

IHE Report

Financial Incentives to Physician Practices

A literature review of evaluations of physician
remuneration models

March 2009

Prepared by

Charles Yan, JoAnn Kingston-Riechers & Anderson Chuck

TABLE OF CONTENTS

Table of contents.....	i
Acknowledgements:	iii
Acronyms	iv
Executive Summary	1
Introduction	6
Background	6
Physician Payment Models.....	6
Fee for Service (FFS)	6
Capitation.....	6
Sessional	7
Contractual	7
Salary, Block Funding and Blended Funding	7
Pay for Performance (P4P).....	8
Physician Payment Models in Alberta	8
Objectives	10
Methods	10
Selection Criteria	10
Results	11
Capitation vs. FFS	13
Salary vs. FFS	14
Salary vs. Capitation vs. FFS	14
Capitation vs. Blended.....	15

Capitation vs. Non-Capitation	16
Pay-for-Performance	17
Hospitals	17
Physicians.....	17
Discussion.....	18
Evidence.....	18
Evidence from Other Reviews	22
Conclusion	23
Policy Considerations Related to the Findings	25
References.....	28
Appendix 1: Background into Pay for Performance Models	32
Appendix 2: Physician Payment Models in Canada and Internationally	36
Appendix 3: Literature Search Strategy.....	40
Appendix 4: Summaries of Studies Reviewed.....	43

ACKNOWLEDGEMENTS:

We are grateful to Liz Dennett, Information Specialist at the Institute of Health Economics, for performing the literature search and its retrieval.

Production of this document has been made possible by a financial contribution from Alberta Health and Wellness.

ACRONYMS

AMA	Alberta Medical Association
ACG	Adjusted Clinical Group
AHW	Alberta Ministry of Health and Wellness
AHCIP	Alberta Health Care Insurance Plan
APP	Alternate Payment Plan
ARP	Alternate Relationship Plan
BCMA	The BC Medical Association
CIHI	Canadian Institute for Health Information
DCG	Diagnostic Cost Groups
DHSS	Department of Health and Social Services
DPS	Disability Payment System
FFS	Fee-for-service
IHE	Institute of Health Economics
ITS	Interrupted Time Series
MHHL	Manitoba Health and Healthy Living
MMA	Manitoba Medical Association
NLMA	Newfoundland and Labrador Medical Association
P4P	Pay-for-Performance
PSC	Physician Services Committee
QOF	Quality and Outcomes Framework
RCT	Randomized Controlled Trial
RHA	Regional Health Authority
YMA	Yukon Medical Association

EXECUTIVE SUMMARY

This report provides information regarding the impact of physician reimbursement models on five dimensions specified in the Provincial Alternate Relationship Plan Program Evaluation. The impact of physician reimbursement models were assessed on the following five dimensions:

1. Health service utilization
2. Access to care
3. Quality of services
4. Patient satisfaction
5. Physician satisfaction

The analysis was conducted using information generated from a systematic review of the existing evidence around physician reimbursement models. Studies related to physician payment models were searched on selected databases and on Government and HTA agency websites. The Google search engine, were used to locate grey literature. Studies that evaluated physician reimbursement between two or more physician payment models were included in the review.

There were studies available in the literature that evaluated fee for service (FFS)^a, capitation^b, salary^c, blended models (e.g. FFS + capitation), and pay for performance (P4P)^d (see table page 2). There is some evidence showing that FFS and salary based approaches produce similar volumes of physician services and similar quality of care, while salaried physicians provide better access to care, spend more time with patients and consequently, achieve greater patient satisfaction.

Likewise, compared to capitation, salary based approaches are associated with better access to care, greater physician satisfaction while maintaining similar quality of care. There is some evidence showing that compared to capitation alone, the combination of capitation and FFS produces an increase in the volume of physician services, a decrease in referrals to specialists and greater physician satisfaction. There are no studies available that evaluated salary alone with the combination of capitation and FFS.

^a Physicians are reimbursed for the services provided with reimbursement rates being pre-determined for the type of service offered.

^b Physicians are prepaid a fixed amount for each patient enrolled into their practice.

^c Physicians are employed on a salary basis that covers all services provided.

^d A framework is developed to measure quality of care based on a point system. Physicians are financially rewarded for achieving quality benchmarks.

Evidence from ‘before and after’ studies show that P4P is associated with improved quality of care. However, it is important to note that the framework for assessing quality may be impacted by how physicians report on the quality criteria. An important component of P4P models is a mechanism for ensuring the accuracy of reporting.

In conclusion, the evidence reveals that physician payment models do have an impact on physician services, access to care, quality of care, patient satisfaction and physician satisfaction. Although the findings may not be directly generalized to the Alberta health setting, since the studies reviewed are conducted in different health contexts, they do provide insights into how financial incentives might be used to achieve specific policy objectives. Shifting from FFS to capitation creates an incentive for physicians to provide fewer services and is also associated with lower patient and physician satisfaction. Salary models are associated with similar volumes of physician services as FFS or capitation alone but achieve greater patient satisfaction; possibly due to improved access to services and more time spent with their physician. Furthermore, P4P models have shown to be successful models for promoting and improving quality of care.

Ideally physician payment models would create the right balance of incentives which would reduce unnecessary physician services, but have incentives to maintain or improve access and quality of care and better patient and physician satisfaction. In a recently published analysis by Léger (2008)¹ (Chapter in IHE book “Financing Health Care”) which reviewed incentive mechanisms for physician reimbursement, Léger suggests that blended models may minimize health expenditure while maintaining or improving health service quality. One policy example given by Léger is to have a lower FFS rate but to offset it with a per-diem payment. This would provide an incentive for physicians to minimize unnecessary services without adversely affecting time spent with patients. Performance based incentives could also be added to further incentivize certain quality improvements.

Other important considerations for physician reimbursement policy related to the literature review are listed below.

1. Funding incentives should promote new models of care and enhanced future performance:
 - a. The goal should be to transform the system to deliver on future, not current performance. This is consistent with the strategic goals outlined by Alberta Health and Wellness to change reimbursement incentives to align with new models of care.²

2. Comprehensiveness of performance criteria:

- a. A broad range of performance criteria should be used in funding systems. Criteria should consider a comprehensive array of patient problems and health conditions and take into consideration the clinical specialty. Incentive programs lacking comprehensiveness will result in physicians focusing on criteria that are being rewarded and not on overall care. However, performance criteria should be developed with the minimum amount of information necessary for valid reporting (i.e. collect no more data than is necessary for validly measuring performance).
- b. Performance criteria should be based on evidence and be standardized across clinical areas to the greatest extent possible to promote acceptance.
- c. Criteria should also explicitly link process measures of quality with their corresponding outcome measures. Explicitly linking performance criteria to its end objective will strengthen the relationship between incentives and results.

3. Consideration of the population served:

- a. Rewarding performance should engage physicians to serve challenging patient populations or remote geographical areas.
- b. Population differences in health status and socioeconomic status should be taken into consideration to prevent physicians avoiding clinically complex patients.

4. Balance of rewards and penalties:

- a. Under a budget constraint, some physicians can only earn more if others earn less. Consideration might be given for penalties for poor performance and rewards for good performance.
- b. Incentives do not necessarily have to be monetary or tied to payment. Non-monetary incentives can include reduction of administrative responsibility and public knowledge of performance. Physicians will be more involved to take action if information is publicly reported irrespective of any monetary reward or penalty.

5. Sustainability of Incentive Programs:

- a. Incentive programs need to be sustainable over a number of years to effect behavioural and system change.
- b. Ensuring the sustainability of incentive programs will also lead to greater involvement, cooperation and confidence from physician groups and organizations.

6. Transparency and public knowledge:

- a. Public awareness of performance is a key incentive mechanism. Physicians will be more likely to act on performance information if information is publicly reported.
- b. Quality criteria and goals should be transparent, explicit and measurable. The same set of measures should be used for both public reporting and payment.
- c. The program should be a united approach and communicates the sharing of responsibility between government and care providers.

7. Information systems for reporting:

- a. Information systems with the capacity to aggregate, analyze and disseminate performance related information are essential for assuring that the performance criteria that form the basis of incentive payments are reliable and valid.
- b. Information systems should be able to facilitate timely feedback about performance to allow the opportunity for early feedback to care providers. It should also allow care providers to monitor patient care and results to show the link between incentives and results.

8. Size of financial payment and rewards:

- a. The type and magnitude of incentive should match the desired objective. Rewards or penalties should be large enough to achieve desired behaviour changes and policy objectives but not waste resources.

9. Group versus individual incentives:

- a. Incentives should be targeted as much as possible towards physician groups (e.g. specialty) and not individuals. The incentive program should

provide external incentives at a group level complimented by individual based incentives within the physician group.

Further examination of some or all of these considerations and their applicability to Alberta would be beneficial to developing future physician reimbursement strategies for Alberta.

Summary of Literature Review Findings on 5 Key Dimensions

Payment	Dimension				
	Volume of Physician Services	Access to care	Quality	Patient Satisfaction	Physician Satisfaction
FFS vs. Capitation	Decrease in physician activities under capitation	Evidence showing both better and poorer access to care under capitation	Little difference in quality of care	Less satisfied under capitation	Less satisfied under capitation
FFS vs. Salary	No significant difference	Better access to care under salary	Little difference in quality of care under salary. May be slight improvement in quality with salary because of more time spent with patient.	More satisfied under salary	No studies
Capitation vs. Salary	No studies	Better access to care under salary	Little difference in quality of care	No studies	Less satisfied under capitation
Capitation vs. Blended	Increase in physicians activities	Reduction in referral rates to specialists under capitation + FFS	No studies	No studies	Less satisfied under capitation than capitation + FFS
PP4	No studies	No studies	Improves Quality	No studies	No studies

INTRODUCTION

BACKGROUND

Health care expenditure has steadily increased over time and represents an increasing share of the gross domestic product in developed nations.¹ Hence there is growing interest around minimizing unnecessary consumption of health services and increasing both the efficiency and quality of health services delivery. Physician payment mechanisms, can serve as an effective approach to reducing unnecessary consumption of care because physicians have the greatest control over the type, quantity and quality of services provided.¹

The method of reimbursing physicians for providing health care services however, will not only affect how physicians practise³ in terms of the volume of health services provided, but it can also provide incentives that influence physician recruitment and retention. Hence alternate payment models to physician reimbursement are of great interest for health policy makers.

PHYSICIAN PAYMENT MODELS

Alternate payment models fall under two main categories: fee-for-service (FFS) and *alternate relationship plans (ARPs)*, which are any physician payment model that is not FFS. The most common ARPs include capitation, sessional, contractual, salary, block funding and blended funding. Another form of ARP that is garnering attention is outcome based payment systems. Countries such as the United States and United Kingdom have a set of outcome-based compensation models known as pay-for-performance (P4P) plans. These physician payment models are described below:

FEE FOR SERVICE (FFS)

Under **fee-for-service (FFS)** physicians are reimbursed for the services provided with reimbursement rates being pre-determined for the type of service offered. Fee-for-service (FFS) was almost exclusively used in Canada and the United States since the 1980s.^{1;4} A disadvantage with FFS is that it provides a financial incentive to generate greater volumes of services (that may be unnecessary) because physicians can receive greater incomes by providing greater services. This is known as physician-induced demand (PID).^{1;5}

CAPITATION

Under **capitation**, physicians are prepaid a fixed amount for each patient enrolled into their practice. The amount is intended to reflect the expected medical expenditures for a specified period of time for each patient enrolled. Hence, there is an incentive to control services provided to maximize income thus minimizing unnecessary services. However, it also creates the risk of reducing the quality of care provided to the patient or physicians enrolling patients with lesser complexity.^{6;7}

SESSIONAL

Under **sessional**, physicians are reimbursed on an hourly or daily basis. Sessional ARPs are intended to provide incentives for physicians to provide additional services. Hence, this model reimburses physicians based on time spent with patients opposed to number of services provided. However, there is a concern in the efficiency of services provided. Sessional ARPs are commonly found in settings such as hospital emergency, psychiatry clinics and rural areas.

CONTRACTUAL

Under **contractual**, funding is based on a pre-negotiated amount for a pre-determined volume of specified services over a specified period of time. Unlike FFS, both the amount of payment to physicians and the volume of services provided are determined during contract negotiations. This payment mechanism eliminates the incentive to provide additional unnecessary services. However, it has also been criticized for impeding productivity and cultivating bureaucracy.^{8;9} Note that academic ARP is a form of contractual model. It provides pooled funding to physicians within academic institutions for teaching, research, administration and clinical services.^{8;10}

SALARY, BLOCK FUNDING AND BLENDED FUNDING

Under **salary**, physicians are employed on a salary basis that covers all services provided. Salary is based on a pre-negotiated amount. Note that salary based and contractual models are similar in terms of the methods of defining the amount of payment. Therefore, these models are often discussed together.

Under **block funding**, a fixed amount (i.e. annual budget) of funding is provided to physician groups (defined by geographic area or specialty) to provide all medical services for a specified period of time. This form of ARP is commonly associated with academic medical centres. This provides alternate compensation under a contractual model for clinical practice and conditional grant funding to compensate physicians for teaching, administrative and research responsibilities.

Under **blended funding**, a blend of fee for service and ARP is used to reimburse physicians.

PAY FOR PERFORMANCE (P4P)

Under **P4P**, a framework is developed to measure quality of care based on a point system. The framework can include several criteria such as patient outcomes, access to care, patient satisfaction and characteristics of the practice's staff and facility. Physicians are financially rewarded for achieving quality benchmarks based on their number of points attained. P4P models were developed to address concerns about deficiencies in the quality of health care.¹¹ Refer to Appendix 1 for background information and history of P4P.

PHYSICIAN PAYMENT MODELS IN ALBERTA

The Alberta Health Care Insurance Act governs the payment to physicians for insured services under the Alberta Health Care Insurance Plan. Physician compensation is negotiated as part of a tri-lateral agreement involving the Alberta Medical Association (AMA), Alberta Health and Wellness (AHW) and regional health authorities (RHAs). Under this agreement, ARPs have been established to enhance specialist physician recruitment and retention, team-based approaches to service delivery, access to services, patient satisfaction and value for money (refer to [Appendix 2](#) for a summary of physician payment models across Canada and Internationally).^{12;12} According to the 2003 master agreement between AHW, AMA and RHAs, physicians are able to voluntarily participate in either sessional, contractual or capitation ARPs.^{13;14} Physicians on an ARP can also return to FFS at any time.

The sessional model is available to all physicians (general practitioners (GP) and specialists). GPs are paid \$151.38 per hour while specialists are paid \$171.40 per hour. As stated previously, while sessional models reduce the financial incentive to conduct extra services it also raises issues of efficiency (i.e. treat less patients over period of time). Hence, physicians in Alberta must be on site for the sessional period and must be constantly providing services in order to receive payment. The agreement also sets a limit of weekly working time up to an equivalent of two days.

Under the contractual model the provincial basic annual payment rate is \$403,584 for general surgery and \$242,982 for general practice. The master agreement suggests that the model works best for the physicians who are involved in procedures or consultants. Note that CIHI categorizes Alberta's contractual and salary models together.⁸

Under the capitation model, capitation rates per enrollee vary by geographic and demographic characteristics such as age, gender and socio-economic status.^{8;15;16} Varying the capitation rate does help to reduce the incentive of physicians selectively enrolling patients with lesser complexity (patient selection described in previous section).

According to the Canadian Institute for Health Information (CIHI), the proportion of total physician payments attributable to ARPs have increased at an average of 2% between 1999 and 2006 in Alberta.¹⁷ Yet, during the same period in Alberta the number of physicians on FFS versus ARP has increased at an average of 1.4% and 0.9% respectively. The proportion of physician payments on FFS has declined but FFS still remains the most prevalent model of reimbursing physicians in Alberta.

In 2007, there was a total of 862 physicians on ARP (table 1).¹⁰ The majority were academic ARPs followed by sessional, contractual and capitation. 862 physicians participated in ARPs at a cost of about \$150 million. In the same year, 7,411 physicians received FFS-based payment and about \$1,600 million.

Table 1: Distribution of ARPs in Alberta 2006-2007			
ARP Types	GPs	Specialists	Total
Capitation ARP	16		16
Contractual ARP	64	87	151
Sessional ARP	119	53	172
Academic ARP			523
# Physicians			862
Expenditures			\$151,295,359

Source: ¹⁰

A final contract between AHW, AMA and Albert Health Services for the 2008 to 2010 financial term completes the final term of the eight year Master agreement between AHW, AMA and RHAs. The final contract includes a rate increases to the schedule of medical benefits (FFS fee schedule) and increases of 5%, 5% and 4.5% to ARPs for 2008/09, 2009/2010 and 2010/11 respectively. The budget for physician services over this time period is \$2.6, \$2.9 and \$3.1 billion.

OBJECTIVES

The objective of the report was to conduct a systematic review of the existing evidence around various models of physician reimbursement. Specifically, the objective was to evaluate the impact of ARP models on five key dimensions:

1. health service utilization
2. access to care
3. quality of services
4. patient satisfaction
5. physician satisfaction

METHODS

Drawing on available evidence that have appeared in the published literature, studies related to physician payment models were searched on selected databases from 1993 to 2008 ([see Appendix 3 for search strategy](#)). Cochrane Database of Systematic Reviews, EMBASE, CRD Databases (DARE, NHS EED, and HTA), Pubmed, Web of Science, Econ Lit, Academic Search Complete, ABI Inform and PAIS were searched using MeSH terminology, descriptors and text words.

Studies related to physician payment models were searched on selected databases and on Government and HTA agency websites. The Google search engine, were used to locate grey literature.

SELECTION CRITERIA

The search was limited to English language publications. The inclusion/exclusion criteria for retrieval and review of identified articles are listed below:

Inclusion criteria

- The study evaluated physician reimbursement models and physician incentive mechanisms.
- The study was a comparative analysis between at least 2 types of physician payment models (excluding P4P).
- Study design was a randomized controlled trial (RCT), interrupted time series (ITS), cross section or controlled before-and-after studies.
- Study participants including physicians including GPs, family physicians or specialist physicians.

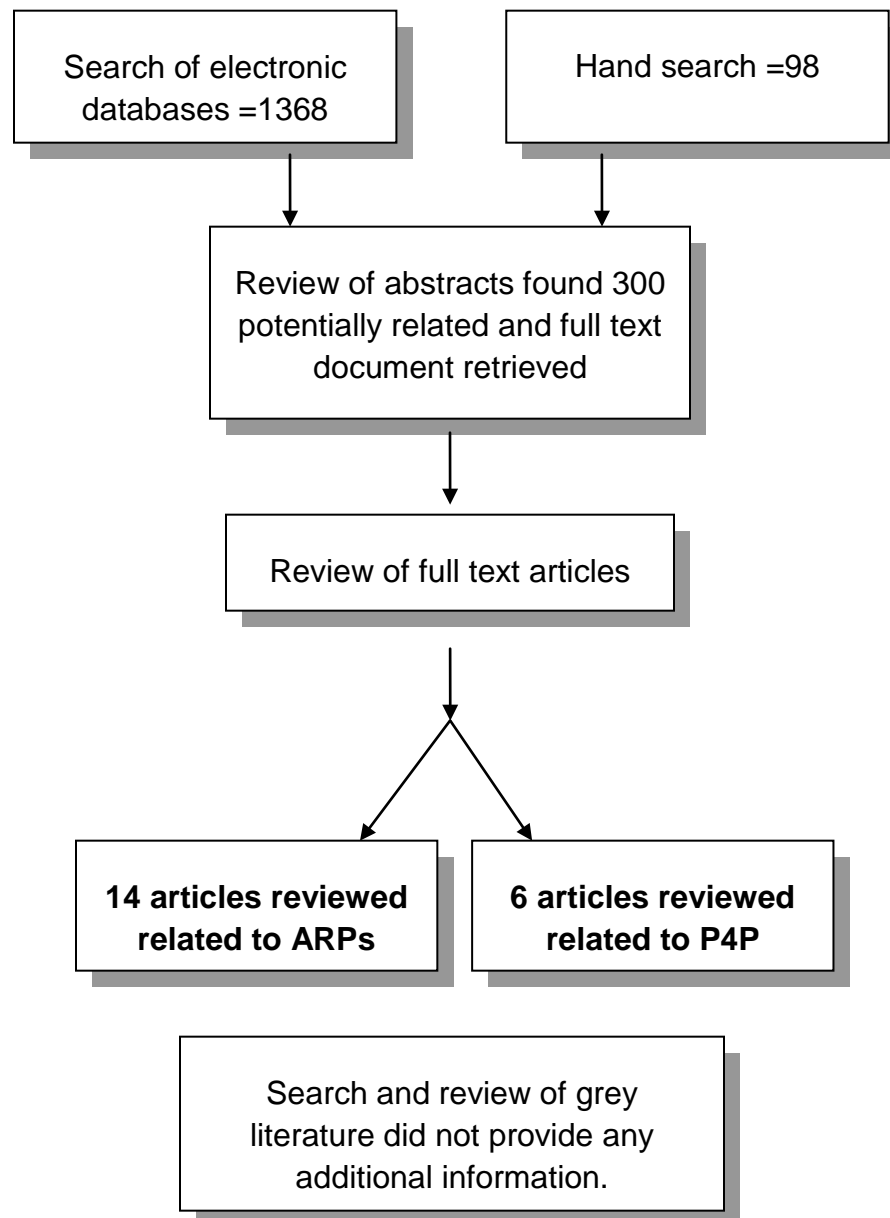
RESULTS

The literature search generated 20 studies that met the final inclusion criteria (Figure 1). Information gathered from the grey literature did not provide additional information to the studies reviewed. Of the 20 studies reviewed, 14 studies focused on conventional ARPs while 6 focused on P4P (refer to Appendix 4 for study summaries). Physician payment plans reviewed in the literature included FFS, Capitation, Salary, Blended and P4P. There was sufficient evidence in the literature to assess the impact of FFS, Capitation and Salary on our five key dimensions (table 2). However, blended models could only be evaluated on service volume, access to care and physician satisfaction while P4P could only be evaluated on quality.

Table 2: Study Dimensions

Payment	Dimension				
	Volume of Physician Services	Access to care	Quality	Patient Satisfaction	Physician Satisfaction
FFS	X	X	X	X	X
Capitation	X	X	X	X	X
Salary	X	X	X	X	X
Blended	X	X			X
P4P			X		

Figure 1. Progress through the Selection of Potentially Relevant Studies



CAPITATION VS. FFS

Hutchison et al. (1996)¹⁸ compared hospital utilization before and after capitation replaced FFS. The study was based on data from Ontario's Health Service Organizations. A major policy objective was to reduce hospital utilization through financial incentives. Physician payment was based on capitation with a bonus for having patients with a lower than average rate of hospital use. Hospital usage was defined as hospital separations or hospital days per 1000 patients adjusted for age, sex and social assistance. The authors found that, in comparison to FFS, capitation plus the reward resulted in no significant difference in hospital usage.

Davidson et al. (1992)¹⁹ conducted a RCT to compare the average primary care physician visits, non-primary care physician visits, clinic/emergency department visits and hospitalizations per patient per year. The study was based on data from the American Children's Medicaid program. Under capitation, 40% of any savings (from decreased service utilization) were paid to physicians. The authors concluded that there was no difference in the volume of physician visits between capitation and FFS. Moreover, in comparison to FFS physicians there was a lower rate of referrals to specialists under capitation.

Catalano et al. (2000)²⁰ conduct a before and after study comparing the cost of mental health services for children and youth. The incentive plan allowed capitation-based organizations to keep any surplus resources. Compared to FFS, capitation resulted in lower mental health services costs. The authors concluded that compared to FFS, capitation reduces health services costs.

Dusheiko et al. (2006)²¹ conducted a before and after study comparing the waiting times for elective surgery. The study was based on a large sample of general practices in primary care in the United Kingdom. As part of the 1991 health reform, GPs who volunteered to enter the capitation model were given a budget by their local Health authority. The budget covered drugs, primary care services and certain types of elective secondary care procedures^e from hospitals. Under this capitation model, any savings (from decreased service utilization) could be retained by the physicians. The capitation model was suspended in 1999. During capitation, there was a significant reduction in waiting times for chargeable and non-chargeable patient admissions by 4.1 to 6.6% and 3.7% respectively. Furthermore, after suspending capitation there was an increase in the volume of elective admissions of approximately 3.5% to 5.1%.

^e These procedures included outpatient services, diagnostic tests and non-emergency inpatient and day case treatment.

Coleman et al. (2000)²² conducted a prospective cohort study comparing health service utilization of older adults receiving institutional rehabilitation for hip fracture. Utilization measures included length of hospital/rehabilitation stay, physician visits, nursing time and time in therapy. The study also compared quality of care measured by recovery of function, improvement in ambulation, return to community living and mortality. The study did not indicate whether capitation-based organizations (i.e. HMOs) could keep any surplus resources. The study found that compared to organizations using FFS, there were less volume of physician visits in organizations using a capitation model. However, there were no significant differences between FFS and capitation in terms of quality of care. The authors concluded that compared to FFS, capitation was associated with a decrease in health service utilization and achieved equivalent health outcomes.

SALARY VS. FFS

Hickson et al. (1987)²³ conducted a RCT comparing physician and emergency room visits and patient satisfaction. Patient satisfaction was measured in four dimensions: humanness, continuity/convenience, overall satisfaction and access to their physicians. The setting for the study was a paediatric residents' continuity clinic. The study found no significant difference in patient visits or the number of enrolled patients between both groups. FFS physicians were also present for a larger proportion of their patient visits and encouraged fewer emergency visits. There was no significant difference in patient satisfaction with the exception of access to their physicians. Patients reported greater satisfaction with access to their physician under salary than FFS.

Ferrall et al. (1998)²⁴ conducted a cross sectional study to examine the difference in practice pattern between physicians on FFS and salary. 29,317 Canadian physicians across Canada were surveyed using a questionnaire. The primary outcome measure was weekly hours of directly patient care and weekly hours of work. The study found that compared to salaried physicians, physicians under FFS spent about 5.9 more hours each week with patients while also spending 5.5 hours less work week hours.

SALARY VS. CAPITATION VS. FFS

Barton et al. (2001)²⁵ conducted a retrospective cohort study comparing access to effective care for elderly patients under FFS, salary and capitation. Data was from a national data set that included patient and health services information on over 7,000 physician practices over a two year period. The study was targeted at the enrollees in Medicare among whom 8920, 4258 and 344,733 of physicians received services on salary, capitation and FFS respectively. Access to care was measured in three areas: preventative care, diagnosis-specific care and chronic disease care. The study showed that compared to FFS, access to care was either as good or better under salary and capitation.

Gosden et al. (2003)²⁶ conducted a before and after study comparing GP behaviour and quality of care between salary and capitation or FFS in the setting of primary care in England. GP activities were measured based on the distribution of their time spent across clinical and non-clinical activities within their practices, the number of consultations, the proportion of all consultations in which a prescription was given or a referral was made, child immunization and pre-school booster rates. Quality was measured based on patients' assessment of thirteen domains of service provision including: access, technical care, communication, interpersonal care, knowledge of patient, nursing care and referral rates. The study found that compared to capitation and FFS, GPs reimbursed on a salary basis were found to spend less time on administrative duties and more time working out-of-hours and in direct patient care. However GPs on salary provided shorter consultations and had similar referral rates. Seven out of the thirteen domains of quality were higher for salary based practices while the opposite was true for two of the aspects. The authors concluded that compared to capitation and FFS, salary-based model did not adversely affect GP productivity and had little impact on the quality of care.

CAPITATION VS. BLENDED

Krasniket al. (1990)²⁷ conducted a before and after study investigating whether a change in payment mechanisms lead to a significant change in physician activities. Primary care physicians in Copenhagen received payment on a capitation basis prior to March 1987 and on a capitation/FFS basis thereafter. Physician activities were measured by calculating the number of consultations per week per 1,000 patients. The consultation activities included seven dimensions: i) face to face consultations, ii) telephone consultations, iii) renewal prescriptions, iv) diagnostic services, v) curative services, vi) referrals to specialists and vii) referrals to hospitals. Results showed that under the blended system, there was a significant increase in total physician visits (117 vs 100 per 1,000 patients) and diagnostic services (138 vs 100 per 1,000 patients). Moreover there was a significant decrease in referrals to specialists (90 vs 100 per 1,000 patients) and hospitals (87 vs.100 per 1,000 patients). The authors concluded that physicians' activities increased and referral rates decreased under the blended system of capitation and FFS system.

Kerr et al. (1997)²⁸ conducted a cross sectional study comparing physician satisfaction with their quality of care between physicians compensated by capitation, salary or FFS. A questionnaire was sent to 910 physicians in 89 physician groups in California. Physician satisfaction with their quality of care was measured in four dimensions: i) relationship with patients; ii) quality of care provided; iii) ability to treat patients according to the physician's own judgment; and iv) ability to refer patients to specialists.

The study found that physicians on capitation reported lower satisfaction on all four dimensions compared to physicians on salary or FFS.

CAPITATION VS. NON-CAPITATION

Dusheiko et al. (2007)²⁹ conducted a cross-sectional study comparing patient satisfaction between capitation and non-capitation based fundholding. The study used data collected from a survey of patients in 60 physician practices in England. Patient satisfaction was categorized by general satisfaction, access, prescription quality, and organizational quality, knowledge of patient's medical history, opening hours and appointment waiting time. The study found that patients of capitation-based fundholding models reported less satisfaction with their GPs' hours of practice, knowledge of their medical history, ability to arrange tests and willingness to refer to a specialist. Moreover, patients of non-capitation based fundholding models were more like to agree that GPs were primarily concerned with minimizing costs opposed to patient care. The authors concluded that patients of capitation-based fundholding models were less satisfied compared to patients of non-capitation based fundholding models.

Balkrishnan et al. (2002)³⁰ conducted a cross-sectional study comparing the effect of capitation-based payment on physician behaviours related to quality of care in a primary care setting in the USA. The study used 46,320 randomly drawn records from the National Ambulatory Medical Care Survey of outpatient physicians and their staff. Due to data limitations, the authors were not able to directly compare different types of capitation or compare capitation with salary or FFS. All forms of capitation were compared to all other payment methods. The primary outcome measure was the amount of time spent with patients. The secondary outcome measures were indices of health counselling and preventive services recommended by the physician during the visit. The study found that capitation-based physicians spent about 5.6% less time with patients than did non-capitation physicians. Compared to patients of non-capitation physicians, patients of capitation physicians were approximately 17% and 3% more likely to receive counselling services and preventive services respectively. The authors concluded that capitation was associated with a modest decrease in the time spent with patients but was also associated with increased referrals to counselling and preventive services.

HOSPITALS

Kahn et al. (2006)³¹ conducted an observational cohort study evaluating hospital quality and financial performance of two P4P programs. The Premier Hospital Quality Incentive Demonstration program and the Medicare Payment Advisory commission program. The financial data of 4,203 hospitals and quality scores for heart attack, heart failure and pneumonia were examined. The study found that P4P model generated greater hospital funding than hospitals without P4P. The authors concluded that P4P had the potential for improving quality of care and generate greater funding for hospitals.

Grossbart et al. (2006)³² conducted a cohort study to evaluate quality improvement between 4 P4P hospitals and 6 non-P4P hospitals that were similar in terms of size and service. Quality was assessed in 3 clinical areas including heart attack, heart failure and pneumonia. The study found that quality improvement was greater in P4P hospitals than in the non-P4P hospitals. The authors concluded that financial incentives under P4P affect the rate of quality improvement.

Lindenauer et al. (2007)³³ conducted a cohort study to evaluate quality improvement between 207 P4P hospitals and 406 non-P4P hospitals. Quality was assessed in ten individual and four composite measures of quality over 2 years. The study showed that the rate of quality improvement was greater in P4P hospitals than in the non-P4P hospitals. The authors concluded that hospitals with P4P incentives generate greater quality improvement than hospital without P4P incentives.

PHYSICIANS

Rosenthal et al. (2005)³⁴ conducted a before and after study to evaluate the quality of care of physician P4P programs in California. The data was from 300 large multi-specialty physician organizations that provided care services of approximately 10,000 enrollees per organization. The study focused on three measures of clinical quality: cervical cancer screening, mammography and haemoglobin A_{1C} testing. Physicians above the 75th percentile for achieving quality targets received monetary bonuses. The study found that Improvements in clinical quality scores for P4P vs. non-P4P were 5.3% vs. 1.7% for cervical cancer screening; 1.9% vs. 0.2% for mammography and 2.1% vs.

^f Since widespread payments employed in health care markets are made by payers to groups of physicians or hospitals, known as the providers, this report focuses on contracts between payers and providers. Internal payments by medical groups to individual physicians are beyond the scope of the report.

2.1% for hemoglobin A1c. The authors concluded that paying clinicians to achieve performance targets may produce little quality gain because it primarily rewards physicians who are already achieving higher quality scores (i.e. ceiling effect).

Doran et al. (2006)³⁵ conducted a cross sectional study to evaluate clinical quality in the first year of establishing a P4P contract in the United Kingdom. Quality was assessed on 76 clinical quality indicators that made up 550 out of 1050 possible quality points. Data from 8,105 physician practices across the United Kingdom were analyzed. The study found that the 83.4% of practices reported improvements in quality. However, a small proportion of practices achieved higher scores by excluding larger numbers of patients (i.e. called exception reporting – defining patients as not eligible for inclusion in quality assessment) that served to increase their overall quality scores. The authors concluded that further research was needed to determine whether these practices were excluding patients for valid clinical reasons or because of financial incentives.

Doran et al. (2008)³⁶ conducted a cross sectional study to determine whether physicians were strategically excluding patients to improve overall quality scores (refer to Doran above). Data from 65 physician practices were analyzed. The study found that physicians excluded 5.3% of patients from the quality assessment (exception reporting) calculations. The authors concluded that the rate of exception reporting have been low with little evidence of widespread strategic behaviour from physicians.

DISCUSSION

EVIDENCE

Various physician reimbursement models have been used in many countries as the means to achieve policy objectives such as decreased unnecessary service utilization, increased quality of care and patient access to care.

FFS, capitation and salary are the main methods of remuneration in industrialized countries (see Appendix 2). For instance, while Greece, Portugal, Spain and Sweden employ primary care physicians directly through salary, Australia, Denmark, New Zealand, Norway and the United Kingdom employ primary care physicians through a mix of capitation, salary and FFS. Still, physicians in Austria, Belgium, France, Germany, Japan, Korea, Switzerland and the United States are paid mainly by FFS.

In Canada, the proportion of physician payments on FFS has declined but still remains the most prevalent method of reimbursing physicians.¹⁷ In Alberta, the proportion of total physician payments attributable to ARPs have increased at an average of 2% between 1999 and 2006.¹⁷ Yet, during the same period in Alberta the number of physicians on FFS versus ARP has increased at an average of 1.4% and 0.9% respectively.

The review of the evidence regarding physician reimbursement models show a wide range of impacts in health utilization, access to care, quality, patient satisfaction and physician satisfaction. Table 3 summarises the evidence reviewed on these five dimensions. There is some evidence showing that compared to FFS, capitation based approaches are associated with a decrease in the volume of physician services and decreased patient and physician satisfaction. In terms of access to care, there was evidence showing both better and poorer access to care under capitation. It is unlikely that there was a difference between capitation and FFS in the quality of services. It is important to note that within capitation, allowing physician groups to keep any savings from decreased services did influence physician behaviour. There were greater decreases in the volume of physician services in the studies reporting that physicians could keep a portion of any savings.

There is some evidence showing that compared to FFS, salary based approaches are associated with no significant difference in the volume of physician services or quality of services although there was evidence that salaried physicians do spend more time with patients. There was some evidence showing that there is better access to care and greater patient satisfaction under salary.

There is some evidence showing that compared to capitation, salary based approaches are associated with better access to care and little difference in the quality of care. Moreover, physicians reported greater satisfaction under salary. There is some evidence showing that compared to capitation alone, the combination of capitation and FFS was associated with an increase in the volume of physician services, decrease in access to specialists and greater physician satisfaction.

Evidence from key literature reviews are consistent with our findings.³⁷⁻³⁹ In a Cochrane review of ARPs, Gosden et al. (2001)³⁷ found that compared to capitation, FFS resulted in greater volumes of visits to primary care physicians, specialists and diagnostic services. Compared to salary, FFS results in more patient visits, and higher compliance with the recommended number of physician visits but patients were less satisfied with access to their physician.

There were no information relating P4P on physician services, access to care, patient satisfaction and physician satisfaction. This is not surprising given that the primary objective of P4P is to improve quality of care. There is evidence showing that P4P does increase quality of care. However it is important to note that the framework for assessing quality benchmarks can impact how physicians report on quality criteria. For instance, in the P4P frameworks in the United Kingdom, physicians can purposely increase their quality score by selectively excluding patients in their practice. Hence, an

important component to P4P models is a mechanism for ensuring the accuracy of reporting. Our findings on P4P are also consistent with findings in other literature and narrative reviews.⁴⁰ Conrad and Perry (2008) moreover, have outlined some key factors that facilitate maximizing quality in P4P models.⁴¹ These are: i) balancing rewards and penalties; ii) , blending structure, process and outcome measures; iii) emphasize continuous and absolute performance standards; iv) adjusting size of incremental rewards to match increasing marginal costs of quality improvement; and v) assuring frequency and sustainability of incentive payoffs.

Table 3: Summary of Literature Review Findings on 5 Key Dimensions

Payment	Dimension				
	Volume of Physician Services	Access to care	Quality	Patient Satisfaction	Physician Satisfaction
FFS vs. Capitation ^{a,b,c,d}	Decrease in physician activities under capitation	Evidence showing both better and poorer access to care under capitation	Little difference in quality of care	Less satisfied under capitation	Less satisfied under capitation
FFS vs. Salary ^{a,e}	No significant difference	Better access to care under salary	Little difference in quality of care under salary. May be slight improvement in quality with salary because of more time spent with patient.	More satisfied under salary	No studies
Capitation vs. Salary ^{b,d}	No studies	Better access to care under salary	Little difference in quality of care	No studies	Less satisfied under capitation
Capitation vs. Blended ^{b,e}	Increase in physicians activities	Reduction in referral rates to specialists under capitation + FFS	No studies	No studies	Less satisfied under capitation than capitation + FFS
PP4 ^b	No studies	No studies	Improves Quality	No studies	No studies

a Evidence from randomized controlled studies.

b Evidence from before and after studies.

c Evidence from prospective cohort study with controls.

d Evidence from retrospective cohort study with controls.

e Evidence is from cross sectional study with controls.

Still, there is significant variability in the methodological approach, study population and health setting in the studies reviewed. Thus, results should be interpreted in light of study limitations. There were 20 studies reviewed of which, there were 2 randomized controlled trials (RCTs);^{19;23} 5 cohort studies;^{22;25} 7 before-and-after studies;^{18;20;21;26;27;42} and 6 cross sectional studies.^{24;28-30} Hence, the evidence presented in this report is primarily based on non-randomized observational studies with controls.

Furthermore, other limitations with specific studies included selection bias (i.e. study population selectively recruited), heterogeneity in the study population (i.e. patient populations between comparators were different), lack of generalizability (i.e. health context is different than that of Canada or Alberta) and short study horizon (i.e. uncertain what the results would be in the long run).

EVIDENCE FROM OTHER REVIEWS

Evidence from key literature reviews are consistent with our findings.³⁷⁻³⁹ In a Cochrane review of ARPs, Gosden et al. (2001)³⁷ found that compared to capitation, FFS resulted in greater volumes of visits to primary care physicians, specialists and diagnostic services. Compared to salary, FFS results in more patient visits, and higher compliance with the recommended number of physician visits but patients were less satisfied with access to their physician.

In a review of P4P and their applicability to Canada, Pink et al. (2006)³⁸ suggest that the Canadian single payer model of centralized healthcare is well suited for P4P and highlights a number of recommendations for Canada discussed below. However, other scholars point out that financial incentives are not the only behaviour influencing mechanism and that P4P is not the solution to Canada's health care system.^{11;38;43}

1. Health regions are a good starting point to start P4P PROGRAM.
 - a. Best understanding of the population they serve and the providers of health services for the population.
2. Performance indicators should be consistent with the provincial health strategy and goals and focus on areas where there is potential for significant improvement.
3. Performance indicators should be within the control of providers and should provide rewards for continuous improvement.
 - a. Reward both improvements and the maintaining of good performance.
4. Performance indicators should be adjusted for the mix of clinical complexity and severity in the population.

- a. Adjustments however, should not have the effect of excusing poor performance for providers serving more complex populations.
 - b. Ensure fair compensation across providers and reduce risk of gaming and ignoring patient populations because they are not linked with financial rewards. Must ensure that even small providers receive their share.
- 5. Quality indicators should be adapted from current sources when possible to minimize implementation costs and time.
 - a. Provinces routinely report on already established measures of performance and these should form the basis of early P4P measures.
- 6. Quality indicators must be accepted by both health care providers and professional groups.
 - a. Can be achieved by involving stakeholders during the development process and starting with voluntary pilot programs.
- 7. Investment in information management systems is necessary.
 - a. Must determine how to appropriately fund information technology to enable measurement and monitoring of quality criteria.

CONCLUSION

In conclusion, the evidence reveals that physician payment models do have an impact on physician services, access to care, quality of care, patient satisfaction and physician satisfaction. Although the findings may not be directly generalized to the Alberta health setting, since the studies reviewed are conducted in different health contexts, they provide insights into how financial incentives might be used to achieve specific policy objectives. Shifting from FFS to capitation creates an incentive for physicians to provide fewer services and is also associated with lower patient and physician satisfaction. Salary models are associated with similar volumes of physician services as FFS or capitation alone but achieve greater patient satisfaction; possibly due to improved access to services and more time spent with their physician. Furthermore, P4P models have shown to be successful models for promoting and improving quality of care.

Ideally a physician payment model would create the right balance of incentives to reduce unnecessary physician services and other incentives to maintain or improve access to care, quality and patient and physician satisfaction. Accordingly, in a recently published analysis by Léger (2008)¹ (Chapter in IHE book “Financing Health Care”)

reviewing incentive mechanisms for physician reimbursement, Léger suggests that blended models may achieve policy objectives that seek to minimize health expenditure while maintaining or improving health service quality. One example given by Léger is to have a lower FFS rate but to offset it with a per-diem payment. This would provide an incentive for physicians to minimize unnecessary services without adversely affecting time spent with patients. Performance based incentives could also be added to further incentivize certain quality improvements.

POLICY CONSIDERATIONS RELATED TO THE FINDINGS

Other important considerations for policy related to the literature review are listed below. Further examination of some or all of these considerations and their applicability to Alberta would be beneficial to developing future physician reimbursement strategies for Alberta.

1. Funding incentives should promote new models of care and enhanced future performance:
 - a. The goal should be to transform the system to deliver on future, not current performance. This is consistent with the strategic goals outlined by Alberta Health and Wellness to change reimbursement incentives to align with new models of care.²
2. Comprehensiveness of performance criteria:
 - a. A broad range of performance criteria should be used in funding systems. Criteria should consider a comprehensive array of patient problems and health conditions and take into consideration the clinical specialty. Incentive programs lacking comprehensiveness will result in physicians focusing on criteria that are being rewarded and not on overall care. However, performance criteria should be developed with the minimum amount of information necessary for valid reporting (i.e. collect no more data than is necessary for validly measuring performance).
 - b. Performance criteria should be based on evidence and be standardized across clinical areas to the greatest extent possible to promote acceptance.
 - c. Criteria should also explicitly link process measures of quality with their corresponding outcome measures. Explicitly linking performance criteria to its end objective will strengthen the relationship between incentives and results.
3. Consideration of the population served:
 - a. Rewarding performance should engage physicians to serve challenging patient populations or remote geographical areas.
 - b. Population differences in health status and socioeconomic status should be taken into consideration to prevent physicians avoiding clinically complex patients.

4. Balance of rewards and penalties:

- a. Under a budget constraint, some physicians can only earn more if others earn less. Consideration might be given for penalties for poor performance and rewards for good performance.
- b. Incentives do not necessarily have to be monetary or tied to payment. Non-monetary incentives can include reduction of administrative responsibility and public knowledge of performance. Physicians will be more involved to take action if information is publicly reported irrespective of any monetary reward or penalty.

5. Sustainability of Incentive Programs:

- a. Incentive programs need to be sustainable over a number of years to effect behavioural and system change.
- b. Ensuring the sustainability of incentive programs will also lead to greater involvement, cooperation and confidence from physician groups and organizations.

6. Transparency and public knowledge:

- a. Public awareness of performance is a key incentive mechanism. Physicians will be more likely to act on performance information if information is publicly reported.
- b. Quality criteria and goals should be transparent, explicit and measurable. The same set of measures should be used for both public reporting and payment.
- c. The program should be a united approach and communicates the sharing of responsibility between government and care providers.

7. Information systems for reporting:

- a. Information systems with the capacity to aggregate, analyze and disseminate performance related information are essential for assuring that the performance criteria that form the basis of incentive payments are reliable and valid.
- b. Information systems should be able to facilitate timely feedback about performance to allow the opportunity for early feedback to care providers. It should also allow care providers to monitor patient care and results to show the link between incentives and results.

8. Size of financial payment and rewards:
 - a. The type and magnitude of incentive should match the desired objective. Rewards or penalties should be large enough to achieve desired behaviour changes and policy objectives but not waste resources.
9. Group versus individual incentives:
 - a. Incentives should be targeted as much as possible towards physician groups (e.g. specialty) and not individuals. The incentive program should provide external incentives at a group level complimented by individual based incentives within the physician group.

REFERENCES

- (1) Legér PT. Physician Payment Mechanisms. In: Mingshan L, Jonsson E, editors. Financing Health Care. Weinheim: Wiley-VCH, 2008: 149-172.
- (2) Alberta Health and Wellness. Vision 2020: The Future of Health Care in Alberta Phase 1. 2008. Alberta Health and Wellness.
- (3) Donaldson C, Gerard K. Paying general practitioners: shedding light on the review of health services. J R Coll Gen Pract 1989; 39(320):114-117.
- (4) Cutler DM. Equality, Efficiency, and Market Fundamentals: The Dynamics of International Medical-Care Reform. Journal of Economic Literature 2002; 40(3):881-906.
- (5) McGuire TG. Chapter 9 Physician agency. In: Anthony JCaJ, editor. Handbook of Health Economics. Elsevier, 2000: 461-536.
- (6) Tor I, Hilde L. The effect of capitation on GPs' referral decisions. Health Economics 2000; 9:199-210.
- (7) Ellis RP. Creaming, skimping and dumping: provider competition on the intensive and extensive margins. Journal of Health Economics 1998; 17(5):537-555.
- (8) CIHI. Physicians in Canada: The Status of Alternative Payment Programs (2005-2006). 1-44. 2006. Ottawa, Canada, Canadian Institute for Health Information.
- (9) Robinson JC. Theory and Practice in the Design of Physician Payment Incentives. The Milbank Quarterly 2001; 79(2):149-177.
- (10) AH&W. Alberta Health Care Insurance Plan Statistical Supplement. 1-96. 2007. Edmonton, Alberta, Alberta Health & Wellness.
- (11) Feasby TE, Gerdes C. Pay-for-performance: Can it work in Canada? Healthcare Papers 2006; 6(4):47-50.
- (12) Health Canada. Canada Health Act-- Annual Report 2006-2007. 1-227. 2008. Ottawa, Canada, Health Canada.
- (13) AH&W. Master Agreement Regarding the Tri-lateral Relationship and Budget Management process for Strategic Physician Agreement. Online access on 02/2009: <http://www.health.alberta.ca/documents/Trilateral-agreement-2004.pdf> 2004.

- (14) AH&W. Alternate Relationship Plans --Application Template and Guidelines. Online access on 02/2009: [http://www health alberta ca/documents/ARP-Application-Template pdf](http://www.health.alberta.ca/documents/ARP-Application-Template.pdf) 2006.
- (15) AH&W. Alternate Relationship Plans --Application Template and Guidelines. Online access on 02/2009: [http://www health alberta ca/documents/ARP-Application-Template pdf](http://www.health.alberta.ca/documents/ARP-Application-Template.pdf) 2006.
- (16) Rice N, Smith PC. Capitation and Risk Adjustment in Health Care Financing: An International Progress Report. *Milbank Quarterly* 2001; 79(1).
- (17) CIHI. Exploring the 70/30 Split: How Canada's Health Care System Is Financed. 1-147. 2005. Ottawa, Canada, Canadian Institute for Health Information.
- (18) Hutchison B, Birch S, Hurley J et al. Do physician-payment mechanisms affect hospital utilization? A study of Health Service Organizations in Ontario. *CMAJ* 1996; 154(5):653-661.
- (19) Davidson SM, Manheim LM, Hohlen MM et al. Prepayment with Office-Based Physicians in Publicly Funded Programs: Results from the Children's Medicaid Program. *Pediatrics* 1992; 89(4):761-767.
- (20) Catalano R, Libby A, Snowden L et al. The effect of capitated financing on mental health services for children and youth: the Colorado experience. *Am J Public Health* 2000; 90(12):1861-1865.
- (21) Dusheiko M, Gravelle H, Jacobs R et al. The effect of financial incentives on gatekeeping doctors: Evidence from a natural experiment. *Journal of Health Economics* 2006; 25(3):449-478.
- (22) Coleman EA, Kramer AM, Kowalsky JC et al. A comparison of functional outcomes after hip fracture in group/staff HMOs and fee-for-service systems. *Eff Clin Pract* 2000; 3(5):229-239.
- (23) Hickson GB, Altemeier WA, Perrin JM. Physician Reimbursement by Salary or Fee-for-Service: Effect on Physician Practice Behavior in a Randomized Prospective Study. *Pediatrics* 1987; 80(3):344-350.
- (24) Ferrall C, Gregory AW, Tholl WG. Endogenous work hours and practice patterns of Canadian physicians. *Canadian Journal of Economics* 1998; 31(1):1.
- (25) Barton MB, Dayhoff DA, Soumerai SB et al. Measuring access to effective care among elderly medicare enrollees in managed and Fee-for-Service care: a retrospective cohort study. *BMC Health Services Research* 2001; 1(1):11.
- (26) Gosden T, Sibbald B, Williams J et al. Paying doctors by salary: a controlled study of general practitioner behaviour in England. *Health Policy* 2003; 64(3):415-423.

- (27) Krasnik A, Groenewegen P. Changing remuneration systems: effects on activity in general practice. *BMJ* 1990; 300(6741):1698-1701.
- (28) Kerr EA, Hays RD, Mittman BS et al. Primary care physicians' satisfaction with quality of care in California capitated medical groups. *JAMA* 1997; 278(4):308-312.
- (29) Dusheiko M, Gravelle H, Yu N et al. The impact of budgets for gatekeeping physicians on patient satisfaction: Evidence from fundholding. *Journal of Health Economics* 2007; 26(4):742-762.
- (30) Balkrishnan R, Hall MA, Mehrabi D et al. Capitation payment, length of visit, and preventive services: evidence from a national sample of outpatient physicians. *Am J Manag Care* 2002; 8(4):332-340.
- (31) Kahn CN, III, Ault T, Isenstein H et al. Snapshot Of Hospital Quality Reporting And Pay-For-Performance Under Medicare. *Health Aff* 2006; 25(1):148-162.
- (32) Grossbart SR. What's the Return? Assessing the Effect of "Pay-for-Performance" Initiatives on the Quality of Care Delivery. *Med Care Res Rev* 2006; 63(1_suppl):29S-48.
- (33) Lindenauer PK, Remus D, Roman S et al. Public reporting and pay for performance in hospital quality improvement. *N Engl J Med* 2007; 356(5):486-496.
- (34) Rosenthal MB, Frank RG, Li Z et al. Early Experience With Pay-for-Performance: From Concept to Practice. *JAMA* 2005; 294(14):1788-1793.
- (35) Doran T, Fullwood C, Gravelle H et al. Pay-for-performance programs in family practices in the United Kingdom. *N Engl J Med* 2006; 355:375-384.
- (36) Doran T, Fullwood C, Reeves D et al. Exclusion of Patients from Pay-for-Performance Targets by English Physicians. *N Engl J Med* 2008; 359(3):274-284.
- (37) Gosden T, Forland F, Kristiansen IS et al. Impact of payment method on behaviour of primary care physicians: a systematic review. *Journal of Health Services & Research Policy* 2001; 6(1):44-55.
- (38) Pink GH, Brown AD, Studer ML et al. Pay-for-performance in publicly financed healthcare: Some international experience and considerations for Canada. *Healthcare Papers* 2006; 6(4):8-26.
- (39) Chaix-Couturier C, Durand-Zaleski I, Jolly D et al. Effects of financial incentives on medical practice: results from a systematic review of the literature and methodological issues. *International Journal for Quality in Health Care* 2000; 12(2):133-142.

- (40) Christianson JB, Leatherman S, Sutherland K. Lessons From Evaluations of Purchaser Pay-for-Performance Programs: A Review of the Evidence. *Med Care Res Rev* 2008; 65(6_suppl):5S-35.
- (41) Conrad D, Perry L. Quality-Based Financial Incentives in Health Care: Can We Improve Quality by Paying for It? *Annual Review of Public Health* 2009; 30(4):1-15.
- (42) Mark D, Hugh G, Rowena J. The effect of practice budgets on patient waiting times: allowing for selection bias. *Health Economics* 2004; 13:941-958.
- (43) Culyer T. Paying for performance: Neither the end of the beginning nor the beginning of the end. *Healthcare Papers* 2006; 6(4):34-38.
- (44) Donabedian A. Evaluating the quality of medical care. 1966. *Milbank Q* 2005; 83(4):691-729.
- (45) Campbell SM, Roland MO, Buetow SA. Defining quality of care. *Social Science & Medicine* 2000; 51(11).
- (46) Rosenthal MB, Fernandopulle R, Song HR et al. Paying For Quality: Providers' Incentives For Quality Improvement. *Health Aff* 2004; 23(2):127-141.
- (47) DoH. The new NHS. London: Stationery Office. London: Department of Health, 1997
- (48) DoH. Delivering investment in general practice: implementing the new GMS contract. 2003. Department of Health London UK.
- (49) DoH. Investing in General Practice: The New GMS Contract. London: Department of Health, 2003
- (50) DoH. Quality and outcomes framework Guidance – Updated August 2004. 2004. Department of Health London UK.
- (51) Simoens S, Hurst J. The Supply of Physician Services in OECD Countries. 1-63. 2006. *OECD Health Working Papers*, No. 21, OECD Publishing.

APPENDIX 1: BACKGROUND INTO PAY FOR PERFORMANCE MODELS

Background

The success of the P4P initiatives in quality incentives relies on quality indicators that are properly designed and measured. Donabedian⁴⁴ argued that quality of care can be accessed on the basis of structure, process and outcome. The structure of care captures the characteristics of hospital equipment and human resources, such as the number of physicians and qualification of professional staff. Process is the activities of care, including components of encounters between medical professionals and patients. Outcomes are the consequences of medical activities, such as the patients' subsequent health status.

Extending Donabedian's framework, Campbell et al. (2000)⁴⁵ defined quality of care in two dimensions: access and effectiveness. For individual patients, the authors suggested that quality was ` whether individuals can access the health structures and processes of care which they need and whether the care received is effective.⁴⁵ From a population's perspective, the authors suggested that quality of care was `the ability to access effective care on an efficient and equitable basis for the optimization of health benefit/well-being for the whole population.⁴⁵

P4P in the United States

Rosenthal et al (2004)⁴⁶ summarized P4P programs in the USA (Table A1). They reviewed a total of 37 P4P programs in the United States including 28 physicians and 9 hospitals programs.

Sponsor	Physician program (N = 28)	Hospital program (N = 9)
Aetna (CA)	O-PE, P	
Anthem Blue Cross Blue Shield of NH	P	
Anthem Blue Cross Blue Shield of VA Midwest (OH, IN, KY)	O-PE, PE (for OH)	O-CM, O-PE, P
Anthem Blue Cross Blue Shield of VA (formerly Trigon)	O-PE, P, S	O-PE, P
Blue Cross Blue Shield of IL	P	O-PE, S
Blue Cross Blue Shield of MA	O-PE, P	
Blue Cross Blue Shield of MN	S	
Blue Cross Blue Shield of MI		P, S
Blue Cross Blue Shield of MO	O-PE, P	
Blue Cross Blue Shield of Rochester (Excelsus) and Rochester IPA (NY)	O-PE, P	

Blue Cross of CA	O-PE, P	
Blue Shield of CA	O-PE, P, S	
Bridges to Excellence	P, S	
Buyers Health Care Action Group	P, S	
Centers for Medicare and Medicaid Services (CMS) and Premier Inc.		O-CM, P
CIGNA (CA)	O-PE, P, S	
CIGNA and Promina (GA)	O-PE, P	O-CM, O-PE, P
Empire Blue Cross and Leapfrog employers		S
Employer Coalition on Health	P	
Harvard Pilgrim Health Care (MA)	P, S	
Hawaii Medical Service Association (Blue Cross Blue Shield of HI)	O-PE, P	O-CM, O-PE, P, S
Health Guard (PA)	P	
Health Net	O-PE, P	
HealthPartners (MN)	P	
Highmark Blue Cross Blue Shield (PA)	O, O-PE, P	
Independence Blue Cross (PA)	O-PE, P, S	O-CM, S
Independent Health (NY)	O-PE, P	
Integrated Healthcare Association (IHA) Local Initiative Rewarding Results (CA)	P	
PacifiCare (CA)	O-PE, P, S	
Tri-River Healthcare Coalition (OH)	P, S	
Western Health Advantage (CA)	O-PE, P, S	
<p>NOTES: P = program focuses on process measures, such as Health Plan Employer Data and Information Set (HEDIS) diabetes or mammogram screening. O-PE = program focuses on patient-experience measures. O-CM = program focuses on clinical outcome measures, such as complications or mortality. S = program focuses on structure measures, such as Leapfrog measures for hospitals or information systems to track chronically ill patients. IHA is Integrated Healthcare Association.</p> <p>Source: ⁴⁶</p>		

A literature review by Pink et al (2006)³⁸ of American P4P programs found that most programs focused on clinical processes and structural measures (Table A1). Patient-experience measures were frequent additions in the physician reward models while clinical outcome measures were frequent additions in hospital reward models.

Table A1: Summary Of P4P Strategies		
Program	Induced Providers/Initiation	Quality Measures
Centers for Medicaid Services: Premier Hospital Quality Incentive Demonstration	Hospitals/2003	34 measures, including acute myocardial infarction, heart failure and community-acquired pneumonia in medical conditions, and coronary artery bypass graft and hip and knee replacement in surgical procedures.

Centers for Medicaid Services: Physician group practice demonstration	Physician groups/2005	32 measures, including diabetes, heart failure and coronary artery disease in medical conditions, and preventive care in health care services.
Veterans health administration: performance measurement program and performance contracts	Executives/1995	measures in 6 value domains: Quality (e.g. prevention index), Access (e.g. waiting time for new primary care appointment), satisfaction, function, and community health
Integrated healthcare association: California pay for performance	Physician groups/2003	Measures in 3 areas: clinical quality (40% weighting), patient experience (40% weighting) and investment and adoption of IT to support patient care (20% weighting)

P4P in the United Kingdom

NHS in the UK started a P4P plan in April 2004 to improve quality of primary care. The NHS reform recommended that primary care trusts (PCTs) should be given the role of commissioning fundholding to health authorities.⁴⁷ The reform introduced an entirely new GP contract in April 2004 that focussed on quality incentives.^{48;49}

Central to the contract was a systematic quality incentive program that set targets for quality standards. The quality framework had four main components comprising primary care standards^g, organization standards^h, patients' experiences and additional services. There were 146 quality indicators in the Quality and Outcomes Framework (QOF)⁵⁰ used to measure quality. Each quality indicator was associated with a corresponding number of 'points'. Practices can earn up to 1050 "points" which are associated with monetary compensation that can be claimed annually.

It is important to note however, that clinical indicators are measured by the ratio of treated patients to the number of patients reported to be eligible for the indicators. The number of patients eligible is calculated by the number of patients with a medical condition minus the number of exceptions they report for the indicator⁵⁰. The removal of patients from the total number of patients treated is called exception reporting. The P4P contract allows exception reporting in order to avoid inappropriate treatment of patients

^g Clinical standards on ten domains of care, which include coronary heart disease, hypertension, diabetes and asthma, comprise part of the primary care standards.

^h Organization standards include covering patient information, practice management and medicine management.

to whom a quality indicator does not apply. However, GPs are reimbursed at a price per point achieved and the number of the “points” increases with the ratio. Therefore, expressing clinical indicators as a ratio is likely to generate an incentive for GPs to increase the number of treated patients, or to decrease the denominator through the exception reporting. While increasing the number of treated patients is desirable, the requirement is an instrument to evade dishonest exception reporting. In effect, the guidelines for QOF emphasize the need for an external monitoring system aimed at reporting fraud⁵⁰.

Table A3 provide examples of the number of quality indicators and their associated points used in the QOF for specific conditions. Table A4 shows an example of the number of points associated with quality indicators used for hypertension.

Table A3: Clinical Indicators and Assigned Points in the QOF		
Condition	No. of Indicators	Maximal No. of Points
Coronary heart disease	15	121
Stroke, transient ischemic attack	10	31
Hypertension	5	105
Hypothyroidism	2	8
Diabetes	18	99
Mental disorder	5	41
Chronic obstructive pulmonary disease	8	45
Asthma	7	72
Epilepsy	4	16
Cancer	2	12
Total	76	550

Table A4: Summary of Clinical Indicators for hypertension	
Indicator	Points
Records	
BP 1. The practice can produce a register of patients with established hypertension	9
Diagnosis and initial management	
BP 2. The percentage of patients with hypertension whose notes record smoking status at least once since diagnosis	10
BP 3. The percentage of patients with hypertension who smoke, whose notes contain a record that smoking cessation advice or referral to a specialist service, if available, has been offered at least once	10
Ongoing Management	
BP 4. The percentage of patients with hypertension in whom there is a record of the blood pressure in the past 9 months	20
BP 5. The percentage of patients with hypertension in whom the last blood pressure (measured in the last 9 months) is 150/90 or less	56

APPENDIX 2: PHYSICIAN PAYMENT MODELS IN CANADA AND INTERNATIONALLY

The table below shows the types of physician payment models in Canada.^{8;12} With the exception of Nunavut, all province and territories have introduced ARPs. Alternate payment modes include salary, contract, capitation, sessional, block funding and the payment incorporating both alternate remuneration and FFS.

Physician Compensation Methods across Canada				
Province/Territory	Compensation Methods for Physicians		Legislation Governing Payments	Negotiation Entity
	Predominant Payment	Others		
AB	FFS	Salary/Contract, Contractual ARP, Sessional, Block Funding and Capitation	The Alberta Health Care Insurance Act	AMA, AH&W and RHAs
BC	FFS	contracts, sessions, salary arrangements, capitation and blended funding	The Medicare Protection Act	The Province of BC and BCMA
MB	FFS	Salary, Contract, Session, Capitation and Blended Funding	The Health Services Insurance Act	MMA and MHHL
NB	FFS	Salary/Contract and Sessional	The Medical Services Payment Act	-
NL	FFS	Salary, Contract, Sessional and Block Funding	The Medical Care Insurance Act	The provincial government and NLMA
NS	FFS	Contract, Sessional and Block Funding	The Health Services and Insurance Act	Doctors Nova Scotia and the department
NT	Contract	Salary and Sessional	The Medical Care Act	NWT Medical Association and the Department
NU	contract	-	-	-
ON	FFS	Salary, Sessional, Block Funding, Contract and Capitation	The Health Insurance Act	MOHLTC and the Ontario Medical Association
PE	FFS	Salary, Contract, Sessional and Blended Funding	The Health Services Payment Act	Bargaining teams of physicians and the government
QC	FFS	Salary, Sessional, Blended Funding, and Block Funding	-	-

Physician Compensation Methods across Canada				
Province/Territory	Compensation Methods for Physicians		Legislation Governing Payments	Negotiation Entity
	Predominant Payment	Others		
SK	FFS	Sessional, Salary, Contract, Capitation, and Blended	The Saskatchewan Medical Care Insurance Act	Saskatchewan Medical Association and the Department
YT	FFS	Contracts, Sessional	The Health Care Insurance Plan Act	YMA and DHSS

Definitions:

Blended funding: a blend of the fee-for-service rates and alternate payment.

Block funding: annual budgets negotiated for a group of physicians.

Capitation: a medical practice is paid a predetermined annual amount for each of its patients. The funding allotment covers a basket of insured medical services.

Contract and blended:

1. Funding to regional boards for clinical services under arrangements in which boards have discretion regarding specific uses of the funds.
2. Contractual payments.
3. Payment arrangements that incorporate both alternate remuneration and fee-for-service.

Guaranteed income: physicians bill fee-for-service and the health ministry tops up if they haven't reached their guaranteed income.

Salary: Physicians employed on a salary basis.

Sessional: payments on an hourly or daily basis. Used by some jurisdictions to fund services in hospital emergency departments, psychiatry clinics and clinics in rural areas.

Physician Payment Models Internationally				
Countries	Primary care physicians	Ambulatory care specialists	Physicians in public hospital	Physicians in private hospital
Australia	75-80% by blended payment (mainly fee-for-service, 10% of income derived from capitation and target payments for immunisation).	Fee-for-service, with no limit on use of services and annual expenditure.	Blended payment (salary for treating public patients and fee-for-service for treating private patients in public hospital).	Fee-for-service and salary.
Austria	60% by fee-for-service and 40% by fee-for-service and capitation.	90% by fee-for-service, 10% by capitation and fee-for-service.	90% by salary and 10% by fee-for-service.	90% by fee-for-service and 10% by salary.
Belgium	Fee-for-service	Fee-for-service	Fee-for-service	Fee-for-service
Canada	Mainly by fee-for-service, some alternate payment methods.	Mainly by fee-for-service		Majority by fee-for-service
Denmark	Blended payment (63% of income from fee-for-service, 28% from capitation).	Not relevant.	Salary.	
England	86% by blended payment (capitation, practice allowance, fee-for-service for selected services, target payments for immunisation), 14% by fee-for-service for private work.	100% by salary for public patients, fee-for-service for private patients.	100% by salary for public patients, fee-for-service for private patients.	100% by fee-for-service.
France	Fee-for-service.	Fee-for-service.	Salary.	Fee-for-service.
Germany	100% by fee-for-service.	100% by fee-for-service.	Salary. Fee-for-service for private patients.	100% by salary.
Greece	Salary in public sector, fee-for-service in private sector.	Salary in public sector, fee-for-service in private sector.	Mainly by salary.	Blended payment (fee-for-service and salary).
Ireland	Fee-for-service if higher patient income, capitation if lower patient income.		Salary. Fee-for-service for treating privately insured patients in public hospital.	

Physician Payment Models Internationally				
Countries	Primary care physicians	Ambulatory care specialists	Physicians in public hospital	Physicians in private hospital
Japan	Fee-for-service.	Salary for hospital outpatient services, fee-for-service for independent outpatient clinics.	Salary.	
Korea	100% by fee-for-service	100% by fee-for-service	100% by salary.	100% by salary.
Mexico	Salary in public sector, fee-for-service in private sector.	Salary in public sector, fee-for-service in private sector.	Salary.	Fee-for-service.
Netherlands	Fee-for-service if higher patient income, capitation if lower patient income.			Blended payment (salary and fee-for-service).
New Zealand	78% by fee-for-service and 22% by capitation	Majority by salary	Majority by salary	Majority by fee-for-service, minority by salary
Norway	Blended payment (70% of income from fee-for service and 30% from capitation).	Salary and fee-for-service in public sector, fee-for-service in private sector.	Salary	
Portugal	Salary in public sector, fee-for-service in private sector.		Salary.	Fee-for-service.
Slovak Republic	Blended payment (capitation and target payments for preventive care).	100% by fee-for-service.	100% by salary.	Fee-for-service.
Spain	Blended payment (85% of income from salary and 15% from capitation).	100% by salary.	100% by salary.	Mainly by fee-for-service
Sweden	Salary.	Salary.	100% by salary	100% by salary
Switzerland	96% by fee-for-service and 4% by salary	90% by fee-for-service, 10% by salary	Fee-for-service, salary and blended payment (fee-for-service and salary).	Fee-for-service, salary and blended payment (fee-for-service and salary).
United States	Blended payment	Blended payment	Blended payment	Blended payment

Source: ⁵¹

APPENDIX 3: LITERATURE SEARCH STRATEGY

The literature search was conducted by the IHE Research Librarian for publications published between 1993 and March 2008. The MEDLINE search is shown and the search was adapted for the following databases: Cochrane Database of Systematic Reviews, EMBASE, CRD Databases (DARE, NHS EED, and HTA), Pubmed, Web of Science, Econ Lit, Academic Search Complete, ABI Inform and PAIS. Government and HTA agency websites, as well as the Google search engine, were used to locate grey literature. The search was developed and carried out a priori to any application of inclusion/exclusion criteria and any other analysis. In addition to the strategy described, reference lists of retrieved articles were reviewed for potential studies.

1. exp Physicians/
2. doctor*.mp.
3. physician*.mp.
4. Academic Medical Centers/
5. family practice/
6. primary health care/
7. general practitioner*.mp.
8. gp.mp.
9. or/1-8
10. alternat* funding.mp.
11. alternat* payment*.mp.
12. 10 or 11
13. 9 and 12
14. exp case-control studies/
15. exp cohort studies/
16. Evaluation Studies.pt.
17. Comparative Study.pt.

18. clinical trial.pt.
19. controlled clinical trial.pt.
20. Randomized Controlled Trial.pt.
21. multicenter study.pt.
22. meta analysis.pt.
23. systematic review.mp.
24. exp "Costs and Cost Analysis"/
25. (cost* or economic* or expenditures or price or fiscal or financial).ti.
26. (quality or versus or evaluation or analysis or impact* or effect* or change* or "before and after" or evidence or alternat* or compared or comparison or results or resulting or result or study or trial or implications or better or worse or increase* or decrease* or fewer or more or less).ti.
27. or/14-26
28. Capitation Fee/
29. capitat*.ti,ab.
30. prospective payment*.mp.
31. sessional.mp.
32. fee-for-service plans/
33. or/28-32
34. (capitat* or pay* or paid or fee* for service* or ffs or prospective payment* or income* or salar* or economic* or financi* or charge* or remuneration or compensation or comp or incentive* or reimburse* or funding or managed care).ti. (NOTE: this line is a relevancy forcer to increase the likelihood that articles are more likely to be useful. I tested it extensively and it helps to separate useful from non-useful)
35. 9 and 27 and 33 and 34
36. 13 or 35
37. limit 36 to yr="1993 - 2008"

This search generated a total of 1368 references and a further 98 references were identified from personal collections. There were 300 studies considered to deserve scan of the full articles. Of the 300 papers reviewed, 14 studies are associated with the evaluation of conventional payment systems (i.e. FFS, salary, capitation, etc.) and 6 with P4P.

APPENDIX 4: SUMMARIES OF STUDIES REVIEWED

Summaries of studies evaluating ARP payment methods

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
1	Hutchison 1996/controlled before and after study	Study group: Capitation- based payment plus ACIP bonuses if the hospitalization rate lower than the regional rate. Control group: FFS	To determine whether the capitation payment reduce hospital utilization, compared with FFS	Primary care/Ontario, Canada	39 physicians in study group and 77 in control group 89,148 patients treated in study and 180,255 in control group Baseline characteristic s of physicians and patients in both groups are comparable.	Hospital separations or hospital days per 1000 patients, adjusted by Age, sex and social assistance	In capitation vs. FFS group, the annual hospital days were 1084.6 vs. 1085.4 ($p=0.988$) at 3 years before the conversion date, 1029.8 vs. 1034.8 ($p=0.917$) at 1 year before the conversion and 954.3 vs. 956.4 ($p=0.965$) at 1 year after the conversion.	The capitation- based payment has not reduced hospital use.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
2	Hickson 1987/RCT	salary vs. FFS	To compare the impact of salary vs. FFS remuneration on physician practice behaviors.	continuity clinics/ USA	18 physicians with 9 in each group	Physician visits, emergency visits and Patient satisfaction	Patient satisfaction was measured in four dimensions, i.e. the humanness, continuity/convenience, overall satisfaction and access to their physicians. There was no significant difference in the three dimensions (i.e. humanness, continuity/convenience, overall satisfaction) of patient satisfaction, but access to physicians was better for the salary group.	The study added evidence that physicians are motivated by reimbursement methods to influence the use of care services by their patients.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
3	Davidson 1992/RCT	Study group: 1) Age-adjusted capitation plus a fund of \$25 per month per child to cover the services not provided directly by participating physicians. 2) FFS at market-level rate (high rate) Control group: FFS at regular rate (about one-half the high rate)	To determine the effect of the payment interventions on care utilization	Children's Medicaid Program (primary care)/USA	Of the 140 eligible physicians, 80, who agreed to participate, were randomly assigned to either high rate FFS or capitation and compared with those paid on the low rate FFS basis.	Average number per year per patient in: 1) Primary care physician visits; 2) Non-primary physician visits; 3) clinic/emergency department visits; 4) hospitalizations	Primary care physician visits decrease by 10.25% and 19.28% in capitation and ctrl group, and increase by 0.81% in high rate FFS. Non-primary care physician visits decrease by 8.06% in capitation group, and increase by 26.87% and 31.10% in high rate FFS and ctrl group. Clinic/emergency department visits decrease by 37.6%, 37.96% and 22.37% in capitation, high rate FFS and ctrl group. Hospitalizations decrease by 54.69%, 48.33% and 36.11% in capitation, high rate FFS and ctrl group.	Capitation payment has no adverse effect on physician visits. Physicians under capitation reduce referrals to specialists.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
4	Krasnik 1990/controlled before and after study	Intervention group: capitation only before 1 Oct. 1987 and capitation/FF S after the date. Ctrl group: capitation/FF S	To investigate changes in GP's behaviors in responses to the change in reimburseme nt methods.	Primary care/Denmar k	100 GPs in study group and 326 in ctrl group. 470,000 patients covered by GPs in study group, and 560,000 by GPs in ctrl group.	The number of contacts and activities per week per 1000 patients (i.e. 1) face to face consultations; 2) consultations by telephone; 3) renewal prescriptions; 4) diagnostic services; 5) curative services; 6) referrals to specialist; and 7) referrals to hospital).	There was a significant increase in total contacts (100 vs.117.4 on Mar. 1988 and 104.2 on Nov. 1988) and in diagnostic services (100 vs. 138.1 Mar. 1988 and 159.5 Nov. 1988). Referrals to specialist decrease from 100 to 90.1 on Mar. 1988 and 77 on Nov. 1988. Referrals to hospital decrease from 100 to 87.4 on Mar. 1988 and 68.4 on Nov. 1988.	The capitation/FF S system results in an increase in GP's activities and a reduction in referral rates.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
5	Barton et al 2001/Retrospective cohort study	FFS, salary and capitation	To compare access to effective care among elderly Medicare patients under the three payment arrangements	Medicare/USA	All objects were enrolled in Medicare. Among them, 8,920 enrolled in a salary payment-based division, 4,258 in a capitation-based division and 344,733 receive services on the FFS basis.	Indicators were created to evaluate access to health care in three domains: prevent care, diagnosis specific care and chronic disease care.	Indicators under salary or capitation-based division were comparable to or better than those under FFS care.	Access to care in salary or capitation-based health plan was as good as or better than that in FFS care.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
6	Kerr et al 1997/Cross section questionnaire	capitation vs. salary or discounted FFS	To examine the satisfaction level of physicians on capitation payment basis in terms of care quality.	Primary care/USA	910 primary care physicians on capitation payment basis.	Physician's satisfaction levels are assessed on 4 aspects: 1) relationship with patients, 2) quality of care provided, 3) ability to treat patients according to physician's own judgments, and 4) ability to get specialty referrals for patients.	Physicians on the capitation payment basis reported lower satisfaction with all the 4 aspects of care than those under salary or discounted FFS.	Physicians on the capitation payment basis were less satisfied with the quality of care they provided.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
7	Coleman et al 2000/one year prospective inception cohort study	capitation vs. FFS	To compare outcomes and care utilization for older adults receiving institutional rehabilitation for hip fracture under both payment arrangements	Secondary care/USA	6 hospitals based, integrated care system on FFS basis vs. 5 group/staff HMOs on capitation basis. 196 patients with acute hip fracture included in FFS, and 140 in capitation system.	Primary outcomes included recovery of function, improvement in ambulation, return to community living, and mortality. Utilization measures included length of hospital stay and rehabilitation stay, physician visits, nursing time and time in therapy.	There was no significantly difference in primary outcomes found in both groups on the whole. With regard to care utilization, patients treated under capitation system used physician services less intensively and substituted less- skilled allied health personnel.	HMOs on the capitation payment basis achieve equivalent care outcomes with less resource used.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
8	Catalano et al 2000/before and after study	capitation vs. FFS	To evaluate financial incentive effect of capitation payment arrangement on mental services for children and youth, compare with the FFS payment.	mental health/USA	4 not-for- profit mental health assessment and service agencies and 1 for-profit corporation on the capitation payment basis; 3 community mental health centers on the FFS payment basis	costs of the mental services	Service cost under capitation payment is significantly lower than that under FFS payment. The capitation payment leads to greater effort (e.g. increase in outpatient treatment, decrease in treatment in emergency room.)	Capitation payment is expected to reduce costs of children's mental health services.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
9	Balkrishnan et al 2002/cross section study	capitation vs. non- capitation	To evaluate whether capitation payment reduces quality of care and increases the use of preventive and health counseling services.	Primary care/USA	Physicians and patients included in the national ambulatory medical care survey. This dataset includes 1247 physicians and 24,715 patient in 1997, and 1226 physicians and 23,339 patients in 1998.	The amount of time spent with patients, and the counseling and preventive services recommended.	Capitated physicians spend 5.6% less time with patients than non-capitated physicians. Capitated patients are 17% and 3% more likely to receive counseling services and preventive services, respectively, than non-capitated patients.	Capitation is associated with a modest decrease in time length of physician visits and with increase in receiving counseling and preventive services.
10	Gosden et al 2003/controlled before-and-after study	salary vs. standard contract (capitation and FFS)	To evaluate the impact of the introduction of salary payment on GP behavior and care quality	Primary care/England	Ten practices on salary payment basis, and ten practices paid by capitation or FFS	GP workload and patients' assessment of care quality	compared with standard contract practices, GPs on salary basis spend less time on practice administration but more working out-of- hours and in direct patient care, tend to provide short consultations, and have similar referral rate. Quality is rated higher for 7 out of 13 aspects for salary- based practices, 2 in standard practices.	Salary contracts did not adversely affect GP productivity and have little impact on the care quality.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
11	Dusheiko et al 2004/before-and- after study	fundholding vs. non- fundholding	To investigated the effect of the UK fundholding on waiting times for elective surgery.	Primary care	Over 7000 English practices	waiting time	The effect of fundholding status was to reduce the waiting time of chargeable admissions of patients of fundholders by 4-7 days. And 2 days for non-chargeable elective admission.	Fundholders were able to obtain shorter waits for all types of elective admissions.
12	Dusheiko et al 2007/cross- section study	fundholding vs. non- fundholding	To assess the impact of GP fundholding on patients' satisfaction with their practices.	Primary care	4441 patients from 60 practices	Opening hours of GPs' practices, knowledge of patients' medical history, GPs' ability to arrange tests and willingness to refer to a specialist.	Less satisfied with opening hours of GPs' practices, knowledge of patients' medical history, GPs' ability to arrange tests and willingness to refer to a specialist. More like to agree that GPs were more concerned about keeping cost down.	Patients in fundholding practices were less satisfied than those in non- fundholding practices.
13	Ferrall et al 1998/Cross- section study	FFS vs. salary	To examine the practice pattern of Canadian physicians and their work hours.	Primary care	29,317 licensed physicians across Canada	Weekly hours of direct patient care, weekly hours of work	FFS physicians under spent about 5.9 hours/week with patients than salary physicians. The total working time/week was about 5.5 hours less for the FFS physicians than salaried physicians.	Salaried physicians choose to reduce their patient contact hours.

	Author/ Study Type	Intervention	Objective	Setting	Participants	Outcome	Result	Conclusion
14	Dusheiko et al 2006/before and after study	fundholding vs. non- fundholding	To estimated the effect of financial incentives on GPs	Primary care	Over 7000 English practices	practice admission rate	Compared with fundholding scheme, non-fundholding increased chargeable elective admissions by about 3.5% to 5.1%.	Physicians' admission rates do respond to financial incentives.

Summaries of studies evaluating P4P initiatives

	Author/ Study Type	Objective	Setting	Participants	Quality Measurement	Result	Conclusion
15	Doran et al 2008/ cross section study	To determine the rate of exception reporting and the association between this rate and the characteristics of patients and medical practices.	primary care/England	65 practices	76 clinical quality indicators, which account for 550 of the 1050 potential points.	Physicians excluded a median of 5.3% of patients from the quality calculations. Exception reporting accounted for approximately 1.5% of the costs of the P4P program.	Rate of exception reporting have generally been low, with little evidence of widespread gaming.

	Author/ Study Type	Objective	Setting	Participants	Quality Measurement	Result	Conclusion
16	Kahn et al 2006/Cohort study	To examine hospital quality and financial performance under two P4P approaches.	hospital/USA	4,203 hospitals	Composite scores on three conditions of heart attack, heart failure, and pneumonia.	Hospital's financial gains and losses likely will be marginal using the premier demonstration payment rules and somewhat larger under the edPAC recommendations.	Hospital can improve care for their patients and potentially benefit financially from P4P at the same time.
17	Rosenthal et al 2005/ Before and after study	To evaluate the impact of a P4P program on quality of care.	primary care/California, USA	300 large physician organizations	three process measures of clinical quality: cervical cancer screening, mammography and hemoglobin A testing	Improvements in clinical quality scores for P4P vs. non-P4P were 5.3% vs. 1.7% for cervical cancer screening; 1.9% vs. 0.2% for mammography and 2.1% vs. 2.1% for hemoglobin A1c. In total, the plan awarded \$3.4 million in bonus payments between July 2003 and April 2004.	Paying clinicians to reach a performance target may produce little gain in quality and will largely reward those with higher performance at baseline.

	Author/ Study Type	Objective	Setting	Participants	Quality Measurement	Result	Conclusion
18	Grossbart et al 2006/Cohort study	To evaluate the impact of a P4P program on performance improvement in 3 clinical areas.	Hospital/USA	4 hospitals in study group vs. 6 in the control	composite scores in 3 clinical areas: MI, heart failure, and pneumonia	Have significant impact on rate and magnitude of performance improvement.	The project led to marked improvement in the quality of clinical process delivery and accelerated the adoption of evidence based practices.
19	Lindenauer et al 2007/Cohort study	To evaluate the impact of P4P on quality improvement	Hospital/USA	207 hospitals in P4P and 406 in control. Baseline characteristics were adjusted to facilitate the comparison between both groups.	Composite scores on three conditions of heart failure, acute myocardial infarction and pneumonia.	The rate of quality improvement among P4P hospitals increases from 2.6 to 4.1% over the 2-year period.	P4P achieved modestly greater quality improvement than non-P4P.
20	Doran et al 2006/cross section study	To assess exception reporting according to practice and its effect on achievement of the clinical targets.	Primary care/England	8105 practices	76 clinical quality indicators, which account for 550 of the 1050 potential points.		English GPs attained high levels of achievement in the 1st year of the new P4P contract.



INSTITUTE OF
HEALTH ECONOMICS
ALBERTA CANADA

Institute of Health Economics
1200 – 10405 Jasper Avenue
Edmonton AB Canada T5J 3N4
Tel. 780.448.4881 Fax. 780.448.0018
info@ihe.ca

www.ihe.ca

ISBN 978-1-926929-43-9 (online)