

Health care expenditures after introduction of a gatekeeper and a global budget in a Swiss health insurance plan

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Abstract

Study objectives—To assess whether the introduction of “managed care” (capitated budget and utilisation control by general practitioners) in a Swiss health insurance plan caused a selective disenrolment of plan members, and whether it achieved its goal of reducing health care expenditures.

Design—Controlled before-after analysis of health insurance claims.

Setting—Health insurance plan of the University of Geneva, Switzerland, which introduced managed care at the end of 1992, and comparison plan, which reimbursed health care expenditures without setting a budget or controlling access.

Participants—Analysis of self selection: university plan members who accepted (3993) or refused (659) transfer to managed care. Analysis of change in expenditures: cohorts of persons continuously enrolled in the university (1575) and comparison (3384) plans in 1992 and 1993.

Main results—During 1992, the year before the transformation of the university plan, persons who refused managed care had generated 35% higher expenditures than those who accepted managed care ($p < 0.001$). Between 1992 and 1993, expenditures per member decreased by 9% in the university cohort and increased by 11% in the comparison cohort ($p = 0.004$). Technical procedures (laboratory tests, physical therapy, drugs) decreased most in the university plan. No impact on hospital admissions was detected.

Conclusions—Introduction of gatekeeping and budget management by physicians caused a favourable self selection process for the university plan. In addition, the managed care plan achieved a substantial decrease in overall health care expenditures in its first year of operation, chiefly by reducing outlays for technical procedures.

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Capitated budgets and control of the utilisation of health services by primary care practitioners have been successfully used for decades by the NHS to contain health care expenditures. These tools are being rediscovered by countries such as the United States and Switzerland whose health care systems have traditionally separated the provision and financing of health services. These countries, faced with runaway

health care costs, increasingly encourage the development of organisations (called health maintenance organisations or managed care organisations) that provide all necessary health services to a defined population for a fixed fee.¹

In Switzerland, health insurance is provided by competing private insurance plans. These indemnity plans reimburse the health care bills of their members on a fee for service basis, but have no means of influencing the utilisation of health services. This situation was changed in 1990, when a federal law authorised the creation of insurance plans “with limited choice of health care provider”. A limited number of these plans were created in subsequent years. In 1992, the indemnity plan of the University of Geneva was transformed into such an organisation. Unlike traditional plans, the organisation used general practitioners to control access to specialised care (gatekeeping), and worked within a fixed annual budget managed by physician managers. These changes caused a decrease in plan members’ satisfaction with medical care, but an increase in their satisfaction with insurance coverage. No impact on health status was detected one year after implementation of the new plan.² This study examines whether or not the managed care plan achieved its goal of reducing health care costs, by analysing insurance claims data. Because some plan members refused the new system and disenrolled, we also sought to understand whether this self selection process was beneficial or detrimental to the managed care plan.

Methods

STUDY SETTING

Managed care was introduced in the group health insurance plan for students at the University of Geneva in October 1992. All members of the University plan were automatically transferred in the managed care plan.^{2, 3} This change was announced during the summer break, and plan members were given only one month to resign and subscribe to an individual insurance policy if they refused this modification of their insurance contract.

Two mechanisms were used to manage care in the new plan. Firstly, access to specialised care was controlled by general practitioners (gatekeeping), but free access to paediatricians, gynaecologists and to emergency care was maintained. The managed care plan itself did not deliver specialised care but referred patients to independent practitioners. In the former university indemnity plan, as well as in

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Table 1 Organisational features of the Geneva (Switzerland) University managed care plan, as compared with indemnity insurance plans in Geneva in 1993

Feature	Managed care plan	Indemnity insurance
Global budget	Yes	No
Coverage	As specified by law on mandatory health insurance	As specified by law on mandatory health insurance
Choice of primary care physician	Only gatekeeper affiliated with the managed care plan	Unrestricted
Choice of specialist	Unrestricted in case of emergency Only through referral from gatekeeper Unrestricted for gynaecologists and paediatricians	Unrestricted
Payment of physicians	Gatekeepers: on salary Others: fee for service	Fee for service
Monthly insurance premium	120 Swiss francs for persons > 25 years old	Variable, in general 25% more expensive than in managed care, 165 Swiss francs in comparison plan for persons > 25 years old
Copayment	None for authorised care, 50% for specialised care not authorised by gatekeeper	10% for ambulatory care, up to a maximum of 450 Swiss francs
Annual deductible	150 Swiss francs	None for hospital inpatient care 150 Swiss francs

all other insurance plans in Geneva at this time, access to specialists was unrestricted. The second innovation was the introduction of a global budget, established on a capitation basis and managed by a group of physician managers. One thousand Swiss francs (approximately £500) per plan member and per year were paid by the insurance company to the physician managers to reimburse all medical services. The financial risk continued to be supported by the insurance company, but a possible surplus was to be attributed to the physician managers. The physician managers did not themselves treat patients, but they supervised the work of the gatekeepers and checked the bills from independent specialists and from hospitals. The gatekeepers were young general practitioners, paid on salary by a pre-existing local clinic. In both plans and during the whole study period, health care providers, including the clinic where gatekeepers worked, were paid on a fee for service basis. All medical services, tests and other procedures in the two plans were paid according to the customary rates in Geneva (table 1).

STUDY DESIGN AND POPULATION

The study is divided in three parts.

Changes in total expenditures among all plan members

We examined refundable health care costs per plan member in the university plan and in a comparison indemnity insurance plan in 1992 (the year before the introduction of managed care) and 1993 (first year of managed care in the university plan). Members of the comparison plan were mostly workers, few were university students.² The comparison plan was chosen for practical reasons: it was administered by the same insurance company as the university plan, and its members were also young adults living in Geneva. Participants in this part of the study consisted of all persons who were ever insured in one of the two plans in 1992 or 1993.

Changes in health care expenditures between 1992 and 1993 can be attributed both to self selection and to the impact of health care management. These two points were considered separately.

Analysis of the self selection of plan members

Fourteen per cent of members resigned in September and October 1992, when managed care was introduced in the university plan. In questionnaire surveys, they indicated that they disenrolled primarily because of the loss of free

Table 2 Refundable health care expenditures per plan member in the Geneva University insurance plan in 1992 (indemnity insurance) and 1993 (managed care), and expenditures in a comparison plan permanently under indemnity insurance (all plan members)*

	University plan				Comparison plan			
	1992 Usual care	1993 Managed care	Change (%)	p Value on change†	1992 Usual care	1993 Usual care	Change (%)	p Value on change†
Average number of members	3995	3671	-8.1	—	11637	16144	+38.7	
Mean age (SD)	28 (8.8)	28 (8.4)	—	0.05	25 (14.6)	26 (15.5)	—	<0.001
Proportion of men (%)	48.6	49.3	+0.6	0.55	47.0	47.5	+0.5	0.41
Total expenditures per person	1197	975	-18.5	<0.001	1174	1251	+6.6	0.027
Expenditures for:‡								
physicians	324	345	+6.5	0.10	400	394	-1.5	0.46
drugs	172	122	-28.9	<0.001	142	163	+14.8	<0.001
lab tests	98	55	-43.5	<0.001	84	84	0	0.89
x rays	26	18	-30.9	0.02	15	21	+40.0	<0.001
psychiatric care	214	186	-13.0	0.28	19	31	+63.2	<0.001
physical therapy	48	21	-55.3	<0.001	0.5	1	+98.1	0.05
inpatient care	95	97	+2.6	0.87	331	352	+6.3	0.39
hospital outpatient care	122	78	-36.1	<0.001	84	99	+17.9	0.008
walk in clinics	37	15	-59.7	<0.001	54	57	+5.6	0.42

*After weighting for the number of months of presence in the plan. †Independent samples tests (underestimate the true significance, as some persons appear both in 1992 and 1993). ‡Expenditures per plan member in Swiss francs (1 Swiss franc is approximately £0.4).

Table 3 Comparison of persons who resigned from the Geneva University health insurance plan when managed care was introduced, and of persons who accepted managed care

	Resigned in September/October 1992	Accepted managed care	Difference(%)	p Value on difference
Number of plan members	659	3993	—	—
Mean age (SD)*	27.6 (9.5)	27.8 (8.8)	—	0.77
Proportion of men (%)*	46.3	49.0	-2.7	0.26
Expenditures in 1992 for:†‡				
physicians	440	319	+38	<0.001
drugs	259	166	+56	<0.001
lab tests	136	96	+42	0.003
x rays	33	26	+27	0.37
psychotherapy	236	219	+8	0.77
physical therapy	75	46	+63	0.01
hospital inpatient care	121	94	+28	0.40
hospital outpatient care	135	125	+8	0.65
walk in clinics	52	36	+44	0.06
Total expenditures in 1992*	1599	1185	+35	<0.001
Total expenditures in 1991‡	1283	1058	+21	0.01
Total expenditures in 1990‡	1122	983	+14	0.12
Total expenditures in 1989‡	797	726	+10	0.31

*Weighted for duration of affiliation in 1992. †Expenditures in Swiss francs (1 Swiss franc is approximately £0.4). ‡Weighted for duration of affiliation during the corresponding year.

choice of physician and because they feared that the managed care plan would provide care of inferior quality.⁴ We compared those who resigned (“resigners”) to those who joined the managed care plan (“joiners”), in terms of past health care expenditures.

Cohort study

To remove the effect of self selection, we followed up cohorts of persons who remained continuously insured in the university plan or in the comparison plan in 1992 and 1993. Expenditures during 1992 were compared with expenditures during 1993. Participants were 18–44 years old in 1992 and had been members of their respective plan from 1 July 1991 to 31 December 1993. Only persons who enrolled at least six months before the beginning of the period under analysis were included, to avoid errors resulting from the low utilisation of health services among recently registered persons during their first months of membership.

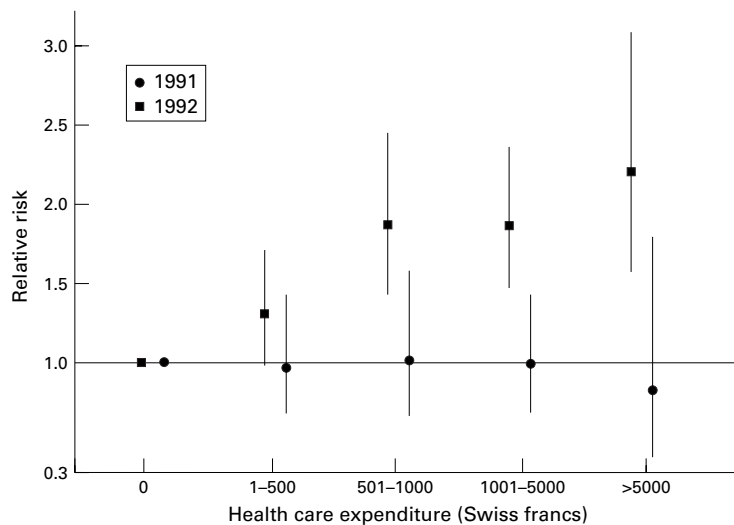


Figure 1 Relative risk (95% confidence intervals) of resigning from the Geneva University health insurance plan in September/October 1991 (round symbols) and in September/October 1992 (after the introduction of managed care, square symbols), according to the level of health care expenditures during the corresponding year.

DATA

We analysed the database used by the insurance company for its administrative management. For each person, the database indicated birth date and sex, the dates when affiliation in the insurance plan began and ended, and the refundable expenditures for each year from 1989 to 1993. Insurance coverage was the same in the university plan before and after the introduction of managed care and in the comparison plan. Refundable services were as specified by the Swiss law on health insurance. Data were entered in the computer files by the same personnel for both plans, at the office of the insurance company. Prices for health services were identical in the two plans. Expenditure data in the two plans during the whole study period were therefore comparable.

ANALYSIS

Comparing all plan members

Because some members were not insured during the whole year, average annual costs per person and proportions of plan members who generated expenditures were computed after weighting for the number of months of affiliation in the plan (for 12 months of presence, weight = 1; for six months of presence, weight = 0.5, etc). In each group, independent samples *t* tests were used to assess change in expenditures between 1992 and 1993. As expenditures in 1992 and 1993 were not entirely independent (many persons were present both in 1992 and 1993), the use of independent samples *t* tests is conservative and underestimates the true statistical significance of change.

Self selection study

Annual expenditures from 1989 to 1992 among “resigners” and “joiners” were compared, for each expenditure category. Comparisons of resigners and joiners and computation of the relative risk of resigning were weighted for the number of months spent in the insurance plan during each year.

Table 4 Refundable health care expenditures for two cohorts of plan members: persons permanently insured in 1992 and 1993 in the Geneva University insurance plan and in a comparison indemnity plan

	University cohort (n = 1575)				Comparison cohort (n = 3384)				
	1992 Usual care	1993 Managed care	Change (%)	p Value on change*	1992 Usual care	1993 Usual care	Change (%)	p Value on change*	p Value on difference in change†
Total expenditures	1461	1332	-8.8	0.015	1847	2058	+11.4	0.008	0.004
Expenditures for:‡									
physicians	353	400	+13.4	0.004	565	584	+3.4	0.22	0.29
drugs	194	162	-16.5	0.001	198	247	+24.9	<0.001	<0.001
lab tests	109	73	-32.8	<0.001	140	144	+2.9	0.52	0.001
x rays	26	23	-11.1	0.49	25	34	+31.9	0.024	0.065
psychotherapy	333	337	+1.1	0.88	36	52	+42.6	0.021	0.56
physical therapy	53	32	-40.1	<0.001	1	0	0	0.93	<0.001
hospital inpatient care	116	140	+20.7	0.44	619	681	+9.9	0.35	0.61
hospital outpatient care	165	97	-41.1	<0.001	112	153	+37.4	0.001	<0.001
walk in clinics	42	21	-50.0	<0.001	79	84	+7.5	0.30	0.004

*Paired t test. †Test on difference between plans in change between 1992 and 1993, adjusted for age and sex. ‡Expenditures per plan member in Swiss francs (1 SFr is approximately £0.4).

Cohort study

(a) Health care expenditures per member—Within each cohort, paired t tests were used to assess changes in annual expenditures per person between 1992 and 1993. For each category of expenditures, we computed individual differences between 1992 and 1993 and compared the two cohorts in analysis of covariance models, adjusting for age and sex.

(b) Proportion of persons who generated expenditures—Within each plan, changes between 1992 and 1993 in the proportions of plan members who generated expenditures were assessed with the McNemar's test for matched data.⁶ The two cohorts were compared for changes between 1992 and 1993 by testing the heterogeneity of the McNemar's matched odds ratios across groups.⁷ McNemar's odds ratio equals b/c where b = baseline non-users who generated expenditures at follow up, and c = baseline users who did not generate expenditures at follow up. The test for heterogeneity of McNemar's odds ratios compares b/c (university plan) to b'/c' (comparison plan), using the ratio of odds ratios, bc'/b'c.⁷ This analysis was adjusted for age and sex in logistic regression models.

Results

CHANGES IN EXPENDITURES AMONG ALL PLAN MEMBERS

Between 1992 and 1993, expenditures decreased by 19% in the university plan and increased by 7% in the comparison plan (table 2). The proportion of plan members who generated expenditures decreased from 68% to 64%

(p<0.001) in the university plan and remained unchanged at 66% in the comparison plan.

Only four "resigners" of the university plan joined the control plan. This small number of transfers is unlikely to have had an impact on expenditures in the control plan.

SELF SELECTION OF PLAN MEMBERS

Resigners and joiners were similar according to age and sex (table 3). In 1992, resigners had caused 35% higher expenditures per person than joiners, and more resigners (80%) than joiners (69%, p<0.001) had generated costs. Expenditures were higher among resigners than among joiners in each of the years 1989 to 1992. The difference between the two groups was smallest in 1989, and then increased progressively for each subsequent year (table 3).

The probability of resigning from the university plan after the introduction of managed care increased progressively with the level of expenditures in the previous year (fig 1, square symbols). To test the hypothesis that the association between health care expenditures and resignation was specific to September and October 1992, when managed care was introduced, we repeated the same analysis for the preceding year, 1991. The probability to resign in September or October 1991 was not associated with the level of health care expenditures in 1991 (fig 1, round symbols).

IMPACT OF MANAGED CARE ON INSURANCE CLAIMS (COHORT STUDY)

Total expenditures decreased by 9% in the university cohort and increased by 11% in the

Table 5 Proportions of persons who generated refundable health care expenditures, in two cohorts of plan members: persons permanently insured in 1992 and 1993 in the Geneva University insurance plan and in a comparison indemnity plan

Proportions of persons who generated expenditures for:	University cohort (n = 1575)				Comparison cohort (n = 3384)				
	1992 Usual care	1993 Managed care	Difference (%)	p Value on difference*	1992 Usual care	1993 Usual care	Difference (%)	p Value on difference*	p Value on difference in change†
any expenditure	73.1	71.2	-1.9	0.16	71.9	74.4	+2.5	0.002	0.002
physicians	55.0	62.4	+7.4	<0.001	59.6	62.2	+2.6	0.003	0.015
drugs	57.1	55.4	-1.7	0.050	58.5	62.3	+3.8	<0.001	<0.001
lab tests	32.8	26.3	-6.5	<0.001	39.7	40.8	+1.1	0.28	<0.001
x rays	5.7	5.1	-0.6	0.51	5.1	6.9	+1.8	<0.001	0.014
psychotherapy	10.0	9.8	-0.2	0.92	2.6	4.0	+1.4	<0.001	0.002
physical therapy	7.0	4.3	-2.7	<0.001	0.3	0.3	0	1.00	0.25
hospital inpatient care	5.6	6.9	+1.3	0.11	10.5	12.2	+1.7	0.016	0.76
hospital outpatient care	27.5	20.1	-7.4	<0.001	23.4	25.2	+1.8	0.048	<0.001
walk in clinics	12.3	6.2	-6.1	<0.001	15.8	16.1	+0.3	0.68	<0.001

*McNemar test. †Test for difference between insurance plans in change over time, homogeneity of McNemar odds ratio adjusted for age and sex.

comparison cohort between 1992 and 1993 (table 4). The proportion of persons who generated expenditures remained stable in the university cohort, but increased in the comparison cohort (table 5).

Between 1992 and 1993, expenditures for hospital inpatient care remained unchanged in both cohorts. Expenditures for psychotherapy remained unchanged in the university cohort but increased in the comparison cohort. In the university cohort, expenditures for technical services (drugs, laboratory tests, physical therapy) decreased between 1992 and 1993, whereas similar expenditures increased or remained unchanged in the comparison cohort. Expenditures for outpatient treatments in hospital clinics and for care in walk in clinics (outpatient clinics open 24 hours a day) decreased in the university cohort, but expenditures under the heading "physicians" increased.

In the university cohort, expenditures decreased by 17.3% among men between 1992 and 1993 ($p=0.001$), but remained unchanged among women (-3.7% , $p=0.44$). Similarly, the proportion of persons who generated expenditures decreased among men (from 66% to 62%, $p=0.057$) but remained stable among women (80%, $p=0.93$). In the comparison cohort, expenditures increased similarly among men and women.

Discussion

The introduction of gatekeeping by general practitioners and budget management by physicians on a capitation basis in the insurance plan for students at the University of Geneva had two main effects: (1) a self selection process favourable to the insurance company, and (2) a decrease in health care expenditures among persons continuously enrolled in the plan.

SELF SELECTION OF PLAN MEMBERS

The decision to resign from the university plan when managed care was introduced was strongly influenced by the level of use of health services during the previous year. This analysis confirms results of questionnaire surveys conducted in the same population.^{3,4} Lower pre-enrolment use of health services has been observed in most,⁸⁻¹¹ but not all studies that investigated self selection processes between managed care plans and indemnity insurance systems.¹²⁻¹³ Our study brings a new insight by showing that the choice between the two systems was more strongly influenced by recent use of health services than by use during the preceding years. Because of regression toward the mean, it is possible that the long term tendency to use health services is a better predictor of future use than recent utilisation.¹⁴ If so, selection studies based on measures of recent use of health services would overestimate the impact of self selection on future costs.

DECREASE IN HEALTH CARE EXPENDITURES

The decrease in total expenditures in the Geneva University plan was particularly important when compared with the increase

KEY POINTS

- Gatekeeping by GPs and budget management by physicians produced important decreases in health care expenditures in Swiss insurance plan members.
- Decreases in expenditures were achieved chiefly by reducing technical procedures (laboratory tests, drugs, physical therapy).
- The introduction of managed care caused selective disenrollment of the more expensive plan members.

observed in the comparison group. Changes in health care expenditures between 1992 and 1993 were only marginally explained by inflation in prices of health services (2% between 1992 and 1993).¹⁵ Managed care affected health services utilisation in two ways: the use of technical procedures (laboratory tests, medications, physical therapy) decreased, and patient visits were transferred from hospital outpatient clinics and walk in clinics to the category "physicians". The latter category includes both gatekeepers and specialists, but questionnaire surveys conducted in the same population indicated that visits to specialists decreased in the university plan after the introduction of managed care, whereas visits to general practitioners increased.¹⁶ A decrease in visits to specialists after the introduction of gatekeeping was also described in the US.¹⁷ The decrease in the use of technical procedures obtained in Geneva is consistent with results obtained by several American managed care plans.^{1,18,19}

Comparison between Switzerland and other European countries is more problematic, as few other countries rely so heavily on private insurance companies and private health care providers.²⁰⁻²² However, the Geneva managed care plan and the UK system share some characteristics, in particular budget control by physicians and control by general practitioners of access to specialised care. There is no evidence that the UK fundholding system encouraged a shift from specialists to general practitioners.²³⁻²⁵ Decreases in costs for medications were described in some^{26,27} but not all²⁸ studies of fundholding. The decrease in technical procedures in the Geneva managed care plan may have been caused by the particular management style of physicians in this plan. Gatekeepers said that more thorough explanations often enabled them to avoid unnecessary technical procedures, and that coordinating expensive procedures and tests performed by specialists may have reduced the number of duplicated tests.⁵ Finally, gatekeepers prescribed generic drugs whenever possible. Prescription of generic drugs also explains why costs for medications were reduced in some UK fundholding practices.²⁹

Expenditures for inpatient care were higher in the comparison plan than in the university plan. This difference was much more important among women than among men, probably

because hospitalisation for childbirth was more frequent in the control group than among students of the university group. Hospital expenditures remained unchanged after the introduction of managed care in the Geneva plan, which conflicts with results observed in the United States.^{1 30 31} In the UK, the impact of fundholding on hospital costs is still unclear, but it has been suggested that differences in inpatient expenditures between fundholding and non-fundholding practices are explained by fundholding practices having received more money from the NHS than non-fundholding practices.³² The Geneva managed care plan had little control over hospital admissions, as it served mostly young adults, for whom most admissions occur in emergency or for childbirth. In addition, because Swiss hospitals are largely subsidised by the government, hospital charges reimbursed by insurance companies represent only about a third of the actual costs. There is therefore no incentive for any insurance plan to avoid hospitalisation and pay instead for unsubsidised ambulatory care.

Expenditures for psychotherapy were much higher in the university plan than in the comparison plan. Interviews with gatekeepers and physician managers indicated that psychological problems were frequent among members of the university plan, probably because many of them were foreign students facing social integration problems. Gatekeepers said that they did not want to take risks by restricting access to psychotherapy.⁵ Persistence of higher expenditures for psychotherapy after introduction of managed care conflicts with results from American studies, which showed that managed care plans had lower mental health care costs than fee for service plans, even after controlling for level of mental health of plan members.^{33 34} In the UK, it has been suggested that ambulatory mental health care visits increased more in fundholding than in non-fundholding practices.³⁵

Expenditures in the university cohort decreased sharply among men but remained stable among women, which suggests that gatekeeping was an effective means of cost control. As free access to gynaecologists was maintained, women had an alternative unrestricted access to health services.

This study has several limitations. Expenditures were recorded for each calendar year, but the change in insurance contracts occurred during the year, in October 1992. Therefore, the first 2.5 months of the managed care plan were attributed to 1992, even though in our computations, we considered that the whole year 1992 was under usual care. This caused an overestimation of the effect of self selection, because expenditures of joiners probably decreased already during the 2.5 months under managed care in 1992. For the same reason, we probably underestimated the impact of managed care, as the initial decrease in expenditures was attributed to the baseline year.

The generalisability of our findings is limited because members of both plans were young and urban, and because the conditions of the introduction of managed care in the university

plan were unusual (all plan members were automatically transferred into the managed care plan). However, most studies of innovations in health care management are case studies with limited generalisability. Also, our study was limited to the first year of existence of the Geneva managed care plan, which may not be representative of long term performance.

Finally, as in all non-randomised studies, the danger exists that an unmeasured confounder explains between group differences. It is hard to see what confounder would explain changes in health care expenditures over time. The availability of a control group enabled us to take into account historic trends. In particular, health insurance premiums increased in 1993 for all young adults in Geneva, as a result of a new law that imposed equal premiums for adults of all ages. This change may have modified health care seeking behaviours.

In summary, this paper suggests that in Switzerland, managed care plans have a potential to be unfair competitors to other health care plans, because they may attract "low risk" consumers. However, in addition to causing self selection, gatekeeping and budget management by physicians have a potential for controlling expenditures. The comparison of our results with previously published studies show that the effects of health care management tools depend on the system in which they are implemented. Comparisons between different countries have a potential to enhance our understanding of the effects of these innovations.

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