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Pay for performance of Estonian family doctors and impact of different practice- and patient-related characteristics on a good outcome: A quantitative assessment

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ABSTRACT

Background and objective: Several practice- and patient-related characteristics are reported to have an influence on a good quality outcome. Estonia started the pay-for-performance (P4P) system for family doctors (FDs) in 2006. Every year the number of FDs participating in P4P has increased, but only half of the FDs achieved good outcome. The aim of this study was to find out which practice- and patient-related characteristics could have an impact on a good outcome.

Materials and methods: The study was conducted using the database from the Estonian Health Insurance Fund. All working FDs were divided into two groups (with “good” and “poor” outcomes) according to their achievements in P4P. We chose characteristics which described structure (practice list size, number of doctors, composition of FDs list: age, number of chronically ill patients) during the observation period 2006–2012.

Results: During the observation period 2006–2012, the number of FDs with a good outcome in P4P increased from 6% (2006) to 53% (2012). The high number of FDs in primary care teams, longer experience of participation in P4P and the smaller number of patients on FDs' lists all have an impact on a good outcome. The number of chronically ill patients in FDs lists has no significant effect on an outcome, but P4P increases the number of disease-diagnosed patients.

Conclusions: Different practice and patient-related characteristics have an impact on a good outcome. As workload increases, smaller lists of FDs patients or increased staff levels are needed in order to maintain a good outcome.

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1. Introduction

Several practice and patient-related indicators (list size, composition of practice, age of patients), and indicators of workload (contact rates, length of consultations, number of primary care team members) describe the functioning of primary care [1,2]. In addition, important factors, such as job satisfaction, quality of work and financial incentives affect organizational performance [3,4].

Financial incentives have most often been used as part of programs to achieve better outcomes [5]. Pay-for-performance (P4P) programs in family practices started in the United Kingdom [6], with the main idea of controlling chronic diseases better and preventing their escalation [7].

Primary care serves as the cornerstone for building a strong health care system that ensures positive health outcomes and health equity [8]. Measuring its performance is important in order to ensure that the whole system works effectively and for the benefit of the patients. It is also important to show what configurations of primary health care are associated with better outcomes [9]. P4P schemes can have an effect on the behavior of physicians and can lead to better clinical management of disease, but that there is cause for concern about the impact on the quality of care [10].

FDs can have different sizes of patients' lists and different structure of diseases of the patients. This means different workloads as well [11].

Estonia started the P4P system for FDs in 2006 [12]. Joining the P4P program is a voluntary process for all FDs, it forms a part of the FDs' contract and there are no sanctions if a doctor is not joined to the P4P.

The Estonian P4P system for FDs contains three major parts: prevention, monitoring of patients with chronic

diseases according to national guidelines and professional competency (Table 1).

P4P is a part of the FDs contract, as a reward of excellent outcome, but its influence on the general budget is relatively small in different countries [13] as well as in Estonia (2%–4% of the total budget of the FDs).

As a bonus, FDs joined to the P4P system and FDs achieving a good outcome receive some increase of funds for investigations. From this fund (which constitutes 27%–32% of the per capita payment) all investigations (X-rays, ultrasounds, blood tests, urine tests, ECGs, etc.) should be performed. Since 2012, FDs not joined to the P4P have a fund for investigations equal to 29% of the capitation, but FDs joined to the P4P have 32%. FDs achieving a good outcome will receive an extra 5% for the investigations (up to 37% of the per capita payment).

Coverage targets in P4P are universal to all FDs and are increasing stepwise every year. FDs who achieved these targets earn points. The maximum number of points FDs can achieve in P4P is 640. If the FD has collected more than 75% of the points (480 points), this is considered a good outcome. If FDs collected less than 75% of the points (less than 479 points), this is considered a poor outcome. In a good outcome two different payments are foreseen: FDs who achieved 480–539 points (75%–84.4% of the maximum) will earn 2975 euros as annual payment and FDs with 540–640 points (84.5%–100% of the maximum) will earn 3720 euros. FDs who achieved less than 479 points (less than 75% of the maximum) have no extra payment.

From 2012, 96.6% of FDs are joined to P4P [14] and are motivated to achieve a good outcome. Every year the number of FDs with a good outcome is increased, but only half of FDs achieved a good outcome.

Table 1 – Pay-for-performance indicators in primary care in Estonia.

Indicator	Description
Part 1 (prevention)	
Immunizations	Pertussis, diphtheria, tetanus, poliomyelitis, measles, mumps, rubella, hepatitis B, <i>Haemophilus influenzae</i> type b according to immunization plan
Children health controls	In 1, 3, 6, and 12 months old, 2 years old, preschool health control
Cardiovascular disease prevention programme	40–60 years old, blood pressure, glucose, cholesterol with fractions. SCORE calculation
Part 2 (chronic diseases)	
Diabetes mellitus type 2	Register of patients with type 2 diabetes, measuring glucose and HbA1c, cholesterol with fractions, serum creatinine testing, urine tests to detect microalbuminuria, blood pressure measurement, nurse counseling
Hypertension	Register of patients with hypertension, dividing into 3 stages, glucose, cholesterol with fractions, serum creatinine testing, urine tests to detect microalbuminuria, blood pressure measurement, ECG, nurse counseling, treatment with ACE inhibitors
Myocardial infarction	Register of patients with myocardial infarction, cholesterol with fractions, ECG, blood pressure measurement, nurse counseling
Hypothyroidism	Register of patients with hypothyreosis, TSH testing
Part 3 (enhanced services)	
	Observation of pregnancy, PAP smear tests, minor surgery procedures
	Participation in CME courses (at least 60 h/year)
<i>Maximum number of points: 640</i>	
<i>Good outcome: more than 480 points (>75%)</i>	
<i>Poor outcome: less than 479 points (<75%)</i>	

Table 2 – Number of family doctors achieving a good outcome or poor outcome in the P4P system (official results of the P4P system during 2006–2012 in Estonia).

	2006	2007	2008	2009	2010	2011	2012
Good outcome	30 (6%)	175 (39%)	224 (35%)	355 (52%)	282 (39%)	397 (53%)	412 (53%)
Poor outcome	470 (94%)	277 (61%)	418 (65%)	323 (48%)	436 (61%)	358 (47%)	360 (47%)

The aim of the study was to find out which practice- and patient-related characteristics could have an impact on good performance outcomes.

2. Materials and methods

The study group consisted of all FDs working with their own patient lists in Estonia during 2006–2012 ($N = 500$ in 2006, increasing to $N = 772$ in 2012). FDs were divided into two groups according to their outcome in P4P (Table 1): a good outcome group and a poor outcome group (Table 2). Good outcome is defined if FD achieved more as 480 (75% of the maximum) points in P4P and poor outcome if FD achieved less as 479 points.

The P4P outcome results (Tables 3 and 4) for every single FD were collected from the Estonian Health Insurance Fund (EHIF) database, which covers 96% of the Estonian population. The database does not cover the data of those 4% of the population who have no medical insurance. The database was created on the basis of the health service invoices submitted to the Health Insurance Fund by family physicians. These invoices list all services provided to the patients (analysis, investigations, counseling, etc.), including all visits to FDs and family nurses, as well as the diagnoses of the patients according to the ICD-10. The numbers of patients on FDs' lists were collected from Estonian Health Insurance Fund contracts. Data about the size of FDs' lists are missing for 2006 because the P4P database in the Estonian Health Insurance Fund was implemented in September 2006. Data about patients with myocardial infarction and hypothyreosis were included in P4P from 2008 onwards. The Ethics Committee of the University of Tartu approved the study.

Four different practice- and patient-related characteristics from the Estonian P4P system (Tables 3 and 4) were studied in order to identify possible differences between the two groups of doctors: with a good or poor outcome. We chose characteristics which described practice list size, number of doctors and composition of FDs list: age group of the patients, number of chronically ill patients (hypertension stages I, II and III, type 2 diabetes, myocardial infarction and hypothyreosis) on FDs' lists during the observation period 2006–2012.

We used descriptive statistics to analyze the data. The differences between the two groups were compared using the non-parametric Mann–Whitney U test, as the data were not normally distributed; if P was lower than 0.05, the difference was considered statistically significant. Data were analyzed using the software IBM SPSS Statistics 19.

3. Results

During the observation period 2006–2012, the number of FDs who achieved a good outcome in P4P increased. At the beginning of the study period, only 6% of FDs achieved a good outcome, but after 2011 a good outcome was attained by 53% of FDs (Table 2).

From practice-related characteristics (Ch.) we found the time period of joining P4P (Ch. 1.1) to be one predictor for a good outcome (Tables 3 and 4). FDs with a longer history of P4P more often had good outcomes compared to FDs with a shorter history. The number of FDs working in a primary care team (Ch. 1.2) had an effect on a good outcome. At the beginning of the study period (in 2006 and 2007) smaller teams achieved a good outcome, but after 2011 teams with more doctors achieved a good outcome (Tables 3 and 4).

The number of patients on FDs' lists (Ch. 2.1) had an influence on a good outcome only in some years (2010 and 2012), but no influence in other years (2007, 2008, 2009 and 2011) (Tables 3 and 4).

The proportion of the patients in different age groups (Ch. 3.1, 3.2, 3.3) had an association with a good outcome in 2007 (Tables 3 and 4).

Regarding the proportion of the chronically ill patients in FDs' lists, only number of patients with hypertension (Ch. 4.2, 4.3, 4.4) had an effect on a good outcome in most of the years (2006–2007 and 2009–2012). The number of patients with type 2 diabetes, myocardial infarction (Ch. 4.5) and hypothyreosis (Ch. 4.6) had an influence on a good outcome only in single years.

One of our findings is that number of patients with chronic diseases (type 2 diabetes, hypertension, and myocardial infarction) increased during the observation period in all groups (Figure).

4. Discussion

The use of financial incentives to reward FDs for improving the quality of primary health care services is growing [15]. Estonia has started P4P for FDs to improve quality in primary care. One of our previous study shows that implementation of P4P in primary health care reduces the load in specialized medical care [16]. In another study we found that P4P increases both the family nurses and FDs workload [11].

As during a 6-year period of P4P, no more than 53% of FDs achieved a good outcome, it is important to understand whether there are some practice and patient-related aspects which could have impact on good performance.

Table 3 – Practice and patient-related characteristics by groups in 2006–2008.

Group		2006			2007			2008		
		Mean	SD	P	Mean	SD	P	Mean	SD	P
1. Practice-related characteristics										
Time since joining P4P (years) (Ch.1.1)	Poor outcome in P4P				1.90	0.02	0.950	2.4	0.04	0.482
	Good outcome in P4P				1.90	0.02		2.47	0.05	
Number of FDs in primary care team (Ch.1.2)	Poor outcome in P4P	5.71	0.33	0.023	7.25	0.5	0.000	5.44	0.36	0.273
	Good outcome in P4P	2.23	0.31		3.81	0.4		4.3	0.37	
2. List size										
Number of patients in FDs list (Ch.2.1.)	Poor outcome in P4P				1739.38	22.17	0.432	1737.39	19.08	0.115
	Good outcome in P4P				1756.49	26.13		1783.93	24.26	
3. Composition of the patient age in FDs list										
Number of patients 0–2 years old (Ch.3.1)	Poor outcome in P4P				32.33	2.32	0.000	34.73	1.7	0.212
	Good outcome in P4P				39.46	2.37		35.22	1.95	
Number of patients 2–69 years old (Ch.3.2)	Poor outcome in P4P				1342.40	20.18	0.047	1357.04	17.32	0.183
	Good outcome in P4P				1403.30	25.08		1398.82	23.09	
Number of patients 70+ old (Ch.3.3)	Poor outcome in P4P				203.31	7.22	0.003	197.8	6.12	0.533
	Good outcome in P4P				167.67	8.7		201.5	7.96	
4. Composition of the patient diseases (chronic diseases)										
Patients with type 2 diabetes (Ch.4.1)	Poor outcome in P4P	37.58	1.29	0.087	46.55	1.91	0.000	43.61	1.5	0.453
	Good outcome in P4P	29.97	4.94		35.25	2.26		45.77	2.14	
Patients with hypertension stage 1 (Ch.4.2)	Poor outcome in P4P	67.16	3.57	0.092	88.11	5.69	0.722	85.71	4.17	0.965
	Good outcome in P4P	49.38	13.28		91.59	8.29		88.14	5.93	
Patients with hypertension stage 2 (Ch.4.3)	Poor outcome in P4P	166.45	6.45	0.020	187.79	9.01	0.000	165.44	6.8	0.963
	Good outcome in P4P	97.07	11.65		121.81	8.84		163.99	9.12	
Patients with hypertension stage 3 (Ch.4.4)	Poor outcome in P4P	22.48	1.23	0.212	20.52	1.44	0.000	19.28	1.18	0.094
	Good outcome in P4P	14.14	2.47		13.18	1.23		16.91	1.71	
Patients with myocardial infarction (Ch.4.5)	Poor outcome in P4P							13.72	0.6	0.892
	Good outcome in P4P							13.23	0.71	
Patients with hypothyreosis (Ch.4.6)	Poor outcome in P4P							18.69	0.84	0.097
	Good outcome in P4P							19.79	1.03	

Notes: SRD: specific reading disability, LIRD: language impairments and reading disability.

Lessons from the United Kingdom on pay-for-performance showed that P4P can be used to improve quality of care, but this is not a “magic bullet” and needs to be combined with other quality-improvement initiatives to produce sustained improvements [17].

FDs patients' lists can vary in size and in the structure of their patients' diseases. In our study we found some clear patterns: a greater number of small children (0–2 years old) and persons (2–69 years old) on FDs' lists are both important predictors for a good outcome [18]. Older patients with increased rates of chronic disease and a higher number of

patients with chronic diseases on FDs' lists are more typical for a poor outcome [19], which was also confirmed in our study.

The number of doctors in a primary care team is an important predictor for a good outcome. The P4P system increases the workload and requires increased staff levels [11]. At the beginning of P4P, single-handed FDs also showed a good outcome, but it seems that over time small teams became overloaded with increased workloads (more detected chronically ill patients in the list and higher target levels) and did not achieve a good outcome. At the same time, primary

Table 4 – Practice- and patient-related characteristics by groups in 2009–2012.

Group		2009			2010			2011			2012		
		Mean	SD	P	Mean	SD	P	Mean	SD	P	Mean	SD	P
1. Practice-related characteristics													
Time since joining P4P (years) (Ch.1.1)	Poor outcome in P4P	2.94	0.06	0.000	3.77	0.06	0.000	4.32	0.09	0.000	5.09	0.09	0.000
	Good outcome in P4P	3.52	0.04		4.47	0.06		5.33	0.05		6.31	0.05	
Number of FDs in primary care team (Ch.1.2)	Poor outcome in P4P	5.1	0.39	0.928	4.74	0.3	0.706	4.01	0.29	0.009	3.85	0.28	0.005
	Good outcome in P4P	4.95	0.35		4.83	0.37		5.12	0.31		5.01	0.31	
2. List size													
Number of patients in FDs list (Ch.2.1.)	Poor outcome in P4P	1764.94	22.41	0.965	1748.18	18.13	0.050	1745.79	21.59	0.115	1727.10	22.04	0.006
	Good outcome in P4P	1763.46	19.01		1795.62	21.75		1795.9	16.83		1810.77	17.11	
3. Composition of the patient age in FDs list													
Number of patients 0–2 years old (Ch.3.1)	Poor outcome in P4P	35.11	1.95	0.004	37.35	1.52	0.048	36.22	1.65	0.001	55.00*	2.00	0.003
	Good outcome in P4P	38.49	1.57		41.58	1.89		41.05	1.41		61.00*	2.00	
Number of patients 2–69 years old (Ch.3.2)	Poor outcome in P4P	1351.96	20.37	0.441	1326.09	16.5	0.044	1292.68	19.13	0.048	1310.12*	20.56	0.001
	Good outcome in P4P	1372.59	18.02		1384.88	20.93		1348.48	16.26		1399.25*	17.82	
Number of patients 70+ old (Ch.3.3)	Poor outcome in P4P	219.04	7.44	0.065	220.58	6.17	0.077	224.96	6.78	0.244	225.91*	6.89	0.834
	Good outcome in P4P	196.75	6.31		201.69	7.48		211.71	6.48		220.55*	6.55	
4. Composition of the patient diseases (chronic diseases)													
Patients with type 2 diabetes (Ch.4.1)	Poor outcome in P4P	47.63	1.86	0.782	72.55	2.12	0.064	76.04	2.39	0.660	77.16	2.46	0.570
	Good outcome in P4P	47.62	1.67		64.34	2.21		73.23	2.11		77.09	2.14	
Patients with hypertension stage 1 (Ch.4.2)	Poor outcome in P4P	67.81	3.83	0.005	162.56	5.69	0.095	137.43	4.58	0.865	125.55	4.08	0.022
	Good outcome in P4P	84.53	4.41		147.99	6.74		138.46	4.59		141.30	4.42	
Patients with hypertension stage 2 (Ch.4.3)	Poor outcome in P4P	175.78	7.92	0.002	196.55	7.15	0.012	210.82	7.27	0.023	212.44	7.22	0.029
	Good outcome in P4P	140.25	6.33		164.07	7.36		190.48	6.77		193.41	6.66	
Patients with hypertension stage 3 (Ch.4.4)	Poor outcome in P4P	34.9	2.43	0.747	39	2.05	0.704	53.22	2.86	0.247	56.20	2.96	0.083
	Good outcome in P4P	35.58	2.6		40.66	2.89		49.43	2.52		50.43	2.51	
Patients with myocardial infarction (Ch.4.5)	Poor outcome in P4P	14.34	0.69	0.330	21.86	0.75	0.429	22.45	0.84	0.332	22.90	0.83	0.015
	Good outcome in P4P	14.93	0.63		20.86	0.89		23.58	0.82		25.81	0.84	
Patients with hypothyreosis (Ch.4.6)	Poor outcome in P4P	23.39	1.1	0.713	41.22	1.53	0.479	44.09	1.77	0.109	41.65	1.59	0.001
	Good outcome in P4P	22.92	0.94		36.42	1.17		44.26	1.29		46.07	1.33	

Notes: * in 2012 0–3 years and 3–70 years.

Notes: SRD: specific reading disability, LIRD: language impairments and reading disability.

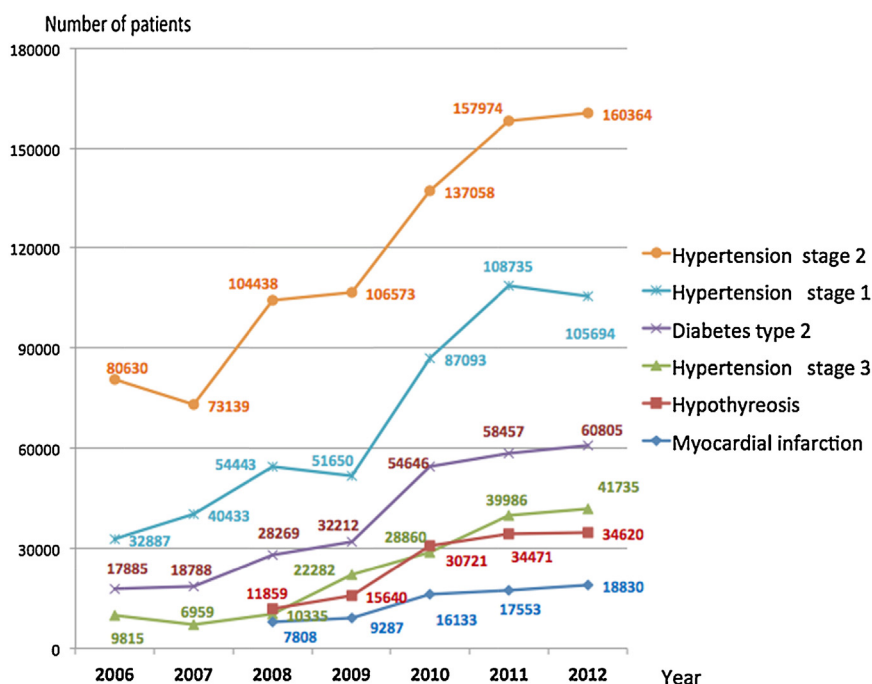


Figure – Number of patients of family doctors by groups of chronic diseases in 2006–2012.

care teams with multiple FDs were probably able to organize their work more efficiently to achieve a good outcome. It is shown by other studies that group practices have better outcomes and patient satisfaction, as well as better continuity of care [20].

The National Chronic Disease Strategy states that chronic diseases have clearly preventable risk factors, therefore early detection of them is very important to reduce the onset, causes, complications or recurrence of disease [21]. In addition, in Estonia FDs should produce a register of all patients with chronic diseases, search intensively for preventable risk factors and provide counseling and treatment. This means an increased workload and more pressure on primary care team members. To achieve the goals and maintain them in the future there are two possibilities: to reduce the number of patients on FDs' lists or increase the number of primary care team members. Paying more attention to detecting chronic diseases in their early stages, recalling patients for general health check-ups and immunizing children has an effect on the workload [17].

At the same time, those activities can increase the number of the patients in the target groups of chronically ill patients, due to a “seek and you will find” strategy, and intensifies the work thereof even more. In our study, the number of patients in groups of hypertension, type 2 diabetes, myocardial infarction and hypothyreosis increased greatly during 2006–2012 (Figure).

The P4P system has its advantages and disadvantages. FDs joined to P4P are probably more motivated to achieve good outcomes, deal more intensively with all patients on their lists, detect and control chronic diseases and organize preventive work. P4P also increases FDs' income and gives more resources for investigations [22]. Disadvantages of P4P are increased workload and financial payment is not always directly

associated with expected health gain or quality adjusted life years [23].

5. Strengths and limitations of the study

The strength of the study is that we have used the data of the majority of the population and all FDs have been involved to the study. A limitation of this study is that the data obtained from the registry database because register data can contain some data-entry errors and the reliability of the source data cannot be checked without conducting a follow-up study. Health service invoices that are electronically submitted to the EHIF are governed by specific rules. Previous studies on data quality in the Cancer Registry and Birth Registry have shown that although medical data in the registries are reliable, the descriptions of diagnoses can be erroneous or inadequate. We assumed that any inaccuracies were distributed evenly all over the Estonian population. Chronically ill patients are included into FDs P4P observation list only if the same patient has the same diagnosis minimum 3 times, to exclude data entry errors and misdiagnosis.

6. Conclusions

P4P is a motivation system with financial reward that forces FDs for a good outcome. Even though the number of FDs achieving a good outcome increased during the observation period from 6% to 53%, there are still some other aspects which could have an influence on a good outcome. Primary care teams with a higher number of FDs, longer history of participation in P4P and the smaller number of patients on FDs' lists showed better results. The composition of patient

with chronic diseases in FDs list has no significant effect on a good outcome, but the P4P system increases the number of disease-diagnosed patients.

Conflict of interests

The authors declare that they have no competing interests.

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