

IMPACT OF ALTERNATIVE PAYMENT PLANS ON PROFESSIONAL EQUITY AND
DAILY DISTRESS OF PHYSICIANS

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By

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ABSTRACT

The way physicians are paid for the provision of care is a relevant aspect of health care systems. Fee-for-service (FFS) payment system has been criticized for affecting quality of care, contributing to the fragmentation of health care, and for rising costs of health care systems. Alternative payment plans (APP) have been introduced as options to the traditional FFS payment scheme. Despite the link between payment methods and behavior of physicians that has been established; there is a lack of evidence about the impact of payment systems on wellness of physicians, specifically on their perception of professional equity and daily distress of physicians. The purpose of this study was to explore the effects of APP on physicians' perceptions of professional equity and daily distress. The following questions guided this dissertation: 1) Does professional equity perceived by physicians vary among practitioners paid by FFS, APP, or blended alternatives? 2) Is the payment method associated with daily distress of medical practitioners? and 3) Are levels of professional equity, daily distress, and career satisfaction of physicians different by gender and payment methods?

In 2011, a cross-sectional study was conducted with physicians practicing in the Saskatoon Health Region (SHR), the largest health authority of Saskatchewan, Canada. Physicians completed a questionnaire evaluating their perceptions of professional equity and daily distress. Analyses of variances (ANOVA) were performed to assess differences in professional equity (overall and by its fulfillment, financial, and recognition dimensions) and daily distress among physicians paid by FFS, APP, and blended schemes. As multivariable analyses, a linear regression was used to test the interaction between specialty and payment methods on the perception of professional equity, controlling for the number of patients, gender, and age group. A mixed linear regression model was built to predict daily distress, testing demographics, workload, complexity of patients, payment method, career satisfaction, and practice profile; the

random component of the model considered the influence of geographic area of practice. Also, a multivariate analysis of variance (MANOVA) was conducted to evaluate differences among professional equity, daily distress, and career satisfaction by payment method and gender.

In total, 382 (48.1%) physicians participated in the study. Response bias was tested and found to be negligible (Appendix F). The ANOVA identified that physicians paid by APP perceived higher professional equity than those paid by FFS ($p=0.005$), as well as higher levels of income ($p=0.03$) and recognition ($p=0.001$) equity than those with FFS. In the multivariable analyses, a higher level of professional equity was predicted among family practitioners (FPs) paid by APP and blended schemes in comparison to those paid by FFS. Additionally, the payment method was a predictor of daily distress when adjusted by other factors. Lower levels of distress were found among physicians who had more than 75% of patients with complex conditions and were paid by APP compared to those paid by FFS and blended methods. The MANOVA identified that female physicians had poorer wellness indicators than male practitioners. Multiple comparisons identified higher levels of equity among male physicians paid by APP than those with FFS, although this benefit was not observed among female ones.

In conclusion, physicians paid by APP perceived higher professional equity (fair economic rewards and appropriate recognition) in comparison to those paid by FFS. Particularly, FPs paid by APP perceived higher professional equity than those FPs paid by FFS. Additionally, the payment method was identified as an associated factor with distress; lower levels of daily distress were predicted among physicians paid by APP who see high proportions of patients with complex conditions. Notwithstanding, female physicians had poorer wellness indicators and the impact of APP on professional equity was only distinguished among males. A potential unequal impact of APP must be recognized between female and male physicians.

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Dedico este trabajo a mi esposa Silvia Bermedo Carrasco y a mi familia:
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Juan de Dios Peña Beltrán, María Cristina Díaz Gómez, Jhoana Melisa Peña Díaz,
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LIST OF ABBREVIATIONS

AIC:	Akaike Information Criterion
ACOs:	Accountable Care Organizations
ANOVA:	Analysis of Variance
APP:	Alternative Payment Plans
CFA:	Confirmatory Factor Analysis
CFI:	Comparative Fit Index
CI:	Confidence Interval
df:	Degrees of Freedom
FFS:	Fee-For-Service
FPs:	Family Practitioners
FSA:	Forward Sortation Area
ICC:	Intra-class Correlation Coefficient
IFI:	Incremental Fit Index
MANOVA:	Multivariate Analysis of Variance
NFI:	Normed Fit Index
NNFI:	Non-Normed Fit Index
RMSEA:	Root Mean Square Error of Approximation
SD:	Standard Deviation
SHR:	Saskatoon Health Region
UK:	United Kingdom
US:	United States

CHAPTER 1 GENERAL INTRODUCTION

About 2,500 years ago, the growing city of Athens used “retaining fee(s)” to secure the services of medical practitioners of the time. These “civic doctors” had the right to charge fees to non-citizens and the freewill to provide services to citizens without charge [1]. This ancient scenario depicts the need to attract and retain physicians using payment policies, revealing the difficulty of defining and implementing a regular way to compensate Galen’s practitioners for their services. The painting “The Doctor”¹ by Sir Luke Fildes, done in 1891, illustrates a physician on a home visit in a humble cottage; a representation of medical practice and conditions of the labor class of that time [2, 3]. A physician is beside a suffering child lying on an improvised bed; the worried parents are at the back, almost in a corner, of the cottage [2]. As Jacalyn Duffin [3, p130] describes, the caring physician “comforts with his presence, even if he appears to offer little” medical help, and argues that “whether she (his patient) lives or dies, the parents will owe him money; whether or not he accepts their payment is another matter, but he certainly has the account in his ledger at home.”

Sick people and their families had an inequitable system in place to access health care in the eighteen century: pay fees according to a fee schedule (where illness could ruin families), attend places where charitable societies organized the provision of care, or simply do not have medical care [3]. Health care systems, both private and public, were launched at the end of the nineteenth and the beginning of the twentieth century. Two cardinal aims of these evolving health care systems were to eliminate the financial burden to access care and to ensure payment of health services [3].

¹ A picture of the painting entitled “The Doctor” of Sir Luke Fildes is available at the website of the TATE Gallery: <http://www.tate.org.uk/art/artworks/fildes-the-doctor-n01522>

Currently, the method of paying physicians for their services remains complex and is a matter of ongoing discussion [4]. The selection of a specific payment method for physicians has a significant impact on recruitment and retention of medical doctors in rural and isolated regions [5], as well as on the quantity [5-9] and quality of health services [5, 10, 11]. Specific payment methods are subjects of discussion due to their influence in the fragmentation [10] and costs of health care systems [10, 12, 13].

Among privately and publically financed health care models, third parties are included in the physician-patient relationship [3, 14]. Intermediaries involved in the provision of care affect the physician-patient relationship [15]. The issue of how a given health care system obtains funds to finance costs of health services must be differentiated from the payment method used to pay services provided by physicians [4]. Health care systems finance provision of care through out-of-pocket, individual private insurance, employment-based group insurance, or government financing; while the payment method refers to how health care providers are paid for their services [4, 14]. Decisions and actions of third parties could generate potential threats for the professional autonomy of physicians. Autonomy is one of the higher-order needs, as described by Abraham Maslow in his theory of motivation [16]. Indeed, autonomy has been established as a critical motivating and wellness factor for physicians [17-23]. An erosion of physicians' autonomy can deteriorate their wellness [17-23], which could affect quality of care [19, 24, 25].

Health care systems have not focused on understanding, evaluating, and improving wellness of health care professionals [19] despite the importance of this issue for the quality of health care [19, 26, 27]. Compared with non-health care professions and the general population, physicians are at higher risk of burnout [19, 28]. Studies have identified and discussed factors affecting the

wellness of physicians [19-21, 29-39]; however, there is a lack of studies measuring the influence that different payment methods could have on the wellness of physicians.

1.1. Payment Methods for Practicing Medicine

“That any sane nation, having observed that you could provide for the supply of bread by giving bakers a pecuniary interest in baking for you, should go on to give a surgeon a pecuniary interest in cutting off your leg, is enough to make one despair of political humanity. But that is precisely what we have done.”

George Bernard Shaw²

The way physicians are paid for the provision of care is a relevant aspect of health care systems and health services organization. Several methods for paying physicians are available which involve different values or attributes of health services, such as freedom, quality, quantity, and costs, among others [4].

Before going further in this subject, a clarification between “payment” and “reimbursement” is necessary [40]. On the one hand, payment refers to what a health care provider gets, basically “what one gets when cashing a paycheck” [40, p87] (*e.g.*, one medical procedure might be paid differently by a government than a private payer, or two physicians with the same level of training and experience could receive different payments for the same service). On the other hand, reimbursement is a term which refers to a compensation of the actual cost/money which has already been used (*e.g.*, an insurance company reimbursing a person for the costs incurred in medical care, or an employee being reimbursed for out-of-pocket travel costs) [40]. The topic under discussion in this dissertation is “payment” and not “reimbursement.”

Two classification models will be employed to understand differences and critical characteristics of payment methods. One model classifies methods according to units of payment

² Preface on Doctors in the Doctor's Dilemma, 1909. Reprinted in International Journal of Epidemiology, 2003;32(6):910-5. Available at: <http://ije.oxfordjournals.org/content/32/6/910.full>

[5, 14, 41] and another considers time and variability as dimensions of payment arrangements [41].

Payment methods for physicians could be placed in a continuum according to the aggregated level, going from the least (one payment per one service) to the most aggregated level (one payment for a variety of services) [14]. At the same time, each payment method uses different units of aggregation [14, 41] (Figure 1-1).

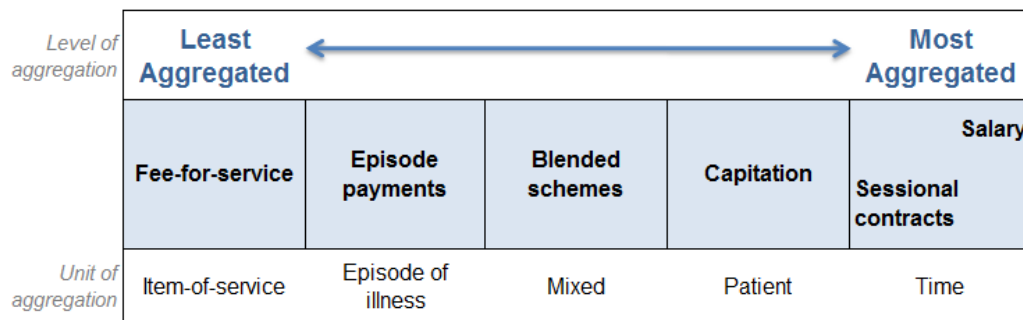


Figure 1-1. Continuum of payment methods for physicians by unit of payment; modified from Bodenheimer and Grumbach [14, p32]

At one end, the unit of fee-for-service (FFS) is item-of-service (*e.g.*, visit or procedure); while at the other end, capitation and salary systems use, as units of payments, patients and time, respectively [14, 41]. Episode payments group procedures according to an episode (practitioners are paid for all procedures carried out related to a given illness episode like an appendectomy, cholecystectomy, etc.) [14], whereas sessional and salary payments aggregate units of time (physicians are paid for a given period of time like weeks, months, etc.). As a result, the continuum of payment methods for physicians goes from FFS to salary systems [5, 14, 41].

The model described by Jegers *et al.* [41] can be used to understand other characteristics of payment methods. This model considers two components in a Cartesian plane:

retrospective/prospective systems in the X axis and variable/fixed systems in the Y axis (Figure 1-2).

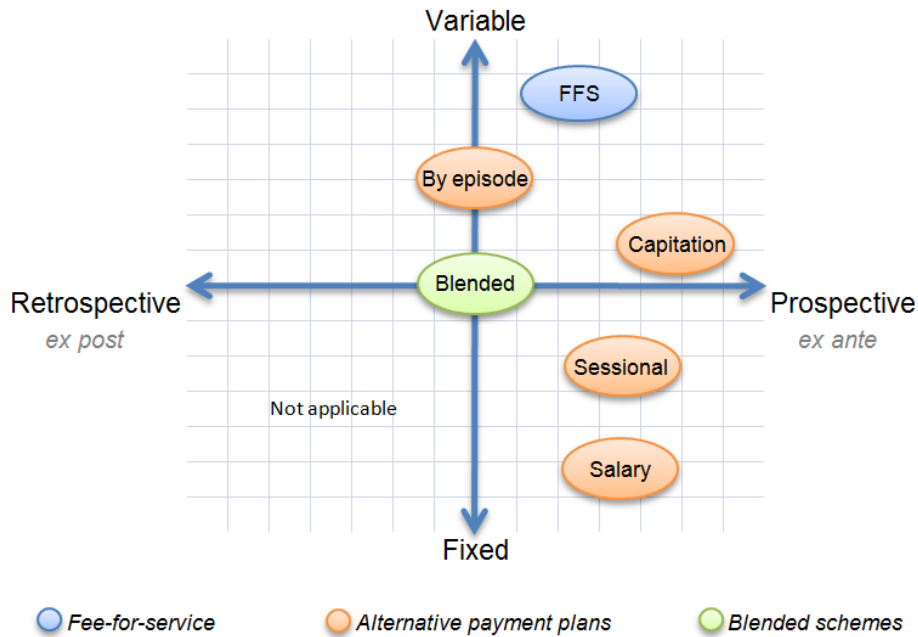


Figure 1-2. Classification of payment methods based on retrospective/prospective and variable/fixed dimensions; modified from Jegers *et al.* [41, p263]

The first dimension is based on the relation between a physician’s income and her/his costs for providing care. A payment method is “retrospective” when payments are done *ex post*; a physician is paid after a service has been provided, covering actual expenses and giving little motivation to reduce costs [41]. A payment is “prospective” when payments or budgets are determined *ex ante*; payments do not have a direct link to the real costs of the individual provider. Prospective payments are systems that stimulate more efficiency in comparison to retrospective models [41].

The variability dimension is based on the relationship between activities and payment. A payment is “fixed” when the amount paid does not vary, despite a high or low volume of activities done. In contrast, a payment is “variable” when payment varies according to changes in volume of activities [41].

1.1.1. Fee-For-Service

In Canada and the United States of America, the conventional method to pay physicians for their services has been FFS [13, 42, 43]. This method provides one payment per each service, procedure, or visit [14, 41]. The prices of medical activities (diagnostic and therapeutic ones) are known *ex ante*, like in the Belgian or German systems which have regulated an extensive list of diagnostic and therapeutic interventions [41]. In Canada, the list of fees that physicians can bill to the ministry of health is annually negotiated between provincial medical associations and provincial governments. These negotiations on fee schedules have been focused on percentages of increase and the size of the total budget for physician services [44].

The FFS system provides a variable income for physicians according to the type and quantity of services provided, offering a strong incentive to increase production [41]. If a physician provides more services, he/she will perceive a higher income [14, 41]. The FFS system was historically preferred by medical practitioners as they could exert price discrimination, having the freewill to charge patients; today, physicians perceive that with FFS they could keep autonomy and protect themselves from potential governmental cost controls which could impact their income [44].

Nevertheless, as Emery *et al.* [44, p6] argue, the FFS system is known “to be far from the socially efficient payment arrangement.” This payment system has been blamed for being a factor contributing to the fragmentation of health care [10], numerous and shorter physician-patient visits, poor quality of care [10, 11], lower satisfaction among physicians [11], and rising costs of health care systems [10, 12, 13].

In Canada, expenditure of physicians is the third largest component of total health care spending [12, 42]. In 2012-2013, the total public-sector expenditure for physicians was 22.83 billion and FFS accounted for 70.7% of it [45]. Additionally, physician spending was identified

as the fastest-growing health category between 1998 and 2008 (6.5% average annual growth), and the key cost driver of physicians spending was FFS schedules increases (3.6% of the 6.5%) [12]. In fact, FFS schedules increased faster than other goods and services and grew faster than the average weekly wages of other health and social services workers [12]. Therefore, there is a need to move from a volume-based payment model to alternative payment methods [46, 47].

1.1.2. Alternative Payment Plans

Since the introduction of Medicare in Canada, physicians have been traditionally paid by FFS schemes [42, 43]; however, since the 1990s provincial/territorial governments have been implementing different forms of alternative payment plans (APP), also known as alternative funding plans [42, 45, 48].

APP are arrangements to pay physicians by other methods than FFS [45, 48] which use diverse units of aggregation (Figure 1-1) [14] and have different levels of variability (Figure 1-2) [41]. According to the National Physician Data Base of the Canadian Institute for Health Information, APP increased from 10.6% in 2000 to 29.3% in 2013 of the total payment for physicians in Canada [45]; see Figure 1-3. Since 2000, similar growing tendencies of APP have been observed across Canadian provinces. In 2013, the percentages of APP ranged from 14% (in Alberta) to 47.9% (in Nova Scotia) of total payments to physicians [45]. From the lowest to highest degree of aggregation and from variable to fixed payments, the continuum of APP for physicians includes episode payments, capitation, sessional contracts, and salaries.

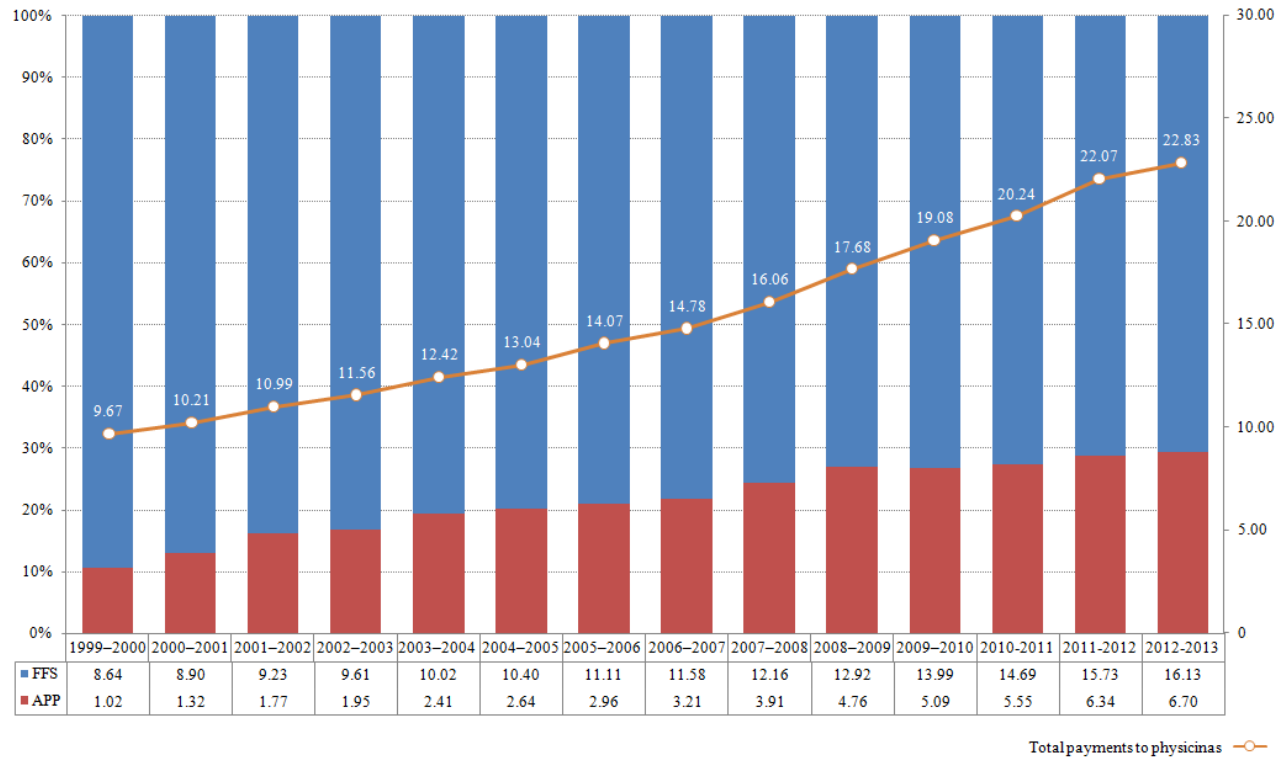


Figure 1-3. Fee-for-service (FFS) and alternative payment plans (APP) proportions of the total payments to physicians from 2000 to 2013. Figure based on National Physician Database, 2012-2013 Data Release [45].

1.1.2.1. Episode payments

Payment by episodes group several services under one payment, such as activities related to one case or episode [14, 49]. To define an episode of care, two dimensions need to be considered. The first dimension refers to the clinical condition or procedure; the second is the time dimension which defines when an episode begins and ends [49]. For example, an insurance company or government could pay a surgeon for a laparoscopic cholecystectomy, including related pre- and post-operative care [14].

Paying physicians by episode-based methods has been recommended since it could be an incentive to improve efficiency and coordination of care [49]. This payment method can encourage services that have a long waiting time (elective surgeries) and also reduce the number

of post-operative visits [14, 49].

Furthermore, episode-based payments transfer to the health services provider part of the financial risk (defined as the “potential to lose money, earn less money, or spend more time without additional payment” [14, p34]) while in capitation schemes the risk transfer is higher [14].

1.1.2.2. Capitation

The unit of payment in capitation is the patient, known as *per capita* payments. Physicians receive an agreed amount of money for a period of time (*e.g.* annual payment) for each enrolled patient [14]. Capitation is prospective given that payment for each patient per a given period of time is established *ex ante* [41]. The total payment that a physician receives is the per capita amount times the total number of patients enrolled, independently of the number of visits and services required by patients on the list [41].

Practitioners paid by capitation are motivated to maximize resources because income *per capita* will be the same despite the amount of services provided; capitation system transfers the financial risk from insurers to providers [14]. This commonly known non-FFS payment system [42] offers the potential to control expenditure and promote coordination of care [14]. The capitation system has a variant called risk-adjusted capitation which considers an extra *per capita* compensation for patients with complex conditions; *e.g.*, elderly patients and those with chronic diseases [14].

1.1.2.3. Sessional payments

Sessional arrangements are payments based on short periods of time (*e.g.* hourly, daily, etc.) between physicians and agencies [45]. For instance, *locum tenens* is a temporal arrangement with a physician to assume the duties of another physician on a temporary basis [50]. *Locum tenentes*

are work opportunities for young physicians to acquire experience and alternatives for systems to cover staff shortages [50-52]; however, these temporal arrangements are seen as a threat to quality and continuity of care [53]. This type of payment might be considered a variant of salary systems.

1.1.2.4. Salary

Salary pays for a complete range of medical care delivered during a period of time (*i.e.*, month or year) [14]. Payment by salary is one of the most common APP [42], situated at the most aggregated and fixed end of the payment models [5, 14, 41]. Physicians could be paid on a salaried basis directly by an insurance company, government, regional authority, or hospital. Medical practitioners on salary could be also paid by medical groups which could be paid, at the same time, by different payment models. This APP could include salary-plus-bonus arrangements, something commonly seen among medical groups [14].

Salary arrangements have strong incentives to reduce marginal costs (*e.g.*, reducing number of visits) [41], are capable of ensuring services of physicians in isolated/underserved areas [5], and have the capacity to attract and secure services that could have a small demand which cannot be financed by FFS (*e.g.*, pediatric neurosurgery, neuro-ophthalmology, pediatric gastroenterology, etc.). Salaries also have been used to involve physicians in academic, research, and administrative positions [14]. Notwithstanding, this payment model does not provide financial incentives for working extra hours, seeing a high volume of complex patients, or for increasing quantity of services provided [14].

The financial risk leans on the insurance agent or practice group which employs the physicians on salary. This risk is managed through constraint policies (more patients and shorter visits, and also by limiting the number of available physicians) [14]; these kinds of strategies

affect autonomy and motivation of medical practitioners [17-23]. Given that patients could receive less care, salary payments could also potentially affect quality of care [41].

1.1.3. Blended arrangements

Other option to pay physicians could be a mixture of different methods. Practitioners paid by salary or capitation could also have the possibility to bill certain services through FFS to increase volume of services provided [42]. For example, a family medicine professor may have a salary for clinical practice and in his contract this physician could be allowed to bill certain medical services, such as for Pap smears, hypercholesterolemia screening, etc.

This common practice of combining FFS and APP usually has great variability in the proportion paid by one or the other method, showing an enormous range of possibilities. Thus, blended payments could be considered an option in the middle of the road within models of payment methods; variability and aggregation levels will depend on the proportions of APP and FFS offered in payment agreements.

1.1.4. Controversies in Payment Methods

Despite the growing trend of APP across Canadian provinces [42, 45, 48], there are discussions about the impact of new payment models on the productivity of physicians and delivery of health services [5-9].

On the one hand, studies have demonstrated that physicians paid by APP have a lower productivity than those paid by FFS [5-9]. Working hours of family practitioners (FPs) paid by salary and blended schemes are 40.46% and 23.13% less, respectively, than practitioners paid by FFS [9]. Also, FPs paid by salary and blended methods see fewer patients per week (between 20% and 58% fewer) [7] and dedicate between 37% and 44% less time to direct patient care in the office/clinic [7, 8] than those paid by FFS.

On the other hand, Sarma *et al.* [8] identified that FPs paid by APP and blended methods dedicate more time to different forms of care. In comparison to physicians paid by FFS, FPs with APP and blended methods invest respectively 61% and 54% more time on direct patient care in settings other than the office/clinic, and also two thirds more time on indirect patient care [8]. In a systematic literature review, Gosden *et al.* [6] recognized that patients of physicians paid by salary reported higher access satisfaction in comparison to patients of practitioners paid by FFS.

APP and blended methods are options to promote effective models of care [8]. APP and blended schemes could act as an incentive for physicians in the co-ordination of care, administration, research, continuing medical education, and interprofessional care [8]. APP could improve the duration and quality of time devoted to patient care [54, 55], while FFS rewards productivity [54, 44] and incentive physicians to adopt a high workloads [44].

As Elit and Cosby argue [55], payment system shifts are a “philosophical change” that could impact perceptions and behaviors of physicians, affecting their clinical and personal priorities. Wranik and Durier-Copp [5] conceptualized the link among the payment methods, behavior of physicians, and health care outcomes. In their conceptual logic model, the internal (health care policies) and external (population health) contexts are considered, highlighting the fact that the effect of payment methods is context-dependent. They described that behavior of physicians and health care outputs are influenced by payment arrangement (FFS, salary, capitation, blended arrangements, etc.) and non-financial incentives (organizational structure, housing arrangements, professional opportunities, leaves agreements, rotation schedules, etc.). Thus, behavior of physicians and health care outputs impact on patient health outcomes. The latter is also affected by adherence of patients and clinical effectiveness [5].

Physicians are influenced by the method with which they are paid, modifying their behavior, outputs and outcomes [5]. For example, payments with high variability could motivate physicians to provide high quantities of care, accept more patients, and invest in the satisfaction of their patients while fixed payment models promote health prevention and promotion activities, and collaborative care [5]. It is proposed in this dissertation that payment methods, along with non-financial factors, affect perceptions of professional equity and distress of physicians (Figure 1-4). These wellness indicators are also influenced by other personal factors, such as gender, age, and specialty. The close relationship of career satisfaction with these two daily perceptions of physicians needs to be considered, as well as the working conditions of medical practitioners (solo or group practice, large or small hospital/medical centre, workload, patients with complex conditions, availability to other health care professionals, access to diagnostic and treatment resources, academic and administrative duties, etc.).

Working conditions are closely connected with non-financial incentives; at the same time, payment methods are linked with non-financial incentives and working conditions. Then, payment methods, non-financial factors, and working conditions have an impact on daily perceptions of physicians (professional equity and distress). Perceptions of physicians indicate their level of motivation and can shape their behavior, influencing health care outputs and affecting health outcomes; see Figure 1-4.

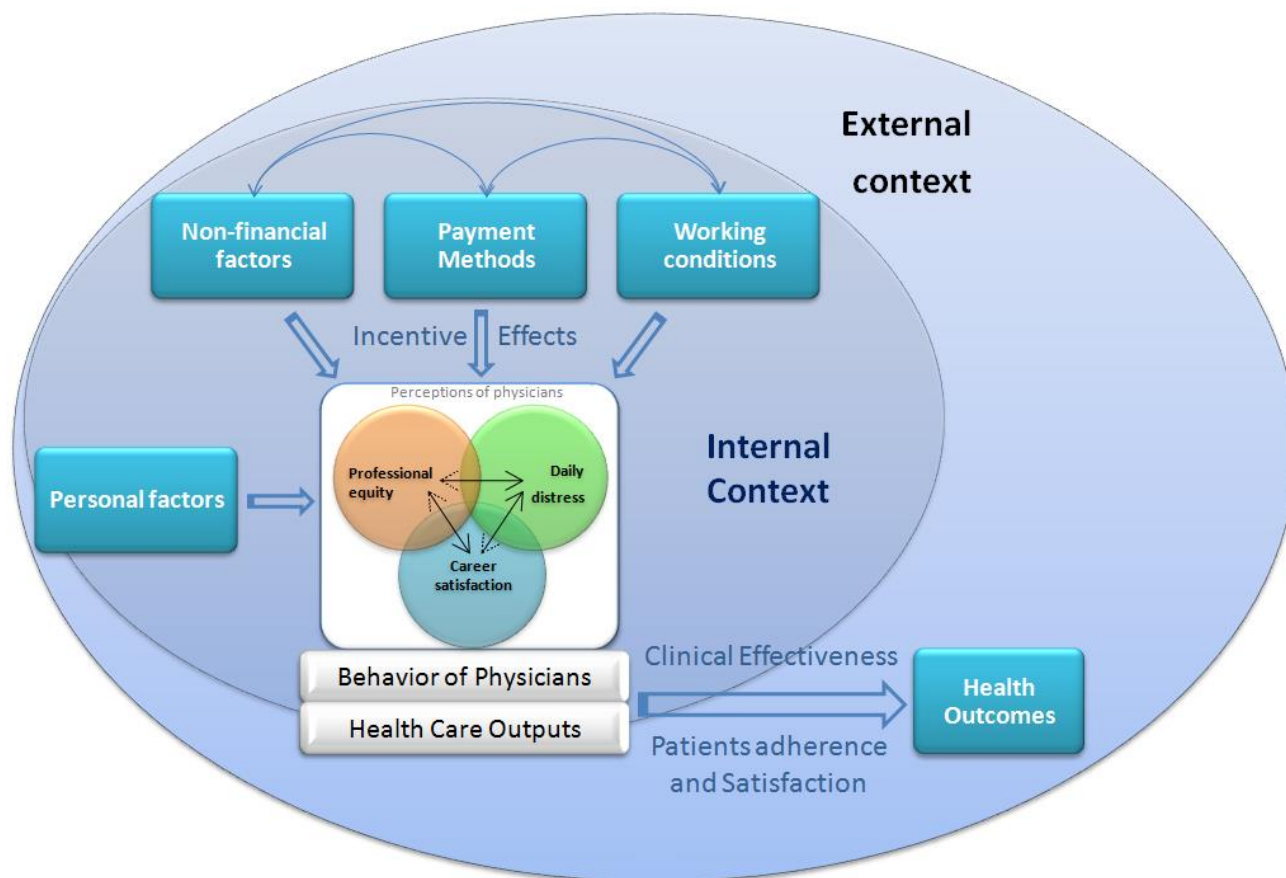


Figure 1-4. Logic model of the influence of payment methods for practicing medicine on behavior of physicians, outputs, and outcomes; modified from Wranik and Durier-Copp [5, p37].

Given that attitudes influence decisions and guide behavior, health care managers need to understand how a person sees the world to facilitate motivation and productivity [56]; thus, attitudes, beliefs, and motivation of physicians need to be understood. However, there is a lack of evidence about the impact of payment methods on perceptions of physicians, specifically about their wellness. Some studies have explored the effect of payment methods on perceived professional equity [57] and work stress [31, 58, 59] by physicians; indeed, disagreement can be observed among studies comparing stress of physicians by the payment method. In the implementation of payment policies, efforts have been focused on productivity measurements, neglecting an evaluation of wellness of medical practitioners.

1.2. Wellness of Physicians

“We are really proposing a paradigm shift and suggesting that physician wellness is also an important and necessary indicator of health care systems quality.”

Jean E. Wallace³

Wellness is a holistic concept understood as a dynamic and ongoing process of a quest for optimal human functioning [60, 61], involving physical, mental, and emotional health and well-being [19, 60]. Physicians face physical (long work hours, workload, fatigue, unhealthy lifestyles, etc.), mental (leadership in a challenging environment, lack of sleep, stress, anxiety, depression, burn-out, substance abuse, etc.), social (lack of free time, other pursuits, time off from work, etc.), and intellectual (information overload, unfinished work, lack of mentorship, lack of time to innovate and update skills and knowledge, etc.) challenges in their professional practice [19, 62]. Evidence demonstrates that wellness of physicians is suboptimal, being a problem that requires further comprehension and attention [19-21, 29-32, 34, 35, 39].

Given that wellness of physicians is associated with the quality of health care provided [26, 27, 39], poor wellness is not only relevant for medical doctors but also for patients and health care systems [19]. Unfortunately, wellness of medical practitioners is “a missing indicator” in health care [19] and there is a poor awareness of the existence of a link between physicians’ wellness and quality of patient care [27].

Wellness of physicians includes “being challenged, thriving and achieving success in various aspects of personal and professional life” [63, p514]. Physicians need to feel engaged, empowered, confident (in self, colleagues, and the organization), and have a self-awareness to develop and maintain wellness [60]. The absence of high levels of distress and optimal levels of motivation are important components of their wellness [19, 63]. This dissertation explores

³ Interview in the Lancet, November 13, 2009. Available at:
http://podcast.thelancet.com/audio/lancet/2009/9702_14november.mp3

professional equity as a measure of motivation, and distress experienced by physicians in their daily practice.

1.2.1. Professional equity

Motivation (from the Latin root *movere* “movement”) refers to reasons that a person has for doing/achieving something [64] and can be defined as the psychological process of “conscious or unconscious stimulus, incentive, or motives for action toward a goal resulting from psychological or social factors, the factors giving the purpose or direction to behavior” [56, p105]. In the organizational context, motivation is a transactional process between an individual and her/his work environment where unsatisfied needs want to be satisfied. This process results in a direction, effort and persistence of individuals toward goals [56, 64, 65]. The art of motivating relies on the recognition of people’s needs [66]. Health care managers should practice this art, promoting self-motivation and an organizational environment that increases the willingness of individuals to apply and maintain effort towards established organizational goals [56, 66].

Different theories have been developed to understand motivation and are grouped in content (needs) and process (cognitive) theories [56, 64]. The first group focuses on factors that drive people to satisfy needs, “what drives behavior?” [56, p106]; the second group focuses on cognitive processes of motivation , “how behavior is energized, directed, sustained, and stopped” [56, p106]. The Maslow’s hierarchy of needs [16] is a well-known example of a content theory which describes that individuals have five levels of needs to be satisfied; higher-needs want to be satisfied once lower-needs are satisfied [16, 56, 64]. As an example of a process motivation theory, the Adams’ professional equity theory considers that an equitable provision of rewards promotes better motivation [56, 64].

Career satisfaction applies the Maslow's hierarchy of needs theory. The evaluation of satisfaction with the career is a long term perception based on evaluation of needs [35]. In contrast, professional equity is a short term perception, almost a daily evaluation, which could be affected by every-day aspects of work. Evaluating professional equity allows the understanding of the effect that intrinsic and extrinsic rewards have on the motivation of medical practitioners [67]. Consequently, both measures of motivation of physicians, career satisfaction and professional equity, are going to be studied in this dissertation.

Special attention will be given to professional equity, since it is a perception that could be directly affected by payment methods for practicing medicine. The equity theory basically considers the relationship between an individual's contributions to the organization (inputs) and rewards that a person receives in return (outputs), motivating individuals to adjust inputs/outputs imbalances [56, 64, 68, 69]. Inputs refer to those factors that a person provides to her/his work (education, experience, skills, abilities, effort, etc.); outputs include all rewards that individuals receive, both intrinsic and extrinsic ones [56, 64, 68]. Extrinsic rewards are tangible or intangible factors like payments, incentives, bonuses, benefits, recognitions, promotions, etc. Intrinsic factors come from the work itself; these are rewards that engage a person such as autonomy, interesting and challenging duties, achievement, etc. [56, 64, 69].

Motivation of physicians is complex because extrinsic and intrinsic factors affect their motivation [69]; however, extrinsic factors like financial incentives (*i.e.*, pay-per-performance incentives) have demonstrated a limited effect on their behavior [70] and a potential to increase the physicians' perception of burden [33]. Among physicians, intrinsic rewards are a critical source of motivation, such as interacting with patients [54, 71, 72] and having professional achievement [73] and autonomy [17-23]. These are noteworthy reasons to apply the professional

equity theory.

As J. Stacy Adams explains [68], individuals evaluate their own ratio of inputs and outputs with the ratios of “referent others” in the same or a different organization. An inputs/outputs imbalance generates tension in an individual and leads to professional inequity. Different mechanisms could be employed by a person to resolve professional inequities. Individuals could modify their inputs (reduce productivity, take longer breaks, etc.) and/or outputs (seek for a payment increase) to restore professional equity [56, 68]. The strength of motivation to reduce inequities is proportional to perceived inequity [56]. Interestingly, inputs adjustment in the presence of inequities vary according to the payment method that a person receives [68]. Moreover, subjective changes could restore a perception of professional equity, adjusting self or others’ inputs/outputs. Individuals could also be motivated to change the “reference other” or just leave the organization or field [56].

Payment methods play a critical role in the perception of professional equity because they will determine financial rewards, as well as other type of rewards like recognition of efforts. For instance, FFS is a volume payment method, basically rewarding more for a greater number of cases [10, 11, 14, 41]. In contrast, salary might provide recognition of training, experience and/or seniority, offering high revenues, extra time off, continued medical education, support for teaching and research duties, etc.

Among physicians, studies have traditionally evaluated motivation applying the satisfaction perspective based on fulfillment of their needs [35-37, 74]. Some studies have explored professional equity [57, 67]; indeed, a specific questionnaire for physicians has been developed and tested across Canadian provinces by Dobson *et al.* [67]. This instrument has three dimensions (financial, fulfillment, and recognition rewards).

In the presence of persistent professional inequities, individuals experience distress in their efforts to restore equity which might lead to negative consequences [56]. An undercompensated person could reduce inputs (productivity, time of work, quality, etc.) or even leave the field (hospital/clinic, region, or the medical practice *per se*) when an individual perceives that inequities are considerable [56]. Additionally, high levels of stress could trigger latent professional inequities and increase the probability of burnout among physicians.

1.2.2. Daily distress

Given that a similar work situation could have two different assessments of demands and resources, stress is a complex and personalized process of an individual interacting with the work environment [56]. Work-related stress is common but it is often considered as a negative aspect; however, there are positive stressors [56] and adequate levels of stress could have beneficial effects [56, 75, 76]. Indeed, if physicians have abilities to cope with daily tensions, the stress of medical practice could potentially improve the quality of medical care; although, vulnerable practitioners would be unable to practice or might result in serious mental/physical illnesses [71].

Considering that the health of workers is a complete continuum of mental and physical health, Beehr and Newman [76, p670] defined stress at work as “a situation wherein job-related factors interact with a worker to change (*i.e.*, disrupt or enhance) his or her psychological and/or physiological condition such that the person (*i.e.*, mind-body) is forced to deviate from normal functioning.” Randall S. Schuler [75, p189] added that stress at the work environment “is a dynamic condition in which an individual is confronted (with an opportunity / constrain / demand) for being / having / doing what she/he desires and for which the resolution of is perceived to have uncertainty but which will lead to important outcomes”, including positive and negative ones.

The concept of stress experienced at work needs to be differentiated from burnout, which is a negative outcome to stress exposure. Burnout has been defined as “a psychological syndrome in response to chronic interpersonal stressors on the job” [77, p399] and is characterized by exhaustion (stress dimension, being depleted of emotional and physical resources), depersonalization (interpersonal context dimension, detachment from the job), and inefficacy (self-evaluation dimension, lack of accomplishment at work) [77]. Burnout is more prevalent among physicians and they are at higher risk of burnout compared to other workers [19, 28]; indeed, physicians at the front line of health care are at a high risk of burnout [28].

Notwithstanding, this dissertation is centered on a wider scope of stress, the daily stress experienced by physicians in their practice. This broader approach of the stress of physicians yields to the differentiation between lower to severe levels of stress in the daily practice of medicine, identifying fatigued medical practitioners from those at risk of burnout [30]. An instrument has been developed by Lepnurm *et al.*[30] to evaluate daily distress of physicians. This questionnaire has been tested with a national sample of physicians practicing in Canada.

Physicians face inherent distresses to medical practice, working in emotionally-charged circumstances and managing complex interactions with patients, families and other health professionals [19, 71]. Jack D. McCue [71, p458-9] states that stresses of medical practice result from “working with intensely emotional aspects of life governed by strong cultural codes...inadequate training for fundamental professional tasks...the need for certainty when current medical knowledge allows only approximation.” This author claims that training is critical for physicians to handle intensely emotional and sensitive dimensions of life in daily medical practice, such as suffering (understanding and managing sickness and pain), fear (primary reason of patients for consulting), sexuality (access to private aspects of individuals),

and death (usually seen as a failure of care) [71]. These inherent tensions of medical practice could be experienced more within certain medical specialties [28, 30]; higher levels of daily distress have been documented among physicians of intensive care units, emergency and operating rooms [30], as well as among physicians at the front line of care [28, 30].

In addition to the inherent distresses of medical practice, other stressors need to be recognized. Workload increases, organizational changes, practice restrictions, lack of professional autonomy, and career dissatisfaction are added sources of stress documented among physicians [19-21, 23, 24, 29]. Heavy workloads are directly associated with physicians' stress, turnover, satisfaction, and also with patient care quality [24]. Medical practitioners tend to work more than 50 hours per week [24], despite medical errors being more likely when physicians experience physical and mental exhaustion [78]. Medical practitioners also need to skillfully manage limited health care resources, complex and growing needs of patients, and rising public expectations, while perceiving a lack of support to achieve these demands [79, 80].

Furthermore, health care systems changes and management adjustments are extra sources of daily distress. Strategies of governments and health insurances companies to control health care costs are threatening quality of care and wellness of physicians [19, 80]. Shifts in payment methods for practicing medicine are changes that have been pointed to as an extra source of stress for physicians [23, 24, 58, 59]. As Williams *et al.* [24] suggest, physicians paid by FFS tend to adopt a high workload to secure a certain income; therefore, becoming exposed to high levels of stress. Notwithstanding, evidence of payment methods as a factor that affects stress of physicians is inconclusive. Changes in the payment method have been associated with increased stress experienced by physicians [59] and less stress could be observed among salaried physicians [58]. In contrast, a study among family physicians practicing in Ontario, Canada,

found that stress was not affected by payment method [31]; however, this study did not consider controlling variables in the analysis. Consequently, the effect of payment methods on stress of physicians needs to be studied, acknowledging demographic, workload, and organizational factors which have been already related to their work stress.

1.2.3. Gender Inequalities

Gender is a critical factor that must be considered in the evaluation of the wellness of physicians given that the proportion of women in medicine is growing [7, 19, 63] and because there are differences in the wellness of female and male physicians [19, 63].

The medical workforce is rapidly changing its demographic distribution and women physicians are no longer a minority [7, 19, 63, 81, 82]. Many years ago, medical training was a proscribed field for women and they experienced discrimination, despite their roles in health care which have been always present throughout history [83, 84]. After decades of struggle, women were accepted in medical schools and they have provided innumerable important legacies in medicine [84]. Several authors state that the number of female physicians will exceed the number of male physicians in the near future [7, 19, 63, 81]. In fact, in the United Kingdom, the proportion of female general practitioners has already surpassed the number of males; also, the proportion of chief executive women in the National Health System is higher than other areas like politics and business [82]. In Canada, the proportion of female physicians has grown from less than 10% in the 60s [8, 85] to 38.2% in 2013 [86]. This growing participation of women in the practice of medicine is a reminder to include the gender perspective in the study of wellness of physicians.

In addition to the inherent distresses of medical practice [71] and the fact that women physicians earn less in comparison to male physicians [87, 88], female physicians experience extra stressors and “often face greater challenges than do male physicians” [19, p1716]. In their

medical careers, many women experience extra stressors, such as discrimination, role strain, and lack of role models and support [89]. Studies report that female physicians experience less control over their workload [88, 90] and that they are at a higher risk of burnout [91].

Gender discrimination is a critical issue that female physicians could face, especially where they are still a minority [89]. After women overcame the discrimination in place for hundreds of years to become medical doctors [84], female physicians are still a minority in relation to male colleagues among certain specialties [86, 89, 92]. According to the Canadian Institute for Health Information, surgical specialties have the lowest proportions of women (urology, 7.8%; orthopedic, 9.8%; cardiac surgery, 10%; neurosurgery, 10.6%; otolaryngology, 16.5%; plastic surgery, 18.9; general surgery, 20%), whereas the highest proportion of female physicians is observed in family medicine (42.4%) [92]. The “attitude that women cannot do surgery is still held by many senior surgeons” [89, p181], making worse the discrimination faced among female physicians that have chosen surgery for their careers.

Female doctors in medical faculty and leadership positions is also growing but is still under-represented [89]. Indeed, it has been reported that women in medical faculty positions experience discrimination to access work resources and access career opportunities [93]. Moreover, the proportion of female physicians notably varies across provinces; Prince Edward Island and Saskatchewan have the lowest proportion of female physicians, 29.1% and 32.7% respectively, while 43% of physicians are women in Quebec [92].

Among the new generation of physicians, under-representation and discrimination could be less common concerns [89]. Although creating and maintaining a balance between work and personal spheres is a significant issue in medicine, this is more challenging for some female physicians [19, 32, 89, 93]. Indeed, Wallace *et al.* [72] identified that female physicians who are

mothers face more work-to-family conflicts than male physicians who are fathers or than physicians who are not parents.

Other important gender differences that might impact wellness of physicians have been documented in relation to income and payment methods. A study across specialties in the United States demonstrated that, in addition to the income differences by specialties, female physicians earn less in comparison to male physicians [87]. This income difference can definitely impact the perception of professional equity, as well as daily distress experienced by female doctors. Moreover, a study among three Canadian provinces (Newfoundland and Labrador, Prince Edward Island, and New Brunswick) identified that more than half of females physicians are paid by APP, especially among those in younger groups [48]. The number of physicians paid by alternative payment systems has been increasing during the last thirteen years across the Canadian provinces, although Ontario and Saskatchewan have shown the most remarkable percentage increases. In Saskatchewan, the proportion of physicians paid by APP has grown from 8% in 2000 to 34.7% in 2013 [45]. These trends highlight the need to continue evaluating the impact of APP.

1.3. Aim and Research Questions

The aim of this dissertation was to explore the effects of APP on physicians' perceptions of professional equity and daily distress. A cross-sectional study was designed and conducted among physicians practicing in the Saskatoon Health Region (SHR), Saskatchewan. The SHR is the largest health authority in the province and provides health care to about a third of the population of Saskatchewan among 75 health care facilities, including 10 hospitals and 30 long term care facilities [94]. A sample of the study questionnaire is presented in Appendix A. The following questions guided this research:

1. Does professional equity perceived by physicians vary among practitioners paid by FFS, APP, or blended alternatives?

Hypothesis: Physicians paid by APP perceive different levels of professional equity than those paid by FFS, and that the effect of payment method on the levels of professional equity varies according to specialty and workload.

2. Is the payment method associated with daily distress of medical practitioners?

Hypothesis: Perceived levels of distress among physicians is associated with payment methods (APP, FFS, or blended schemes), considering workload, working hours, proportion of complex cases, time devoted to academic and administrative tasks, and career satisfaction of practitioners.

3. Are levels of professional equity, daily distress, and career satisfaction of physicians different by gender and payment methods?

Hypothesis: Professional equity, daily distress, and career satisfaction vary by gender and payment method, and also that payment methods and gender have an interaction effect on these wellness indicators of physicians.

This dissertation has been organized in an article-based format. Three published articles address each of the research questions stated above.

Article one (Chapter 2) explores the effect of payment methods on professional equity perceived by physicians, using the three dimensional questionnaire developed by Dobson *et al.*[67]. Levels of professional equity were compared by payment method in unconditional and conditional analyses. Also, levels of fulfillment, income, and recognition equity were compared among physicians paid by APP, FFS, and blended schemes.

Article two (Chapter 3) examines the role of payment methods on daily distress of physicians. Levels of daily distress experienced by physicians were measured with the questionnaire of Lepnurm *et al.*[30]. A two-level regression model was used to test the effect of payment methods on distress. The multilevel model accounted for environmental factors where physicians practice (random component) and for individual factors associated with levels of distress that physicians experience (fixed component).

Article three (Chapter 4) analyzes disparities in professional equity, distress, and career satisfaction of physicians by gender and payment method. Differences among these indicators of wellness by gender and payment were concurrently evaluated and an interaction effect between these two factors was tested.

Ethics approval from the Behavioral Research Ethics Board, University of Saskatchewan, was obtained to conduct this research (Appendix B), as well as Operational Approval from the SHR (Appendix C).

Each of the articles describes in detail the methodology and characteristics of the sample. Some repetition might be observed among chapters. The permission to reprint the articles published in the Journal of Hospital Administration is available in Appendix D.

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CHAPTER 2[†]
**ARTICLE ONE: IMPACT OF PAYMENT METHODS ON PROFESSIONAL EQUITY
OF PHYSICIANS**

[†] This chapter examines professional equity and payment methods for physicians. The purpose of Chapter 2 is to compare levels of professional equity among payment methods. The contents of Chapter 2 have been published as: Peña-Sánchez JN, Lepnurm R, Dobson RT, Keegan D. Impact of payment methods on professional equity of physicians. *Journal of Hospital Administration*. 2013;3:50-60. <http://dx.doi.org/10.5430/jha.v3n2p50>

2.1. Background

Motivation is the psychological process of “conscious or unconscious stimulus, incentives, or motives for action toward a goal” [1, p105]. Health care professionals are motivated by both extrinsic and intrinsic factors [2]. Physicians do not automatically respond to financial incentive schemes [3]—an extrinsic factor—as they are influenced considerably more by intrinsic factors of medical practice, such as interaction with patients [4], professional autonomy [5] and achievement [6]. Consequently, complex motivational sources among physicians need to be understood. The use of professional equity theory could facilitate understanding of perceived fairness between efforts and rewards in the practice of medicine.

Professional equity theory [7] argues that individuals evaluate their own contributions (inputs) and rewards received (outputs) compared to the inputs and outputs of “referent others” within the same organization or in other organizations with similar conditions. A perception of imbalance between contributions and rewards leads to professional inequity and tension within a person, who is then likely to be motivated to adjust imbalances [1]. An individual will attempt to restore a state of professional equity when her/his rate of inputs and outputs becomes the same as the rates of others [7]. This scenario underlines the relevance of payment methods on professional equity; however, this perception has not been assessed according to payment

methods among physicians. In a continuum of payment methods according to units of aggregation, fee-for-service (FFS) represents the least aggregated end, where a payment is made per each service, procedure, or visit; while, salary represents the most aggregated end, paying per time for a complete range of medical services to patients. Also, capitation is a well-known intermediate payment example, where periodic payments are made per patient for a broad range of health services [8]. Alternative payment plans (APP)—such as salary, capitation, among others—represent varying degrees of aggregation. Since the satisfaction of different medical specialists has been associated with patient interactions, payment methods that encourage duration and quality of time in the provision of patient care are recommended instead of FFS schemes [4].

Traditionally, physicians in North America have been paid by FFS for the provision of care; however, concerns about the negative effects on the health care system and its providers have been raised. In the United States (US), FFS has been considered as a contributory factor to the fragmentation of health care among Medicare beneficiaries, as well as to the high cost and the poor quality of health care [9]. There is a call for a transition from this volume-based payment method, FFS, to value driven payment alternatives to support innovative health care delivery models [10]. Indeed, the US Affordable Care Act includes models of health care intending to move from FFS payment of physicians to alternative or blended methods [11]. In Canada, FFS has been recognized as an important factor in increasing health care cost, accounting for more than half of the average annual growth in physician spending between 1998 and 2008 [12]. During the last two decades APP have been implemented across Canada [13, 14]; as a result, APP represented a quarter of the total payment for physicians by 2010 [13].

Family physicians paid by APP have been found to see fewer patients but devote more time to direct patient care outside the office and to indirect patient care [15, 16]. Also, given that lower levels of satisfaction [17, 18] and income disparities [19] have been described among family/general practitioners (FPs) in comparison with other specialists, it is pertinent to evaluate differences in the perceptions of professional equity among physicians, comparing FPs and other specialists paid by different payment schemes.

FPs play a fundamental role in health care systems, and adequate levels of professional equity among them are critical. Since physicians are called to understand the patient and her/his context in order to adequately treat a person with a disease [20], models ensuring a continuum of care will facilitate physicians to have a comprehensive knowledge about their patients. Models of care that reduce the gap between primary and hospital care need to be explored. For instance, a triangular model with FPs as health care leaders has been developed in Castelfiorentino (Tuscany, Italy) [21] where hospitalists and primary care physicians are coordinated in a patient-centered care model, supported by an academic physician who acts as facilitator and educator. Accountable Care Organizations (ACOs) in the US provide another example of a patient-centered care model. The ACOs are integrated networks of physicians assuming the responsibility for providing care to a defined patient population, where rewards are based on quality of care and implemented by value driven payment methods [10, 11, 22, 23]. FPs should be leaders in the development and implementation of these and other novel health care models. Alternative and blended payment methods could be central in promoting professional equity among FPs and to support the expansion of innovative health care models. Therefore, professional equity of FPs has to be particularly measured, followed, and enhanced during this critical process.

An instrument designed to measure the perception of professional equity, specifically for physicians, was developed and tested by Dobson, Lepnum and Struening [24] across Canada. This instrument could be used to measure professional equity and make comparisons among physicians. However, the authors of this instrument suggested that the questionnaire might benefit from further testing and improvements [24]. The objectives of this study are to: 1) confirm the internal structure of the instrument used to measure professional equity of physicians; 2) compare the levels of professional equity perceived by physicians paid by FFS, blended methods, and APP; 3) identify differences in the levels of fulfillment, income, and recognition dimensions of equity among physicians paid by FFS, APP and blended schemes; and 4) test an interaction effect between specialty group and payment method on the levels of professional equity, controlling by number of patients seen per week, age and gender.

2.2. Methods

A cross-sectional study was conducted in Saskatoon Health Region (SHR) in 2011. SHR is the largest health region in Saskatchewan, actively involved in research and health human resources training [25]. All physicians in the region, except those who were on a leave of absence or those in a residency program, were invited to participate.

Applying the Dillman method [26], physicians were sent a survey in the mail, offering an on-line option to participate by e-mail. Three follow-up mails were sent to non-responders after the initial mail-out, with the last mailing including a one page non-response survey with key questions to check for response bias (Appendix E). Participants were asked about their perception of professional equity, among other well-being measures, type of payment plan, and demographic information. Ethics approval from the Behaviour Research Ethics Board, University of Saskatchewan, and operational approval from the SHR were obtained to conduct this study.

2.2.1. Measures

The instrument used to measure professional equity of physicians consisted of 15-items with three dimensions (five items per dimension), evaluating perceived intangible and tangible rewards for practicing medicine [24]. The intangible rewards were measured by fulfillment and recognition dimensions, and the tangible rewards were measured by the dimension of income. The professional equity measure is capable of assessing the degree of fairness of the exchanges, linking specific demands of medical practice with different types of rewards. All of the items were scored using 6-point scales. The wording of all items was reviewed and two items which had poor loadings in the Canadian sample of physicians [24] were adjusted: “income reflects practice expense” to “how well income reflects years of experience”, and “proportion of uninteresting work” to “fulfillment with choices of activities carried out.” In addition, two new items were added to the recognition dimension: “dedication leads to career advancement” and “recognition from own family.”

Confirmatory factor analysis (CFA) was performed, using the statistical software EQS 6.1, to confirm the internal structure validity of the questionnaire. A χ^2/df ratio between 2 and 3, a Root Mean Square Error of Approximation (RMSEA) < 0.08 and a 95% C.I. with a lower boundary < 0.06, a Comparative Fit Index (CFI) > 0.9, a Normed Fit Index (NFI) > 0.9, a Non-Normed Fit Index (NNFI) > 0.9, and an Incremental Fit Index (IFI) > 0.9 were considered as indicators of an adequate model adjustment [27].

Cronbach’s alpha coefficients were computed for the measure as a whole and for each dimension, assessing internal consistency of the instrument. The levels of the overall equity scale were standardized by summing the scale items, then dividing by the number of items, yielding scores from 1.00 to 6.00. Similarly, standardized scores were computed for the dimensions of fulfillment, financial, and recognition equity.

2.2.2. Analysis

One-way analyses of variance (ANOVA) and Scheffe tests were carried out to account for differences among payment methods (FFS, APP, and blended schemes) on the overall levels of professional equity and the three dimensions: fulfillment, recognition, and income equity. ANOVAs and T-Tests were used to compare professional equity levels among number of patients seen per week (< 40, 40-100, and > 100) and specialty groups (FPs vs. clinical/surgical specialists), respectively.

In order to test the interaction effect between specialty group and payment method on professional equity, a linear regression model was used. First, unconditional analyses were carried out between the dependent variable (15-item professional equity scale) and each of the considered independent variables (payment method, specialty group, number of patients seen per week, age group, and gender). Second, the interaction effect between payment method and specialty group was tested in the model, controlling by number of patients seen per week, age group, and gender. Finally, possible interactions between payment method and other predictors were also tested. These analyses were completed using the statistical software SPSS[®] 20.

2.3. Results

The response rate was 48.1%; with 382 practitioners of the 794 eligible physicians completing the questionnaire. In total, 253 questionnaires were received on paper and 129 were submitted on-line. In the sample group, 136 participants (35.6%) were FPs, 233 (61%) respondents were from medical or surgical specialties, and the remaining 13 (3.4%) were pathologists. The mean age of the sample was 49.04 years (SD=11.4), and 18.45 (SD=12.3) was the mean years of experience. Furthermore, according to payment method for practicing medicine 45.3% (n=173) of physicians were paid by FFS, 24.6% (n=94) were remunerated by APP, and 30.1% (n=115) were paid by blended schemes of APP and FFS. Since there were only 13 pathologists and all

were paid by APP, this group was excluded from the analyses for an adjusted study population of 369 physicians for this report. Table 2-1 presents characteristics of participants by specialty groups.

Table 2-1. Demographics by specialty groups (n = 382)

	All physicians	Family/general practitioners n(%)	Medical-surgical specialists n(%)	Pathologists [†] n(%)
Age group (years-old)				
Less than 40	108	38 (35.2)	66 (61.1)	4 (3.7)
Between 41 and 49	84	23 (27.4)	57 (67.9)	4 (3.7)
Between 50 and 59	117	41 (35)	72 (61.5)	4 (3.7)
More than 60	71	33 (46.5)	37 (52.1)	1 (1.4)
Gender				
Female	142	57(40.1)*	77(54.2)*	8(5.6)*
Male	240	79(32.9)*	156(65)*	5(2.1)*
Payment method				
Pure FFS	173	101(54.4) [#]	72(41.6) [#]	-
Blended schemes	115	15(13) [#]	100(87) [#]	-
Pure APP	94	20(21.3) [#]	61(64.9) [#]	13(3.4) [†]
Number of patients per week				
Less than 40	112	21 (18.9) [#]	90 (81.1) [#]	-
Between 40 and 100	137	36 (27.3) [#]	96 (72.7) [#]	-
More than 100	133	79 (62.7) [#]	47 (37.3) [#]	-

[†] Group omitted from further analyses due to lack of payment comparison category; [#] χ^2 with $p < 0.001$; * χ^2 with $p < 0.05$

2.3.1. Confirmatory factor analysis of the professional equity measure

Before performing the CFA, the minimum standards for factor analysis were verified:

Bartlett's Sphericity = 3,682.74, $p < 0.001$, and the Kaiser-Meyer-Olkin Measure of sampling was 0.88. Descriptive statistics for items and corrected item-total correlations are presented in Table 2-2. Almost all corrected item-total correlations ranged from 0.37 to 0.67; only two items had correlations below 0.3 (EQREC01=0.27 and EQREC07=0.25).

Table 2-2. Professional equity questionnaire for physicians

Item		Mean	S.D	Corrected Item-Total Correlation	α dimension
Regarding fulfillment, consider the following aspects of your medical practice. (from 1 “Very Low” to 6 “Very High”)					0.87
EQFUL01	Your sense of gratification derived from providing care to patients is:	4.81	0.91	0.44	
EQFUL02	Your sense of contributing to society in your various roles as a physician is:	4.63	0.94	0.44	
EQFUL03	The opportunities to use your most advanced clinical skills are:	4.37	0.96	0.49	
EQFUL04	The choices you have over the activities you carry out or participate in are:	4.20	1.03	0.60	
EQFUL05	Your sense of accomplishment from your work as a physician is:	4.71	0.92	0.58	
How well does your income reflect: (from 1 “Not at all” to 6 “Perfectly”)					0.94
EQINC01	The time you spend on your duties?	3.85	1.36	0.60	
EQINC02	Your qualifications and training?	3.90	1.37	0.63	
EQINC03	Your responsibilities?	3.79	1.35	0.66	
EQINC04	The stresses of making risky decisions?	3.49	1.47	0.67	
EQINC05	Your years of experience?	3.44	1.59	0.60	
Regarding recognition, please consider the following aspects of your practice. (from 1 “Strongly disagree” to 6 “Strongly Agree”)					0.79
EQREC01	Patients often express their appreciation for the clinical care that you provide to them.	4.64	1.09	0.27	
EQREC02	Your contributions to the general well-being of your region are appreciated.	3.81	1.30	0.59	
EQREC03	Your colleagues acknowledge extra efforts you make in carrying out your responsibilities.	4.01	1.19	0.58	
EQREC04	Nurses you work with show respect for you as a physician.	4.72	1.05	0.37	
EQREC05	Administrators understand the stresses you experience as a physician.	2.98	1.33	0.48	
EQREC06	Your dedication as a physician has led to advances in your medical career.	4.21	1.17	0.55	
EQREC07	Your family understands the stresses you face as a physician.	4.54	1.18	0.25	

Note. n =369 (134 females and 235 males); Cronbach’s Alpha for 17-item Scale ($\alpha= 0.88$)

Then, using the tri-dimensional structure proposed a priori for the professional equity measure for physicians [24], a CFA was performed including all 17 items. According to the robust maximum likelihood results, the initial model presented an adequate fit: $\chi^2=307.63$, $df=113$, $p<0.001$; $\chi^2/df=2.72$; RMSEA=0.07, 95% C.I.=0.06-0.08, CFI=0.93, NFI=0.9, NNFI=0.92, IFI=0.93. However, a model adjustment was required since two items presented low eigen values (EQREC01=0.44 and EQREC07=0.35). The item with the lowest eigen value (EQREC07 “recognition obtained from own family”) was eliminated. The CFA with 16-items was run yielding similar results. Thus, EQREC01 item “recognition obtained from patients” was also eliminated. The final 15-item measure was tested and model fit indicators presented an improvement: $\chi^2=233.46$, $df=84$, $p<0.001$; $\chi^2/df=2.78$; RMSEA=0.07, 95% C.I.=0.06-0.08, CFI=0.94, NFI=0.92, NNFI=0.93, IFI=0.95; Figure 2-1 presents the final model with standardized estimates. This model yielded very good internal consistency reliability ($\alpha=0.89$). The Cronbach’s alpha for each of the 5-item dimensions was: fulfillment, $\alpha=0.87$; income, $\alpha=0.94$; and recognition, $\alpha=0.79$. This 15-item tri-dimensional questionnaire was considered for further analyses.

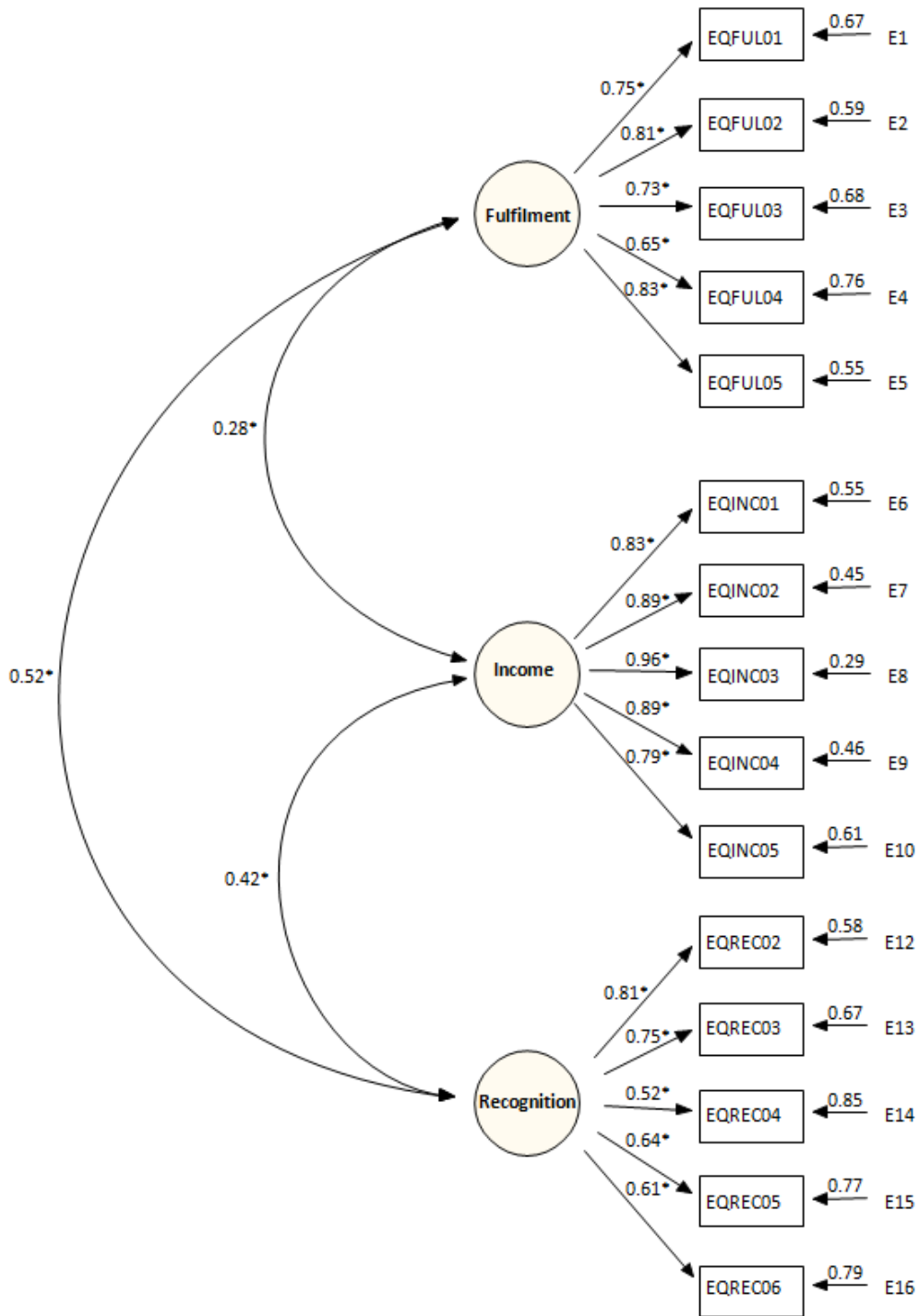


Figure 2-1. CFA of the professional equity questionnaire for physicians: The tri-dimensional structure of the 15-item questionnaire (fulfilment, income and recognition equity) is illustrated with standardized estimates.

2.3.2. Professional equity by payment methods

In the sample group, the mean level of professional equity was 4.06 (SD=0.76), ranging from 1.53 to 5.67, and the median was 4.13. The means for the dimensions were: fulfillment, 4.55 (SD=0.77); income, 3.70 (SD=1.28); and recognition, 3.94 (SD=0.90).

One-way ANOVA showed significant differences in the levels of professional equity by payment method, $p=0.004$. Physicians paid by FFS perceived lower professional equity than those paid by APP ($p=0.005$). By dimensions, differences in income equity levels were found, $p=0.03$, as well as in the recognition dimension, $p=0.001$. Physicians paid by APP reported higher levels of income ($p=0.03$) and recognition equity ($p=0.001$) than those paid by FFS. There were no significant differences in the levels of fulfillment equity by payment method. Furthermore, a higher level of fulfillment equity was identified between physicians who see less than 40 patients per week and those who see over 100 ($p=0.02$). According to number of patients, there were no significant differences on the overall professional equity, either on the income and recognition dimensions. Finally, FPs perceived lower levels of professional equity than clinical-surgical specialists ($p=0.003$), as well as poorer levels of fulfillment ($p=0.003$) and income equity ($p=0.008$). Table 2-3 presents the mean levels of professional equity, overall and by each dimension, according to payment method, specialty group, and number of patients seen per week.

Table 2-3. Mean (SD) levels of professional equity perceived by physicians according to payment method, specialty group, and number of patients seen per week

n =369	Professional equity levels	Professional equity levels by dimension		
		Fulfillment	Income	Recognition
All participants	4.06 (0.76)	4.55 (0.77)	3.70 (1.28)	3.94 (0.90)
Payment method				
Fee-for-service (FFS)	3.94 (0.76) [†]	4.48 (0.82)	3.54 (0.10)*	3.80 (0.92)**
Blended FFS-APP schemes	4.10 (0.76)	4.62 (0.74)	3.72 (0.12)	3.97 (0.88)
Alternative payment plans (APP)	4.27 (0.70) [†]	4.57 (0.69)	4.00 (0.15)*	4.23 (0.82)**
Specialty group				
Family/general practitioners	3.91 (0.79)	4.39 (0.83)	3.47 (1.26)	3.88 (0.81)
Medical-surgical specialists	4.15 (0.73) [†]	4.64 (0.71) [†]	3.83 (1.28) [†]	3.99 (0.87)
Number of patients per week				
Less than 40	4.21 (0.79)	4.72 (0.79)*	3.90 (1.28)	4.01 (0.92)
Between 40 and 100	4.02 (0.70)	4.50 (0.67)	3.56 (1.30)	4.00 (0.82)
More than 100	3.98 (0.77)	4.44 (0.81)*	3.66 (1.25)	3.83 (0.95)

* p<0.05; † p<0.01; ** p≤0.001

2.3.3. Interaction effect between payment method and specialty group

First, unconditional analyses identified that payment method (p=0.002), specialty group (p=0.001), and number of patients seen per week (p=0.03) were predictors of professional equity. Gender was kept in the model since it confounded coefficients of specialty group and number of patients per week; similarly, age group confounded the coefficients of payment method, number of patients, and specialty group. In the model with five predictors (see Table 2-4), a significant interaction effect between specialty group and payment method was identified (p=0.01). No significant interactions between payment methods and the other variables in the model were found.

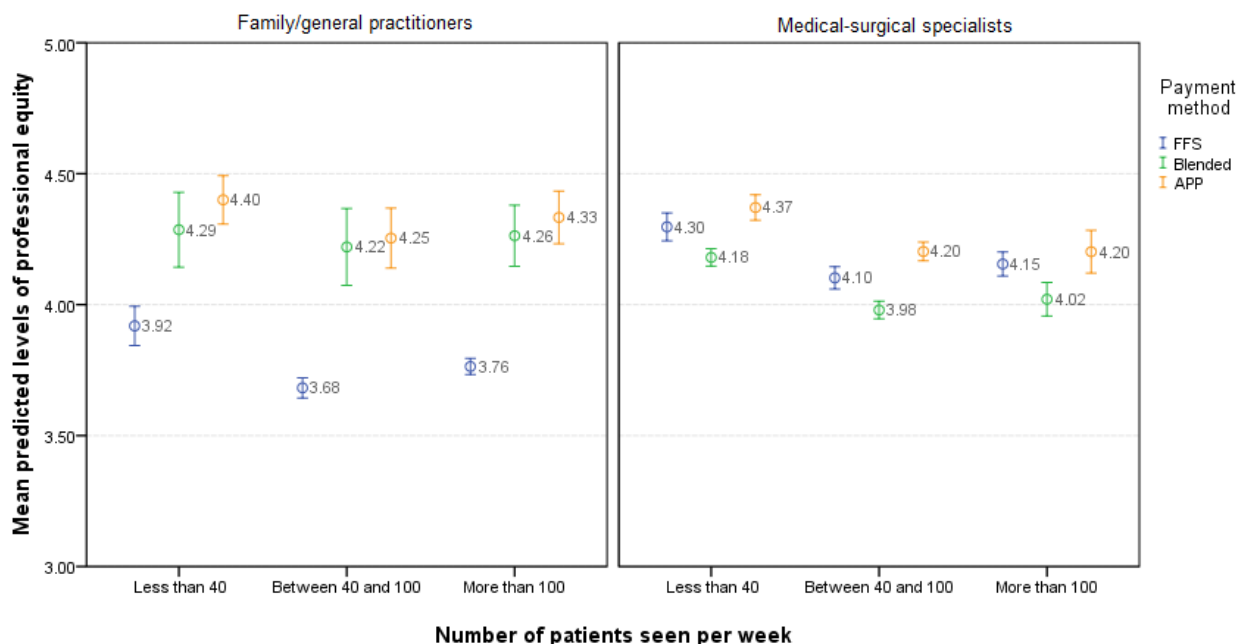


Figure 2-2. Mean predicted levels and 95% C.I. of professional equity by payment method, specialty group, and number of patients seen per week.

As depicted in Figure 2-2, a similar pattern across different ranges of patients seen per week were observed among FPs; higher levels of professional equity can be predicted among FPs with alternative payment plans (APP) and blended schemes in comparison to those paid with FFS, despite the number of patients seen per week. In contrast, small differences were observed among clinical/surgical specialists; slightly higher predicted levels of professional equity were found among physicians with APP and who see less than 40 patients per week.

Table 2-4. Estimates and 95% CI of predictors in the linear regression model of professional equity levels of physicians

	Beta	95% CI	p-value
Number of patients per week			
Less than 40	Ref.		
Between 40 and 100	-0.18	(-0.37, 0.00)	0.05
More than 100	-0.16	(-0.37, 0.04)	0.11
Specialty group			
Family/general practitioners	Ref.		
Medical-surgical specialists	0.41	(0.19, 0.64)	<0.001
Payment method			
Pure FFS	Ref.		
Blended	0.49	(0.10, 0.88)	0.01
Pure APP	0.57	(0.22, 0.91)	<0.001
Gender			
Female	Ref.		
Male	0.08	(-0.08, 0.24)	0.33
Age group			
Less than 40 year-old	Ref.		
Between 41 and 49 year-old	-0.11	(-0.32, 0.10)	0.29
Between 50 and 59 year-old	-0.05	(-0.24, 0.14)	0.60
More than 60 year-old	0.18	(-0.04, 0.40)	0.12
Interaction payment and specialty group			
Blended*medical-surgical specialists	-0.50	(-0.92, -0.07)	0.02
APP*medical-surgical specialists	-0.61	(-1.06, -0.17)	0.01
Intercept	3.85	(3.60, 4.10)	<0.001

2.4. Discussion

The structure of the instrument to assess professional equity of physicians has been confirmed. The instrument has three dimensions evaluating intangible and tangible rewards for physicians practicing medicine [24]. Adjustments have been done to items in the recognition dimension. Acknowledgments from colleagues, nurses, administrators, health region are relevant sources of recognition for physicians, as well as dedication leading to career advancement (the new item added to this dimension). Also, the physicians in our sample did not consider recognition from their family and patients to be essential. This may mean that physicians do not

expect credit or appreciation from patients for their professional efforts. Medical practitioners are more likely to expect trust from patients, perceived by provision of adequate information, compliance to recommended treatments, and engagement to self-care [28].

The ANOVA demonstrated that the perception of professional equity of physicians is associated with their payment method. This phenomena might be present because a specific contract could directly provide a balance between contributions and rewards [29] and, also because payment methods for physicians have an incentive effect on their behavior [30, 31]. Quantities of care delivered [15, 31] and the way that health services are provided [16, 31] are affected by payment method. As our study identified, APP could endorse a balance in the evaluation of contributions and rewards for practicing medicine. This impact was specifically observed in the income and recognition dimensions where practitioners under APP reported better levels of equity than those paid by FFS. Physicians paid by APP considered that they are receiving fair economic rewards according to their qualifications, training, experience, responsibilities, risks, and time devoted to medical practice. Physicians paid by APP perceived appropriate recognition from administrators and the health region for their contributions, as well as career advancements. In contrast, fulfillment equity could not be affected by payment method; this dimension is more an assessment of the intangible rewards for practicing medicine [24], being closely related to specialty and medical practice characteristics.

Critical findings that require special attention are that FPs perceived poor fulfillment and income equity. Previous studies have described that FPs experience poor career satisfaction [17, 18]. These results depict a lack of motivation among FPs who are fundamental in the provision of primary care. Indeed, strengthening primary care has been recommended as a strategy to improve health of populations [32]. In Canada, several provinces are engaged to change primary

health care, promoting inter-professional work, team-based care, and alternative payment arrangements [33]. Since income disparities are present among medical specialties [19], APP could be more supportive of primary care reforms by the enhancement of professional equity—adjusting tangible and intangible rewards—of FPs. APP could help to explore more challenging and interesting medical practices.

Ten years ago, the Canadian Standing Senate Committee on Social Affairs, Science and Technology called for changes in the way that physicians are paid at the primary health care level, recommending APP [34]. During the last decade, there have been considerable efforts to explore alternative payment options to attract and retain FPs [30]; however, FFS is still the dominant method of payment across all Canadian provinces [13, 14]. Indeed, a single payment method cannot be recommended for all physicians because each scheme fits different scenarios. FFS is recommended as an incentive to increase quantity of care delivered and acceptance of new patients; capitation encourages preventive care and increases collaboration among providers; and, salaries along with blended schemes may be suitable for sparsely populated areas [31].

Non-FFS payment alternatives should support the development of innovative models based on inter-professional, coordinated, and ongoing care to promote a strong primary health system. Given that physicians self-select their payment method and the time dedicated to direct and indirect patient care varies [15, 16], FPs with a considerable number of elderly patients or cases with chronic conditions could be attracted by group practice. Other FPs might be interested in dedicating their full time practice to be hospitalists, leading a patient-centered model of care for the articulation of hospital and primary health services. Within these scenarios, APP could provide professional equity to motivate innovations in health care delivery. As identified in our

linear regression model, despite different volumes of patients, enhanced levels of professional equity among FPs with blended or alternative payment schemes could be predicted, a motivating factor which could support innovative primary care models.

Despite the importance of remuneration highlighted in the present study, it is relevant to consider that payment is not the most important motivator among medical doctors. Key sources of motivation for physicians are professional autonomy [5, 35], achievement [6], relationships with patients [4], and interaction with colleagues [6, 36]. Motivation of physicians is affected by both financial and non-financial incentives which should be considered together for long term results [36, 37]. Policy makers need to recognize that motivation among physicians is complex and requires comprehensive approaches [3]. Therefore, there are personal and environmental factors that should be carefully studied in the evaluation of physicians' well-being.

Regarding limitations of this study, it needs to be acknowledged that this research was conducted on a sample of physicians practicing in one region among many in Canada. Results can be extrapolated to physicians practicing in the SHR and also to those practicing in similar health regions. Since this study was cross-sectional, relationships between variables are associations. We recommend further longitudinal research to evaluate the effect of APP. Covariates and potential confounders should be considered to study the impact of payment methods on physicians' well-being indicators, considering both personal and environmental factors.

2.5. Conclusions

An instrument specifically designed for physicians to measure professional equity has been tested. This measure allows the overall evaluation of professional equity considering both intangible and tangible rewards for practicing medicine. The tri-dimensional structure of professional equity has been confirmed and showed good internal consistency.

Higher levels of professional equity were identified among physicians paid by APP in comparison to those paid by FFS. Furthermore, physicians paid by APP considered that they are receiving fair economic rewards and appropriate recognition. FPs perceived lower fulfillment and income equity in comparison to medical-surgical specialists. Moreover, enhanced levels of professional equity could be predicted among FPs with APP and blended schemes, controlling by the number of patients, age and gender. Thus, APP (salary, sessional, capitation, etc.) could be further explored to improve professional equity of FPs, promoting fairness and well-being among medical practitioners, and indirectly impact primary health care outcomes. APP bring a policy alternative to support the development of innovative primary care models.

2.6. Contributions of the First Article to the Dissertation

APP have a relevant impact on wellness of medical practitioners, identifying that physicians paid by APP perceive better professional equity in comparison to those with FFS schemes. The impact of APP was specifically observed on the perception of recognition and income equity of physicians. Moreover, APP offer a payment policy alternative to enhance professional equity of FPs and to improve the quality of primary health care.

In the presence of persistent professional inequities, physicians experience distress that could result in a reduction of their inputs or leaving the practice [1]. APP might alleviate perceived professional inequities, and prevent related tensions and negative results. Daily stressors in medical practice could be also reduced if the wellness of physicians is promoted by endorsing professional equity. At the same time, professional inequities could be triggered if physicians experience high levels of distress; therefore, the effect of payment methods on daily distress is studied in this dissertation as a critical indicator of the wellness of physicians.

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CHAPTER 3[†]
**ARTICLE TWO: PAYMENT METHOD AS A PREDICTOR OF THE DAILY
DISTRESS EXPERIENCED BY PHYSICIANS**

[†] This chapter examines daily distress of physicians and payment methods for practicing medicine. The purpose of Chapter 3 is to evaluate if payment methods are associated with daily distress of medical practitioners. The contents of Chapter 3 have been published as: Peña-Sánchez JN, Lepnurm R, Keegan D, et al. Payment method as a predictor of daily distress experienced by physicians. *Journal of Hospital Administration*. 2014;3:1-13.

<http://dx.doi.org/10.5430/jha.v3n5p1>

3.1. Introduction

Health care professionals experience greater risk for burnout than other human service occupations [1, 2], and critical care environments are the most stressful [3, 4]. Other professionals such as teachers, lawyers, social workers, psychologists are also at risk of emotional exhaustion because relationships of trust are formed between providers of service and clients [2]. The distress faced by physicians and nurses is of ultimate legal responsibility over outcomes and pressures from high workloads [5-7]. Medical doctors are at a higher risk for burnout in comparison to individuals in other non-medical professions [1], and high stress among physicians affects well-being of these health professionals and quality of care provided to patients [8-13].

Physicians face intrinsic and unalterable tensions when practicing medicine due to working within an emotionally-charged environment, dealing with suffering and fear [8, 14]. The practice of medicine has repetitive and unavoidable daily distresses which are particularly evident in certain areas of care (e.g., intensive care units, emergency, and operating rooms) [1, 9]. Medical errors tend to occur when practitioners face intense physical and mental exhaustion [15], and

physicians are stressed when the quality of care is not as good as it could be [16]. Deterioration of physician-patient relationship [13, 17], increases in the amount of tests ordered [8, 13], and increases in the likelihood of medical errors [13, 17] have been observed among highly stressed physicians.

In Europe and North America, about a quarter of physicians suffer from high levels of stress [10, 11]. In Canada, about 40% of physicians feel stressed at least once a week, emergency physicians and surgeons are specialists experiencing the highest levels of distress [9], and burnout and stress are commonly reported among family practitioners [9, 12]. Declines in clinical autonomy, increases in workloads, organizational changes, practice restrictions, and career dissatisfaction have been identified as added sources of stress in medical practice [8, 13, 17, 18]. Governmental budget constraints to control rising system costs are further sources of stress since physicians experiencing changes to their workload have to find ways to access services and resources for the care of their patients [19]. In privately funded health care systems, interventions by health insurance companies restrict the autonomy and income of physicians, potentially affecting the quality of care [8]. These factors increase the inherent daily distress of medical practice, perpetuating a vicious circle of strain and stress. Furthermore, among different organizational and system changes, shifts in the way that physicians are paid have been suggested as sources of strain that might increase distress that physicians experience in their daily practice [10].

Since the introduction of Medicare in Canada, physicians have been traditionally paid by provincial/territorial governments through fee-for-service (FFS) schemes [20]. A considerable proportion of the increase in the health care expenditures has been attributed to FFS payment for physicians [21]. Alternative payment plans (APP) have been introduced, including salaries,

capitation, sessional and blended schemes with FFS across Canada. During the last decade, APP have doubled their share among all payment methods for physicians [22, 23]; notwithstanding, there is disagreement about the impact of APP on the distress levels of physicians. Among Canadian family practitioners, no association was reported between stress and type of remuneration [12]. In the United Kingdom (UK), salaried physicians experienced less stress in carrying out management tasks than non-salaried practitioners [24]; however, higher stress levels were identified in the UK after the implementation of a specific contract which aimed to promote multidisciplinary teamwork [25].

The impact of payment schemes on the levels of stress among physicians requires considering confounding variables, such as practice features and allocation of time to academic and administrative duties. Consequently, the objectives of this study were to: 1) compare distress levels of physicians among FFS, APP, and blended schemes, in an unconditional analysis; 2) identify payment method and other factors predicting daily distress of physicians in a multi-level regression model, considering confounders which could affect associations; and 3) explore interactions between predictors of daily distress and payment method for practicing medicine.

3.2. Methods

3.2.1. Study design

A cross-sectional study was conducted in the Saskatoon Health Region (SHR), Saskatchewan, Canada, in 2011, by the MERCURi Research Group at the University of Saskatchewan. The SHR is the largest health authority of the province, including rural and urban areas, providing health care to about one third of the population of Saskatchewan, from primary services to specialized care, in an academic medical complex consisting of multiple health care organizations [26].

3.2.2. Measures

In this study, all physicians practicing in the region received a comprehensive questionnaire asking about daily levels of distress, practice settings, working hours, workload, payment method, and demographics. Physicians eligible to participate in the study were medical doctors on the list of practitioners in the SHR and who were practicing at the time of the study; those physicians who were on a leave of absence or in a residency program were not eligible to participate in the study. Applying the Dillman Method [27], eligible physicians received a cover letter, a questionnaire, and a prepaid return envelope by post inviting them to participate in the study. An on-line option to participate was also offered by e-mail. Three reminders followed the initial invitation. In addition, a one-page questionnaire was attached to the last reminder in order to test non-response bias (Appendix E). The Behavioral Research Ethics Board of the University of Saskatchewan and the SHR provided ethical and operational approvals, respectively.

The Daily Distress measure developed by Lepnum, Lockhart, and Keegan [9] was used. This measure evaluated the concepts of fatigue and reaction, identifying those practitioners who need more time off than a weekend, those with feelings of frustration and desensitization, and those who are at risk of burnout [9]. The distress measure had one overall question of distress and 16 items all scored on 7 point scales from never to daily (see Table 3-1). Levels of daily distress experienced by physicians were standardized by summing the items and dividing by 16, yielding standardized scores ranging from a minimum 1.00 to a maximum of 7.00.

Table 3-1. Questionnaire to measure daily distress of physicians used in the present study

How frequently do you:	Never	A few times a year	Once a month	2 - 3 times a month	Once a week	2 - 3 times a week	Every day
Have workdays which are so busy that you are physically exhausted at the end of the day?	[]	[]	[]	[]	[]	[]	[]
Have such demanding workdays that you are emotionally drained at the end of the day?	[]	[]	[]	[]	[]	[]	[]
Suffer from fatigue due to working late nights and/or nights?	[]	[]	[]	[]	[]	[]	[]
Express impatience when people do not respond to requests as quickly as they should have?	[]	[]	[]	[]	[]	[]	[]
Express anger when people at work make mistakes?	[]	[]	[]	[]	[]	[]	[]
Have workdays when you can devote enough time to all of your patients?	[]	[]	[]	[]	[]	[]	[]
Feel frustrated accessing facilities/services for patients?	[]	[]	[]	[]	[]	[]	[]
Feel depressed because of the death or serious illness of a patient?	[]	[]	[]	[]	[]	[]	[]
Feel that your work has desensitized your feelings/emotions?	[]	[]	[]	[]	[]	[]	[]
Experience frustration dealing with demanding patients?	[]	[]	[]	[]	[]	[]	[]
End up doing tasks which you think are outside of your responsibilities?	[]	[]	[]	[]	[]	[]	[]
Cancel a personal or social activity in order to meet work commitments?	[]	[]	[]	[]	[]	[]	[]
Experience conflict between responsibilities at work and at home?	[]	[]	[]	[]	[]	[]	[]
Feel that you can concentrate on the tasks that should be done?	[]	[]	[]	[]	[]	[]	[]
Feel that you are in control of your day-to-day working activities?	[]	[]	[]	[]	[]	[]	[]
Feel confident that you have been able to do your work at a high standard of care?	[]	[]	[]	[]	[]	[]	[]
How would you rate your level of stress?	[Very Low]	[Low]	[Moderate]	[High]	[Very high]		

As independent variables, physicians were asked about the number of patients seen per week, proportion of patients seen with complex medical/social conditions, number of hours worked per week, and time spent on patient care, academic, and administrative activities. Physicians were asked about their payment methods for medical practice, capturing proportions of payments received by FFS and APP. Then, payment methods were classified in three groups: paid only by

FFS or APP, and paid by blended schemes of FFS and APP. In addition, levels of career satisfaction of physicians were measured using a 16-item questionnaire previously tested among Canadian physicians [28].

3.2.3. Statistical Analysis

The reliabilities of the measures were confirmed using Cronbach's alpha coefficients of internal consistency [29]. A Pearson correlation coefficient was computed between reported overall levels of stress and standardized distress levels. One-way analysis of variance (ANOVA) was used to compare standardized scores of daily distress according to payment method as an unconditional evaluation. Also, ANOVAs and T-Tests were used to identify the main factors affecting daily distress of physicians.

3.2.3.1. Multivariable analysis

Since several variables might act as confounders in the relationship between payment method and daily distress levels, a multivariable analysis was required to identify predictors of distress and the role of payment method as a predictor in this model. Also, given that distress of physicians could be clustered by geographical area of practice within the SHR (distress of physicians practicing in rural areas might be more similar than those practicing in urban areas, or distress of those in deprived areas of the city could be more alike, as well as the distress experienced by those working within the same hospitals, clinic, and medical centers), a multiple-level model was built to account for individual (fixed portion) and unmeasured environmental factors (random component). Thus, the first three postal code characters – Forward Sortation Area (FSA) – of physicians' mailing addresses were used in the random portion of the model. The FSA was considered as a geographical proxy to account for the influence of environment on daily distress. Age, gender, specialty group, career satisfaction, regular working hours per week, number of weekends on call, number of patients per week during regular hours and on call,

proportion of patients with complex conditions, time devoted to academic and administrative activities, practice setting, and payment method were considered as independent variables in the fixed portion of the model.

First, a null model was built to evaluate clustering of the outcome using the intra-class correlation coefficient (ICC) = $\sigma^2_{\mu} / (\sigma^2_{\mu} + \sigma^2_{\epsilon})$ [30], where σ^2_{μ} is the variance at the FSA level and σ^2_{ϵ} is the variance at the individual level. Unconditional analyses were performed for each independent variable. The assumption of linearity between the outcome and the independent variables was checked with a quadratic term for the continuous independent variables to decide whether to include them as continuous or categorical variables. Then, the backward method was used in the model building process. Excluded variables were tested as confounders. Interactions between payment method and predictors of daily distress were also evaluated. Using the final model, mean predicted values were computed and depicted for interacting variables. Residuals for the cluster and individual levels were evaluated. Analyses were performed in STATA 12 and the model building was carried out using the *xtmixed* procedure, at a 5% level of significance.

3.3. Results

From the 794 eligible physicians, 382 doctors completed the questionnaire, corresponding to a 48.1% response rate. Geographically, participants had their offices distributed among 12 FSA within the SHR (on average, 31.8 physicians per FSA with 91.7% of units replicated). As presented in Table 3-2, the mean age in the sample was 49.0 (SD = 11.40) years, 142 were females and 240 were males. On regular hours, physicians reported working 54.9 (SD = 16.55) hours/week on average; only 15.4% of the participants reported that they work 40 or less hours per week and 20% of them stated that they work more than 3 weekends per month. Of total regular working hours, on average, 27.2% of the time was dedicated to academic activities and 8.7% to administrative duties. The mean number of patients seen per week was 84.9 (SD =

76.21); the average proportion of patients with complex socio-medical conditions was 47.3% (SD = 25.79). Regarding payment method, 173 physicians were paid by FFS, 94 by APP, and 115 by blended schemes. Table 3-2 also presents demographic, workload, practice organizational, and well-being factors by payment methods. Non-response bias was checked by comparing participants and non-participants according to age group, specialty group, gender, distress, and satisfaction levels; and found to be negligible (Appendix F).

Table 3-2. Descriptive statistics of respondents in the sample and by payment method: mean (SD) and n (%)

N = 382	Total Group	Payment method		
		FFS (45.3%)	Blended (30.1%)	APP (24.6%)
Demographic factors				
Age (years-old)	49.04 (11.40)	50.60 (11.78)	48.03 (10.84)	47.41 (11.09)
Gender				
Female	142 (37.2%)	59 (41.5%)	44 (31%)	39 (27.5%)
Male	240 (62.8%)	114 (47.5%)	71 (29.6%)	55 (22.9%)
Specialty group				
Family/general practitioners	136 (35.6%)	101 (74.3%)	15 (11%)	20 (14.7%)
Medical-surgical specialists	233 (61%)	72 (30.9%)	100 (42.9%)	61 (26.2%)
Pathologists	13 (3.4%)	-	-	13 (100%)
Workload factors				
Regular working hours (total number of hours x week)	54.90 (16.55)	55.49 (17.51)	57.02 (16.86)	51.24 (13.67)
Patients seen on regular hours (number patients x week)	84.88 (76.21)	109.31 (80.44)	61.65 (69.02)	68.33 (62.72)
Number of weekends on call				
None	75 (19.6%)	35 (46.7%)	11 (14.7%)	29 (38.7%)
One	118 (30.9%)	54 (45.8%)	35 (29.7%)	29 (24.6%)
Two	111 (29.1%)	44 (39.6%)	42 (37.8%)	25 (22.5%)
Three or more	77 (20.2%)	39 (50.6%)	27 (35.1%)	11 (14.3%)
Patients seen on call (number patients x week)	12.35 (24.15)	13.09 (23.51)	17.52(31)	4.66 (9.76)
Patients with complex socio-medical conditions (proportion of total patients)	47.33 (25.79)	40.46 (24.33)	53.24 (25.07)	52.77 (26.42)
Practice organizational factors				
Practice setting				
Solo practice	70 (18.3%)	33 (47.1%)	17 (24.3%)	20 (28.6%)
Group practice	312 (81.7%)	140 (44.9%)	98 (31.4%)	74 (23.7%)

Time dedicated to academic duties (proportion of total working hours)	27.17 (21.94)	17.94 (17.85)	36.16 (21.63)	33.17 (22.67)
Time dedicated to administrative duties (proportion of total working hours)	(12.10)	6.14 (8.04)	9.14 (10.97)	12.83 (17.42)
Well-being factors				
Career satisfaction level*	4.22 (0.61)	4.19 (0.63)	4.25 (0.63)	4.25 (0.54)
Daily distress levels [†]	3.31 (0.89)	3.34 (0.95)	3.22 (0.86)	3.36 (0.81)
Overall perceived stress				
Very low	13 (3.4%)	7 (58.8%)	3 (23.1%)	3 (23.1%)
Low	68 (17.8%)	35 (51.5%)	22 (32.4%)	11 (16.2%)
Moderate	192 (50.4%)	86 (44.8%)	57 (29.7%)	49 (25.5%)
High	94 (24.7%)	35 (37.2%)	30 (31.9%)	29 (30.9%)
Very high	14 (3.7%)	10 (71.4%)	3 (21.4%)	1 (7.1%)

Note. *Cronbach's α of the career satisfaction measure = 0.84; [†]Cronbach's α of the daily distress measure = 0.87

According to the overall levels of stress reported by physicians, 21.2% experienced very low or low stress, 50.4% moderate, and 28.4% high or very high (see Table 3-3). In the standardized distress score from 1.00 to 7.00, the mean level of daily distress experienced by physicians was 3.31 (SD = 0.89), and the median was 3.31. The reliability for the daily distress 16-item questionnaire was very good ($\alpha = 0.87$), and was similar across specialty groups [family and general practitioners ($\alpha = 0.89$), medical-surgical specialists ($\alpha = 0.86$), and pathologists ($\alpha = 0.90$)]. The correlation between standardized distress score with the overall perceived stress was $r = 0.62$ ($P < .001$). The standardized score of daily distress experienced by physicians was used as the dependent continuous variable for the subsequent unconditional and multivariable analyses.

Table 3-3. Daily distress of physicians according to demographics, workload, and practice organizational factors (n=382)

Variable	Categories	Daily distress Mean(SD)
Demographic factors		
Age group	<41 year-old	3.47 (0.81) [‡]
	41 - 49 year-old	3.57 (0.77)
	50 - 59 year-old	3.24 (0.90)
	>59 year-old	2.87 (0.96) [‡]
Gender	Female	3.43 (0.84)
	Male	3.24 (0.92)
Specialty group	Family/general practitioners	3.45 (0.96)
	Medical-surgical specialists	3.23 (0.84)
	Pathologists	3.34 (0.99)
Workload factors		
Regular working hours per week	<48	3.06 (0.97) [‡]
	48 – 61	3.30 (0.80)
	>61	3.56 (0.83) [‡]
Number of patients seen on regular hours x week	<40	2.93 (0.85) [‡]
	40-100	3.43 (0.85) [‡]
	>100	3.50 (0.88) [‡]
Number of weekend days on call	None	3.00 (0.99) [†]
	One	3.22 (0.88)
	Two	3.46 (0.82) [†]
	Three or more	3.53 (0.82) [†]
Number of patients seen on call x week	None	3.20 (1.01)
	One to 10	3.29 (0.83)
	11 or more	3.48 (0.84)
Patients with complex socio-medical conditions	<25%	3.15 (0.89)
	25% - 75%	3.34 (0.92)
	>75%	3.40 (0.80)
Practice organizational factors		
Payment method	FFS	3.34 (0.95)
	Blended	3.22 (0.86)
	APP	3.36 (0.81)
Practice setting	Solo practice	3.04 (0.99) [†]
	Group practice	3.37 (0.86) [†]
Time dedicated to academic duties	< 10%	3.47 (0.96)
	10% - 30%	3.26 (0.83)
	>30%	3.22 (0.88)
Time dedicated to administrative duties	<5%	3.23 (0.98)
	5% - 10%	3.43 (0.79)
	>10%	3.32 (0.81)

Note: [†]p<.01; [‡]p<.001

3.3.1. Unconditional analyses

By payment method, ANOVA did not identify significant differences in levels of daily distress, $F(2, 379) = 0.78$ ($P = .46$). Unconditional analyses showed that the main factors affecting daily distress were age group, $F(3, 376) = 10.41$ ($P < .001$), hours worked per week, $F(2, 379) = 10.58$ ($P < .001$), number of patients seen on regular hours, $F(2, 379) = 15.78$ ($P < .001$), number of weekends on call, $F(3, 377) = 6.14$ ($P < .001$), and practice setting, $t(380) = -2.81$ ($P = .005$). As presented in Table 3-3, higher levels of distress were identified among younger physicians in comparison to older physicians ($P < .001$), those working more than 61 hours/week versus practitioners working less than 48 hours/week ($P < .001$), physicians who see more 100 patients/week versus those who see less than 40 patients/week ($P < .001$), practitioners working three or more weekends or holidays per month in comparison to those that do not ($P = .004$), and among physicians working in a group versus those in a solo practice ($P = .005$).

The null model identified that 8% of the variation in the outcome was explained by clustering of physicians (ICC = 0.08, 95% CI 0.02 to 0.28). Then, the majority of the predictors were significant in the unconditional analyses; only time devoted to academic duties, specialty group, and payment method were not significant (P -values $> .05$). Payment method was considered in the multivariable analysis, since we hypothesized that it is a predictor of distress when controlling by confounders. Only career satisfaction and number of patients seen on call met the linearity assumption, being used in their continuous form. Other continuous independent variables were classified into categories based on their distribution: working hours/week, number of patients seen on regular hours per week, time devoted to academic and administrative duties, and percentage of patients with complex socio-medical conditions were divided by tertiles.

3.3.2. Multivariable analysis

Using the backward method, an initial model was defined. This model included as significant predictors of distress: payment method ($P = .04$), age group ($P < .001$), number of patients/week on regular hours ($P < .001$), number of weekends on call ($P = .04$), proportion of patients with complex conditions ($P = .01$), and career satisfaction ($P < .001$); Akaike Information Criterion (AIC) = 804.33. Then, removed variables of the model were tested as confounders. Regular working hours/week were found to confound the coefficients of payment method and proportion of complex patients; time devoted to academic duties confounded the coefficients of payment method; and time dedicated to administrative tasks confounded the coefficients of age group and payment method. Along with gender [31, 32], regular working hours/week, time devoted to academic duties, and time dedicated to administrative tasks were added to obtain an adjusted model with ten predictors (AIC = 806.97). Afterwards, interactions between predictors of distress and payment methods were tested. Only one significant interaction was identified: payment method interacted with the proportion of patients with complex socio-medical conditions, $\chi^2 = 12.23$, $df = 2$; $P = .02$.

$$Y_{\text{distress}} = \beta_0 + \beta_1 X_{\text{Age_g}} + \beta_2 X_{\text{Gender}} + \beta_3 X_{\text{Reg_wh}} + \beta_4 X_{\text{\#pts}} + \beta_5 X_{\text{Complex}} + \beta_6 X_{\text{Acad}} + \beta_7 X_{\text{Admin}} + \beta_8 X_{\text{Weekends}} + \beta_9 X_{\text{Payment}} + \beta_{10} X_{\text{Satisfaction}} + \beta_{11} X_{\text{ComplexXPayment}} + \mu + \varepsilon \quad (1)$$

where,

$X_{\text{Age_g}}$: age group, reference category=less than 41 year-old

X_{Gender} : physician's gender, reference category=female

$X_{\text{reg_wh}}$: regular working hours per week, reference category=less than 48 hours

$X_{\text{\#pts}}$: number of patients seen on regular hours, reference category=less than 61

X_{Complex} : patients with complex socio-medical conditions, reference category=less than 25%

X_{Acad} : time dedicated to academia of total working hours, reference category=less than 10%

X_{Admin} : time dedicated to administration of total working hours, reference category=less than 5%

X_{Weekends} : number of weekends on call, reference category=none

X_{Payment} : payment method for practicing medicine, reference category=FFS

$X_{\text{Satisfaction}}$: levels of career satisfaction of physician

μ : group error by Forward Sortation Area (FSA) of physicians' practice office

ε : individual error.

Then, the final predicting equation was:

$$\begin{aligned}
 Y_{\text{distress}} = & 5.45 + 0.04X_{\text{Age_g2}} - 0.21X_{\text{Age_g3}} - 0.51X_{\text{Age_g4}} - 0.07X_{\text{Gender_g2}} - 0.04X_{\text{Reg_wh_g2}} + \\
 & 0.14X_{\text{Reg_wh_g3}} + 0.31X_{\text{\#pts_g2}} + 0.43X_{\text{\#pts_g3}} + 0.28X_{\text{Complex_g2}} + 0.41X_{\text{Complex_g3}} - 0.17X_{\text{Acad_g2}} - \\
 & 0.2X_{\text{Acad_g3}} + 0.11X_{\text{Admin_g2}} + 0.14X_{\text{Admin_g3}} + 0.14X_{\text{Weekends_g2}} + 0.25X_{\text{Weekends_g3}} + \\
 & 0.32X_{\text{Weekends_g4}} + 0.49X_{\text{Payment_g2}} + 0.15X_{\text{Payment_g3}} - 0.62X_{\text{Satisfaction}} - 0.53X_{\text{Complex_g2XPayment_g2}} + \\
 & 0.22X_{\text{Complex_g2XPayment_g3}} - 0.36X_{\text{Complex_g3XPayment_g2}} - 0.15X_{\text{Complex_g3XPayment_g3}}
 \end{aligned}
 \tag{2}$$

The final model indicated a better fit (AIC = 802.93) and reported that 9% of the outcome variation was explained by clustering of practice area. Residuals for the two levels of the model were assessed and found to be reasonable, ranging between 2 and -2 standard deviations from zero. According to the final model (see equations), career satisfaction of physicians was identified as a protective predictor. Distress of physicians decreased by 0.62 per unit of increase in the levels of career satisfaction ($P < .001$). Similarly, older physicians had 0.51 less distress than those who were younger than 41 years-old ($P < .001$). The distress of physicians who see more than 100 patients/week and between 40 and 100 patients/week increased 0.43 units and 0.31 units, respectively, versus those who see 40 or less patients/week ($P \leq .001$). The impact of workload on distress can be also observed by the number of weekends and holidays on-call per month. The distress of those who are two days and three or more days on-call per month increased 0.25 ($P = .02$) and 0.32 ($P = .004$) units, respectively, in comparison to those who are not on-call (see Table 3-4).

Table 3-4. Non-interacting predictors of daily distress obtained in the multilevel linear regression model^{*, †, ‡}

Covariant	categories	β	95% CI	P-value
Age group (year-old)	<41	ref.		
	41 - 49	0.04	(-0.15 to 0.24)	.70
	50 - 59	-0.21	(-0.39 to -0.03)	.02
	>59	-0.51	(-0.72 to -0.30)	<.001
Gender	Female	ref.		
	Male	-0.07	(-0.22 to 0.08)	.38
Regular working hours x week	<48	ref.		
	48 - 61	-0.04	(-0.22 to 0.13)	.63
	>61	0.14	(-0.04 to 0.33)	.13
Number of patients seen on regular hours x week	<40	ref.		
	40-100	0.31	(0.13 to 0.48)	.001
	>100	0.43	(0.24 to 0.63)	<.001
Time dedicated to academic duties of total working hours	< 10%	ref.		
	10% - 30%	-0.17	(-0.36 to 0.01)	.07
	>30%	-0.20	(-0.39 to 0.01)	.05
Time dedicated to administrative duties of total working hours	<5%	ref.		
	5% - 10%	0.11	(-0.06 to 0.27)	.21
	>10%	0.14	(-0.04 to 0.32)	.12
Number of weekends on call x month	None	ref.		
	One	0.14	(-0.05 to 0.33)	.15
	Two	0.25	(0.04 to 0.45)	.02
	Three or more	0.32	(0.10 to 0.55)	.004
Levels of career satisfaction		-0.62	(-0.74 to -0.51)	<.001
Constant		5.45	(4.83 to 6.08)	<.001

* Model's Akaike Information Criterion (AIC) = 802.93

† Group variance, $\sigma^2_{\mu}=0.04$, and individuals variance, $\sigma^2_{\epsilon} = 0.41$

‡ Model's intra-class correlation coefficient (ICC) = 0.09, 95% CI, 0.02 to 0.39

In relation to the levels of distress of physicians by payment method and percentage of patients seen with complex socio-medical conditions, the Figure 3-1 presents predicted levels of distress by these interacting variables. Lower levels of distress were predicted among physicians who see more than 75% of patients with complex conditions when paid by APP in comparison to practitioners who see the same proportion of complex cases and who are paid by FFS or blended schemes. In contrast, higher levels of distress were found among physicians with 25% to 75% of complex cases who are paid by APP versus those paid by blended methods. Among practitioners

who see a small proportion of complex cases, similar levels of distress were observed between physicians paid by APP and FFS; conversely, there were high distress levels predicted among those paid by blended schemes.

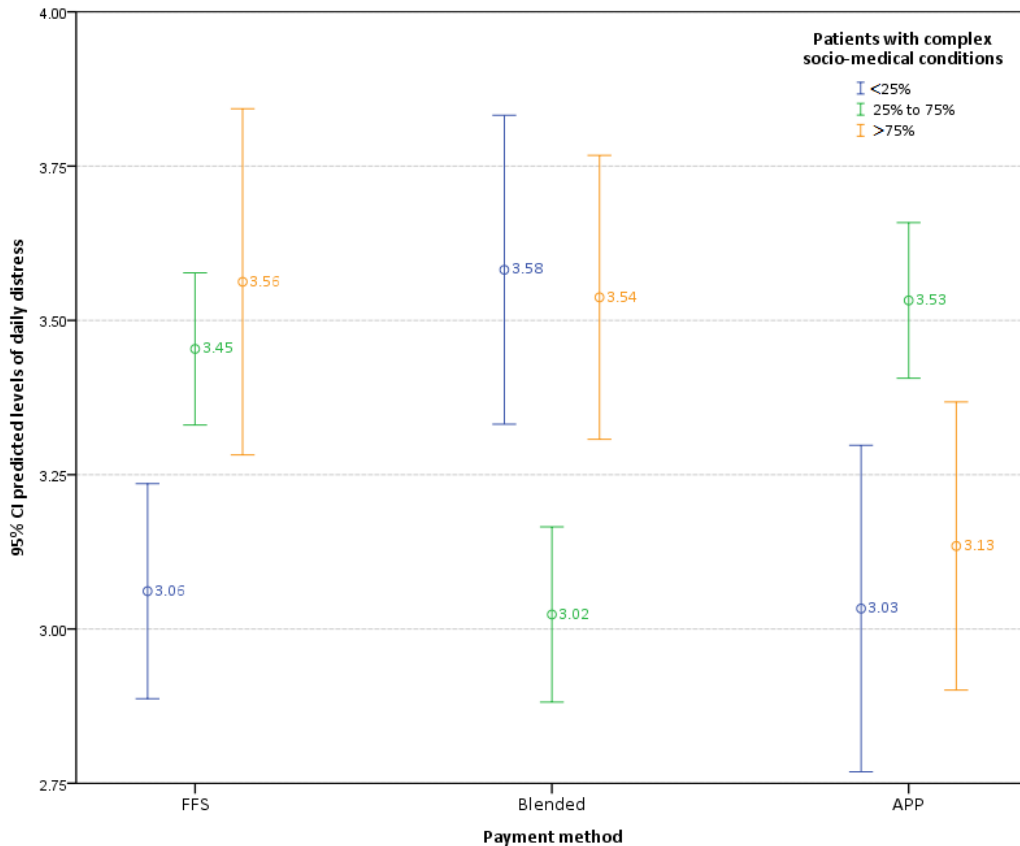


Figure 3-1. Daily distress levels of physicians by interacting covariates. The figure depicts the mean and corresponding 95% CI of predicted distress levels according to payment method and percentage of patients with complex socio-medical conditions. It appears that physicians who see more than 75% of patients with complex conditions perceived lower distress levels when paid by APP than when paid by FFS or blended schemes. In contrast, higher levels of distress were perceived among physicians paid by APP and FFS with a mix profile of complex cases, between 25% and 75%, than those paid with blended methods.

3.4. Discussion

Comparing distress levels of physicians according to payment method without controlling for other variables shows no differences, which is in agreement with a previous Canadian study [12]; however, this is an unadjusted evaluation which does not take into account confounders and

other covariates. As our results identified in the multivariable analysis, payment method is a significant predictor of distress perceived by physicians when other predictors and confounding variables are considered in the assessment of this association. Gender [31, 32], time devoted to academic [9, 33] and administrative duties [9], and total number of working hours [34] are significant factors and they should be incorporated in distress models. Physicians self-select a payment method [35] and when they are paid by non-FFS schemes they tend to distribute their time differently [36]. In our sample, physicians under APP and mixed payment models dedicated more time to academic and administrative duties (see Table 3-2). Moreover, since APP have been recommended and used to involve physicians in academic and administrative duties [36], proportions of time dedicated to these activities are potential confounding variables which need to be considered.

Predictors of distress were identified in the mixed linear regression model. First, the fixed portion of the model demonstrated that age group, patients seen per week, weekends on call, proportion of patients with complex conditions and payment methods are relevant predictors of distress, as well as career satisfaction of physicians. The latter has been acknowledged as a protective factor [8, 37]; it should be considered as an indicator of physicians' well-being, and, indirectly, of quality of care and patient safety. Second, the random component of the mixed model acknowledged those unmeasured factors at the cluster level; this was approached using the FSA, capturing a general practice environment (rural/urban location, neighborhood, hospital, clinic, medical centre, or group practice) which influences distress experienced by physicians. In fact, a previous study identified conditions in the work environment (e.g. safety programs and practice, cleanliness, orderliness, good team communication) and organizational features (e.g. teamwork, staffing ratios, quality improvement processes) as factors affecting the well-being of

health professionals [38]. The psychosocial work environment matters because low job control, co-worker support, supervisor support, procedural justice, and relational justice are related with stress-related disorders [39]. Our multivariable analysis not only recognized payment method as a significant factor affecting distress of physicians but also it identified an interaction effect between payment method and the proportion of complex patients in the prediction of daily distress.

Physicians paid by APP and who see a high proportion of complex patients probably experience less distress because they might be able to dedicate quality and quantity of time to patients with complex medical and/or social conditions. Non-FFS payment methods might be operating as an incentive to invest extra time for these patients, removing time pressure. The Nova Scotia Ministry of Health recognized that the common payment method in emergency room – FFS – frustrates and stresses physicians who perceive that FFS leads to high-volume “turnstile medicine” [40]. Physicians experience frustration because they cannot provide appropriate care to patients with complex medical conditions [41].

Lack of time [41, 42] and inadequate payment systems [41] have been identified as causes of inadequate care for patients with complex conditions. Innovative primary care models for patients with complex care needs require an inter-professional team, like the IMPACT Clinic initiative in Toronto [43, 44]. Also, the Nova Scotia Ministry of Health strategically planned the development of APP for emergency care physicians [40]. APP could be a supportive choice for health care systems, providing a fixed income for comprehensive care for complex patients, putting aside time pressure. In contrast, FFS and blended schemes might not be appropriate for physicians who see high proportions of complex patients because variable components of these payment methods could add pressure to daily practice.

Since this study was cross-sectional, relationships between predictors and the distress experienced by physicians are associations. The response rate was adequate since response-bias was checked and found to be negligible (Appendix F). The multi-level applied technique allows controlling for environmental factors that contribute to distress of physicians on their daily practice. The results of this study could be extrapolated to physicians practicing within the SHR and other health authorities across Canada with similar characteristics to the SHR. Further studies evaluating the impact of payment methods using a longitudinal perspective are recommended.

3.5. Conclusions

Workload, working hours, and type of patients are important covariates of distress that have to be considered in the prediction of daily distress of physicians, as well as the levels of career satisfaction of practitioners. Payment method was identified as a predictor of daily distress in the multivariable analysis, demonstrating the importance of considering other variables, such as time devoted to academic duties and time dedicated to administrative tasks, given that they could confound this relationship. Furthermore, our model identified that payment method is a predictor of daily distress which also interacts with proportion of complex cases.

APP could be recommended to promote the provision of care for patients with complex conditions since low distress levels can be predicted among physicians who see more than three quarters of complex cases and are paid by APP. This is a relevant finding that needs to be considered to improve well-being of practitioners engaged with provision of care for patients with complex conditions and, indirectly, ensure quality of care and outcomes among these patients.

3.6. Contributions of the Second Article to the Dissertation

To understand the complex association between daily distress and payment models, this study considered individual and environmental factors that predict the distress of physicians. In contrast to previous studies evaluating an association between payment models and stress of physicians [12, 24, 25], this study identified that daily distress experienced by physicians differed according to payment systems. This study also found that payment methods interact with the percentage of patients seen with complex conditions. APP are capable of promoting lower levels of distress among practitioners working with patients who have complex social and medical conditions. This evidence could definitely impact the wellness of medical practitioners and patients who require a different provision of care. APP could be tailored for innovative and effective health care delivery where patients could have optimal time according to their own medical and social needs.

APP have been associated with improved professional equity and low distress of medical practitioners. Since the wellness of male and female physicians differs [31], the impact of payment models on the perception of professional equity and distress requires to be investigated by gender. Given that career satisfaction is a long term indicator of wellness of physicians [28] and is associated with their perceptions of distress and equity, this indicator needs to be included as a covariate in the evaluation of the effect of gender and payment methods on the wellness of medical practitioners.

3.7. References

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CHAPTER 4[†]
**ARTICLE THREE: LATENT GENDER INEQUALITIES IN THE WELL-BEING OF
PHYSICIANS ACCORDING TO PAYMENT METHOD FOR PRACTICING
MEDICINE**

[†] This chapter examines gender inequalities in the wellness of physicians and the role that payment methods have in these inequalities. The purpose of chapter 4 is to identify differences in the levels of professional equity, daily distress, and career satisfaction of physicians by gender and payment methods. The contents of Chapter 4 have been published as: Peña-Sánchez JN, Lepnurm R, Bermedo-Carrasco S. Latent gender inequalities in the well-being of physicians according to payment method for practicing medicine: a cross-sectional study. *Journal of Hospital Administration*. 2013;2:7-14. <http://dx.doi.org/10.5430/jha.v2n4p7>

4.1. Introduction

The correlation between the well-being of physicians and the quality of health care has been recognized as a relevant association that requires further comprehension, awareness, and interventions [1, 2]. Physicians' wellness indicators should be incorporated into the evaluation of health care systems [3] and gain the attention of policy and decision makers. Boundaries between work and personal spheres are essential in promoting work-life balance among physicians [4], but these limits are difficult to create, especially for female physicians [5, 6]. The proportion of female physicians has increased considerably during the last 30 years, especially among family physicians [7]. Conflicts between work and home play significant roles in burnout, and the predictors of burnout differ by gender, with the stressors of exhaustion and disengagement stronger among women [8]. A study of physicians in Western Canada examined interactions among work-to-family conflicts by gender and parental status, finding a considerable percentage of physicians who are mothers reporting high levels of work-to-family conflicts [9].

Another conflict for female physicians is that they perceive obstacles in their career development which negatively affect their career satisfaction. Female medical school faculty perceive gender discrimination in promotions, allocations of space, access to administrative staff, and the assignment of graduate students [6]. There is evidence that female specialists are paid slightly less in comparison to male physicians [10]. In addition, it has been reported that new cohorts of female physicians tend to choose alternative payment methods [11] rather than the traditional fee-for-service (FFS) schemes.

FFS has been blamed for escalating costs of the health care system, accounting for more than half the average annual growth of physician spending in Canada [12], and for generating more but briefer patient encounters, affecting quality of care provided and satisfaction of physicians at the primary care level [13]. Most Canadian physicians continue to be paid by FFS, but during the last decade alternative payment plans (APP), such as salary, capitation, sessional or blended forms, have been gaining popularity, increasing from 10.6% in 2000 to 26.8% of all payments for physicians in 2010 [14]. Despite this transformation in payment systems, available evidence does not explain the impact of APP on the satisfaction of physicians, and the shift from FFS to APP can be considered a “philosophical change” which might modify clinical and personal priorities of practitioners [15]. Therefore, it is important to study the effects of APP, FFS, or blended payment systems on career satisfaction and professional equity, given that these two concepts are aspects of motivation [16]: career satisfaction is a longitudinal perception of outcomes evaluating both higher- and lower-order motivational needs [17]; and professional equity is a short term process-oriented perception, evaluating the balance between contributions made and rewards received [18]. In addition, since stress affects satisfaction and rewards, levels

of daily distress need to be concurrently measured when studying well-being of physicians and payment methods.

Several studies have analyzed the impact of payment methods on quantity and quality of health services [19], but differences in the levels of career satisfaction, fulfillment-recognition rewards, and daily distress of physicians by payment method have not been explored. In addition, studies about factors affecting the well-being of physicians need to consider gender differences [20]. The objectives of this paper are to identify differences in the levels of career satisfaction, fulfillment-recognition rewards, and daily distress of physicians by gender and payment method (FFS, APP, and blended forms); and to assess interactions between gender and payment method on the three measures of physicians' well-being.

4.2. Subject and Methods

A cross-sectional study was conducted in 2011, including all physicians practicing in rural and urban areas of the Saskatoon Health Region (SHR). The SHR is the largest health region in Saskatchewan (SK), Canada, providing health care for about 318,000 people (30% of the province population), and encompasses rural and urban areas (including six First Nations reserves). It is a referral center of specialized care for SK and an academic healthcare organization. The Region includes 10 hospitals, with three tertiary hospitals in the Saskatoon city [21]. Medical doctors registered in the list of practitioners of the SHR (850 by May 2011) were considered as the sample frame. Eligible physicians to participate in the study were those practicing in the SHR as a health care provider (inclusion criterion). Physicians in a residency program, retired, or on a leave of absence were excluded from the study (exclusion criteria). This study received ethics approval from the Behavior Research Ethics Board of the University of Saskatchewan, and Operational Approval from the SHR.

Eligible physicians were sent a questionnaire and a cover letter, explaining the nature and importance of the study and inviting them to participate either by post or on-line, using recommendations from the Tailored Dillman Approach [22]. Physicians who did not return their questionnaires were contacted one and two months after the first mail-out by post, receiving a letter highlighting the importance of their participation in the study, a copy of the questionnaire booklet, and a pre-stamped envelope; also, three reminders were sent by e-mail. Four months after the first contact, non-participant physicians received a one page non-response survey to check for response bias (Appendix E). The questionnaire asked about current remuneration method (pure FFS, pure APP, or blended methods), career satisfaction, professional equity, daily distress, and demographic factors.

4.2.1. Measures

The measure of career satisfaction contained inherent and performance dimensions to capture satisfaction with higher-order needs, and personal and professional dimensions to capture satisfaction of lower-order needs [17]. The measure has four items for each of the four dimensions, all scored on six-point scales, from “very dissatisfied” to “very satisfied.” Mean levels of overall career satisfaction were computed for the 16-item scale, scored from 1.00 to 6.00.

Professional equity was measured in three dimensions: fulfillment (five items), financial (five items), and recognition (five items) rewards for practicing medicine [18]. All the items scored on six-point Likert scales. For this study, the dimensions of fulfillment and recognition equity were combined. The scale was scored from 1.00 to 6.00.

The distress experienced by physicians in their daily practice was measured in two dimensions: fatigue and reaction [23]. All items scored on seven-point scales, from “Never” to

“Daily.” The mean levels of distress were also computed for the 16-item scale, scoring from 1.00 to 7.00, identifying job strain at lower levels and risk of burnout at higher levels.

The measures of career satisfaction [17], professional equity [18] and daily distress [23] were validated in a Canadian cross-national sample among different medical specialties.

4.2.2. Statistical Analysis

To study differences in the levels of career satisfaction, fulfillment-recognition rewards, and daily distress among physicians paid by the three remuneration methods (FFS, blended, and APP) and gender, a multivariate analysis of variances (MANOVA) was conducted using the general linear model [24] of SPSS® 20, and the Wilks’ Lambda criterion was considered. Multiple comparisons were performed as post-hoc tests.

4.3. Results

Of the 794 eligible physicians in the SHR, a total of 382 completed the questionnaire (response rate=48.1%). The majority of the questionnaires, two thirds, were completed on paper and the other third was submitted on-line. In the sample, 37.2% (n=142) were female physicians and 62.8% (n=240) were male. Slightly less than half (45.3%) of the physicians were remunerated by FFS, 24.6% by APP, and 30.1% were under mixed models. Table 4-1 presents the distribution of payment methods by gender. The reliability for the measures of well-being (career satisfaction, fulfillment-recognition equity, and daily distress scales) was very high (Table 4-2). The three dependent variables were found to be moderately correlated: career satisfaction and fulfillment-recognition equity ($r=0.66$, $p<0.001$); career satisfaction and daily distress ($r=-0.53$, $p<0.001$); and, fulfillment-recognition equity and daily distress ($r=-0.40$, $p<0.001$).

The MANOVA test (Wilks’ Lambda criterion) identified that the three dependent variables were significantly affected by gender, $F(3,374)=2.83$, $p=0.04$, but not by the payment method,

F(6,748)=1.02, p=0.41; moreover, there was no evidence of an interaction effect between payment method and gender, F(6,748)=1.2, p=0.3. In addition, the box's M was 33.84, p=0.32, holding the assumption of homogeneity of variance-covariance matrices.

Table 4-1. Payment methods and demographics by gender

	All physicians n=382	Women 142 (37.2%)	Men 240 (62.8%)
Payment method			
FFS	173 (45.3%)	59 (41.5%)	114 (47.5%)
Blended	115 (30.1%)	44 (31%)	71 (29.6%)
APP	94 (24.6%)	39 (27.5%)	55 (22.9%)
Age in years-old – mean (SD)	49.04 (11.4)	46.8(10.1) *	50.4(11.9)*
Marital status			
Single	26 (6.9%)	14 (9.9%)	12 (5.1%)
Married/common law	335 (88.4%)	118 (83.1%)	217 (91.6%)
Separated/divorced	11 (2.9%)	6 (4.2%)	5 (2.1%)
Widowed/other	7 (1.8%)	3 (2.1%)	3 (1.3%)
Missing data	3 (0.8%)	3 (0.7%)	-
Specialty group			
Family/general practitioners	136 (35.6%)	57 (40.1%)	79 (32.9%)
Medical specialties	120 (31.4%)	47 (33.1%)	73 (34.4%)
Surgical specialties	99 (25.9%)	28 (19.7%)	70 (29.6%)
Laboratory and medical images	27 (7.1%)	10 (7%)	17 (7.1%)
Years in practice – mean (SD)	18.5 (12.3)	16(11) **	19.9(12.8) **

*t(328.9)=-3.14, p=0.002; ** t(326.3)=-3.15, p=0.002; χ^2 Tests were not significant, p-values >0.05.

Table 4-2. Career satisfaction, professional fulfillment-recognition equity, and daily distress of physicians by gender and payment method

Dependent variables	α	n=382 Mean (SD)	Gender			Payment Method			F-value	Interaction F-value
			Women Mean (SD)	Men Mean (SD)	F-value	FFS Mean (SD)	Blende d Mean (SD)	APP Mean (SD)		
Career satisfaction	0.84	4.23 (0.68)	4.14 (0.57)	4.27 (0.63)	60.7**	4.19 (0.63)	4.26 (0.63)	4.25 (0.63)	0.15	1.61
Fulfillment-recognition equity	0.86	4.24 (0.72)	4.15 (0.71)	4.29 (0.72)	6.18**	4.14 (0.73)	4.29 (0.71)	4.34 (0.69)	1.70	3.41 ⁺
Daily distress	0.87	3.31 (0.89)	3.43 (0.84)	3.24 (0.92)	5.07*	3.34 (0.95)	3.22 (0.86)	3.36 (0.81)	0.74	0.96

α :Cronbach's Alpha

*p=0.03; **p=0.01; ⁺ p=0.02

Significant differences in the mean levels of career satisfaction, fulfillment-recognition equity, and daily distress were identified between female and male physicians (Table 4-2). Women scored lower levels of career satisfaction, $F(1,376)=6.07$, $p=0.01$, and fulfillment-recognition equity than men, $F(1,376)=6.18$, $p=0.01$, and female physicians referred higher levels of daily distress compared to male physicians, $F(1,376)=5.07$, $p=0.03$. In contrast, no significant differences were identified by remuneration method. However, an interaction effect between gender and payment method on the mean levels of fulfillment-recognition equity was significant, $F(2,376)=3.41$, $p=0.03$, suggesting that the importance of intrinsic rewards is stronger among men with APP (Table 4-3). Caution in the interpretation is warranted, since this interaction could be a type I error due to the multiple comparisons performed. Therefore, the mean levels are shown with error bars for the three outcome variables (Figure 4-1).

Table 4-3. Mean levels of physician's professional equity, daily distress, and career satisfaction by payment method and gender

Measurement	payment method	Gender	n	Mean (SD)
Career Satisfaction	FFS	female	59	4.19 (0.57)
		male	114	4.20 (0.66)
	Blended	female	44	4.13 (0.61)
		male	71	4.34 (0.64)
	APP	female	39	4.09 (0.54)
		male	55	4.36 (0.52)
Fulfillment-recognition equity	FFS	female	59	4.18 (0.66)
		male	114	4.12 (0.76) ^{T*}
	Blended	female	44	4.14 (0.73)
		male	71	4.39 (0.69) ^T
	APP	female	39	4.11 (0.77) ⁺
		male	55	4.51 (0.58) ⁺ *
Daily distress	FFS	female	59	3.38 (0.91)
		male	114	3.32 (0.98)
	Blended	female	44	3.35(0.88)
		male	71	3.15(0.85)
	APP	female	39	3.58(0.68)
		male	55	3.20 (0.85)

Significant pair-wise comparisons

⁺ $p=0.008$; ^{*} $p=0.003$; ^T $p=0.03$

4.4. Discussion

This study found differences in the reported well-being between male and female physicians. There are inequalities in the perceptions of career satisfaction, professional equity and daily distress levels between female and male physicians that need attention. Female physicians, in comparison to men, report earning less [10, 25], experience less control over patient load and more time pressure to see their patients and, simultaneously, state that they see more patients with psychosocial problems [25, 26]. Further, female physicians experience additional stressors, like discrimination, lack of role models and support, and the challenge of balancing career and family spheres. Medical students have experiences of gender discrimination which result in resignation, influencing professional identity and choice of specialty among new female physicians [27]. Although the proportion of females among new cohorts [7] (including female professors) is increasing, they are still under-represented among positions in medical leadership [28]. Physicians who are mothers have more work-to-family conflicts compared to father physicians and to male or female physicians who are not parents [9]. These are critical factors that directly involve female physicians, new cohorts and current practitioners, as well as policy makers, since strategies to eliminate gender inequalities in the well-being of physicians are still required. In addition, these are facts that need to be considered when selecting and designing payment methods for practicing medicine.

When comparing APP, blended methods, and FFS, it is positive that no significant differences were identified in the levels of daily distress, fulfillment-recognition equity and career satisfaction of physicians. In fact, since a lack of professional and clinical autonomy is associated with career dissatisfaction [29] and poor professional rewards [30], the findings indicate that alternative payment schemes, both blended forms and pure APP, do not threaten physicians'

clinical autonomy. Moreover, the intrinsic and unalterable tensions of practicing medicine are not affected by alternative payment methods.

Female physicians give more importance to issues such as control of work schedule and environment, and recognition for their work [25]. Since female physicians report higher percentage of complex patients [25], less control on daily aspects of practice [26], extra challenges to achieve work-life balance [5, 6, 9] and professional development [6, 10], alternative payment schemes should acknowledge these factors, providing the necessary flexibility to enhance their motivation.

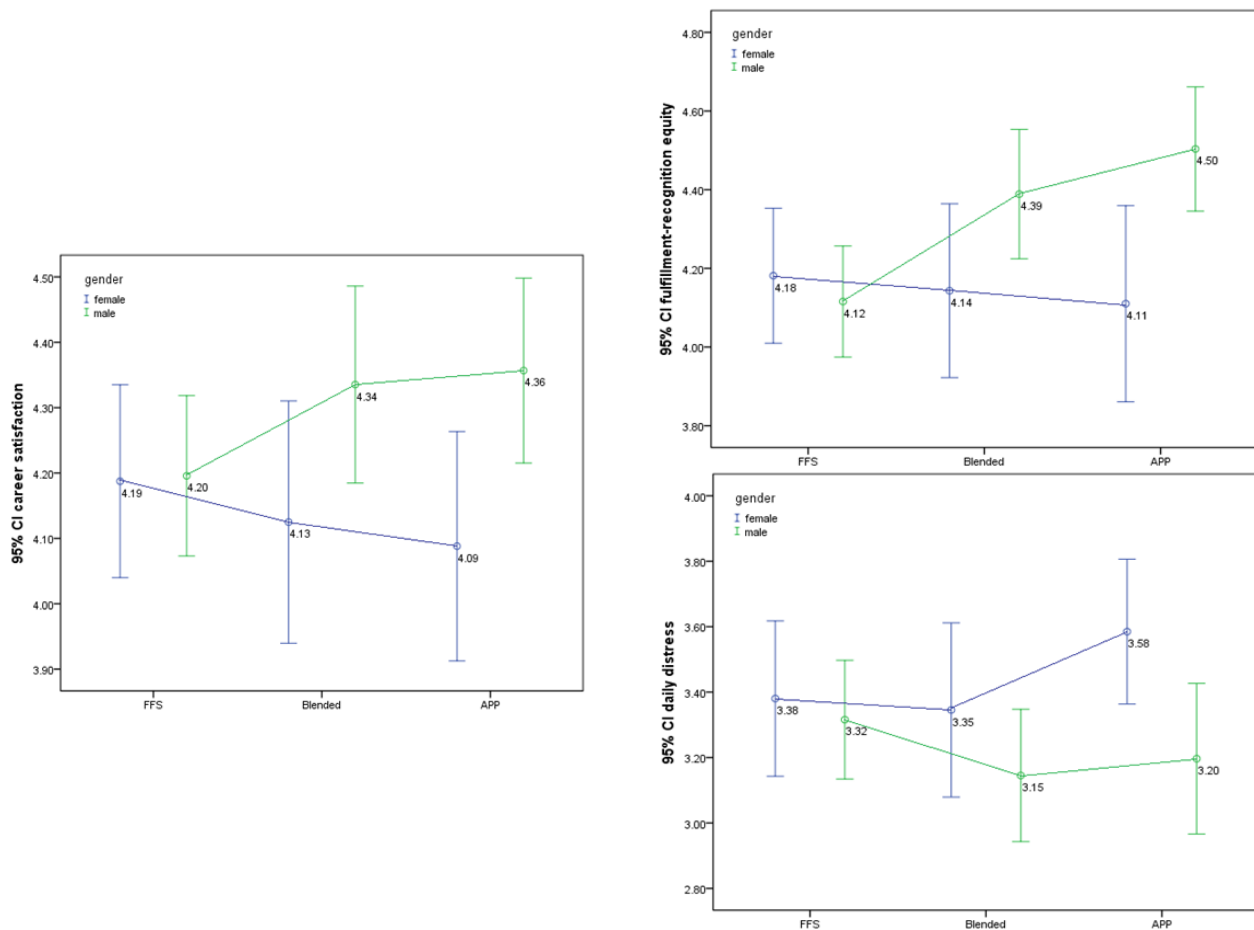


Figure 4-1. Error bars of the three dependent variables by payment methods and gender

Given that this was a cross-sectional study, findings must be considered as associations. However, results can be extrapolated to physicians practicing in the SHR and the Regina Qu'Appelle Health Region and, with caution, to other similar regions across Canada. In comparison with other surveys among physicians, the response rate of this study is adequate; especially because response bias was tested and found to be negligible (Appendix F). Finally, sufficient numbers of specialists among the three payment methods were limited. National studies with bigger and stratified samples are needed to further explore the well-being of physicians.

4.5. Conclusions

Female physicians reported poorer levels of career satisfaction and professional equity, and higher levels of daily distress in comparison to male physicians. These findings are evidence of a lack of gender equity in the well-being of practitioners which needs to be addressed. APP and blended payment methods did not show differences in the well-being indicators when compared to traditional FFS. APP have been recommended to engage physicians in research and academic duties, as well as administrative responsibilities [31], along with providing incentives for health promotion and preventive services [32]; while FFS has been described as adequate to reward high quantities of clinical care [33]. Finally, it is recommended to study the potential interaction effect between APP and gender with stratified samples across provinces.

4.6. Contributions of the Third Article to the Dissertation

Gender differences were confirmed among wellness indicators. Female physicians perceived lower professional equity and higher daily distress, as well as a reduced career satisfaction, in comparison to male physicians. Multiple comparisons suggested latent gender inequalities according to payment methods, specifically in the perception of fulfillment-recognition equity.

Higher levels of equity were identified among male physicians paid by APP in comparison to male physicians with FFS. Notwithstanding, this benefit could not be observed among female physicians. The potential benefit of APP to enhance the perception of professional equity appears to be provided inequitably by gender. Similar differences on the benefits of APP to improve career satisfaction and reduce daily distress could be suggested, although no significant differences were identified in the present study. Taking into account the growing participation of women in medical practice and the differences in the wellness of female and male physicians, professional and personal needs of female physicians should be considered when designing payment methods in order to promote wellness among them.

4.7. References

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CHAPTER 5 GENERAL DISCUSSION AND CONCLUSIONS

5.1. Discussion

Canadian Ministries of Health, Medical Societies, and Faculties of Medicine recognize that alternative payment plans (APP) have been contributing to the recruitment and retention of physicians (*i.e.*, in rural and remote areas), the promotion of collaborative care, and the encouragement of preventive care and health promotion services within the Canadian health care system [1]. APP are also important to promote the involvement of physicians in research, teaching, and administrative responsibilities [2, 3]. Payment systems affect the behavior of physicians, as well as health care inputs and outcomes [1]. Given that attitudes of individuals influence their behavior [4] and that behavior of physicians is affected by payment methods [1, 2, 5, 6], it is important to have a better understanding of how payment systems motivate physicians and promote their wellness [7-9].

This dissertation has established that payment systems, along with personal, organizational and contextual factors, affect the perception of professional equity and daily distress of physicians [7, 8]. In the evaluation of wellness of physicians and payment schemes for practicing medicine, the importance of considering the role of age [7, 8], gender [8, 9], and specialty group [7] was highlighted. A protective contribution of career satisfaction on daily distress perceived by physicians was demonstrated [8], as well as the association of professional equity and career satisfaction as short and long term indicators of motivation [9]. Also, working conditions (*e.g.* workload, proportion of patients with complex conditions, time dedicated to academic and administrative duties) are important factors to consider when studying the impact of payment methods on the wellness of physicians [7, 8].

Taken into account working and personal factors, it was identified that APP are capable of enhancing the perception of professional equity among physicians, especially among family practitioners (FPs) [7] and have the potential to encourage provision of care for patients with complex conditions by decreasing daily distress [8].

In contrast to fee-for-service (FFS) payments, APP can provide a balance between contributions and rewards of physicians, improving perceived income and recognition equity. Non-FFS payment methods are an option for enhancing the motivation of dissatisfied physicians, offering financial equity and promoting recognition through appropriate non-financial incentives [7].

On the one hand, financial incentives have limited influence on motivating physicians [10-12], undermining their intrinsic motivation [11], showing a negligible impact on the quality of care [10-12], and challenging the performance of complex cognitive tasks [11]. On the other hand, non-financial incentives (*e.g.*, supports for career and professional development, professional autonomy, practice collaboration, work-life balance, etc.) can have a positive effect on motivating medical practitioners and enhancing the quality of care [13-15]. Both types of incentives need to be considered for physicians because their motivation is complex and requires the understanding of multiple factors, such as relevance of professional autonomy [11, 16-18], limited effect of financial incentives [10-12], and potential benefits of non-financial incentives [13-15]. A balanced combination of financial and non-financial incentives could have a synergistic impact on motivation and the wellness of physicians, as well as on patient outcomes [14].

Financial disparities [19] and poor wellness [20, 21] have been described among FPs in comparison to other medical specialties. APP could play a significant role to overcome these

disparities [7] and to motivate FPs to be leaders of primary health care reforms. Inter-professional primary health care teams and group networks, supported by alternative payment models, are key components for the transformation of primary health care in Canada [22]. Inter-professional and team-based health care models are particularly necessary at the primary health care level since health care systems with strong primary care infrastructures have healthier populations, fewer health-related disparities, and lower overall costs for health care [23, 24]. APP promote collaborative and inter-professional care [1] and physicians paid by APP report greater motivation and wellness (*i.e.*, higher professional equity and reduced daily distress) [7, 8]. The encouragement of inter-professional primary health care models can support the health care needs of an increasing number of patients with chronic and complex medical conditions [25]. Adequate time is particularly challenging for physicians in providing care for patients with complex conditions (*i.e.*, elderly patients with multimorbidity); appropriate time is important to promote participation of patients and their families in medical decision processes [26]. Physicians in Europe and North America consider that the time allocated to their patients is less than the time that patients actually require [27], adding an extra tension to the inherent distresses of medical practice.

Patient safety and quality of care have been associated with stress that physicians experience [28-30]. Daily distress of physicians is associated with payment systems [8]; this association is affected when practitioners see patients who with complex conditions [8, 31]. Medical practitioners paid by FFS experience distress when examining and treating patients who have complex conditions [31]. Physicians feel the “frustration that ‘money rules’ creating ethical dilemmas when everyone is trying to avoid these patients, in spite of their needs” [26]. In contrast, physicians paid by APP can devote more hours to indirect patient care and direct patient

care in other settings [2]; also, APP could support inter-professional, collaborative health care delivery, and a better quality of care [1]. The provision of care for complex patients requires time [26, 27] and adequate payment systems [26]; therefore, APP could be a tool to decrease distress among physicians and indirectly provide better quality of care for patients who have complex conditions [8]. Notwithstanding, several factors associated with the distress of physicians need to be acknowledged, such as working environment [8, 32, 33], workload [8, 34], academic and administrative duties [8, 35, 36], professional autonomy [18], career satisfaction [37, 38], medical specialty [36], payment methods [8, 18, 39], and gender [9, 40].

Female physicians face additional stressors in their medical practice [9, 40-49], such as work-life conflicts [43-45], less income [42, 46], unequal objective professional success [47], underrepresentation among certain medical specialties and leadership positions [48, 49], as well as poor wellness indicators (*e.g.*, poor professional equity, a high daily distress, and low career satisfaction) [9]. Additionally, female physicians, especially younger ones, are more likely to be paid by APP [50]. As observed among three Canadian provinces, 57% of female physicians under 40 years old are paid by APP compared to 28.3% of females practitioners over 60 years old [50]. The enhancement of professional equity offered by APP presented in this dissertation [7, 9] might only be present among male physicians [9]. Unequal benefits of APP in promoting wellness between male and female physicians require further attention to eliminate existing disparities and acknowledge differences in their medical practices. Consequently, APP need appropriate adjustments for female physicians to enhance their motivation [9].

The manner in which female physicians practice medicine needs to be recognized as a critical contribution to the provision of health services [51-53]. Changes in delivery of care and patient-physician relationships can be observed with more women in medical practice [52]. Women's

communication style improves health care quality by increasing patients' adherence to treatments, encouraging patient involvement, and decreasing medical malpractice [53]. Moreover, the way that female physicians engage patients in health care decision processes also needs to be acknowledged [52].

Finally, the findings of this dissertation are associations. Longitudinal studies are required to evaluate the effect of payment systems on motivation, wellness, and behavior of physicians. Also, the advantages of each payment system need to be acknowledged and promoted for the most suitable health care scenarios [1-3, 6-8], taking into account that physicians self-select their payment method [2, 6]. It is important to highlight that there is no ideal payment model for all medical practice settings [1, 5, 22, 54]. Hutchison *et al.* [22] state that “no single funding or payment method holds the key to transforming primary health care... Organizational change and improved quality of care are possible through varied arrangements for remunerating physicians.”

5.2. Conclusions

Payment methods have been associated with the perception of professional equity of medical practitioners. Enhanced levels of professional equity were observed among physicians paid by APP in comparison to those paid by FFS. Physicians paid by APP perceived fair economic rewards and appropriate recognition. Particularly, FPs paid by APP perceived higher professional equity than those FPs paid by FFS. By supporting professional equity among FPs, APP could promote interdisciplinary models of care and improve the provision of primary health care.

Payment methods have been associated with daily distress of physicians when adjusted for other factors. Lower levels of daily distress can be predicted among physicians paid by APP who see high proportions of patients with complex conditions. Thus, APP could benefit the

wellness of practitioners and potentially improve the quality of care for patients with complex conditions.

A poorer professional equity, a higher daily distress, and a lower career satisfaction were identified among female physicians in comparison to their male colleagues. In addition to the differences in the wellness of female and male physicians, there could be an inequitable impact of APP by gender. The impact of APP on the perception of professional equity was observed only among male physicians. Consequently, APP must recognize existing differences in the wellness of practitioners by gender.

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APPENDIX A
QUESTIONNAIRE

***Satisfaction and Professional Equity of
Physicians in the Saskatoon Health Region (SHR)***



The objectives of this survey are to seek your views and those of your colleagues in the SHR regarding: your career satisfaction, your workload and the stresses of practice, your sense of professional equity and interruptions to personal life; studying the impact and fairness of remuneration systems within the Region.

**Alternative Payment Plans Study
2011**

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Satisfaction and Professional Equity of Physicians in the SHR

1. Please describe your practice arrangements. Many doctors see patients in a variety of settings (*in their private medical office, in the hospital, in a nursing home, rehabilitation facility or other setting*) and some doctors see patients only in one of these settings.

1.1 Where do you see your patients? <i>(Please indicate approximate % per week among the following items)</i>			
	In your private practice office	%	
	In hospital emergency room or out-patient department	%	
	In the treatment/diagnostic units or wards of the hospital	%	
	In a nursing home or rehabilitation facility	%	
	Home visits	%	
	<u>Other settings(specify) _____</u>	%	
TOTAL		100 %	
1.2 The organization of your practice. <i>(Please mark "yes" or "no" for each item)</i>			
	Are you in solo practice?	[]	[]
	Are you in individual practice within a group setting?	[]	[]
	Do you maintain more than one practice office?	[]	[]
	Does your main practice share or pool revenues?	[]	[]
	Does your main practice share office expenses?	[]	[]
	Does your main practice share staff?	[]	[]
	Does your main practice share equipment?	[]	[]
	Does your main practice share medical records?	[]	[]
	Are you accepting new patients?	[]	[]
1.3 How many patients do you see in an average week? <i>(Please indicate the number of patients per week)</i>			
	Regular Hours	<input style="width: 50px; height: 20px;" type="text"/>	
	On Call	<input style="width: 50px; height: 20px;" type="text"/>	
1.4 Of ALL the patients you see in an average week, approximately what percent have <i>(Please indicate approximate percentages among the following items)</i>			
	ROUTINE conditions, given your specialty	%	
	COMPLEX conditions, given your specialty	%	
	SERIOUS personal/family problems (drug abuse, battering etc.)	%	
	<u>BOTH complex medical conditions & serious personal/family problems</u>	%	
TOTAL		100 %	
1.5 In your MEDICAL PRACTICE, what proportions of your income come from <i>(Please indicate approximate percentages among the following items)</i>			
	Fee-For-Service (FFS)	%	
	Salary	%	
	Alternative Payment Programs (APP)	%	
	<u>Others (specify) _____</u>	%	
TOTAL		100 %	
1.6 Are the following elements included in your reimbursement arrangements? <i>(Please mark "Yes" or "No" for each item)</i>			
	Payment by salary	[]	[]
	A contract with the Saskatoon Health Region	[]	[]
	A contract with the University of Saskatchewan	[]	[]
	The invoicing of some services on a fee-for-service basis	[]	[]
	Ability to enter into contractual agreements with other parties	[]	[]
	Flexibility to decide the number of hours you work every month	[]	[]
	Independence to manage costs of delivering your professional services	[]	[]
	Ability to select and organize your team (eg. physicians, nurses, therapists, etc.)	[]	[]
	Benefits from any pension, group life, long-term disability plan, or any other plan	[]	[]
	<u>Other provisions (specify) _____</u>	[]	[]

1.7 Group Settings. (Please indicate if you have available the following health professionals for your patients)				
In my group we have services available from:	PART-time	FULL-time	By consult or referral	Do not have
Physiotherapist(s)	[]	[]	[]	[]
Dietician(s)	[]	[]	[]	[]
Midwife(ves)	[]	[]	[]	[]
Nurse practitioner(s)	[]	[]	[]	[]
Psychologist(s)	[]	[]	[]	[]
Social worker(s)	[]	[]	[]	[]
Others (specify) _____	[]	[]	[]	[]

2. Regular Working Hours per Week. To establish the structure of your time, we first ask you about regular hours and then On Call duties (See point 2.2. On Call below). First regular hours.

2.1 On Regular Hours. (Please indicate how many hours you spend on the following activities)

2.1.1 Direct Patient Care			
Direct Patient Care which <u>does not involve</u> teaching or research	<input type="text"/>	Hours per week	
Direct patient care involving either <u>teaching</u> or <u>research</u>	<input type="text"/>	Hours per week	
2.1.2 Indirect Patient Care			
Communicating care plans to other health professionals	<input type="text"/>	Hours per week	
Charting, telephone calls & other patient-related duties	<input type="text"/>	Hours per week	
2.1.3 Non-patient care Teaching & Research			
Lecturing or preparing materials, marking, evaluating	<input type="text"/>	Hours per week	
Research activities, collecting & analyzing data, writing etc.	<input type="text"/>	Hours per week	
2.1.4 Maintaining Knowledge			
Obtaining CME credits, keeping up with medical literature, participating in patient care conferences/rounds, and/or Attending symposia/conferences	<input type="text"/>	Hours per week	
2.1.5 Administrative Duties			
Administrative tasks associated with your practice	<input type="text"/>	Hours per week	
Other service, organizational, or administrative duties	<input type="text"/>	Hours per week	
Total number of hours you work on regular hours (Sum all items above)		<input type="text"/>	Hours per week

2.2 On Call & Call Backs.

	None	1-2 per month	3-4 per month	5-6 per month	7-8 per month	9-12 per month	13-17 per month	18+ per month
How many WEEKDAY evenings (Mon-Fri) are you On Call in an average month?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	None	One	two	3 or 4	5 or 6	7 or 8		
How many SATURDAYS OR SUNDAYS in an average month are you On Call?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

2.3 Practice Changes. (Please mark "Decrease", "No change" or "Increase" for each item below)

What changes in your practice would you like to make?	Decrease	No change	Increase
The number of patients you provide care to	[]	[]	[]
Your participation in teaching	[]	[]	[]
The range of clinical procedures or treatments that you provide	[]	[]	[]
Your participation in research activities	[]	[]	[]
Your involvement in medical administration	[]	[]	[]

3. Changes and administrative issues in medical practice (Please indicate your perception with the following)

Part 1:	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
The portion of complicated patients in my practices has increased during the last two years.	[]	[]	[]	[]	[]	[]
Patients have become more demanding in their requests during the last two years.	[]	[]	[]	[]	[]	[]
The proportion of elderly patients has increased.	[]	[]	[]	[]	[]	[]

Part 2:	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
I have had to increase my time commitment in serving on healthcare related committees.	[]	[]	[]	[]	[]	[]
The costs of staff in my medical practice have increased during the last two years.	[]	[]	[]	[]	[]	[]
The costs of equipment in my medical practice have increased during the last two years.	[]	[]	[]	[]	[]	[]
The costs of rent/lease/mortgage for my medical facilities have increased during the last two years.	[]	[]	[]	[]	[]	[]
In my opinion participating in administrative meetings in the region is a waste of time.	[]	[]	[]	[]	[]	[]
In my opinion participating in clinical meetings in the region is a waste of time.	[]	[]	[]	[]	[]	[]

4. Career Satisfaction. (Please indicate your satisfaction with the following aspects of your career from being “very dissatisfied” to “very satisfied”)

How satisfied are you with:	Very Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Somewhat Satisfied	Satisfied	Very Satisfied
your interactions and relationships with other physicians?	[]	[]	[]	[]	[]	[]
the doctor-patient relationships derived from providing patient care?	[]	[]	[]	[]	[]	[]
the diversity of patients you see (age, types of clinical conditions, etc.)?	[]	[]	[]	[]	[]	[]
your success in meeting the needs of your patients?	[]	[]	[]	[]	[]	[]
your ability to access resources needed to treat your patients?	[]	[]	[]	[]	[]	[]
your capacity to keep up with advances in your clinical specialty?	[]	[]	[]	[]	[]	[]
your role in organizing treatment programs for patients in your community?	[]	[]	[]	[]	[]	[]
your interactions and relationship with nurses?	[]	[]	[]	[]	[]	[]
your interactions and relationship with health care administrators?	[]	[]	[]	[]	[]	[]
your authority to get your clinical decisions carried out?	[]	[]	[]	[]	[]	[]
your ability to control your work schedule?	[]	[]	[]	[]	[]	[]
your ability to keep responsibilities at work from intruding on your personal life?	[]	[]	[]	[]	[]	[]
your earnings as a physician during your medical career?	[]	[]	[]	[]	[]	[]
your career advancement in medicine?	[]	[]	[]	[]	[]	[]
the way administrative aspects of your medical practice are handled?	[]	[]	[]	[]	[]	[]
your ability to maintain satisfying activities in the community (service, culture, church, etc.)?	[]	[]	[]	[]	[]	[]
Overall, your medical career, considering your various roles and responsibilities?	[]	[]	[]	[]	[]	[]

5. **Professional Equity.** Professional equity is defined as the balance between the contributions of physicians and the rewards they receive. Your responses to the following statements will allow you to assess the contributions you make, the rewards you receive, and whether equity has been achieved or not achieved. *(Please indicate your perception with each of the following aspects)*

Regarding fulfillment, consider the following aspects of your medical practice.	Very Low	Low	Moderately Low	Moderately High	High	Very High
Your sense of gratification derived from providing care to patients is:	[]	[]	[]	[]	[]	[]
Your sense of contributing to society in your various roles as a physician is:	[]	[]	[]	[]	[]	[]
The opportunities to use your most advanced clinical skills are:	[]	[]	[]	[]	[]	[]
The choices you have over the activities you carry out or participate in are:	[]	[]	[]	[]	[]	[]
Your sense of accomplishment from your work as a physician is:	[]	[]	[]	[]	[]	[]

How well does your income reflect:	Not at all	Slightly	Partially	Moderately	Mostly	Perfectly
the time you spend on your duties?	[]	[]	[]	[]	[]	[]
your qualifications and training?	[]	[]	[]	[]	[]	[]
your responsibilities?	[]	[]	[]	[]	[]	[]
the stresses of making risky decisions?	[]	[]	[]	[]	[]	[]
your years of experience?	[]	[]	[]	[]	[]	[]

Regarding recognition, please consider the following aspects of your practice.	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
Patients often express their appreciation for the clinical care that you provide to them.	[]	[]	[]	[]	[]	[]
Your contributions to the general well-being of your region are appreciated.	[]	[]	[]	[]	[]	[]
Your colleagues acknowledge extra efforts you make in carrying out your responsibilities.	[]	[]	[]	[]	[]	[]
Nurses you work with show respect for you as a physician.	[]	[]	[]	[]	[]	[]
Administrators understand the stresses you experience as a physician.	[]	[]	[]	[]	[]	[]
Your dedication as a physician has led to advances in your medical career.	[]	[]	[]	[]	[]	[]
Your family understands the stresses you face as a physician.	[]	[]	[]	[]	[]	[]

Overall, the full range of rewards you receive for all the contributions you make are:

Very Unfavourable	Unfavourable	Somewhat Unfavourable	Fair	Somewhat Favourable	Favourable	Very Favourable
[]	[]	[]	[]	[]	[]	[]

6. Stress in your work. (Please indicate how often you feel stressed with each of the following aspects)

How frequently do you:	Never	A few times a year	Once a month	2 - 3 times a month	Once a week	2 - 3 times a week	Every day
have workdays which are so busy that you are physically exhausted at the end of the day?	[]	[]	[]	[]	[]	[]	[]
have such demanding workdays that you are emotionally drained at the end of the day?	[]	[]	[]	[]	[]	[]	[]
suffer from fatigue due to working late and/or nights?	[]	[]	[]	[]	[]	[]	[]
express impatience when people do not respond to requests as quickly as they should have?	[]	[]	[]	[]	[]	[]	[]
express anger when people at work make mistakes?	[]	[]	[]	[]	[]	[]	[]
have workdays when you can devote enough time to all of your patients?	[]	[]	[]	[]	[]	[]	[]
feel frustrated accessing facilities/services for patients?	[]	[]	[]	[]	[]	[]	[]
feel depressed because of the death or serious illness of a patient?	[]	[]	[]	[]	[]	[]	[]
feel that your work has desensitized your feelings/ emotions?	[]	[]	[]	[]	[]	[]	[]
experience frustration dealing with demanding patients?	[]	[]	[]	[]	[]	[]	[]
end up doing tasks which you think are outside of your responsibilities?	[]	[]	[]	[]	[]	[]	[]
cancel a personal or social activity in order to meet work commitments?	[]	[]	[]	[]	[]	[]	[]
experience conflict between responsibilities at work and at home?	[]	[]	[]	[]	[]	[]	[]
feel that you can concentrate on the tasks that should be done?	[]	[]	[]	[]	[]	[]	[]
feel that you are in control of your day-to-day working activities?	[]	[]	[]	[]	[]	[]	[]
feel confident that you have been able to do your work at a high standard of care?	[]	[]	[]	[]	[]	[]	[]

How would you rate your level of stress?	Very Low	Low	Moderate	High	Very high
	[]	[]	[]	[]	[]

How would you rate your level of health?	Very poor	Poor	Fair	Good	Very Good
	[]	[]	[]	[]	[]

7. Interruptions with personal life. Patient care responsibilities are carried out on a round the clock basis throughout the entire year, requiring the dedication of physicians on weekends, holidays, and on evenings and nights. Most people working in health care occupations experience interruptions in their personal life, due to their job responsibilities. (On the next page, please indicate how often you experience interruptions in your personal life)

How often does your medical career interfere with:	Not applicable	Never	A few times a year	Once a month	2-3 times a month	Once a week	2-3 times a week	Every day
being at home at the same time as your partner?	[]	[]	[]	[]	[]	[]	[]	[]
taking part in recreational or social interests in the community?	[]	[]	[]	[]	[]	[]	[]	[]
looking after my preschool children?	[]	[]	[]	[]	[]	[]	[]	[]
getting children ready for school in the morning?	[]	[]	[]	[]	[]	[]	[]	[]
picking up my children from school, or being at home when they come home from school?	[]	[]	[]	[]	[]	[]	[]	[]
finding child care?	[]	[]	[]	[]	[]	[]	[]	[]
taking care of household duties?	[]	[]	[]	[]	[]	[]	[]	[]
being at home with family members?	[]	[]	[]	[]	[]	[]	[]	[]
spending time with friends?	[]	[]	[]	[]	[]	[]	[]	[]
looking after a dependent relative or parent?	[]	[]	[]	[]	[]	[]	[]	[]

8. Demographics. (Please answer all the following items)

8.1 What is your age? <input type="text"/> years	8.2 Indicate your gender Female <input type="checkbox"/> Male <input type="checkbox"/>				
8.3 Your main area of specialization <input type="text"/>	8.4 Other areas of specialization <input type="text"/>				
8.5 How many years have you been in practice? <input type="text"/> Years					
8.6 Select the hospital where you see most of your patients	Royal University Hospital []	St. Paul's Hospital []	Saskatoon City Hospital []	Other: _____ []	None []
8.7 Your current marital status	Single []	Married / Common Law []	Separated / Divorced []	Widowed []	Other: _____ []
8.8 How many days a week does your partner work?	Not applicable []	Less than 1 day per week []	1 or 2 days per week []	3 or 4 days per week []	Full-time []
8.9 In which age range do you have children living with you?	None []	Under 2 years old []	2 to 5 years old []	6 to 18 years old []	Over 18 years old []

9. Contact and results feedback. (If you wish to receive feedback regarding this study, please mark "yes" or "no" for each of the following items)

	Yes	No
Would you like to receive a summary of the results of this study?	[]	[]
Would you like to participate in a workshop about the results of this study?	[]	[]
Would you like to receive abstracts of previous articles by this research group?	[]	[]

Thank you for taking the time and effort to complete this survey.

The results will be analyzed and reported in broad groups.

Your identity will be held in strictest confidence.



**Alternative Payment Plans Study
2011**

© R Lepnurm, JN Pena-Sanchez, R Dobson



**UNIVERSITY OF
SASKATCHEWAN**

APPENDIX B
ETHICS APPROVAL
Behavioural Research Ethics Board (Beh-REB)
Certificate of Approval

PRINCIPAL INVESTIGATOR
Rein Lepnum

DEPARTMENT
School of Public Health

BEH#
11-140

INSTITUTION(S) WHERE RESEARCH WILL BE CONDUCTED
University of Saskatchewan

SUB-INVESTIGATOR(S)
Roy Dobson, David Poulin

STUDENT RESEARCHER(S)
Juan-Nicolas Pena-Sanchez

FUNDER(S)
INTERNALLY FUNDED

TITLE
The Impact of Alternative Payment Programs (APP) on the Satisfaction and Professional Equity of Physicians: A Case-Control Study in the Saskatoon Health Region

ORIGINAL REVIEW DATE 29-May-2011	APPROVAL ON 27-Jun-2011	APPROVAL OF: Ethics Application Consent Protocol	EXPIRY DATE 26-Jun-2012
-------------------------------------	----------------------------	--	----------------------------

Full Board Meeting Date of Full Board Meeting:
Delegated Review

CERTIFICATION

The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS

In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for further instructions: http://www.usask.ca/research/ethics_review/

John Rigby, Chair
University of Saskatchewan
Behavioural Research Ethics Board

APPENDIX C
OPERATIONAL APPROVAL



UNIVERSITY OF
SASKATCHEWAN



**Associate Vice-President Research – Health
(University of Saskatchewan)
Vice-President Research and Innovation
(Saskatoon Health Region)**

247-111 Research Drive
Atrium Building, Innovation Place
Saskatoon, SK S7N 3R2
Phone: (306) 966 - 8745

DATE: July 5, 2011

TO: Dr. Rein Lepnurm
School of Public Health
University of Saskatchewan

FROM: Martha E. (Beth) Horsburgh
Associate Vice-President Research – Health (University of Saskatchewan)/
Vice-President Research & Innovation (Saskatoon Health Region)

RE: **RESEARCH ETHICS BOARD (REB) #: B2011-140**
**PROJECT NAME: The Impact of Alternative Payment Programs (APP) on the
Satisfaction and Professional Equity of Physicians: A Study in the Saskatoon
Health Region**
PROTOCOL #: N/A

Saskatoon Health Region is pleased to provide you with operational approval of the above-mentioned research project.

Kindly inform us when the data collection phase of the research project is completed. We would also appreciate receiving a copy of any publications related to this research. As well, any publications or presentations that result from this research should include a statement acknowledging the assistance of Saskatoon Health Region.

We wish you every success with your project. If you have any questions, please feel welcome to contact Shawna Weeks at 655-1442 or email shawna.weeks@saskatoonhealthregion.ca

Yours truly,

Martha E. (Beth) Horsburgh, RN, Ph.D
Associate Vice-President Research – Health (University of Saskatchewan)/
Vice-President Research & Innovation (Saskatoon Health Region)

cc: Dr. David Poulin, Vice President, Medical Affairs, SHR

Catalyzing Health Research and Innovation Together

APPENDIX D
REPRINT PERMISSION

Permission to use copyrighted material in doctoral dissertation

jha <jha@sciedu.ca>
To: juan.nicolas.ps@usask.ca
Cc: "Lepnum, Rein" <r.lepnum@usask.ca>

21 August 2014 12:20

Dear Dr. Juan-Nicolas Pena-Sanchez,

Thank you very much for your letter and information! The papers' copyright in JHA belongs to the authors. So we approved. You can reprint them in your dissertation. Thanks again for your interest in our journal! I look forward to collaborating with you next time.

If you have any other questions, please don't hesitate to contact with me at: jha@sciedu.ca.

Sincerely yours,

Edith Lecea

On 8/20/2014 7:46 PM, Juan-Nicolas Pena-Sanchez wrote:

August 20, 2014

Sirs
Editorial Board
Journal of Hospital Administration

Re.: Permission to use copyrighted material in doctoral dissertation

Dear Sirs:

I am a graduate student of the University of Saskatchewan, completing my Doctoral dissertation entitled "Effects of Alternative Payment Plans on Daily Distress and Professional Equity of Physicians". I would like to ask for permission to reprint in my dissertation the following articles that have been published in your journal:

- Peña-Sánchez JN, Lepnum R, Dobson R, Keegan D. Impact of payment methods on professional equity of physicians. *Journal of Hospital Administration*. 2014; 3(2):50-60.
- Peña-Sánchez JN, Lepnum R, Dobson R, Keegan D, Bermedo-Carrasco S. Payment method as a predictor of the daily distress experienced by physicians. *Journal of Hospital Administration*. 2014; 3(5):1-13.

- Peña-Sánchez JN, Lepnurm R, Bermedo-Carrasco S. Latent gender inequalities in the well-being of physicians according to payment method for practicing medicine. *Journal of Hospital Administration*. 2013; 2(4): 7-14.

The articles will have the appropriate citations. The requested permission extends to any future publication of my dissertation by the University of Saskatchewan. These rights will in no way restrict republication of the material in any other form by the *Journal of Hospital Administration* or by others authorized by the Journal.

My dissertation will be available in full-text on the internet for reference and study. The electronic version will be accessible through the University of Saskatchewan Library web page, the Library's web catalogue, and also through web search engines. I will also be granting University of Saskatchewan an authorization to reproduce, loan, and distribute single copies of my dissertation.

Please confirm in writing or by e-mail that these arrangements meet with your approval.

Sincerely,

Juan-Nicolás Peña-Sánchez
PhD candidate, School of Public Health, University of Saskatchewan

--

Edith Lecea,
Editorial Assistant
Journal of Hospital Administration, Sciedu Press

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APPENDIX F
BIAS CHECK RESULTS

Of the 794 eligible physicians, 382 participated in the study (response rate = 48.1%). Of the 412 physicians who did not participate, 73 completed the one-page questionnaire (Appendix E) which was sent by mail in the last reminder. The responses of the 73 physicians could represent the characteristics of the 412 physicians who did not participate in this study.

Among physicians who completed the one-page survey, the mean age was 50.62 (SD=12.93) years. By gender, 24.7% (n=18) were females and 75.3% (n=55) were males. The overall mean levels of efforts/rewards equity, stress, and career satisfaction were 5.11/6.00 (SD=1.47), 3.52/6.00 (SD=0.88), and 4.79/7.00 (SD=1.02), respectively.

No significant differences were identified according to gender (p=0.05) and age (p=0.29) between those who completed the one-page questionnaire and those who participated in the study. Similarly, there were no significant differences found in reported overall equity, stress, and satisfaction between these two groups of physicians (p>0.05).

Characteristic	One-page survey (n = 73)	Participants (n = 382)
	n(%) / mean(SD)	n(%) / mean(SD)
Gender		
Female	18 (24.7)*	142 (37.2)*
Male	55 (75.3)*	240 (62.8)*
Age	50.62 (12.93) †	49.04 (11.40) †
Overall efforts/rewards balance	5.11 (1.47) †	5.08 (1.36) †
Overall stress	3.52 (0.88) †	3.07 (0.84) †
Overall career satisfaction	4.79 (1.02) †	4.62 (0.91) †

† T-tests with p>0.05

* χ^2 with p=0.05