



A PREPAYMENT SCHEME FOR HOSPITAL CARE IN THE MASISI DISTRICT IN ZAIRE: A CRITICAL EVALUATION

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Abstract—In most developing countries, government funding allocated to the health services is not sufficient to allow these services to provide appropriate health care accessible to all. Consequently, community financing has received much more attention in recent years and innovative schemes are being explored throughout the developing world. Risk-sharing schemes, like prepayment, are interesting because of their potential redistributive effects. At the end of the eighties, a prepayment scheme for hospital care was experimented with in the Masisi health district in Eastern Zaire. In the present paper, the experiment is described in a chronological way and the results are analyzed and discussed in detail. Although this particular case-study was not successful, it yields important lessons concerning the design, implementation and evaluation of prepayment schemes for hospital health care in developing countries. More specifically, phenomena like adverse selection and moral hazard are discussed. Finally, conditions for success of similar experiments are discussed. These conditions relate mainly to the organization pattern of the district health services system. The Masisi experiment is a nice illustration of the fact that prepayment is not a 'magic bullet': the lessons drawn from it may be of relevancy to health planners intending to implement hospital prepayment schemes in similar settings.

Key words—prepayment, hospital care, district health service organization, community participation, evaluation

1. INTRODUCTION

In Zaire, as in many other developing countries, the choice made by the government in favour of a decentralized and integrated approach of health care provision—as outlined in Alma Ata—coincided with a severe socioeconomic crisis. The effects of this crisis were, among others, dramatic cuts in national health expenditure as well as in other social sectors. In Zaire, national expenditure for health care dropped from 3 U.S.\$/inhabitant/year in 1978 to <1 U.S.\$/inhabitant/year in 1988. At the same time, the purchasing power of the population steadily decreased; the average income/inhabitant/year was only 150 U.S.\$ in 1988, whereas it was 210 U.S.\$ ten years earlier. However, if ten years after Alma Ata, the Republic of Zaire had achieved a certain level of functioning of basic health services on part of its huge territory, this was—to a large extent—because of investments made by international and bilateral aid organizations. This situation explains the uneven distribution of primary health care services throughout the country, as well as the difficulties these services encounter to cover their operating costs with government funding alone. This is one of the reasons why there was considerable latitude, at district level, for experimenting with innovative cost-recovery schemes. As the resources of the community are

limited, it was crucial to choose methods of payment for health care which preserve an acceptable accessibility to these services but which respond to the real needs of the community and which enable these services to cover their expenses.

It is in this context that the district authorities of the Masisi district, in 1987, considered the possibility to implement a health care prepayment system. It was thought that such a system could be a solution to the huge budgetary problems the Masisi referral hospital faced in its attempts to cover its operating expenses. In order to test the feasibility of such a system of payment, it was proposed to launch a small scale experimental prepayment system.

The main purpose of the present paper is to present and discuss this experiment; and in a broader perspective to identify conditions for success of similar experiences. Prior to the description of the Masisi experience, some theoretical aspects concerning risk-sharing arrangements will be briefly considered.

2. THEORETICAL AND TECHNICAL ISSUES RELATIVE TO RISK-SHARING SCHEMES

If additional resources are to be mobilized in the health care sector through payments for health care, then broadly speaking, two different modes of payment can be considered: firstly, payment by the service users only (e.g. fee for service payment or payment per episode of sickness or risk); and

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secondly, payments based on risk-sharing schemes through contributions of potential users [1]. The Masisi experiment is situated in the latter category. This choice was guided by the fact that such systems have redistributive effects [2]. They therefore have the potential to extend solidarity among people; indeed, the financial participation to the health services system will not be limited to the service users only [3]. Solidarity could be defined as the consciousness of togetherness and the willingness to bear its implications [4].

Risk-sharing is based on the assessment of the probability that a particular event will occur in a population over a given time-span (in the present discussion this event will necessitate an 'intervention' of the health service). The cost of this intervention will be supported by the contributions of people who subscribed to the scheme. It is difficult to predict this probability or risk for an individual. But what is unpredictable for an individual is highly predictable for a large number of individuals [2]. It is important to avoid that in the frame of voluntary subscriptions to such risk-sharing schemes, a preferential selection of high-risk individuals occurs. Therefore, it is crucial that the subscribers are representative of the whole population upon which the risk assessment has been made, and this to the greatest possible extent. In practice, the smaller the proportion of people subscribing to a risk-sharing program, the higher the likelihood of selecting a group of individuals not representative of the entire population. Possible solutions would be either to establish a minimal proportion of people (i.e. some kind of 'cut-off point') who would then, when joining the program, all pay the same subscription premium; or to determine the real risk as a function of the characteristics of the groups of individuals who intend to subscribe to it [5]. In the former option, the premium does not vary according to risk status. Risk sharing then takes place at community level; this is qualified as 'community rating' [2]. In the latter option, groups of people at various levels of increased risk will pay higher and higher subscription premiums. Such a policy implies that, even if there is sharing of risks *within* specific small subgroups (e.g. elderly, pregnant women, infants, HIV positive individuals . . .), there is no (or less) risk sharing *between* lower risk groups and higher risk groups. The redistributive effect, or the *solidarity* basis of such a scheme, would then be far less important.

Equity is a concept often referred to, but it is understood differently by different people, even if it is generally accepted as an important social and economic policy goal. There is indeed a lack of conceptual clarity on what is meant by it [6]. Some authors would define equity as an equality in the availability of the health services, others would focus

on equality of access or equality of utilization. The purpose of this paper is not to debate which definition would be most appropriate nor why. Suffice it to say that a choice for either definition is not a neutral process: it is clearly guided by underlying views on how society is to be [7]. In addition, it is important to emphasize that utilization of health services is not the only means to improve health. Health services have only a relative role to play in this process. Health services' utilization can thus not be a goal in itself, it is only one of the means to achieve better health. But if this means is to yield any effectiveness, then the services provided should obviously be effective themselves. There is no point indeed in increasing utilization of poorly effective health services.

The willingness to subscribe to a risk-sharing program is likely to be shaped by the following factors: first, the perception of risk; second, the empirical assessment of this risk by people ("is it high? is it low?") and the costs the occurrence of such an event imply; third, the willingness to pay the subscription premium, considering the other priorities people have and considering their ability to pay for it; and finally, the existence of particular financial modalities aiming to discourage frivolous utilization (i.e. co-payments, deductibles, ceiling prices . . .) [5]. The main elements to take into account when calculating the amount of the subscription premium are the probability that the population covered by the program will use the health service (i.e. the risk), the mean cost of the care that is provided, and the administrative expenses incurred to run and manage the program [2].

The sustainability, the relevancy and consistency of such programs are generally assessed on the basis of criteria such as effectiveness, efficiency, equity and displacement effects of the program—i.e. the displacement of funding by a new source of health care financing from other sources [3]; on the capacity to preserve or enhance continuity of care; and, last but not least, the capacity to promote solidarity and responsibility in the community [3, 8, 9].

3. PRESENTATION OF THE MASISI EXPERIMENT

3.1. Presentation of the Masisi district

The Masisi health district is situated in eastern Zaire in the mountainous Kivu region (altitude ranging from 1000 up to 2000 m). It has been 'operational' since 1984 and counts a rural population of approx. 215,000 inhabitants on a territory of 3500 km². By the end of 1990, (only) 87,600 inhabitants in the district had a reasonable access to basic health facilities offering comprehensive care. These services were provided through a network of 10 health centres and one referral hospital of 90 beds. On the whole, among the population 'covered' by the health service (i.e. 87,600 people), 80% lived within a range of 10 km from a health centre; and the distance to the referral hospital was 50 km at the most*. The transport and

*The mean distance to the hospital for populations not (yet) covered by health centre activities was 80 km.

communication infrastructure is poorly developed, access to the (formal) health facilities occurs mainly on foot; this is obviously a major barrier if an equal utilization of hospital care (for equal need) is to be achieved. Indeed, it was established that almost half of the patients admitted in the hospital live within a range of 10 km around the hospital, while this range represents only 16% of the population having access to integrated care (and only 7% of the entire district population). The majority of the first line health services manage to recover their operating expenses through a system of fee for service payment for out-patients clinics and a payment per episode of risk for preventive clinics (antenatal care and under-fives clinics). The coverages of antenatal clinics and under-fives clinics, in 1989, were 63 and 50% respectively and the utilization rate of the out-patients clinics was 0.22 new episodes/inhabitant/year.* This low utilization rate may be due—to some extent—to the financial barrier created by a fee for service payment system.

The payment for hospital care is completely dissociated from the one prevailing at the health centre level. At the referral hospital, a fee scale was established listing the charges for any medical act performed, any treatment given or any drug prescribed . . . At the end of the eighties, inflation on an annual basis was almost 100% (in 1991, it was ten times higher!). In addition to inflation, the dramatic and increasing insufficiency of government funding made regular upgrading of these fees inevitable. This increase in fees was necessary not only to cover operating expenses (drug purchases, fuel, maintenance products etc.), but also to cover part of the fixed costs (wages of staff, depreciation costs, etc.) that were supposed to be covered by national funding. In 1990, the intervention of the government was limited to financing (only) one third of the staff's salaries, which were grossly insufficient. Indeed, in 1990, a medical doctor and an unskilled worker would receive the equivalent of 60 U.S.\$ and 11 U.S.\$ per month, respectively. This is one of the reasons why medical doctors, working in government institutions, were allowed by the Zairian Ministry of Health to receive part of the hospital revenue. The lack of funds at the hospital level, together with poor wages, were an incentive for medical staff throughout the country to deliver, preferentially, profit-making activities. The problem of the very poor wages was perhaps partially solved, but it may have contributed to a lack of relevance and efficiency of the care dispensed. For example, more technical examinations could have been ordered in situations where the result of the investigation did not influence the therapeutical decision (e.g. an X-ray for a sputum-positive tuberculous patient). In Masisi, this phenomenon was

considered to be of only marginal importance even if there are no hard data to support this subjective impression. Indeed, the range of diagnostic and therapeutical choices in the Masisi hospital was relatively narrow; the cost of the drugs prescribed to admitted patients was not included in the calculation of the doctor's fee (laboratory examinations on the other hand were included); and a regular audit among the Masisi hospital doctors (one expatriate and one Zairian doctor) allowed to discuss outliers in diagnostic and therapeutical behaviour.

Notwithstanding this critical context, hospital occupation remained more or less stable (i.e. a bed-occupancy rate of approx. 40%). However, the proportion of households experiencing difficulties in paying the fees increased; indeed, families often had to sell their personal assets . . . Facing a situation where the financial balance of both hospital and household budgets was permanently threatened, the district executive considered an experiment with a paying system based on the principle of risk-sharing. More specifically, a prepayment scheme covering all costs of a hospital admission, was considered.

3.2. Implementation of the program

The idea was to propose people join, on a voluntary basis, a prepayment scheme that would guarantee all (direct) hospital admission costs to be covered. In order to test the feasibility of such a scheme, a first attempt was to be launched within the community living in the responsibility area of the (urban) health centre of Masisi township (population of approx. 12,000 inhabitants in an area of about 200 km²). The referral hospital is located in Masisi town itself. The community was informed through its health committee about the initiative, and practical proceedings were discussed. The health committee members expressed their interest and curiosity for such an innovative payment scheme. As discussed above, three parameters were considered when calculating the subscription fee: first, the mean cost of an hospital admission; second, an assessment of the risk of this event to occur; and third, the costs to run the scheme (e.g. administrative costs). Within the same area (i.e. the Masisi responsibility area) the subscription fee or premium did not vary according to health risk or occupation, i.e. "community rating" [2]. The calculations were done upon data for the year 1986.

$$\begin{aligned} \text{Risk} &= \text{Number admissions per year/population} \\ &= 562/12,261 = 46\% \end{aligned}$$

$$\begin{aligned} \text{Subscription fee} &= \text{risk} \times \text{mean cost of admission} \\ &= 46\% \times \text{U.S.}\$ 18 \\ &= \text{U.S.}\$ 0.828/\text{individual}. \end{aligned}$$

Eventually, this amount was set at U.S.\$ 1/individual so as to cover the expenses of running the program. The entire target population was then

*These data pertain to the 87,600 people with a 'reasonable' access to a health centre.

informed, after agreement of the local authorities (administrative and traditional ones) on the subscription procedures. The latter were to be carried out by health committee members as well as by village health workers. The period of subscription was limited to one month (April 1987), and the entire operation was supervised by two district employees. The program was to cover the subscribers from April 1987 until April 1988 (i.e. a period of 13 months). There was no agreement that the government would cover the cost of any over-run of the prepayment scheme. An over-run, if any, would be covered initially by the Masisi district pharmacy itself and subsequently recovered through an increase of the drug prices for all the district health facilities (with, ultimately, an increase of drug prices for the users).

In this first experiment, 846 individuals out of 12,629 joined the scheme (6.7%). The collected funds were managed by the district authorities, who decided to purchase drugs with these funds so as to offset the effects of inflation. These drugs were then introduced in the existing cycle of drug orders and supplies in the Masisi district. The hospital, on a monthly basis, calculated the amount due for in-patients who had joined the program and subsequently invoiced it to the district pharmacy. In May 1988 (i.e. after 13 months of functioning), the utilization of the referral hospital by the subscribers to the scheme was analysed. It appeared that 144 individuals (out of the 846 who joined the scheme) had been admitted in the hospital's inpatient department; this corresponds to an annual hospital admission rate of 157%, whereas it was—in the absence of the program—only 46%. Thus, there was almost a fourfold increase! Obviously, the experiment encountered a financial deficit. The cost of this over-run was picked up by the district pharmacy.

The district executive attempted to draw the necessary lessons from this first experiment, and tried to assess which elements contributed to such a high hospital admission rate. The conclusions were the following: an individual subscription is too selective, and a subscription for the entire household would be more appropriate; the most suitable period of subscription would be August or September rather than April, because the selling of crops (and consequently the availability of cash money) mainly occurs during these months.

A second experiment was then launched in the same community from September 1988 until August 1989. The number of subscribers then increased to 3531 individuals (878 households), i.e. 26.8% of the target population. The hospital admission rate of the subscribers was 93%, which still is twice the one before prepayment but far less than the one observed in the first experiment. Concomitantly to this second test, a similar experience was launched in a community living within the responsibility area of a health centre located at 22 km from the hospital. The

hospital admission rate—for that community—was 4% in 1987; notwithstanding the lower 'risk', the same subscription fee was charged (i.e. U.S.\$ 1, whereas it should normally have been less if the above mentioned formula was to be applied). Only 384 individuals out of 10,627 joined the scheme (95 households out of 2170); i.e. only 3.6% of the target population. The annual hospital admission rate for the subscribers increased to 36% (almost tenfold increase!).

In 1990, the Masisi district authorities decided not to continue the program because of the very critical political and economical situation at that time; despite the fact that the Masisi population had expressed its wish for the program to be continued.

The following general comments can be made regarding these successive experiments:

- the assessment of the probability ('the risk') of hospital admission was not appropriate. Indeed, it did not take into account the fact that the hospital admission rates were very likely to increase.
- the program seems far less attractive to more remote communities. One of the most likely explanations would be that other (substantial) costs—apart from the hospital fee—remain unchanged (i.e. the indirect costs). The principle that direct costs (and only they) are to be covered by the program is, apparently, not a strong enough incentive.

From these considerations, two questions arise: what are the determinants that lead to the occurrence of such high admission rates among people who joined the prepayment scheme? What was the real impact of the program on admission rates as a function of the distance between hospital and place of residence of individual households? In order to answer these questions, we propose to analyse more in depth the two experiments that took place within the community of the Masisi health centre. The experiment in the more remote community will not be considered, since only a minority of it participated in the program.

3.3. Findings and analysis

We have studied, through a longitudinal retrospective study, the variations in hospital admission rates of the Masisi urban community, for the period from January 1987 till August 1990. Within this time-span, different payment systems alternated. These successive periods cover a period of three years and eight months which can be subdivided as follows:

- I. *January 1987 until March 1987*: period prior to the first prepayment experiment.
- II. *April 1987 until April 1988*: first prepayment experiment.
- III. *May 1988 until August 1988*: period prior to the second prepayment experiment.

Table 1. Hospital admission rates on an annual basis during the five successive periods desegregated according to distance from domicile to the hospital

Health centres	Period I	Period II	Period III	Period IV	Period V
<i>Masisi HC</i>					
0-2 km	52‰ (36)	70‰ (208)	62‰ (59)	80‰ (231)	73‰ (217)
3-5 km	31‰ (40)	45‰ (251)	43‰ (76)	42‰ (232)	36‰ (201)
6-10 km	15‰ (17)	16‰ (82)	17‰ (27)	21‰ (103)	14‰ (68)
Total Masisi	30‰ (93)	40‰ (541)	37‰ (162)	43‰ (566)	36‰ (486)
Loashi HC (8-16 km)	9‰ (25)	7‰ (74)	10‰ (36)	9‰ (100)	8‰ (89)
Lushebere HC (8-18 km)	6‰ (22)	4‰ (67)	5‰ (27)	5‰ (78)	5‰ (85)
Kibabi HC (29-38 km)	2‰ (8)	2‰ (39)	1.5‰ (8)	2‰ (42)	2.5‰ (46)

Between parentheses is noted the number of hospital admissions.

Period I, period prior to first prepayment experiment.

Period II, period of first prepayment experiment in Masisi.

Period III, period after first and prior to second prepayment experiment.

Period IV, period of second prepayment experiment in Masisi.

Period V, period after second prepayment experiment.

IV. September 1988 until August 1989: second prepayment experiment.

V. September 1989 until August 1990: period after the second prepayment experiment.

The data relating to these successive periods have been analyzed, so as to compare the variations of hospital admission rates during the different periods considered. In addition to the data relative to the population living within the area of responsibility of the Masisi Health Centre, data concerning the population of three (relatively well-functioning) health centres have been studied during the same time-span (health centres of Loashi, Lushebere and Kibabi respectively). These populations will act as 'control' group.

The overall hospital admission rates are presented in Table 1. We observe a slight increase in hospital admission rates for the total Masisi population during periods II and IV (40‰ and 43‰ respectively), whereas these rates remained more or less stable in the 'control' health centres during the same periods. This increase is mainly due to the increase in hospital admission rates in the subgroup of the nearby population (0-2 km).

The hospital admission rates in the population which joined the prepayment scheme are much higher than for those who did not join it. During the first experiment in 87-88 (see Table 2), the hospital admission rate reached a peak of 254‰ for the population living in a range of < 2 km from the hospital. During the second experiment the hospital admission rates

Table 2. Admission rates according to distance and subscription status to the prepayment program 1987-1988

Health centres	Population			Admissions*		
	Subscription (%)†	No subscription	Total	Subscription (n=)	No subscription (n=)	Total (n=)
<i>Masisi HC</i>						
0-2 km	182 (6.6%)	2.569	2.751	254‰ (50)	56‰ (158)	70‰ (208)
3-5 km	437 (8.4%)	4.749	5.186	154‰ (73)	35‰ (178)	45‰ (251)
6-10 km	227 (4.8%)	4.465	4.692	85‰ (21)	13‰ (61)	16‰ (82)
Total	846 (6.7%)	11.783	12.629	157‰ (144)	31‰ (397)	39.5‰ (541)
Loashi HC (8-16 km)	—	—	10.499	—	—	7‰ (79)
Lushebere HC (8-18 km)	—	—	15.073	—	—	4‰ (67)
Kibabi HC (29-38 km)	—	—	18.046	—	—	2‰ (39)

*The program covers a 13 month period (April 1987-April 1988), but the rates (in per thousands) presented refer to a conversion of the numbers of admissions to a period of 12 months (n divided by 13 and multiplied by 12).

†Proportion of people who subscribed to the program.

Table 3. Admission rates according to distance and subscription status to the prepayment program 1988-1989

Health centres	Population			Admissions		
	Subscription (%)*	No subscription	Total	Subscription (n =)	No subscription (n =)	Total (n =)
<i>Masisi HC</i>						
0-2 km	814 (28.3%)	2.064	2.878	144% (117)	55% (114)	80% (231)
3-5 km	1.745 (32.2%)	3.668	5.413	88% (154)	21% (78)	42% (232)
6-10 km	972 (19.9%)	3.911	4.883	61% (59)	11% (44)	21% (103)
Total	3.531 (26.8%)	9.643	13.174	93% (330)	24% (236)	43% (566)
Loashi HC (8-16 km)	—	—	10.814	—	—	9% (100)
Lushebere HC (8-18 km)	—	—	15.718	—	—	5% (78)
Kibabi HC (29-38 km)	—	—	18.772	—	—	2% (42)

*Proportion of people who subscribed to the program.

(see Table 3) amongst the subscribers are lower than in the first experience, but still much higher than the rate used for the risk assessment. Very likely, this relative decrease is explained by the higher subscription rate to the 88-89 program. A decrease in hospital admission rates when distance increases is observed in both experiences, whether subscribers or non subscribers are concerned. It is nevertheless interesting to notice that this gradient is less strong amongst the subscribers.

The very high hospital utilization amongst the subscribers is one of the causes that jeopardized the financial sustainability of this program. Two possible explanations (which are not mutually exclusive) for this phenomenon can be withheld: firstly, the subscribers have used the hospital for care which could have been provided at the level of the health centre (or at the level of the family itself); but these levels (with a fee for service payment at the health centre level) were bypassed in favour of a free of charge hospital admission. And secondly, the program through a mechanism of adverse selection has selected a population of high-risk individuals. Unfortunately, no information is available concerning the extent to which hospital admissions were justified or not (i.e. was hospital care necessary? or could the care have been provided at a lower level of the health services system?). It is therefore not possible to test the hypothesis whether this high hospital utilization among the subscribers is to be attributed to an 'unnecessary' hospital use. This phenomenon is qualified by the insurance industry as moral hazard: i.e. "the tendency of individuals, once insured, to behave in such a way as to increase the likelihood or size of the risk against which they have insured" [2]. It should however be stressed that in Masisi the decision for hospital admission is eventually taken by the doctor himself and not by the patient, even if some 'pressure' on the doctor cannot be ruled out. However, the data available allow us to assess

whether the second explanation, related to a phenomenon of 'adverse selection', played an important role in this process of excess hospital use among the subscribers. In order to test the validity of this hypothesis the following analysis is proposed.

Within the set of health problems necessitating a hospital admission, a distinction can be made according to the level of predictability (by the patient) of the risk of being admitted at some stage of the evolution of the health problem. Obviously, the perception by individuals of this predictability will influence their decision to join or not to join a prepayment program. It is important to stress that this perception is not a uniform one: indeed, it is strongly related to the local environment and to prevailing value judgements and priorities. The fact that the health seeking behaviour for a given problem often is different from one society to another—because of quite complex reasons—really is common knowledge.

The above mentioned distinction would be one between problems with a high predictability of the risk of hospital admission (labelled as 'predictable risk conditions') and those with a low predictability for an admission to occur (labelled as 'unpredictable risk conditions'). The former group would, for instance, include chronic conditions (e.g. diabetes, leprosy, cardiopathy etc. . .) or the set of health problems related to pregnancy. The latter group would be more acute problems (e.g. acute respiratory infections, diarrhoeal diseases etc. . .). Our null hypothesis can be formulated as follows: the increase in hospital utilization in the population of subscribers is attributable equally to predictable and to unpredictable risk conditions. In the present analysis, deliveries (dystocic and eutocic ones) were withheld as predictable risk conditions on the one hand. On the other hand, a set of health problems were grouped and considered as unpredictable risk conditions; this group contained traumatic problems, malaria, acute lower respiratory tract infections, acute digestive

tract infections, any other acute infections as well as all fevers of unknown origin.

In the period 87-88, when only 6.7% of the target population joined the prepayment program, the hospital admission rate for deliveries was almost 7 times higher in the population of subscribers than in the population of non-subscribers (this ratio was only 2.7 for unpredictable risk conditions):

	Subscribers	Non-subscribers
Predictable risks	63/846 (74.5‰)	129/11.783 (11‰)
Unpredictable risks	33/846 (39‰)	167/11.783 (14.2‰)

In the period 88-89, when 26.8% of the target population joined the program, the ratios were 4.6 and 3.3 respectively:

	Subscribers	Non-subscribers
Predictable risks	149/3.531 (42‰)	89/9.643 (9.2‰)
Unpredictable risks	94/3.531 (26.6‰)	79/9.643 (8.1‰)

The proportion of hospital deliveries among the population of subscribers was 7.4% in the 87-88 period (63/846) and decreased until 4.2% in the 88-89 period (149/3531). The difference is highly significant ($\chi^2 = 15.4$, $P < 0.001$).

When we correct the figures for the first experiment (indeed, they relate to the admissions for a 13 months period), we have 69 hospital deliveries per year per thousand individuals who subscribed to the scheme; and (only) 10 hospital deliveries per year per thousand for the population of non-subscribers. The birth rate in the Kivu region is estimated to be approx. 54‰. It clearly appears that the first experiment selected women in their reproductive age, unless the Masisi township population would have a substantially higher than average proportion of women in that age group (this seems highly unlikely even if we have no solid evidence to rule it out). When looking at the second experiment, we obtain the following figures: 42 per year per thousand subscribers (which approaches the average Kivu birth rate figure) and 9.2 per year per thousand non-subscribers.

Upon these findings we may reject our null hypothesis. As discussed above, very likely a phenomenon of selection of women in their reproductive age took place in the first experiment. At that time, subscriptions took place on an individual basis which indeed is an incentive for adverse selection to occur. During the second experiment the subscription rate to the program substantially increased, but, more important is the fact that the subscriptions took place on a household basis and not on an individual basis*. In that context an intra-household adverse selection can be excluded; it does however not exclude an inter-household one (for instance preferential selection of households with several women at reproductive age

versus lower selection of households with no women in that age group).

Admitted patients can be classified according to sex for the two periods concerned:

	Females	Males
Subscribers 87-88	112/144 (77.8%)	32/144 (22.2%)
Non-subscribers 87-88	273/397 (68.8%)	124/397 (31.2%)
Subscribers 88-89	255/330 (77.3%)	75/330 (22.7%)
Non-subscribers 88-89	171/236 (72.5%)	65/236 (27.5%)

In the first experiment the difference between male and female admissions among subscribers and non-subscribers respectively is very close to the significance level ($\chi^2 = 3.75$, $P = 0.053$), pointing in the direction of a preferential selection of women. This information is congruent with the above analysis on 'predictable risk conditions; (i.e. hospital deliveries). There is no significant difference in the second experiment ($\chi^2 = 1.46$, $P = 0.23$).

The group of patients in the 15-40 years age group (which constitutes $\frac{3}{4}$ of all admissions) can be split according to sex and subscription status for the two periods concerned:

	Females	Males
Subscribers 87-88	88/102 (86.3%)	14/102 (13.7%)
Non-subscribers 87-88	215/287 (75.9%)	72/287 (24.1%)
Subscribers 88-89	208/230 (90.4%)	22/230 (9.6%)
Non-subscribers 88-89	141/176 (80.1%)	35/176 (19.9%)

In both experiments, the difference is highly significant (first period $\chi^2 = 5$ and $P = 0.025$; second period $\chi^2 = 8$ and $P = 0.005$). Women in their reproductive age have been using the hospital significantly more in the population of subscribers than in the population of non-subscribers. This finding was already identified in the analysis on predictable risk conditions. Concerning the first period, as discussed above, this can be explained to a large extent by a preferential selection of women in their reproductive age to join the program. Concerning the second period, this finding may be explained by the fact that the vast majority of women at reproductive age who did join the program (but without a preferential selection within a same household since the subscription took place on household basis) and who were due to deliver in the period from September 1988 till August 1989 did indeed deliver in the hospital. The high hospital utilization of women between 15 and 40 years in the second period seems therefore to be more an expression of a moral hazard like phenomenon than of an adverse selection. Indeed, *a priori*, it cannot be expected that all these deliveries really needed to take place in a hospital environment for technical reasons (e.g. high risk pregnancies), unless of course households with women known to be at high risk for morbidity have selected themselves (e.g. previous delivery dystocic). In the absence of a prepayment scheme covering hospital admissions costs (i.e. the non-subscribers) one woman out of five due to deliver did so in the hospital maternity; in the

*In addition, a short 'waiting period'—up to one month—was introduced in 88-89; people who subscribed to the scheme in the course of August were only covered by the program from September on.

presence of such a scheme (i.e. the subscribers) *almost all of them* did . . .

When admissions related to pregnancy are excluded from the group of female admissions the difference between the proportion of female admissions between subscribers and non subscribers is not significant any more:

	Females	Males
Subscribers 87-88	17/31 (55%)	14/31 (45%)
Non-subscribers 87-88	88/160 (55%)	72/160 (45%)

($\chi^2 = 0.03$, $P = 0.86$).

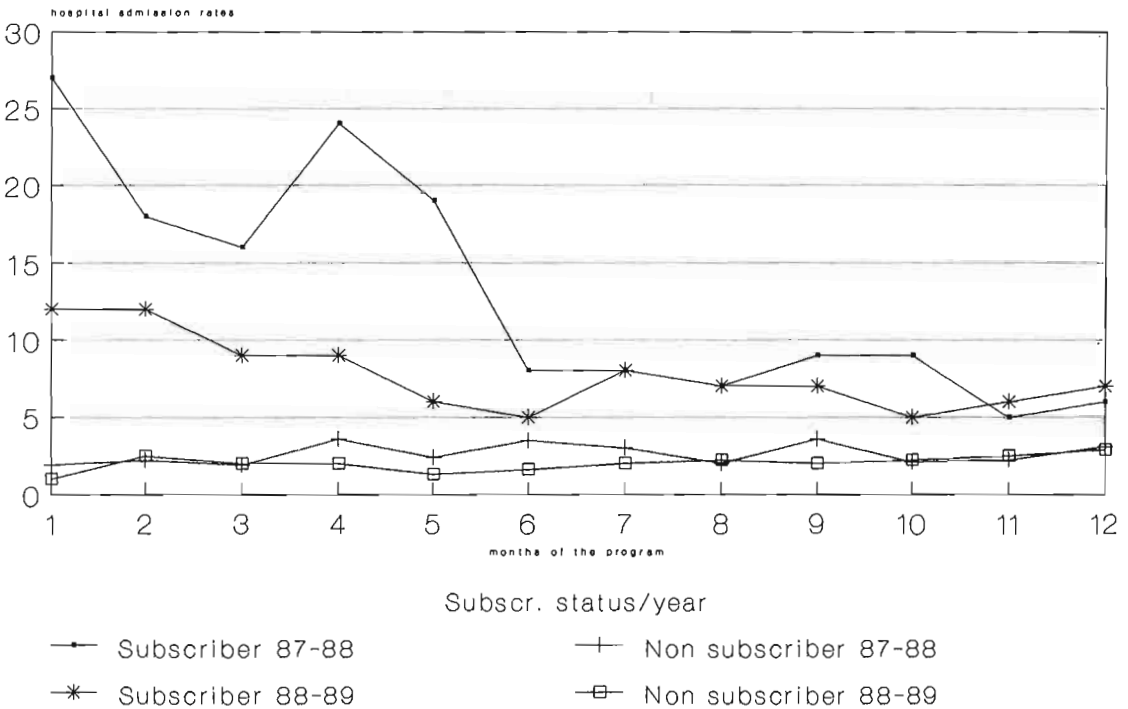
	Females	Males
Subscribers 88-89	61/83 (73.5%)	22/83 (26.5%)
Non-subscribers 88-89	54/89 (60.7%)	35/89 (39.3%)

($\chi^2 = 2.63$, $P = 0.10$).

This information is consistent with the explanation that the excess of female admissions among the population of subscribers is to be explained by a higher hospital utilization for deliveries.

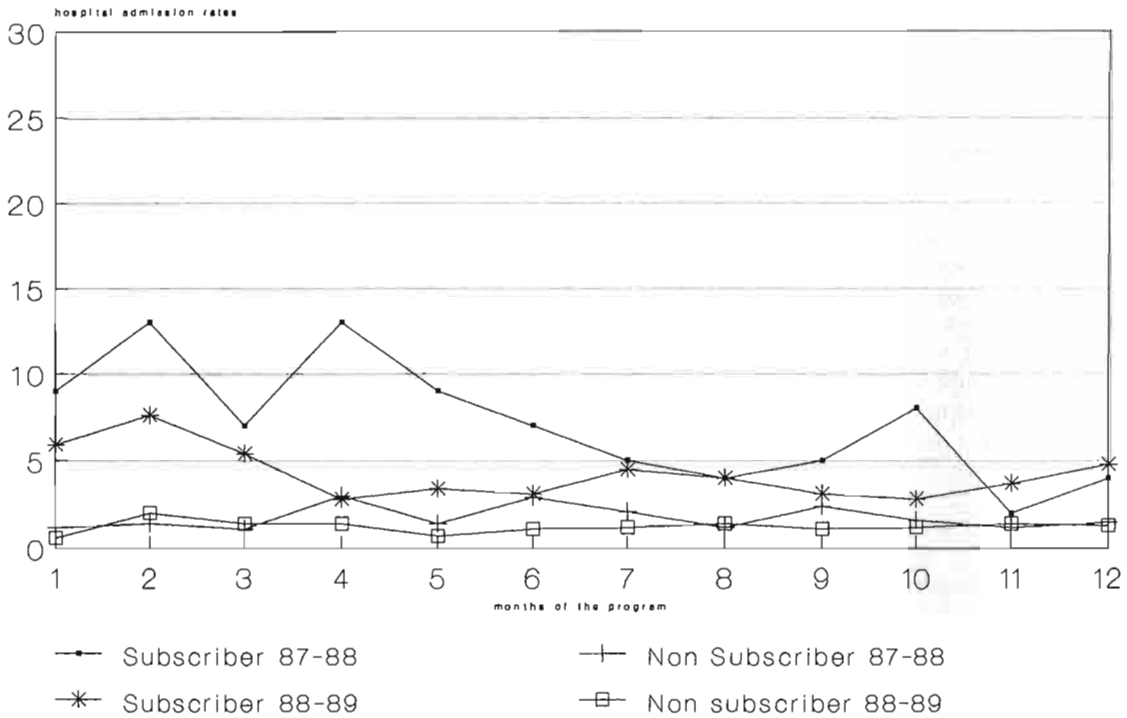
If a phenomenon of preferential selection for women in their reproductive age has played an important role, as is suspected here, then we would also suspect that the women's initial assessment of the risk of a future hospital admission will vary over time. For instance, it makes sense to state that the perception of the risk of a hospital admission

(whether justified or not) will be stronger for a woman pregnant at the time of the subscription period than for a woman who just delivered or who is not pregnant at that very time. Consequently, since the subscription period is limited in time (in this case a month), the motivation of these women to join the program will obviously not be a uniform one. In other words, individuals who expect or who intend to use the hospital in the near future (in this case women who are pregnant) will have a stronger incentive to join the prepayment scheme. If such a bias would have occurred here, we would expect to notice, in the population of subscribers, a peak of hospital admissions in the beginning of the program and from then on a gradual decrease. This is confirmed by the analysis of the monthly hospital admission rates (all admissions confounded) during the program, starting from month 1 up to month 12 (see Fig. 1). We notice a clear trend for higher hospital admission rates among the subscribers at the start of the program. These rates gradually decrease and, around the sixth month of the program, they tend to stabilize at a level approximately twice that of the admission rates observed in the non-subscribers. This trend is particularly striking in the first experiment (87-88). There appears to be no time effect on the admission rates for the non-subscribers in either period. When problems related to pregnancy are excluded (Fig. 2), this trend is less present, if at all.



Admission rates in per thousands

Fig. 1. Hospital admission rates. Evolution of rates over 12 months.



Admission rates in per thousands

Fig. 2. Hospital admission rates. Exclusion of pregnancy related problems.

It must be added that it was precisely the observation of this gradual decrease over time in hospital admissions for the subscribers which triggered the attention of the district executive staff to the possibility of an adverse selection. This fact may be of more general relevance; indeed, the monitoring of this evolution (which is fairly simple to be carried out) may be a detector device of the occurrence of adverse selection.

4. DISCUSSION

The analysis of these results allows us to present some elements to answer the initial questions put forward, and leads us to the formulation of suggestions for a better adaptation of this program to the context of the Masisi district.

1. There is a need to identify a minimal subscription rate in order to avoid the process of adverse selection which has jeopardized the financial viability of the Masisi scheme. For the same reason, it is clear that subscription on an individual basis is to be avoided.

2. There is a need to identify, within the limits of the resources available, these health problems for which hospital care is indeed justified (and the costs of which are worth to be borne by a prepayment scheme). This implies the need to establish strategies

counteracting 'unjustified' utilization of the referral hospital services as well as the need to identify criteria for 'unjustified' utilization. These strategies should however be such that they do not raise barriers to the demand for and the provision of 'justified' care [2]. In that perspective, a rationalization of the health care system, with a continuous evaluation of the strategies chosen, is a basic condition for a more effective and efficient utilization of the health services. This process of rationalization could be carried out along the following lines: standardization of the care provided within the limits of the resources available, improvement of the quality of care of the first tier within the health system, compliance of health centre staff with the instructions relative to the referral of patients to the hospital, creation of effective communication channels between the different tiers of the district health system, rationalization of hospital admission criteria etc.

3. Concerning the issue of equity in a prepayment scheme, two issues are important: firstly, to maintain equality between individual households within the sub-population who joined the scheme and secondly, not to exclude the utilization of health services by those who for socioeconomic reasons did not have the possibility to subscribe to the program. Concerning the first issue, and referring to the analysis of the Masisi scheme, it is obvious that within an

environment where geographical accessibility of the hospital is a major issue, the payment of a same subscription fee penalizes these households living far from the hospital. A similar fee implies that the latter households, in a context of equal need, actually subsidize the hospital care of households living close to the hospital (who use its services more frequently). If no measures are taken to correct for this unfairness, it is likely to contribute to the lack of incentive for the more remote populations to participate to the program. The possibility to consider sliding scales of fees (subscription and/or co-payment fees if they exist) according to the distance between place of residence and hospital could be experimented. This was actually attempted in the Bwamanda district in north-east Zaire where a similar scheme has been functioning from 1986 on [10, 11]. Concerning the second condition, a comment often made is that similar schemes, based on risk sharing, hinder these households which did not join the program to have access to the health services [7]. Referring to the Masisi district, it is appropriate to take specific measures in order to avoid the exclusion of the 'worse-off' when they present a health problem justifying health services' use. It is important therefore for the community to identify the households which had no means to pay the subscription fees to the program and to propose measures safeguarding as much as possible an equal access to the health services. We think that the identification of the poor is a matter not to be institutionalized nor that it should be solved by the health service alone. The local communities should look for acceptable and feasible solutions themselves. In the case of Masisi for instance, the different development committees could identify within each village these households to be exempted of the subscription fee. An individual assessment—household per household—of the situation could be done through the use of given criteria. For as much as these measures are socially and culturally acceptable to all*, they allow for an identification of the poor through a decision-making process handled by the community itself. On the other hand, it is important for the health service to emphasize that if, for instance, half of the population would be qualified as being poor (and exempted of fees), then the program would very likely go bankrupt. The criteria handled should be specific enough so as to avoid as much as possible an abuse of the exemption rule. In the light of a recent evaluation of the Bamako Initiative in five African countries, it is worth noting that current exemption mechanisms seem to work poorly and sometimes even detrimentally in practice, and that the search for effective mechanisms should be pursued [12].

*This is not obvious: indeed, to explicitly label an individual household as being poor and thus not able to pay the subscription fee is perhaps creating an even higher burden to the family . . .

5. CONCLUSION

The analysis of the two consecutive Masisi hospital prepayment experiments suggests that either those people who subscribed to it were not representative of the Masisi community (during the first experiment); or that it led to an excess of hospital use not matching objective needs (during the second experiment). Moreover, neither experiment achieved a sound financial balance. In both cases, the deficit was covered by the district pharmacy. Given the small scale of the experiment, and given the fact that the excess in hospital use mainly occurred for normal deliveries (which involve relatively low costs), the effect of this deficit on subsequent changes in the drug pricing structure was minor. Despite the lack of success, important lessons can be learned from this experience. They illustrate that prepayment schemes for hospital care are not a 'magic bullet'. The following conclusions can be drawn:

1. The management of a prepayment scheme is conditioned by the management of the health services system. Prepayment is likely to lead to substantial moral hazard in a context where the organization of health services lacks basic rationalization. Rationalization allows to control the use of the health services at the appropriate level. Perhaps the first condition is that the first level of care functions in an acceptable way, that clear criteria for referral are used at that level, and that people have confidence in the services provided. At the hospital level, specific criteria for admission and standard guidelines for clinical case management could be designed. If the health system is not functioning as a system where self-care, first line and second line care are organized in a complementary way, with the necessary back-stopping, then prepayment for hospital care is likely to lead to unjustified bypassing of the first line, or even to hospital use for problems which could be taken care of at the level of the family or community. A mistake would precisely be to jump these, quite complex, but necessary steps.

2. The success of prepayment schemes will also be conditioned by the level of participation of the population in the process of design, implementation and evaluation of the scheme. This process of participation cannot be built overnight: it needs a lot of time. People will only subscribe to similar schemes if there is a relationship of confidence between health services and community, if the rationale of the scheme has been explained to them, if the quality of care at the hospital level is satisfactory in their perception etc. Even then, it is likely that the subscription rate will be rather low in a first stage. People should be given time to get to know and understand prepayment and eventually to assess its benefits. In that respect, it is unfortunate that the political instability in Zaire did not allow the Masisi experiment to be extended.

The Masisi experience raised the interest of other communities in the district as well. Indeed, the health committees of some of the other health centres asked the district executive to implement a similar program in their respective areas. In addition to the potential *health benefit* for the beneficiary communities, such prepayment schemes can also be considered as a means to foster the *process of community participation* in the management of the health services.

3. It was argued above that moral hazard can be kept within reasonable proportions by the health services. Adverse selection is less amenable to control. The occurrence of such a phenomenon is function of the nature of the subscription unit on the one hand (individual or household basis), and of the proportion of people who join the scheme on the other. The former determinant can be controlled, the latter not (unless a minimum subscription rate is imposed before the scheme is to function). It is difficult to anticipate the community's subscription rate to a prepayment scheme at the start of its implementation. Initial low subscription rates are likely to be accompanied with more adverse selection, and thus with financial loss. In that respect, it may be very useful to have a 'backing-up' by a third party (like the district pharmacy in the Masisi experience) during the very first years of the implementation of the scheme until the subscription rate has reached a level guaranteeing financial sustainability.

4. It is important that health planners have enough 'room for manoeuvre' if they are to take into account the specificities of their own setting. In addition, if the populations these planners are responsible for, are to be involved into the entire process, then similar experiments should be carried out on a relatively small scale. Such an involvement has indeed been recognized as a crucial issue if such schemes are to succeed [5, 10, 13, 14]. A relatively small scale increases the likelihood to have more homogeneous communities and to have 'manageable' health systems. The district seems the most appropriate level in that respect: it is there that top-bottom and bottom-up planning encounter. The responsibility of the higher levels in the national health system would then rather be confined to the definition of a broad regulating framework for the organization of such schemes which would leave enough latitude for district planners to adapt to their own specific context and to adopt their own pace. Lessons learned from different district experiences could then later be translated in a more detailed set of recommendations and suggestions for implementation in other settings. The Bwamanda experiment in north-east Zaire, even if its reproducibility is matter for debate, is a nice illustration of the relevance of launching similar schemes at district level [10]; whereas the Burundi health insurance scheme, implemented on a nationwide basis, illustrates the lack of community involvement in and control over a top-down designed scheme [12].

5. Other things remaining equal, it appears that the subscription to a prepayment scheme, in a rural environment like Masisi, depends less on the income disparity (which is a relatively narrow one in Masisi) than on the huge differences in the expenses of a trip to and a stay in the referral district hospital. These indirect costs which patients and their families face in case of a hospital admission are often higher than the direct costs [3, 12, 15]. Therefore, the suggestion could be considered to take into account the factor distance, rather than the factor socioeconomic status in any attempts to introduce differential rates in prepayment schemes launched in similar rural settings. The criterion distance has the additional advantage that it can be easily assessed. The implementation of gradients in fees (e.g. sliding scales according to distance) makes sense only if it compensates for the gradient in indirect costs. The acceptability of such a measure for the nearby communities (who would then face higher fees) needs however to be assessed. In fact, the problem of indirect costs is considered to be not really 'vulnerable' by the health service. This is not entirely true. A solution may be to improve the 'self-care' units and the lodging infrastructure in and around the hospital compound so as to reduce the cost for the patient of a hospital admission. For instance, lodging facilities could be developed for the patient's family and/or for referred patients who are not bedridden and who can thus be followed-up on an ambulatory basis.

There is undoubtedly plenty of room and need for research concerning hospital prepayment schemes in developing countries. But not every setting is equally eligible for research on this matter. Priorities for research may indeed lie *elsewhere* in settings where an acceptable level of rationalization of the district health system is lacking or where effective and sustainable channels of dialogue between health service and community are not yet developed. Let us not jump the gun!

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