Enrollment Procedures and Self-Selection By Patients: Evidence From A Family Practice in Krakow, Poland

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Summary

This paper examines the consequences of patient enrollment procedures in a capitation-based family practice in Krakow (Poland), where the local city government used two different methods for preparation of patient lists. In the first, the city gave the individuals living within the practice area the option of withdrawing from being enrolled in the practice; in the second, individuals were given the option of enrolling in the practice. These two enrollment procedures, identified as "active-negative" and "active-positive" respectively, provide a natural experiment for investigating the effects of an enrollment methodology on the economics of a physician's practice. An examination of the data indicates that self-selecting enrollees utilize significantly greater quantities of health care compared to others, and university educated individuals and individuals more likely to fall ill are more likely to self-select into a practice. The study suggests that in order to reduce demand-side adverse selection, either the system of active-positive enrollment should be modified, or capitation rates should be risk-adjusted by health status than by demographic variables only. The policy implications of this study become even more significant as more and more physicians leave their salaried jobs to start state-financed independent practices.

Keywords: Capitation, Enrollment, Patient Lists, Health Care Financing, Poland

1. Introduction

Since 1990, the government of Poland has introduced a number of reforms in the finance, management and organization of the health sector, mostly in keeping with the overall shift from a centrally planned communist system to a free market economy. One reform that is rapidly gaining wide acceptance is the separation of finance and provision of health care, and one of the ways that it is being implemented is a shift from salary-based physician employment to new payment mechanisms such as capitation and fee-for-service. Many provincial ("voivod") and city governments are adopting this change in the expectation that the new incentives following the reform will lead to a number of important benefits in efficiency and quality of care. In the process of shifting to a capitation payment system, these governments have had to address a variety of issues ranging from legal basis of capitation contracts to determination of per capita amounts, risk-adjustments, basket of services and enrollment of prospective patients. In this paper we draw upon the experience of the city of Krakow and examine the implications of different enrollment strategies that have been tried by the local government.

The city of Krakow is responsible for providing primary health care to the 745,000 inhabitants, while the voivod is responsible for hospital-based care. The city-financed primary health care in Krakow is delivered by over 367 salaried physicians in 49 outpatient clinics managed by 4 relatively autonomous health administration units (zespol opieki zdrowotnej, or "zoz"). Since April 1996 when capitation payments were first introduced, 24 physicians in 11 practices have moved from salary-based employment to capitation contracts. This number is expected to increase very rapidly, as the pace of the city reforms picks up and gains significant momentum in 1998. Indeed, it is expected that the number of physicians under capitation and the number of enrolled people will increase dramatically from 24 and 5,000 respectively to about 120 and 240,000 respectively by end of 1998.

Capitation-based physician payment was started in April 1996 with the introduction of family medicine in Krakow. Started with financial assistance from international donors, the first few family practices have been set up as models to exemplify not only the wider and comprehensive scope of family medicine, but also to highlight the superior quality of services that better structures and processes can potentially bring. Thus, the first few family practices offer personalized and comprehensive services in relatively well-equipped clinics characterized by clean and spacious waiting rooms, friendly reception and registration services, and competent staff, and patients presumably would perceive quality of services in these clinics to be better than public facilities.

Initially, the city authorities followed a two-step procedure in preparing patient lists for these clinics. First, the neighborhood was reviewed and a specified area was selected for practice. A list of inhabitants of the area was obtained from the central register and a tentative list of expected enrollees was prepared. Second, the city health department wrote to everyone on the list explaining the proposal that health care for all inhabitants of that area could be taken over by the family practice. The addressees were given the choice of acceptance, and the choice was required to be conveyed in an "active-negative" response: the addressees were required to inform the city only if they did not accept the new family practice; non-response implied acceptance. This practice was revised subsequently, with a shift from active-negative to "active-positive" response: non-response implied non-acceptance. Thus, an individual had to register in the rolls of the practice, and up to 2,500 enrollees were allowed per physician. At the same time, enrollees from outside the specified area could also be accepted. In effect, this meant that any resident of Krakow could enroll in a capitation-based family practice, within limits set by the city.

These two enrollment procedures have presumably allowed different types of individuals to join the practice, and to this extent provide a natural experiment for investigating the effects of an enrollment methodology on the economics of a physician's practice. This becomes particularly important when the only risk-adjusters used in setting capitation rates are demographic. We conduct this study in one of the first family practices in Krakow. Our findings indicate that self-selecting enrollees utilize significantly greater quantities of health care compared to others. We also find that individuals more likely to fall ill are more likely to self-select into a practice. We believe that the implications of this study, the first of its kind in Poland, are very important to rate-setting and macro-viability of this trend, as more and more physicians leave their salaried jobs to start state-financed independent practices.

The rest of the study is organized as follows. We present a brief review of the literature in the next section, followed by a short note on the data collection process in section 3. Section 4 contains the descriptive as well as regression analysis, and the paper ends with a discussion in section 5.

2. Review of literature

While the extant literature is rich in studies on capitation payment systems, we do not find any reference to the enrollment procedures of the type used in Krakow. However, there is considerable discussion in the literature on rate-setting, and we draw upon some of the relevant conclusions to guide our investigation.

Since the 1980s a large number of countries have experimented with alternate medical care delivery and financing systems, including capitation, as methods of payment for physicians [1, 2, 3, 4, 5, 6, 7, 8]. Physicians under capitation receive a lump sum per capita payment, intended to cover a fixed basket of services. Capitation rates are usually based on future expenditures determined through an assessment of predictable risks or events including demographic variables, and more recently, such variables as previous diagnoses, self-reported health status and previous utilization [3, 4, 6, 7, 8]. Since no additional payment is made regardless of the services provided, the composition of the enrolled group plays an important role in determining the extent of financial risk borne by the physician. Unless capitated payment rates can be adjusted for enrollee health status, physicians with patient populations that are sicker than average will be at a financial disadvantage. Sick patients may also be in jeopardy, since capitated physicians have a financial incentive to select healthier individuals, and groups with individuals more likely to demand health care will be less attractive to the physician.

In the absence of risk adjustment, capitation rates are likely to overpay physicians and hospitals for healthier patient groups and underpay for less healthy groups that use relatively more services. As a result, biased selection where physicians and insurers favor healthier individuals has become a problem due to the failings of many such capitation formulas [3, 4, 6, 7, 8]. There has been considerable interest among payers and physicians alike in determining the nature and extent of selection bias, and a number of risk-adjustment methods have been developed to compensate for differences in case mix. Models based solely on demographic variables (e.g. age, sex and place of residence) have been shown to not reflect expected costs accurately, since they do not incorporate any adjustment for the risk group of the patients [4, 6, 7, 8]. Measures such as self-reported health status predict future expenditures much twice as well as demographics [3, 4]. Other measures studied in the literature include functional status, prior utilization, and clinical descriptors such as the existence of an acute or chronic condition, and these are also known to be good predictors for total medical expenditures, hospital utilization as well as for ambulatory utilization, though less so for the latter [3].

3. Methods and Data

The database for this analysis combines enrollment information, past medical records and current usage records for the period July-December, 1996, of 886 enrollees in one of the earliest family practices in Krakow to accept capitation payments. This practice is managed by three full-time physicians and has about 2,300 enrollees. We choose this practice for two reasons. First, this is the only practice that we are aware of where the patient list is prepared using both, the active-negative as well as active-positive methods. This presents us with a rich data that allows a useful comparison. Second, we had access to patient data and medical records in this practice. We ensured confidentiality by assigning random identity codes to patient's records, and by employing data-entry personnel different from those assigning identity codes.

Descriptive statistics of the full sample are presented in table 1. The first three subsections, i.e., the demographic, occupation and education profiles were obtained from information provided by the individual at the time of enrolment. The information in subsection 4, i.e., the enrolment method, was available with the city as well as the practice from where the sample was drawn. An individual health's history was taken from previous medical records, maintained by the government clinics where the patient sought care before joining the practice. And finally, the health utilization data was obtained from patient's records as maintained by the practice.

We note that the average age of the sample is 35.5 years. About 10% of the sample is below 7 years, 72% between the ages of 7 and 59, and 18% 60 years or more. We choose these age-groups in keeping with the age-adjusted capitation payment made by the city to the physician, in which the weights attached to the three categories of children, adults and the elderly are 1.3, 1 and 1.8 respectively. In the occupation profile, we define student as anyone who attends school full-time, irrespective of whether he has any income from any job. About half of the sample is salaried, 1% self-employed, 17% retired and 12% unemployed.

Half of our sample joined the practice following the active-positive route. We formed an index of an enrollee's health history by examining the records that were handed over by the government clinic to the practice. Unfortunately, these records had not been maintained in any uniform manner, and many part of the records were difficult to read. Patients were categorized as having "some history of illness" if: (i) there was any record of treatment for chronic illnesses (like diabetes, blood pressure, asthma, etc.); (ii) the patient visited the government clinic more than 6 times, equivalent to the average utilization rate for the city plus one standard deviation, in any of the last three years; or (iii) there was any record of hospitalization in the patient's case history during the last three years. In our sample of 886, 35% of the enrollees had some previous history of illness according to one or more of the three criteria.

Finally, data on health utilization was obtained from current usage records that are maintained in the clinic. These records are readable and accurate, and provide complete information on each and every aspect of treatment, including visits, referrals, and all tests carried out.

4. Analysis

In our sample of 886 enrollees, 445 are from the active-positive list and 441 from the active-negative list. There are many differences in the profile of these groups (table 2). The active-positive list comprises significantly more self-employed, retired and unemployed individuals, and significantly less salaried employees. As far as education is concerned, the active-positive list has significantly more university graduates than the active-negative list.

As is to be expected, there are significantly more individuals (44%) in the active-positive list with a record of previous illness than in the active-negative list (25%), a clear evidence of self-selection by sicker individuals. Again, as is to be expected, individuals in the active-positive list utilize health services significantly more than those in the active-negative list. The average number of visits by active-positive enrollees is 1.87, which is almost three times the visits made by the active-negative enrollees. Similarly, the active-positive enrollees record five times more home visits by physicians, three times more referrals, three times more diagnostic tests, and four times more laboratory tests as compared to the active-negative enrollees.

There is thus clear evidence that individuals enrolled through the active-positive procedure are more likely to use health services as compared to those who enrolled through the active-negative procedure. In the next step we look at the utilization rates only for those individuals who make at least one visit to the clinic, so as to compare the intensity of use across the two groups.

Utilization statistics are presented in table 3. Here again we find significant differences in utilization between the two groups, though the extent of difference is much smaller. Thus, 237 individuals in the active-positive list visited the clinic 835 times during the six-month period, at an average visit rate of 3.52 per person, as compared to 3.02 per person on the active-negative list. Similarly, 25 individuals from the active-positive list had 51 home visits by physicians, at an average of 2.04 visits compared to 1.43 for the active-negative group. The averages for referrals, diagnostic and laboratory tests are also higher for the active-positive group, at 1.65, 1.65 and 4.83 respectively, as compared to the corresponding figures of 1.29, 1.26 and 3.42 for the active-negative group. While these differences are statistically significant, they are not as large as differences in utilization across the two groups in the whole sample.

It is interesting to note that prior health status for both groups after controlling for those who made at least one visit to the clinic is very similar. 42.2% of individuals in the active-positive group and 42.4% in the active-negative group had some history of illness.

Finally, we ran a probit regression to identify factors affecting an individual's decision to enroll on the active-positive list. We expect generally sicker individuals to be more pro-active in choosing their primary care physician compared to individuals with little or no history of prior illness. Therefore, since older people are more likely to demand more care, we also expect them to make an active choice regarding their primary health care provider. Employment and education are likely to play some role in this decision as well, with the more educated individuals probably being more particular about choosing their physician. We therefore included age, gender, history of illness, employment and education profile as regressors in this equation. Since only about 20% of the total population of enrollees joined the family practice via the active-positive list and our sample is equally distributed across both active-positive and active-negative lists, we use population weights in the probit regression.

Of all the factors that can potentially affect an individual's decision to actively enroll in the practice, we find previous history of illness and university education to be the most significant. The negative sign on the probit coefficient in model 1 is surprising, and we therefore estimated model 2 categorizing age into three groups: child (age 0-6 years), adult (age 7-59 years) and elder (age 60+ years), using adult as the control group. The results did not change in any significant manner.

We also compute the marginal effects of a change in a regressor on the probability of choosing the active-positive list. In both models that we estimate, the probability that an individual with a history of illness will follow the active-positive enrollment procedure is 15% to 16% higher than an individual with no history of illness. Similarly, a university graduate is 13% to 15% more likely to enroll through the active-positive list than an individual who has not completed university education. A surprising result is the high (though insignificant) marginal effect associated with being self-employed, who are 15%-20% more likely to enroll through the active-positive list. However, since there are only 9 self-employed individuals in our sample, this result is not conclusive.

5. Discussion

Krakow city had a health budget of about 105 million zlotys in 1997. Out of this, the health department allocated a budget for each zoz to meet its recurrent expenses, based on per-capita rates weighted by age-adjusters of 1.3 for every individual less than 7 years of age, 1.0 for every individual 7 to 59 years of age, and 1.8 for every individual 60 years or more. At the same time , the city also contracted directly with some family practices using the same formula as offered to the zozs to provide a similar basket of services (except dentistry) to their patients. Thus, the contracted family practices also provide primary and specialist consultation services, diagnostic and laboratory tests, nursing and rehabilitation services, and minor surgeries. While many of these services are provided by the family physicians themselves, others are arranged from elsewhere but financed by the practice. For example, it is the responsibility of the practice to arrange and pay for all specialist referrals. In this sense, the family practices in Krakow are fund-holders on behalf of the city for almost all types of non-inpatient services.

Future physicians contracts will be signed by the zozs instead of the city, and some of the early discussions reveal that the many zoz Directors favor the use of similar age-adjustment weights for the new contracts as well. Even though age-adjusted capitation rates are not as good predictors of cost as rates based on other risk factors like self-reported health status, they approximate average expenditures fairly well if the group size is large and the group is assembled for a purpose other than buying health. Thus, age-adjusted rates for entire zoz populations as large as 150,000 tend to reflect costs quite accurately. Even for smaller practice sizes of 2,500 to 3,000 age-adjusted group rates would perform well if the group is assembled on the basis of such criteria as place of work, street address, etc., unless there is a particular reason to believe that people belonging to a specific workplace or residing in a specific neighborhood are especially vulnerable to health disorders. However, it is difficult to construe a good 'average' rate or define a 'typical' user if individuals can self-select, since they know better than the provider about their particular health conditions and the propensity to become sick. In such cases, age-adjusted capitation rates are likely to under-predict the true costs to the physicians of providing health services.

We find considerable evidence of this demand-side adverse selection problem in the practice that we have studied. On an average, an individual who joins the practice following the active-positive process is likely to make three times more clinic visits, demand five times more home-visits by physicians, require four times more specialist referrals and use four times more diagnostic and laboratory services, and is thus likely to be much more costly to the physician compared to a patient who joins the practice following the active-negative procedure. It is thus reasonable to expect physicians to avoid enrolling such patients in their practices. Since the language of the existing city-physician contracts does not require the physician to accept every patient who expresses a desire to join the practice, physicians may introduce the practice of requiring some form of check on the prospective enrollee's health history, like a physical examination or a pre-test, all of which eventually adds to expenses. And even after accepting the individual, the physician may use subtle means to restrict treatment, a constant concern with any capitation-based system.

This does not bode too well for the future of capitation-based contracts in Krakow, for till such time that either the rate-adjustment formula or the enrollment practice is changed, either of the physician and the patient group will remain dissatisfied. And given that physicians usually have better information about severity of illness than patients, it is likely that the higher-risk patients will be adversely affected. The voivod-financed hospitals may also start experiencing higher referrals from the primary care system, since hospitals also provide a large number of specialist services. Of course, it is likely that the problems of demand-side adverse selection and under-treatment by physicians will reduce as the number of contracted practices increases. On the one hand, prospective enrollees will now choose between two non-government practices as opposed to making a choice between a presumably 'good' practice and a government clinic, thereby spreading the riskier patients across more practices instead of concentrating them in only one. On the other, competition between practices to enroll and retain consumers is likely to prevent under-treatment.

Our study suggests that it is indeed worthwhile for the city to develop capitation rates risk-adjusted by health status than by demographic variables. At the same time, the system of active-positive enrollment should also be modified to allow for group enrollment in a manner that retains the patient's right to choice of physician, and yet prevents widespread demand-side adverse selection.

References

1. Baines, Darrin L. and David K. Whynes. (1996) "Selection Bias in GP Fundholding." Health Economics. Vol. 5: 129-140.

2. Bodenheimer, Thomas and Kevin Grumbach. (1994) "Reimbursing Physicians and Hospitals." JAMA. September 28. Vol. 272: No. 12; 971-977.

3. Epstein, Arnold M and Edward J Cumela. (1988) "Capitation Payment: Using Predictors of Medical Utilization to Adjust Rates." Health Care Financing Review. Vol. 10: pps. 51-69.

4. Fowles, Jinnet B., et al. (1996) "Taking Health Status Into Account When Setting Capitation Rates." JAMA. October 23/30. Vol. 276: No. 16; 1316-1321.

5. Glennerster, Howard and Manos Matsaganis. (1993) "The UK Health Reforms: The Fundholding Experiment." Health Policy. Vol. 23: pps. 179-191.

6. Luft, Harold S and Robert H Miller. (1988) "Patient Selection in a Competitive Health Care System." Health Affairs. Vol. 7: pps. 97-119.

7. Matsaganis, Manos and Howard Glennerster. (1993) "The Threat of 'Cream Skimming' in the Post-Reform NHS." Journal of Health Economics. September. Vol. 13: 31-60.

8. Van Vliet, R. C. J. A. and W. P. M. M. Van De Ven. (1993) "Capitation Payments Based on Prior Hospitalizations." Health Economics. Vol. 2: 177-188.

9. The appropriate marginal effect for a binary independent variable would be the difference in the probability as the value of the binary variable changes from 0 to 1. However, as Greene (1996) notes, taking the derivative with respect to the binary variable as if it were continuous also provides very good approximation.

Table 1: Descriptive Statistics of the Full Sample(N=886)

Variable	***Mean***	***Standard Deviation***
1. Demographic Profile		
Male	0.4831	0.7029
Age	35.523	22.3468
Children (0-6 years)	0.1038	0.3052
Adults (7-59 years)	0.7156	0.4514
Elder (60 + years)	0.1806	0.3849
2. Occupation Profile		
Student	0.2065	0.4051
Salary Employment	0.4910	0.5002
Self-Employed	0.0102	0.1003
Retired	0.1727	0.3782
Unemployed	0.1196	0.3247
3. Education Profile		
Completed Secondary School	0.6163	0.4866
Completed University	0.0993	0.2993
4. Enrollment Method		
Positive List	0.5023	0.5003
5. Health History		
No history of illness	0.6535	0.4761
Some history of illness	0.3465	0.4761
6. Health Utilization		
Visits to the Clinic	1.2788	2.3945
Home Visits by Physician	0.0688	0.4619
Specialist Consultations	0.1704	0.6371
Diagnostic Tests	0.1953	0.6155
Laboratory Tests	0.6535	2.1931

Table 2: Active-Positive and Active-Negative Sub-Samples: Descriptive Statistics (standard deviation in parenthesis)

	Active-Positive List (N=445)	***Active-Negative List (N=441)***
Variable	***Mean***	***Mean***
Male	0.51 (0.86)	0.46 (0.49)
Age	35.54 (23.13)	35.51 (21.55)
Student	0.19 (0.39)	0.22 (0.42)
Salary Employment*	0.44 (0.50)	0.54 (0.49)
Self-Employed*	0.02 (0.13)	0.01 (0.05)
Retired*	0.20 (0.40)	0.14 (0.35)
Unemployed*	0.15 (0.36)	0.09 (0.28)
Completed Secondary School*	0.53 (0.49)	0.70 (0.46)
Completed University*	0.15 (0.36)	0.05 (0.21)
Some history of illness*	0.44 (0.49)	0.25 (0.43)
Visits to the Clinic*	1.87 (2.82)	0.68 (1.66)
Home Visits by Physician*	0.11 (0.62)	0.02 (0.19)
Specialist Consultations*	0.26 (0.83)	0.08 (0.33)
Diagnostic Tests*	0.30 (0.78)	0.09 (0.36)
Laboratory Tests*	1.06 (2.83)	0.24 (1.12)

*: significant at 0.01 level

Table 3: Utilization Rates (sample restricted to those utilizing at least one visit)
Descriptive Statistics (standard deviation in parenthesis)

	Active-Positive List		***Active-Positive List***	
Variable	***Mean***	***N***	***Mean***	***N***
Visits to the Clinic*	3.52 (3.03)	237	3.02 (2.29)	99
Home Visits by Physician*	2.04 (1.74)	25	1.43 (0.53)	7
Specialist Consultations*	1.65 (1.44)	70	1.29 (0.46)	28
Diagnostic Tests*	1.65 (1.04)	81	1.26 (0.63)	31
Laboratory Tests*	4.83 (4.28)	98	3.42 (2.66)	31

*: significant at 0.01 level

Table 4: Probit Model; Dependent variable: Active-positive list=1; Weights: Population Proportion; N=886; (standard errors in parenthesis; partial derivatives computed at variables' means)

Variable	***Model 1***		***Model 2***	
	Coefficient	***Partial***	***Coefficient***	***Partial***
Constant*	-0.7662 (0.1628)	-0.2030 (0.0415)	-0.7168 (0.2798)	-0.1900 (0.0733)
Age	-0.0066 (0.0052)	-0.0017 (0.0014)		
Male	0.1044 (0.0809)	0.0276 (0.0214)	0.1061 (0.0810)	0.0281 (0.0215)
Bad Health*	0.5549 (0.1403)	0.1470 (0.0371)	0.5865 (0.1474)	0.1555 (0.0390)
Salaried	-0.0505 (0.2542)	-0.0134 (0.0673)	-0.2840 (0.2945)	-0.0753 (0.0781)
Retired	-0.0204 (0.3572)	-0.0054 (0.0946)	-0.2570 (0.3492)	-0.0681 (0.0926)
Student	-0.1882 (0.1858)	-0.0499 (0.0492)	-0.3007 (0.2738)	-0.0797 (0.0726)
Business	0.8291 (0.6528)	0.2196 (0.1732)	0.5644 (0.6711)	0.1496 (0.1781)
Highest Grade:	-0.1264	-0.0335	-0.1832	-0.0486
Secondary	(0.1806)	(0.0478)	(0.1781)	(0.0472)
Highest Grade:	0.5709	0.1513	0.4903	0.1299
University*	(0.2358)	(0.0626)	(0.2392)	(0.0636)
Child (<7)	-0.1538	-0.0408	(0.2873)	(0.0762)
Elder (60+)	-0.2968	-0.0787	(0.2277)	(0.0604)
Log-Likelihood	-410.2257		-410.0360	

*: significant at 0.01 level