and middle income countries.

Supplemental Data: PPS Reform Contexts in Asian Developing Countries (Online-only)

	National health system reforms / sub-national policy initiatives examined	Contexts (Design and institutional arrangement)
1	Thailand's health system pays different social health insurance schemes via different payment methods. The earliest Civil Service Medical Benefits and Scheme (CSMBS) reimburses providers via fee-for-service. In 1990, Social Security Scheme (SSS) was established to cover former sector employees and it pays providers via capitation payment system. This is the first major reform to derail from a largely fee-for-service system. In 2001, universal health coverage was extended to the entire population. The UC scheme (also known as 30-Baht Scheme) covers the poor and informal sector, and pays the providers via capitation (outpatient) and DRG (inpatient).	A few waves of reform to improve coverage and provider payment mechanisms started as a result of the election of a strong and populist government, fueled by bureaucrats that were able to wield political power to push the reform agenda. The payment systems are relatively established as compared to many other developing countries' health system. Over the years it is characterized by constant improvement and stability of the administrative support systems and delivery structures. However, there remains fragmentation in the social health insurance system with various provider payment mechanisms applied to beneficiaries of different social health insurance schemes that cover different segments of the population (Yip et al 2001; Hughes et al 2010; Hughes & Leethongdee 2007).
2	Vietnam's 2008 Health Insurance Law and capitation payment reform in 2009	Health Insurance Law that was issued and enacted in 2008 made capitation payment compulsory to district hospitals by 2009. Nevertheless, the health system remains fragmented with fee-for-service systems continue to be applied at higher level health facilities and different provider payment mechanisms at different geographic locations (Sominathan et al 2014; Nguyen et al 2015).
3	Philippines provider payment reform in 2011 and expansion of benefits package in 2013	A health system characterized by recent and large scale national level payment system reform, and high level of devolution of autonomy in terms health care management, from the national government to the local governments. 'Philhealth' is designated as the policy coordination agency. There remains high level of geographic inequity in service deliveries and resource endowment (Picazo et al 2016).
4	Indonesia National Health Insurance reform (JKN) in 2014	A health system characterized by recent and large scale national health insurance reform which entails payment reforms to the primary health providers (capitation payment system legislated in 2013). There is high level of devolution of autonomy in terms of health care management from the central government to the local governments. BPJS-Health is designated as the payer and JKN implementation agency of the national health insurance which aims to consolidate all existing social health insurance schemes into one universal scheme by 2019. There remains high level of geographic inequity in service deliveries and resource endowment (Trisantoro et al 2016).
5	Kazakhstan National Health Policy Reform (DRG system implementation) in 2012	A health system characterized by recent and large scale national level reform ushered by strong political will - adoption of Kazakh DRG classification system in all hospitals. DRG payment reform was adopted as a tool to mitigate the perverse incentives created by the payment system that placed a strong financial burden on health care (Chanturidze et al 2016).
6	China's sub-national government policy pilots/experiments and policy initiatives from late 1990s onwards	Sub-national government (provincial level and/or county) policy pilots and policy experiments of various prospective payment reforms started flourishing and took place in different provinces to increase efficiency and practices of public health facilities since late 1990s. There were high levels of devolution of autonomy in health care management from central government to the local government. Local government is responsible to design their own social health insurance system, which include benefit packages, payment rates, premium levels etc (The World Bank 2010; Meng 2005).