
Risk sharing as solution for providing access to emergency obstetric care: Experience with obstetric risk insurance in Mauritania

Philippe Renaudin^{1,2}, Mohamed Ould Abdelkader³, Sidi Mohamed Ould Abdelaziz⁴, Mohamed Ould Mujtaba⁵, Mohamed Ould Saleck⁶, Charles Vangeenderhuysen⁷, Alain Prual⁸

Abstract

Financial barriers to emergency obstetric care are one of the causes of a high maternal mortality ratio in low-income countries, particularly in Mauritania. Risk sharing through the introduction of obstetric risk insurance provides all women with care throughout their pregnancies for a flat-rate ticket of 22 US\$, i.e. between two and ten times less than in other public sector maternity wards. Pregnancy-related complications and surgical procedures are included in the package. Besides facilitating access, this strategy aims to improve the quality of emergency obstetric care and ensure better working conditions for health staff.

After five years of implementation in the capital and over two years in three rural regions, the scheme has had a highly positive impact: the population's massive adherence in all four areas has led to a growing number of services delivered and a consequent twofold increase in assisted deliveries in rural areas. Less than 0.1% of services go unpaid and the scheme is completely autonomous following an injection of initial investment. It is managed by a committee made up of users, health staff members and locally

¹ National Reproductive Health Programme, Nouakchott, Mauritania.

² French Development Agency. Email : philippe_renaudin@yahoo.fr, (correspondence should be addressed to this author).

³ Obstetrician-gynaecologist, head of Sebkhia Maternity, Nouakchott, Mauritania.

⁴ Obstetrician-gynaecologist, head of maternity at Kiffa Hospital, Mauritania.

⁵ Obstetrician-gynaecologist, head of maternity at Néma Hospital, Mauritania.

⁶ Obstetrician-gynaecologist, head of maternity at Aïoun Hospital, Mauritania.

⁷ Obstetrician-gynaecologist, France.

⁸ UNFPA, Dakar, Senegal.

elected representatives, guaranteeing exemplary transparency.

These initial results have encouraged the Ministry of Health to prioritise expansion of this Obstetric Risk Insurance scheme, aiming to cover 80% of the country by 2010.

Keywords : maternal mortality, access to health care, emergency obstetric care, risk insurance, Mauritania.

Introduction

Every year, of the 536,000 women who die as a consequence of pregnancy, 99% live in less developed countries. In 33 countries, 30 of them in Africa, the maternal mortality ratio exceeds 600 per 100,000 live births (UNFPA 2005 a), which is sixty times higher than in Western countries.

These deaths, which often occur outside health facilities, are the consequence of known complications (Royston *et al.* 1990), both quantifiable (Prual *et al.* 2000) and avoidable with assistance during delivery: in the survey “Maternal Morbidity in West Africa”, 67.9% of deaths were due to direct obstetric causes.

In these countries, the poorest women present the highest risks: the ratio of maternal mortality is clearly related to levels of wealth and the proportion of assisted deliveries (UNFPA 2005 b; WHO 2005 a).

Improving access to care to reach 80% of skilled attendance at delivery would reduce the maternal mortality ratio to below 200 per 100,000 live births, as found in most countries (WHO 2005 a).

Whilst geographic and socio-cultural issues are also at stake, the financial constraints incumbent on poorer women limit their use of health services considerably, and few solutions to this problem have been proposed to date. Many states lack the resources, or the political will, to guarantee the financial protection of their populations. The poorest are obliged to go without health care, or sink heavily into debt to cover the associated costs, especially in the event of an obstetric emergency, as shown in the socio-anthropological survey carried out in Nouakchott (Prual 2000). In Mauritania, several different approaches co-exist: in facilities without a flat-fee system, the user pays for each service provided, but the poorest are often excluded from the most expensive health care. Exemptions do exist, but not always for those in greatest need. There have been trials in free health care, but the personnel

complain of overwork and start selling medicines that should be free of charge (WHO 2005 b). There have been only limited experiments in setting up community loan systems and community based health insurance (Fofana 1997, Carrin 2005), with insufficient results to date.

To reduce the financial barriers to obstetric care, a system of prepayment, called “Obstetric Risk Insurance” (in French: “forfait obstétrical”), was introduced in two Moughataas in Nouakchott in November 2002, covering a third of the city. The system was extended to an additional Moughataa in May 2004, becoming operational in five maternity wards and thus covering the needs of half the expected pregnant women in the capital. This chapter aims to describe the Obstetric Risk Insurance, detail the different stages of its implementation and evaluate the results 5 years after its introduction.

Context

Mauritania, a semi-desert West African country with 2.8 million inhabitants, is one of the least advanced countries in terms of health development: in 2002, health expenditure represented 2.9% of the GDP, being 10 US\$ per inhabitant. The latest surveys show a maternal mortality ratio of 747 deaths/100,000 live births (MAED/MSAS 2001), a neonatal mortality of 40‰ and under-five mortality of 123‰ (MAED/ONS 2004).

The health system organisation follows the administrative boundaries. It is a pyramidal system comprising of three levels: the central level, represented by the Ministry of Health; the intermediate level, made up of Regional Health Directorates (Directions Régionales de l’Action Sanitaire: DRAS) situated in the 13 capitals of the Wilayas (regions); and the peripheral level, composed of Moughataa (departmental) health districts re-grouping health centres and health posts. Certain regional hospitals are run autonomously; others fall under the Regional Health Directorates.

In Nouakchott, the capital with 558,195 inhabitants (MEAD/ONS 2002), 90% of deliveries take place in public sector maternity wards (MEAD/ONS 2004); the remaining 10% are distributed between the private sector and homes. The city is divided up into 9 Moughataas and the country’s two referral hospitals are located here.

There are sufficient midwives for health facilities at all levels, yet the quality of health care is notoriously poor, both in terms of interpersonal

relationships and behaviour towards patients in general, as well as adherence to diagnostic and therapeutic norms and procedures.

Pregnant women cover the totality of costs related to health care during pregnancy, as the country offers no social insurance, except for the civil servants whose costs are covered by the State. The existing cost recovery system is based on the profits from sales of essential drugs. The complexity of the redistribution of the profit into personnel bonuses renders the whole management system opaque. Moreover, frequent stock shortages oblige patients to buy their medicines and consumables in private pharmacies at prohibitive prices, further increasing delays in the application of emergency therapeutic decisions. There is no organised public sector referral system so patients have to use private transport, and the backhanders demanded by certain categories of personnel significantly increase the official rate. These costs obviously vary according to the type of care required, the health facility in question and the personnel involved: they range from an average of 32 US\$ for a pregnancy and non-complicated delivery to 333 US\$ for a caesarean delivery (Prual 2000). These costs are too high for the majority of users, and often explain the delays observed in the provision of emergency care in the only surgical gynaecology-obstetric unit in the country, located within the National Hospital Centre (Centre Hospitalier National: CHN).

THE NOUAKCHOTT SAFE MOTHERHOOD PROJECT

Obstetric Risk Insurance was introduced in Nouakchott through the Nouakchott Safe Motherhood Project, financed by the French Ministry for Foreign Affairs (budget of 600,000 US\$) with technical support from the World Health Organization. Designed to contribute to reducing maternal and perinatal mortality, the project, piloted by the Regional Health Delegation (DRAS) with the help of French Technical Assistance, focused on a multidisciplinary approach bringing together gynaecologists, public health specialists, socio-anthropologists, political and associative representatives and heads of NGOs and development partners in order to address all the determinants of maternal and perinatal mortality.

The project introduced a series of preliminary measures:

- supplying all maternity wards with basic equipment,
- staging a refresher course on emergency obstetric care for doctors and midwives,
- developing working and monitoring tools (Vangeenderhuysen *et al.*

2001),

- building and equipping an operating theatre in the Health Centre with the highest attendance rate, thereby turning it into an emergency referral centre,
- carrying out a socio-anthropological survey to shed light on user/health staff relationships and health-seeking behaviours,
- setting up an audit committee to examine maternal deaths,
- introducing an autonomous management system granting financial access to the entire population regardless of the level of health care required.

The risk insurance scheme therefore formed part of a global approach aimed at improving access to health care and the quality of services provided, as opposed to being an isolated measure.

The different stages of implementing the Obstetric Risk Insurance Scheme

Although there were some initial difficulties in convincing all the parties involved, the strong political support given to the scheme from its outset encouraged adherence from the majority of health staff members.

A number of information meetings were organised to allow each staff member to understand how the system worked and appreciate the opportunity it offered to a largely impoverished population.

Consensus conferences, responsible for drawing up protocols, upheld the principle “no delivery without a midwife” and extra staff have been allocated to the participating facilities as necessary.

All health staff members adopted the standardised care protocols and the various tools developed (obstetric case notes, individual mother and child health books, registers for drug management, laboratory and ultrasound management, referral cards, monthly activity and consumption reports, receipt ledgers, etc.).

Then a national NGO carried out a programme of intense social mobilisation, circulating information amongst elected representatives and community leaders and enlisting women volunteers to visit 70% of households, explaining the project to families and inviting them to participate in local meetings for information and discussion.

The personnel adopted a “good conduct” charter, focusing on the quest for quality and the rejection of illicit financial gains, but also incorporating the right to information on managing the risk insurance scheme.

A detailed estimation of needs and the average cost of care during pregnancy was drawn up using in-depth knowledge of the maternity wards’ activity (acquired before the project began), the acceptance of the data from the “Maternal Morbidity in West Africa” survey (Prual *et al.* 2000) for determining the incidence of the main pathologies expected during pregnancy and the estimate of drugs and consumables required for each service.

A sum of 70,000 US\$ was allocated to cover the first year’s working capital, thereby guaranteeing the availability of medicines and consumables from day one.

A Monitoring Committee was set up, composed of health professionals, elected political leaders, Ministry of Health representatives, community representatives and development partners. This composition ensured full transparency.

A smaller committee was formed for handling day to day management. Different models with varying fees have been tested, ranging from 18 to 24 US\$, with the fee of 22 US\$ retained as the most realistic. It covers re-supply of medicines and consumables and bonuses for personnel (doubling their salaries if activity levels were high) whilst remaining affordable for the vast majority of pregnant women who paid, on average, according to the official rate (which was lower than the real rate), between 14 and 33 US\$ for a delivery, and around 200 US\$ for a caesarean section.

Description of the system

Based on the underlying principle of risk sharing, Obstetric Risk Insurance (“ORI”) involves a financial contribution from pregnant women of 22 US\$ paid in one or two instalments during pregnancy, to cover the costs of all related health care, regardless of the pregnancy outcome, the mode of delivery or any immediate complications.

All patients attending their first ante-natal care (ANC) consultation are informed of the options available and the services covered by the insurance scheme. They can choose to pay per act rather than enrolling in the ORI, but they cannot change their mind later on in the pregnancy. The quality of

services provided, however, remains unchanged.

Whatever mode of payment chosen, the user then receives a health book and payment receipt, presenting the latter at each contact with obstetric services. The ANC midwife notes down the patient's name and the sum received in a receipt ledger, to be collected by the ORI administrator every month.

The insurance scheme entitles the patient to an obstetric package consisting of four ANC consultations, prophylaxis treatment, blood and other tests (haemoglobin level, blood group and rhesus at the first ANC consultation, albuminuria and glycosuria at each consultation), one ultrasound scan during the first trimester, management of pathologies associated with the pregnancy, care during a normal or complicated delivery including a caesarean section, ambulance transportation to a referral hospital if necessary, hospitalisation and post-natal care (PNC).

The management committee tracks the activity in the wards, the data collected from monitoring and the receipts generated by the system; it also approves drugs and consumables orders and bonus distributions and maintains a balanced budget.

The ORI administrator summarises the necessary information for the management committee: every week, he collects the receipts and compares them with the reported activities and receipt ledger stubs; at the end of the month, he presents the committee with a financial overview and settles the bonuses and running costs. Once the pharmacist has drawn up the monthly estimation of medicines and consumables, he pays the orders from an account requiring three signatures.

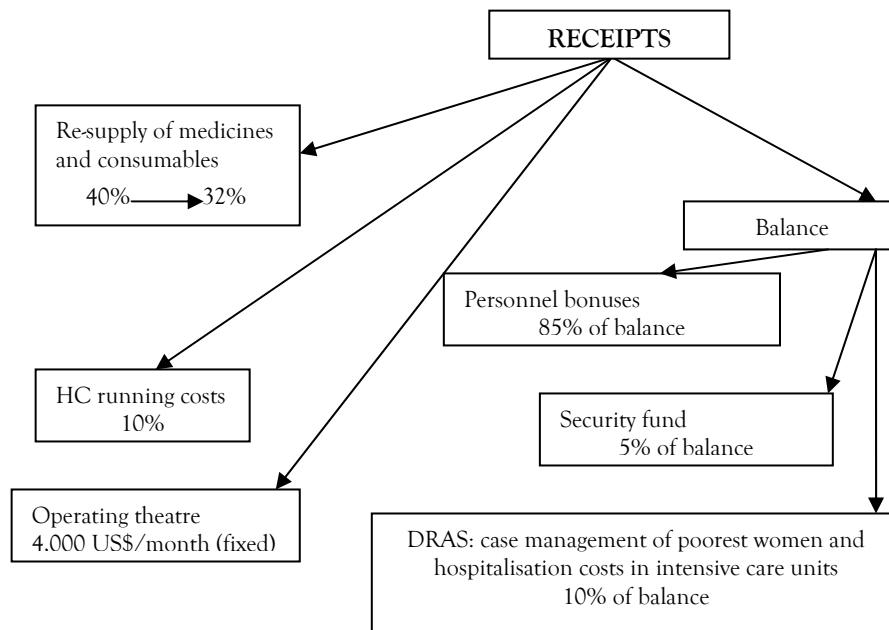
On the first day of each month, the health centres report on activities and stocks of medicines and consumables in order to be re-supplied on the basis of estimated monthly needs. After each delivery, the central pharmacy stock is re-evaluated and re-supplied; in the event of a stock shortage in the Medicines and Consumables Purchase Centre (Centrale d'Achats des Médicaments et Consommables: CAMEC, the official public sector supplier), drugs are purchased from the private sector in accordance with their quality and price.

The receipts generated by the contributions should cover the purchase of medicines and consumables, contribute towards running costs (setting off the lost takings from medicines sales as envisaged by the Bamako initiative), pay the extra personnel required to keep the operating theatre running 24/7

and provide maternity health staff members with bonuses to compensate for the loss of non-official revenues. In an effort to maintain the notion of quality at the forefront of service provision, 30% of bonuses are distributed in accordance with merit-based criteria: application of hygiene rules, punctuality, adherence to protocols and quality of interpersonal relationships.

Forty percent of receipts were initially set aside for re-supply, with this figure gradually adjusted to 32% over the course of 2007 following better price offers by the CAMEC (Figure 1).

Figure 1. Expenses breakdown, Mauritanian obstetric risk insurance, 2007



The Regional Health Delegation (DRAS) receive 10% of receipts as reimbursement for costs generated by the few necessary transfers for intensive care at the National Referral Hospital (CHN); this fund also covers medicines and consumables for the poorest patients, estimated at 5% of users.

Once several maternity wards become involved in the scheme, personnel

bonuses are distributed in accordance with activity. Not all acts practiced during pregnancy care are equivalent, varying in technical complexity, degree of responsibility or the time they take. Each one is therefore attributed a coefficient. Thus a delivery has a coefficient of 1, a consultation and a day in hospital 0.2, an ultrasound scan and laboratory examinations 0.3. The number of interventions and hospital days are multiplied by their respective coefficients, leading to the attribution of points to each facility, then the distribution of bonuses following a scale defined jointly by the system's managers and health staff members, with distribution in relation to staff qualification.

The Monitoring Committee, run by the Region's Prefect, guarantees the system's smooth running, transparency in the management of receipts and outlays, equity in the distribution of bonuses and adherence to the charter of rights and duties signed by all members of the maternal health services.

A DRAS midwife, supervised by the ORI Coordinator, provides constant monitoring of the population's adherence to the plan, the activity in the maternity wards and the quality of services provided. Systematic data collection in all public sector maternity wards of the city is organised, identifying the geographic distribution of deliveries with the aim of pinpointing the relationship between delivery location and domicile; regular interviews are programmed with users and health staff members to assess their perceptions of the system. Retro-information is provided to the midwives running the maternity wards.

EXTENSION OF THE OBSTETRIC RISK INSURANCE SCHEME

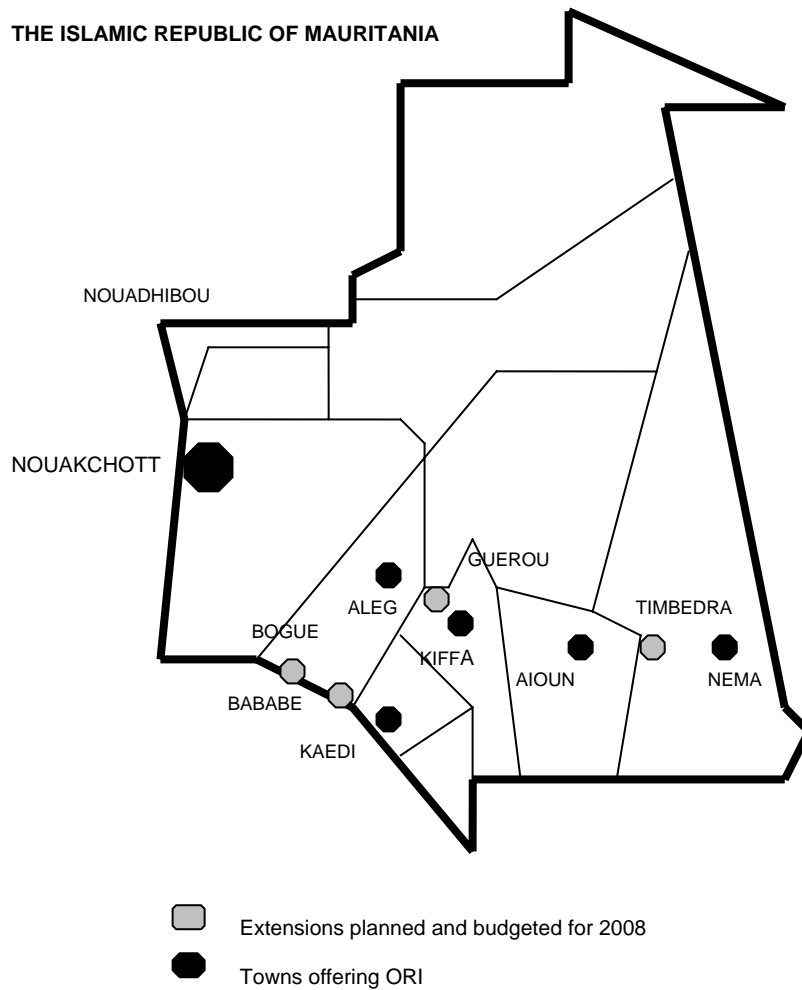
After two years of encouraging results and despite the fact that ORI does not resolve all the existing problems, the Mauritanian Ministry of Health adopted this initiative as a model to be adapted for rural areas. The system was then extended to several Wilayas outside the capital:

- On the 11th May 2005, the Ministry of Health decided to initiate the extension to the capitals of three of the county's Eastern regions: Kiffa (Assaba), Aïoun (Hodh El Gharbi) and Néma (Hodh El Chargui), representing a population of around 70,000 inhabitants, being a third of the three Moughataas.
- On the 11th May 2007, the commune of Aleg (15,000 inhabitants for 60,000 in the moughataa) joined the scheme.
- On 12th May 2008, the extension reached the towns of Kaédi (40,000

inhabitants) and Nouadhibou (90,000 inhabitants).

- At every stage, the presence of an effective operational surgical team was guaranteed, including a gynaecologist introduced to the facility 9 to 12 months previously. Obviously, the concordance between the arrival of a specialist and the set up of a new system of access to health care makes it difficult to carry out a separate analysis of the impact of each event. But there was no question of implementing Obstetric Risk Insurance without an adequate referral level.

Figure 2. Map of Mauritania, distribution of the ORI area



Methods

We carried out an annual evaluation on the target population's adherence to the ORI in participating facilities, the impact on service utilisation, the quality of health care provided and its financial viability.

Quantitative data was gathered from:

- routine data collected from monthly activity reports provided by participating facilities since the introduction of ORI,
- monthly monitoring carried out in all the public sector maternity wards in Nouakchott over 24 consecutive months between 2005 and 2007, gathering all the information available on all women delivering in the first week of each month,
- Regional Health Delegations and annual hospital reports.

Qualitative data was gathered from:

- analysis of obstetric case notes selected at random in series of fifty consecutive files from each participating facility once a year; the study focused on the quality of the anamnesis, the search for signs of materno-fœtal infection, blood pressure readings, the quality of the partographs and post-partum surveillance (the limited reliability of the study's results for the first two items explains their absence from the presentation of results),
- cross-checking the ward's monthly activity reports with reports on the delivery and consumption of medicines and consumables, leading to a comparison of product use with therapeutic protocols,
- study of referral causes and the nature of serious complications associated with pregnancies receiving care in the surgical gynaecology-obstetrics ward (monthly reports),
- Nondirective interviews of users and maternity health personnel carried out once a year until 2006 by external staff trained in the interview techniques.

Results

IN THE FIVE MATERNITY WARDS IN NOUAKCHOTT

ORI enrolment and service utilisation

The percentage of pregnant women enrolling in ORI from their first antenatal clinic (ANC) rose from 90% at the end of the first year to 98.2% in 2007 (number of enrolments in ORI at the first ANC over the total of ANC1 carried out in the five participating facilities).

The study of delivery location (public sector facilities versus home deliveries) provides an indication of women's confidence in health facilities (Table 1): generally speaking, most women deliver in the nearest maternity ward to their home, but this is more pronounced when they live in an ORI catchment area (81% compared to 59% $p < 10^{-3}$): 13.2% of women living outside an ORI catchment area deliver in ORI-participating facilities; 16.6% of women living within an ORI catchment area still attend non-ORI participating facilities, largely for geographic reasons, despite the higher rates they have to pay.

Table 1. Geographic distribution of deliveries in all the public sector maternity wards in Nouakchott: (study carried out on a sample of 11,342 women collected from monthly monitoring reports between June 2005 and May 2007)

	Maternity wards ORI area	Maternity wards non-ORI area	Hospitals
Women living in the ORI area ORI n=5720	81.3%	2.1%	16.6%
Women living outside the ORI area ORI n=5622	13.2%	58.8%	28%

As shown in Table 2, whatever the service under consideration, the activity of all the participating facilities has risen sharply since the scheme's introduction: in particular, the enrolments increased by 77.8% between 2003 and 2007 and the proportion of deliveries covered by ORI now represents 77% of all deliveries in these 5 maternity wards compared to 42.4% in 2003, demonstrating the population's confidence in the scheme.

Table 2. Activities and ORI coverage for the five participating maternity wards of Nouakchott, 2001-2007

	2001**	2003***	2004	2005	2006	2007
N° of expected births	11,130	11,904	12,148	12,451	12,762	13,082
N° of enrolments in the ORI scheme		5,504	7,549	7,829	8,823	9,784
N° of ANC consultations	13,500	12,479	18,937	18,990	19,670	23,879
N° of deliveries carried out	6,848	9,485	11,111	12,389	11,787	12,463
% caesarean sections/assisted deliveries	1	2.8	2.6	3.5	3.2	3.3
N° of PNC consultations	5,890	6,772	8,227	9,224	8,650	8,720
N° of maternal deaths		10	11	16	12	8
Ratio of maternal mortality (per 100,000 LB)	250*	105	99	129	102	64
% of deliveries with ORI		42.4	57.4	64.9	72	77
% of ORI activity ****		58.2	72.9	78.8	83.5	86.8
% of receipts generated by ORI		59.9	70.6	71.1	76.8	81

* data for the entire city of Nouakchott in 2001, for ORI-participating maternity wards for the following years

** last complete year without ORI

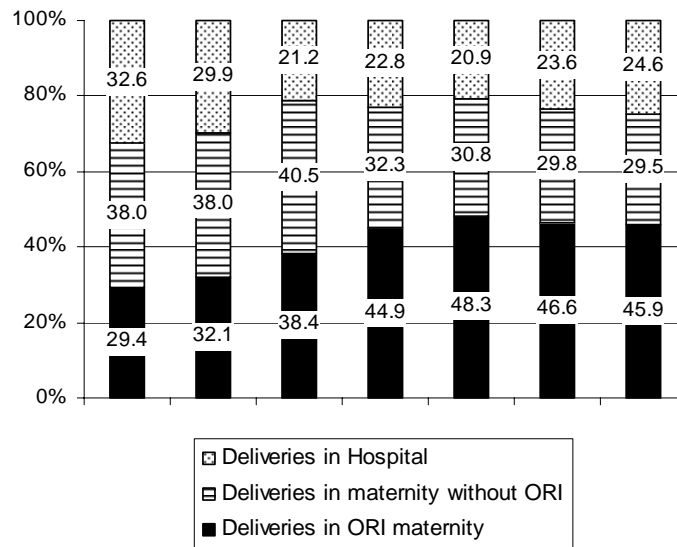
*** first complete year with ORI

**** services covered by ORI compared to all services

If we only consider the deliveries in Nouakchott's public sector facilities, Figure 3 clearly shows an increase of activity in the 5 maternity wards, largely at the expense of hospitals offering the same services at higher rates.

In 2007, service utilisation was higher for patients enrolled in the ORI, with an average number of 2.4 ANC per patient (1.7 outside the catchment area) and 72.9% coverage of PNC (45% outside the catchment area).

Figure 3. Distribution of deliveries in the public facilities of the Wilaya of Nouakchott



Moreover, blood and urine testing is carried out in 95.4% of cases and an ultrasound scan for 71.8% of patients (data not available in non-participating maternity wards).

Among the women not enrolled in ORI and paying all the direct expenses for their delivery in the referral hospital, 62% did not attend ANC.

Quality of care

Although quality of intrapartum care has improved in comparison with 2005, it has not reach the quality standards existing at the introduction of the ORI (Table 3).

Table 3. Changes in 3 quality criteria in maternity wards in the ORI catchment area, Nouakchott, 2003-2007

	2003	2005	2007
Quality of partogram*	48%	35%	45%
Post-partum care	30%	14%	30%
Blood pressure readings during labour	-	29%	55%

*% of good quality partograms over the number of deliveries in the maternity wards offering ORI

The differences between the use of medicines and consumables and defined norms lead to different conclusions: highly satisfactory with regards to the application of hygiene measures and utilisation of oxytocics but considerably less so in the administration of preventive measures. Despite the permanent availability of products, it is clear that personnel do not always follow procedures: in particular, albuminuria testing was only carried out during ANC1.

During the 2005-2007 period (Table 4), severe maternal morbidity accounts for 5.3% of deliveries with a case-fatality rate of 1.6%. Haemorrhages and eclampsia account for 75% of deaths.

Table 4. Severe maternal morbidity and rate of lethality in the 5 maternity wards in the ORI catchment area, 2005-2007

	Haemorrhage pre and per partum	Post-partum haemorrhage	Severe hypertension complication	Severe dystocia and CPD*	Others	Total
Severe maternal morbidity	13.2%	12.2%	13.9%	43.2%	18.6%	
% delivery	0.7	0.6	0.7	2.3	1	5.3
Lethality %	3	1.3	4.8	0.4	1.3	1.6

*Cephalopelvic disproportion

The percentage of caesarean sections is relatively stable (Table 2) with globally identical indications from one year to the next, exclusively for maternal reasons in the absence of foetal monitoring during labour. The

number of maternal deaths is decreasing regularly, but the figures are not yet significant.

Perception of the system by users and providers

The interviews carried out with system stakeholders reveal their opinions on ORI at different stages of the project.

Most users find the system more equitable and accessible to greater numbers of people. Generally speaking, they appreciate their reception at ANC level or in the maternity wards, but many complain of a lack of information on "the principles of risk insurance and its advantages" and observe periodic lapses into corruption behaviour in the referral maternity wards, with some staff members falsely claiming drug shortages in order to sell drugs to women on the side. They appreciate the fact that medicines and consumables are provided, even if prescriptions are still required on occasion. Amongst the non-enrolled patients, there are two different scenarios: either their pregnancies are followed up in a non-participating facility and they present themselves at the ORI-participating maternity ward for delivery, or, far too often, their pregnancies are not followed up at all.

Amongst the personnel, opinions vary greatly: most complain of a significant increase in work load and insufficient bonuses, and a lack of consultation and information within the system, etc. But for the users, there is a clear improvement, both in terms of service cost and the increased rapidity of emergency care.

In reality, the study of changes in workload per ward shows the situation to be stable. Nonetheless, in so far as salaries have risen considerably since 2003, the impact of bonuses on monthly revenues is becoming less and less significant.

The financial viability of the system

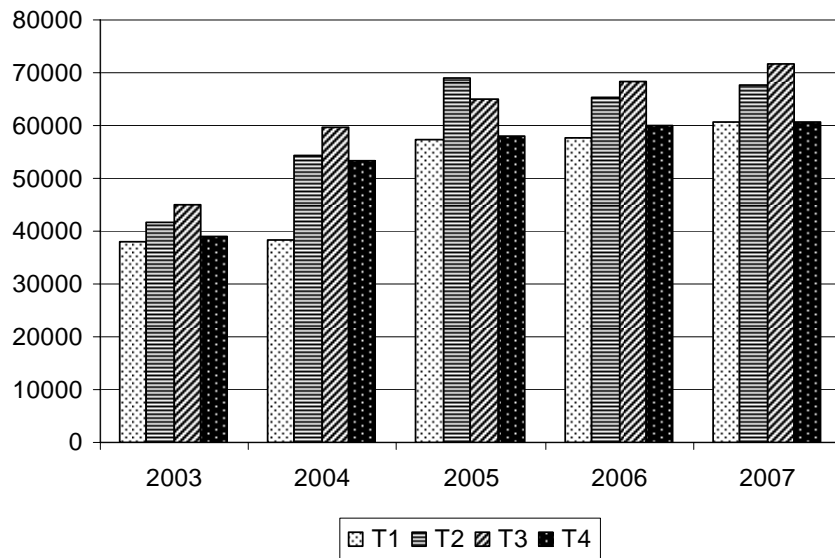
The increased receipts (Table 5) are logically proportional to the increased activity, with a growing share generated by ORI.

Table 5. Annual receipts in US\$ for the five maternity wards in the ORI catchment area, Nouakchott, 2002 - 2007

	2002	2003	2004	2005	2006	2007	Total
Total	16,200	167,670	210,465	254,880	257,527	261,110	1,167,852
% Risk insurance	37.5	59.9	70.6	71.1	76.8	81.0	72.4

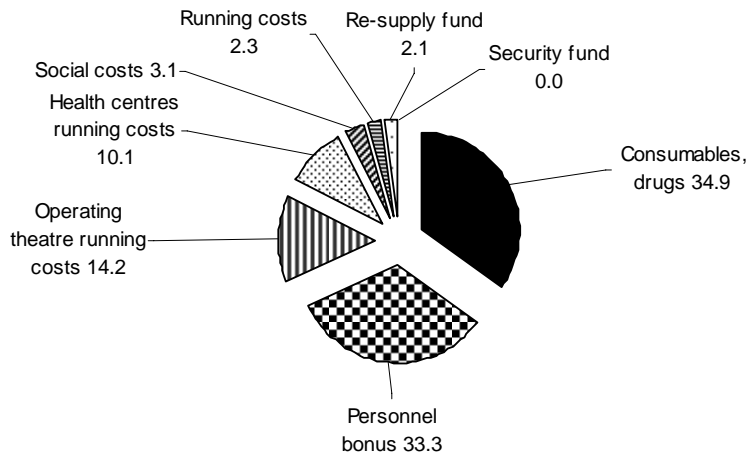
The breakdown of receipts varies significantly depending on the month under consideration (Figure 4), which clearly explains the variability of bonuses paid over to health staff members.

Figure 4. Quarterly breakdown of receipts in US \$ in the 5 maternity wards in the ORI catchment area, Nouakchott, 2003-2007



The breakdown of expenses (Figure 5) shows that the funds initially set aside for re-supply are used for such, either in the future (2%), or already used or in stock (35%).

Figure 5. Breakdown of outlays in % of total receipts for the maternity wards in the ORI catchment area, Nouakchott, 2002-2007



Operating theatre running costs, independent of the volume of activity, and in line with personnel costs, represent 14% of expenses. In total, including the 34% attributed to varying bonuses, 48% of receipts are re-distributed directly to personnel.

Of the 10% set aside for health centre running costs, half is also distributed as bonuses to the numerous “volunteer” personnel. The rest is spent on small-scale maintenance.

The 3% re-assigned to the DRAS largely covers hospitalisation costs for the intensive care unit (ten patients on average per year over the 5 year period) and medicines and consumables for patients unable to afford ORI. They represent only 0.1% of users since the scheme’s introduction.

Of the 5% assigned to the security fund, almost all of it was used on maintenance, repairs and the purchase of supplies. This was not planned, as these costs should fall to the Minister of Health.

On 31st December 2007 the financial reserves covered six months of

supply; over the last year, the average overall cost of medicines and consumables required for pregnancy care accounted for 32.4% of the risk insurance fee, being 0.4% more than forecasted. If costs and activities remain unchanged, there are currently no concerns regarding financial viability.

RESULTS IN THE NEW WILAYAS (KIFFA, AÏOUN, NÉMA)

For Kiffa, Aïoun and Néma (Table 6), we compared the last complete year without ORI (2004) with the complete years with ORI (2006 and 2007). The scheme has not been in place long enough to present results for Aleg, Kaédi and Nouadhibou, even if for Aleg, the preliminary results are similar to those observed in the three first Moughataas.

Table 6. Main indicators for maternal health in Kiffa, Aïoun and Néma since the introduction of ORI, 2004-2007

	KIFFA			AÏOUN			NEMA		
	2004	2006	2007	2004	2006	2007	2004	2006	2007
Nbr of ANC Consultations	3,000	5,929	5,970	1,800	2,932	3,742	749	2,176	2,845
Nbr of assisted deliveries	1,520	2,142	2,630	906	1,178	1,359	605	1,075	1,191
Nbr of enrolments in ORI		1,956	1,939		732	821		932	1,204
% of caesarean sections/assisted deliveries		3,2	2,5	4,1	4,9	4,8	2,8	3,3	5,7
Ratio of maternal mortality (per 100,000 LB)	675	186	266	873	524	809	1,818	744	755
% of ORI deliveries/ assisted deliveries		59	61		58	63		58	64
% of assisted deliveries/expected deliveries in the moughataa	41	62	69	23	50	65	18	42	49

Adherence and service utilisation

There was a noticeable rise between 2004 and 2006:

- Number of ANC increased by 63% in Aïoun, 97% in Kiffa and 190% in Néma,
- Number of assisted deliveries increased by 30% in Aïoun, 41% in Kiffa and 78% in Néma.

This trend continued in 2007, but, logically, in a less spectacular manner.

This improvement in access to health care led to a significant increase in the rate of assisted deliveries in all the Moughataas, surpassing the rate recorded in the hospital maternity wards and thus testifying to the knock-on effect of introducing ORI in these departments.

There was massive adhesion to the ORI scheme (enrolments rose from 83% to 87% during the first ANC consultation) and women now choose this mode of payments for 2/3 deliveries.

In Nema, it is regrettable that around a third of enrolled members, originating from villages close by, carry out their ANC in ORI-participating facilities but then return to their villages to deliver, often doing so in unsafe conditions. This can probably be explained by gender-associated taboos (the health staff members in rural areas are almost always male) and the considerable influence of religion in these rural areas, added to the population's lack of confidence in their health system to date. We can imagine that re-locating the offer of health care to health posts at an affordable rate will help re-gain the confidence of these women who have been forgotten for so long by the health services.

Quality of care

For the users, the permanent availability of medicines and consumables and the consequent drop in prescriptions and costly purchases in private pharmacies is a major step forward, and largely explains the success of the ORI scheme.

This availability provides health staff members renewed comfort in their working conditions and for most of them, the consequent reduction in revenue is compensated for by bonuses.

The rate of caesarean sections has risen, varying between 2.5% in 2007 in Kiffa to 5.7% in Néma.

There has been a definite reduction in hospital maternal mortality

(significant for Kiffa and Néma); nonetheless the rates remain too high. Over half the deaths recorded were due to eclampsia, requiring resuscitation that is difficult to provide in hospital facilities equipped with minimal technical resources.

Moreover, the increased death rate in 2007 results from a higher number of referred cases coming from neighbouring Moughataas in deplorable conditions (74% of deaths).

An explanation is still required for why the substantial increase in caesarean delivery rates in Néma between 2006 and 2007 had no effect on maternal mortality, and why there was such a difference ($p=0.007$) in mortality with Kiffa, where the equipment and human environment appear identical.

Financial viability

The financial management analysis demonstrates that the level of receipts is stable, largely covering re-supply in medicines and consumables and a distribution of bonuses that can amount to a second salary, depending on the month and the health worker's professional qualification.

The accounts are comfortably in credit, both for re-supply and security funds.

Discussion

Despite the imperfections listed by the users and inadequacies in the quality of certain services provided during routine care (Table 3), this initiative has been an undeniable success with the population: amply demonstrated by the rising number of enrolments and the constant increase in activities (Tables 2 and 6). This confidence attracts the women living outside the ORI catchment areas (Table 1), and explains the other Moughataas' demands to be included in the scheme, whether in the capital or beyond. Increasing numbers of women choose to enrol in the ORI, and concerns expressed during the scheme's introduction regarding non-payers have proved unfounded. Given the population's average living standards, the financial appeal of the scheme is considerable, even if the promised quality is not always delivered.

In Nouakchott, the downside of this success has led to a saturation of the referral gynaecology-obstetric ward, with an average of 50 ANC

consultations and 18 deliveries taking place per day. Whilst the teams on duty are managed by a midwife, they are otherwise composed of insufficiently qualified auxiliary personnel, with all the safety risks that this implies. The ward needs to reinforce its health staff members and introduce continued supervision in order to improve the quality of its services; improved organisation of tasks and a more judicious distribution of working hours could also lead to improved ANC and PNC coverage.

In terms of quality, the main improvement lies in the permanence and continuity of care, made possible by the availability of drugs and supplies, the effective presence of an operational team available 24/7 and the existence of an efficient referral system allowing faster delivery of emergency obstetric care. The average time required between the decision to carry out a caesarean section and the start of the intervention is now 45 minutes, which is, according to the conscientious observations made by the obstetricians on duty, three times less than in the two other surgical maternity wards in the capital.

In Nouakchott, despite a reduction in comparison to the 2003/2005 period (Renaudin *et al.* 2007), lethality remains high (Table 4), particularly during haemorrhagic and severe hypertension complications, but it can be hoped that the recent availability of blood products (fresh frozen plasma and concentrated red blood cells) will bring it down.

Outside the capital, the increased number of deaths registered in the regional capital maternity wards corresponds to an increase in referrals from neighbouring departments: this confirms the urgency of extending the ORI coverage in order to organise the referral system in the best conditions possible.

The ORI introduced official additional resources, but despite the increase in activities, the bonuses remained stable following a multiplication of “arranged” staff postings to participating maternity wards. This led to periodic instances of corrupt behaviour from certain staff members, who nonetheless remained a minority. In regions with fewer personnel, the risk of such behaviour is lower, and satisfaction quasi-unanimous.

Fears of embezzlement in the management of such initiatives can curb their implementation: experience shows that rigour and transparency are possible when management protocols are well-defined and Management Committees are held accountable to users.

Risk insurance generates considerable resources, and is at times

mistakenly considered an absolute solution to all problems - the maintenance of medical equipment, for example - as if it were possible to expect users to cover not just medicines, supplies, bonuses and duty personnel but the entire health system's running costs as well. Rehabilitating premises, maintaining equipment or buying it new must remain the responsibility of the State or donors, and it would be dangerous to imagine that this scheme, successful though it is, can substitute them in their entirety.

Improvements are required, particularly at the level of information circulation amongst personnel, on-going training, adherence to protocols, maternity ward supervision, consultation with users' representatives, etc. (although it is difficult to obtain continuity in the latter due to its inevitably voluntary nature). After 5 years of experience in Nouakchott, nearly 3 years of experience outside the capital and an increase of 10% in the ORI fee in early 2005 (20 to 22 US\$), the budget is balanced and financial autonomy assured if good management practices are applied, particularly in the purchase of medicines and consumables.

The ORI fee is accessible, yet sufficient to avoid the need for external financing (from development partners, community associations, the State or communes, etc.) that can never be guaranteed over the long term. Development partners and health authorities consider that the moderate budget for regional extension, currently estimated at between 4 and 7 US\$ per woman of childbearing age (depending on whether or the Moughataa has a working ambulance or not), should allow implementation of the extension strategy without undue delay.

Conclusion

The guaranteed availability of supplies, the presence of a surgical team exclusively for emergencies, the organisation of a referral system and the accessibility of the ORI fee are probably all factors that explain the huge success of this scheme with women.

Furthermore, this mode of prepayment for an existing event with a known duration and for which the date of enrolment is open to choice probably corresponds to the financial capacities of a population with modest and irregular revenues better than a classic mutual insurance system.

It should be noted that rigorous management and transparent procedures guarantee viability and autonomy without the need to undertake or envisage

any recapitalization.

The marked increase in assisted deliveries at rural Moughataa level shows the knock-on effect of risk insurance and pleads for a rapid extension of the scheme towards more remote areas, where needs are more acute, expectations higher and efforts most required. The ORI alone cannot resolve the enormous challenge facing those responsible for the health system with regards to the tragic levels of maternal mortality, but its positive impact and knock-on effects has placed it at the core of Mauritania's maternal health policy.

The strong political support accorded to the scheme from the outset has undoubtedly contributed to its sustainability to date. The recently-envisaged extension of care to newborns should also capitalise on a firm political will to define a real strategy for reducing neonatal mortality.

At present, 25% of Mauritanian women benefit from this risk sharing scheme; with the help of development partners (the French Development Agency, UNFPA, UNICEF and the Spanish Cooperation), the scheme aims to cover 80% of the country by the end of 2010 in the reasonable hope of reaching the Millennium Development Goal of a three quarters reduction in maternal mortality.

References

Carrin G, Waelkens MP & Criel B (2005) Community-based health insurance in developing countries: a study of its contribution to the performance of health financing systems. *Tropical Medicine & International Health* 10(8), 799-811.

Fofana P, Samaj O, Kebbie A & Sengeh P (1997) Promoting the use of obstetric services through community loan funds, Bo, Sierra Leone. The Bo PMM Team. *International Journal of Gynecology and Obstetrics*, 59(suppl 2), 225-30.

MAED/MSAS, Mauritanie (2001) Enquête démographique et de santé 2000-01, ONS/ORC Macro, RIM.

MAED/ONS, Mauritanie (2002) Recensement général de la population et de l'habitat 2000. Répertoire des lieux habités.

MAED/ONS, Mauritanie (2004) Enquête sur la mortalité infantile et le paludisme. Office National de la Statistique. Nouakchott.

Pruval A, Bouvier-Colle MH, de Bernis L & Bréart G (2000) Severe maternal morbidity from direct obstetric causes in West Africa : incidence and case fatality rates. *Bulletin of the World Health Organization* 78, 593-602.

Pruval A (2000) Discours et récits des parturientes, de leur famille et des personnels de santé sur les pratiques autour de l'accouchement à Nouakchott : analyse et leçons à tirer. MSAS/DPCS/DRASS de Nouakchott & CHN. Programme maternité sans risque.

Renaudin P, Prual A, Vangeenderhuysen C, Abdelkader M, Vall MI & El Joud D (2007) Ensuring financial access to emergency obstetric care : three years of experience with obstetric risk insurance in Nouakchott, Mauritania. *International Journal of Gynecology and Obstetrics* 99(2), 183-90.

Royston E & Armstrong S (1990) Les causes des décès maternels In : La prévention des décès maternels. WHO, Geneva, pp 78-111.

UNFPA (2005a) Reproductive health: a measure of equity. In: State of World Population 2005, UNFPA, New York, pp 33-44.

UNFPA (2005b) Indicateurs In : State of World Population 2005, UNFPA, New York, pp 107-17.

Vangeenderhuysen C, Renaudin P & Vall MI (2001) Le dossier d'accouchement: une aide à la décision. *Cahiers Santé* 11(4), 259-63.

World Health Organization (2005a) Chapters 1 & 2 In: World Health Report 2005, WHO, Geneva, pp 1-40.

World Health Organization (2005b) Reconciling maternal, newborn and child health with health system development. In: World Health Report 2005, WHO, Geneva, pp 125-48.

Appendix 1

IMPLEMENTING REGIONAL EXPANSION

It is an absolute priority to ensure the proper management of the referral surgical gynaecology-obstetrics ward so it can handle all emergencies. The ORI is therefore always introduced into the regional capital first, then extended to departmental health posts once the referral hospital is established, then departments depending on this regional hospital for surgical referrals.

PRELIMINARY STEPS

Human resources: the first requirement is a team trained in the case management of obstetric emergencies, which involves:

- the presence of a gynaecologist-obstetrician or, if none is available, a surgeon trained in the techniques of vacuum extraction and caesarean section at referral hospital level
- the presence of an anaesthetist technician, operating theatre personnel and a laboratory technician in the regional hospital
- the effective presence of sufficient midwives and nurses trained in Emergency Obstetric Care to assist deliveries in the health centres and regional hospital; presence of one registered nurse and one auxiliary midwife in the health posts.

Equipment: refers to the referral facility and basic health facilities

- the existence of an equipped, functional operating theatre in the regional hospital
- the availability of blood products
- the equipment of all maternity wards with basic supplies to ensure quality care for vaginal deliveries
- the existence of communication means (radio or telephone) in each health facility
- the allocation of a functioning ambulance exclusively for the use of obstetric emergencies.

PROCEDURES

It is vital to precede the introduction of ORI with presentations of the scheme's objectives and management, offered to:

- health authorities and health management staff (regional director, hospital director, senior doctors in health centres, gynaecologist, Reproductive Health Programme midwife)
- administrative authorities and local elected representatives
- representatives from civil society (NGO, women's associations, etc.)

Regional actors should obviously be associated with all stages of the extension procedure.

Health information; detailed knowledge of maternal health activity is critical in order to:

- fix objectives
- monitor and evaluate
- adapt the working capital to the volume of activity
- at health district level, the only indicators required are simple to collect:
 - number of ANC consultations (first and total)
 - number of deliveries
 - number of referrals to the regional hospital
 - number of maternal deaths
 - number of stillbirths
- In addition to the indicators above, the number of caesarean sections and lethality of the different complications should be recorded at regional hospital level, which is often new for these facilities
- during strategy presentations in health posts, an analysis is carried out with the post's Head Nurse on the cost of services, users' preferences and the services already used by women in rural areas.

Training: this must be dispensed at all levels of the health pyramid and adapted to the targeted personnel; focus should be placed on managing the practical training and the programmed monitoring.

- training on the use of a partograph
- training on the case management of obstetric and neonatal emergencies with the strict application of pre-defined care protocols already validated by consensus conferences in Nouakchott

- in the outlying facilities, the training should focus on the early detection of emergencies and the organisation of referrals
- standardised training modules exist at national Reproductive Health programme level; they are starting points for the theoretical sessions, which should be delivered jointly by central and regional trainers
- particular attention should be accorded to the absolute necessity to collect reliable and accurate activity data: this guarantees that indicators are monitored correctly, and management controls are also based on activity.

Setting up a working capital fund: this fund aims to cover the purchase of drugs, supplies and management tools for the first 6 months of the scheme's introduction.

- the size of this fund obviously reflects activity levels
- its composition is decided on the basis of preventive and curative care protocols; five years of experience can be capitalised on together with regular checks to assess the average consumption, thus ensuring a volume for a determined length of time, in accordance with the funding allocated
- all needs can be met at local levels: ideally, the working capital fund should be accorded and topped up by the CAMEC (the national purchasing centre for essential and generic medicines) which ensures product quality and competitive prices. In the event of shortages, purchases can be made through the private sector.

Management: the community financing approach, which is totally different to the system in place, requires a specific way of managing which is now thoroughly tried and tested, both in Nouakchott and outside the capital. It is steered by a Management Committee composed of health staff representatives and users.

As a first step, an administrator is appointed uniquely to the ORI: if possible, he should be a member of civil society, be familiar with basic IT tools, and have the trust of users and health staff members alike.

He requires preliminary training in all aspects of his job: collecting receipts, gathering detailed data on maternity ward activity, consumption and stocks, drawing up monthly financial reports, presenting them to the Management Committee, ordering and distributing supplies, paying bonuses...

The most delicate stage of this extension process concerns the development of a list of active personnel involved in maternal health activities and the definition of a motivation scale. This discussion must be transparent and include all the categories of personnel in order to avoid conflicts later on, even if it is often difficult to meet all the demands.

The breakdown of receipts' allocation should be clearly explained to all the health staff members and user representatives.

Allocation models are proposed to Management Committees but each Committee can decide to allocate its receipts as it wishes so long as some basic principles are respected:

- the risk insurance is fixed at 22 US\$ at national level
- 35% of receipts are automatically reserved for re-supply once a surgical maternity facility is operational in the catchment area concerned
- the planned offer of services must be delivered
- Staff bonuses must be reserved exclusively for staff involved in maternal health activities.

In regional extensions, adaptations to the management model are required:

- when one facility only carries out deliveries (as is the case in certain regional capitals), the system of coefficients depending on acts no longer applies: only points depending on rank and individual activity are taken into consideration
- in the Moughataas outside the regional capital, there are neither operating theatres nor surgical teams. Obstetric emergencies are therefore referred and the care provision cannot be exactly the same: there are no personnel trained in ultrasound, for example, and blood group testing is reserved for referred women
- each "Moughataa ORI" is therefore autonomous and holds a contract with the regional hospital for evacuations. These are then recorded under the "regional capital ORI" as "patients paying per act", but are covered by the "Moughataa ORI"
- In a "non-surgical Moughataa ORI scheme", no drugs and supplies are needed for an operating theatre; the percentage reserved for re-supply is therefore reduced to 20% and a budget for referrals is set aside, extending up to 28% in the most remote rural areas.

Information and awareness-raising:

- the population's adherence to the principle of obstetric risk insurance is completely dependent on personalised awareness-raising, with a strategy of household visits conducted by local animators. The objective is to visit 70% of the households within the selected geographical area
- the administrative authorities and elected representative must also be provided with detailed information on the implementation of this strategy during meetings held specifically for this purpose
- the manual "*Everything you need to know and explain about obstetric risk insurance in 36 questions/answers*" serves as a starting point for this activity
- fliers summarising the scheme's objectives and how it works are distributed during contacts with the population
- this activity must be carried out jointly by health staff members and representatives of civil society selected for their representative capacities and impartiality.

Monitoring - supervision:

- without fixing any specific dates, it is obvious that regular monitoring missions must be carried out during the first few months of implementation in order to reassure the parties involved and check the procedures set up are all running smoothly
- at a later date, bi-annual supervision is sufficient
- as time moves on, it is preferable that regional Management Committees propose and organise themselves expansion of the risk insurance scheme to new health posts.