Tackling Unmet Needs for Major Obstetric Interventions

Case studies

Haiti

CONTENTS

ABBREVIATIONS

AGCD: Agence Générale de Coopération au Développement (Belgian co-operation)

AMI: Absolute Maternal Indication

CAM: Co-ordination and Management Team (In ITM Antwerp-B)

CHU: Communal Health Unit (UCS: Unité Communale de Santé)

DGCI: Direction Générale de la Coopération Internationale (Directorate General of International Co-operation)

DOSS: Direction d'Organisation des Services de Santé (Directorate of Health Services Organisation)

DPPS: Direction de la Promotion et de la Protection de la Santé (Directorate of Health Promotion and Protection)

EB: Expected Births

EC: European Commission

EMMUS: Enquête Mortalité, Morbidité et Utilisation des Services (Mortality, Morbidity and Health Services Utilisation Survey)

FED: Fonds Européen au Développement (European Development Fund)

GBR: Gross Birth Rate

HAS: Hôpital Albert Schweitzer (Albert Schweitzer Hospital)

HBP: Hôpital Bienfaisance de Pignon (Bienfaisance Hospital, Pignon)

HCH: Hôpital Claire Heureuse (Claire Heureuse Hospital)

HCR: Hôpital Communautaire de Référence (Community reference Hospital)

HJ: Justinien Hospital(Justinien Hospital)

HPG: Hôpital La Providence des Gonaïves (La Providence Hospital, Gonaïves)

HSN: Hôpital Saint-Nicolas (Saint-Nicolas Hospital)

HUEH: Hôpital de l'Université d'Etat d'Haïti (Haïtian State University Hospital)

ITM-A: Institute of Tropical Medicine - Antwerp

MOI: Major Obstetric Intervention

MSPP: Ministère de la Santé Publique et de la Population (Ministry of Public Health and Population)

NGO: Non-Governmental Organisation

PHO/WHO: Pan-American Health Organisation / World Health Organisation

SHGO: Société Haïtienne de Gynécologie et d'Obstétrique (Haïtian Society of Gynaecology and Obstetric)

SNIS: Système National d'Information Sanitaire (National Health Information System)

STD: Sexually Transmitted Diseases

UNFPA: United Nations Population Fund

UNICEF: United Nations Children's Fund

UON: Unmet Obstetric Needs

UR: Uterine Rupture

USAID: United States Agency for International Development

1. INTRODUCTION

The study of unmet obstetric needs in Haiti covered only part of the population (around 30%). Nevertheless, it played an important political role in the context of the late 1990s in Haiti. In fact, from the outset of the process of establishing contact between the Haitian Ministry of Health and the Co-ordination and Management Team (CAM team) of the UON network in Antwerp the study was seen by local leaders not merely as a mapping of the needs to be met but rather as a means of dynamising the application of a health policy which had already been well thought out. The Ministry, under the leadership of its director-general, considered activities for the reduction of maternal mortality (among which was the UON study) in accordance with a systemic approach to the development of the health system. This meant that such a study should serve not only for the promotion of maternal health but also for the development of the health system as a whole. It was in this light – and perhaps more in Haiti than in other countries in the network – that the feedback to health workers was organised. The present case study shows clearly, in the importance attached to the utilisation of the results rather than merely to a descriptive analysis, that the country's interest in the UON approach has been directed by the desire for a tool which will have a mobilising effect not only in the campaign to reduce maternal mortality but also (and perhaps mainly) in the promotion of health in general.

2. CONTEXT

General

The Republic of Haiti occupies the western part of the island of Hispaniola, which lies in the Caribbean to the south-east of Cuba. It has an area of 27,250 sq.km, or rather more than one-third of the island which it shares with the Dominican Republic, and a population of around 7.5 million, two-thirds of them living in rural areas. The capital, Port-au-Prince, has a population of some 2 million.

After years of a totalitarian regime, followed by five years of turmoil and competition for power, a new elected President set the country on course for democracy in 1990. Unfortunately, these hopes were dashed by a coup d'état, and for some years thereafter the political and economic situation in Haiti remained difficult and unsettled. It was only in 1994, thanks to the resistance of the Haitian people, the intervention of the international community and an economic embargo, that democracy was restored.

Haiti is a poor country, and there has been a considerable drift away from the land, particularly since the 1990s. The annual rate of population growth is estimated at 2.1%. Maternal mortality at the end of the 1980s was estimated at 457 per 100,000 live births and infantile mortality at 74 per 1,000 live births[1]. Bringing the estimates of maternal mortality up to date for 1995, however, produces a much more worrying figure – a ratio of 1,122 (422-2,337) per 100,000 live births[2].

In the matter of health coverage, 40% of the population live within an hour's walk of a health structure. In 1998, the year of the UON study, Haiti had 652 health establishments, a third of them in the Ouest department, mainly in the capital, which lies within that department.

[1] Cayemittes M., Rival A., Barrère B., Lerebours G., Gédéon M.A. 1994-95. Enquête Mortalité, Morbidité et Utilisation des Services, EMMUS II, Institut Haïtien de l'Enfance, Demographic and Health Survey, Macro International Inc., 363 p.
[2] Hill K, AbouZahr C & Wardlaw T. 2001. Estimates of maternal mortality for 1995. Bulletin of the World Health Organisation, 79(3) :182-193.

In 1995, according to the EMMUS II survey[3], qualified medical staff assisted 46% of births, mainly by trained matrones. In rural areas, 90% of these births took place at home, compared with 56% in urban areas. In the capital 50% of women gave birth in a health structure.

In the field of health policy the central level was for many years organised in a highly vertical fashion, the Ministry being divided into units of technical expertise concerned with the planning and programming of measures for dealing with priority health problems and major administrative activities. In 1971, the Ministry of Health's organisation chart comprised eleven health districts directly dependent on the central level. In 1982, a law on regionalisation was promulgated, and in 1983, health regions were established by decree. These regions were technical and administrative entities, which were divided into health districts, sub-districts and sections. The role of the health regions was to carry out the Ministry's programmes and policies. In 1987, the decentralisation of authority in health matters became effective and health departments were created, replacing regions. By 1991, however, although there were nine departments in existence, there was still no effective decentralisation of authority. The political troubles of the early 1990s put a complete stop to the process and led to a disintegration of the public sector in favour of the non-profit private sector supported by the non-governmental organisations, which increased humanitarian aid during the period of the economic embargo.

1994 saw the introduction of the project for the creation of Communal Health Units (CHUs), designed to bring about the regrouping and the formation into a network of all local operators within an area of operation defined so as to ensure the optimal provision of the minimum parcel of services. However, the persistence of the long-established tendency towards "verticalisation" has prevented these CHUs from functioning properly.

Maternal health policy

Development of a maternal health programme

In 1971, after the creation of the Family Health Division, a vertical programme established in clinics outside hospitals took over responsibility for family planning and mother and child consultations. The object of the programme was to reduce maternal and infantile mortality and slow down the country's demographic growth.

In 1978, after the integration of these services in the health structures, the programme not having proved particularly effective, a new approach was introduced under which the Haitian armed forces were made responsible for the family programme. Rural police chiefs were given training to organise public meetings designed to motivate the population in favour of family planning. By 1983, this programme covered almost all rural areas, and was accompanied by a community programme based on the training of agents selected from the population for their ability to communicate. The role of these agents was to inform, motivate, recruit and refer mothers, children between 0 and 4, pregnant women and potential "clients" for family planning.

In March 1996, the Ministry of Health introduced a change in health policy. For long based on vertical approaches, with centralised management, it was now directed towards the recognition of people's fundamental right to health and a guarantee that everyone should have access to health care. This was in line with the 1987 constitution, which called for the decentralisation of the state and its resources in a spirit of equity, solidarity and social justice. The reform of the health sector was part of the policy of decentralisation of the state, the object of which was to ensure access to basic health care for all. At this level the communal health units, in which the minimum parcel of services is available, are the point of anchorage of decentralisation. The Ministry of Health then set out its priorities as follows:

[3] Institut Haïtien de l'Enfance, Demographic and Health Survey, Macro International Inc.1995 Enquête Mortalité, Morbidité et Utilisation des Services EMMUS-II 1994:95, 364 p

- To strengthen the Ministry of Health at central and peripheral levels. This includes the development of human resources and management abilities by using new methods of financing health services, reforming the hospital system, amending health legislation, reviewing policy on the supply of essential medicines, developing the health information system, pursuing inter-sectorial co-ordination and centring services on communal health units based on decentralisation and community participation.
- To develop primary health care, including complete care for children and women, with particular emphasis on risk-free maternity and the prevention of maternal mortality (vaccination, access to essential medicines, control of sexually transmitted diseases…).
- To reinforce health promotion activities in order to encourage the population to take responsibility for their health problems. This includes health information and education programmes, social mobilisation, particularly in the prevention of contagious diseases, violence, accidents and pathologies linked to eating habits.
- To improve health on a wider scale by increasing accessibility to drinking water, improving food hygiene, etc.

The programme for 1998-2000 (national strategic plan for reproductive health) defined a strategy for intervention with a view to reducing maternal mortality to 100 per 100,000 live births by the following means:

- Improving the quality of maternity care: training of personnel, review of norms and procedures for maternity care, allocation of equipment, committee for surveillance of maternal mortality, supervision of ante- and post-natal maternity services, detection of sexually transmissible diseases, co-ordination with nutrition service, integration of family planning
- Reorganising programmes for training of matrones: detection of at-risk pregnancies, referral in good time, improvement in quality of care in childbirth
- Improving the quality of family planning services
- Extension of family planning services
- Strengthening community participation

Plan for reduction of maternal mortality 1998-2000:

The results hoped for are to make all health institutions capable of providing quality services for pregnant women at all levels and to reduce the number of deaths secondary to complications of pregnancy in health structures. For this it is necessary that all institutions should adopt norms and procedures for maternity care, that they should all have an ante-natal consultation and be provided with the necessary basic equipment, that all personnel should be adequately trained, that committees for the surveillance of maternal mortality should be in place everywhere in order to examine all cases of maternal death, and that all hospital departments should be rehabilitated.

The strategy also includes the reinforcement of family planning in order to reduce the incidence of pregnancy in under-20s; the training of all matrones so that all births at home can be assisted by an adequately trained matrone; and measures to increase community awareness of the problem of maternal mortality through leaders of opinion, community groups and the media.

Haiti has also appealed to international organisations and co-operation agencies for support in carrying out this health policy. The contributions made by these bodies are very considerable. For example in the current two-year period the WHO's budget is $370,000 and UNICEF's $800,000; USAID's budget for the next five years is $54 million for support to the private sector and $13 million for the public sector, in addition to $750,000 for the purchase of contraceptives. UNFPA, Coopération Belge and a number of non-governmental organisations also make contributions.

All these outside bodies and the staff of the Ministry of Health agree in recognising the overall inadequacy of the health network in Haiti: lack of qualified and motivated personnel, lack of efficient health structures and of articulation between the different levels of the health pyramid, and almost total absence of leadership in the public sector. Each organisation, of course, has its own particular guiding ideas, but there is almost complete unanimity on the need to invest in emergency obstetric care. Another line of action generally advocated is the improvement of collaboration between the different levels of the health pyramid. Early pregnancies and abortion appear also to be problems that cause particular concern in Haiti, leading to many maternal deaths. One original approach to improving care for pregnant women has been the setting up of committees for the surveillance of maternal mortality, which analyse all maternal deaths in order to establish the factors causing such deaths and make possible action to deal with them, for example the construction, near the hospitals, of huts for the accommodation of women with a possible obstetric problem or the improvement of facilities for reception in maternity units in order to permit earlier provision of care. But since there is malfunctioning at every level of the health system action is required in a variety of fields, ranging from the training of personnel to the availability of material resources, the motivation of staff, health information, community participation, collaboration between different levels and the improvement of overall management of the system by the Ministry of Health.

All health workers are aware of the problem of maternal mortality, but action to reduce it seems often to be ad hoc, inadequately concerted and poorly co-ordinated. There are numerous strategic lines of approach, and the priorities accorded to each of them frequently differ between one agency and another. To demonstrate convincingly that it will not be possible to reduce maternal mortality without a drastic reform of the health system is the objective of the UON approach in Haiti. This reform will involve the professionalisation of obstetric care in childbirth – the main requirement for which is the rapid training of qualified midwives – and also the training of generalist doctors to deal with surgical emergencies: a first battle to be won against the gynaecologists' lobby (gynaecologists being the only practitioners legally authorised to perform caesareans).

3. THE UON EXERCISE

The UON study in Haiti was carried out in three departments – Nord, Nord-Ouest and Artibonite. The maps presented later in this document show only these three departments.

The UON study In Haïti was carried out in three departments:

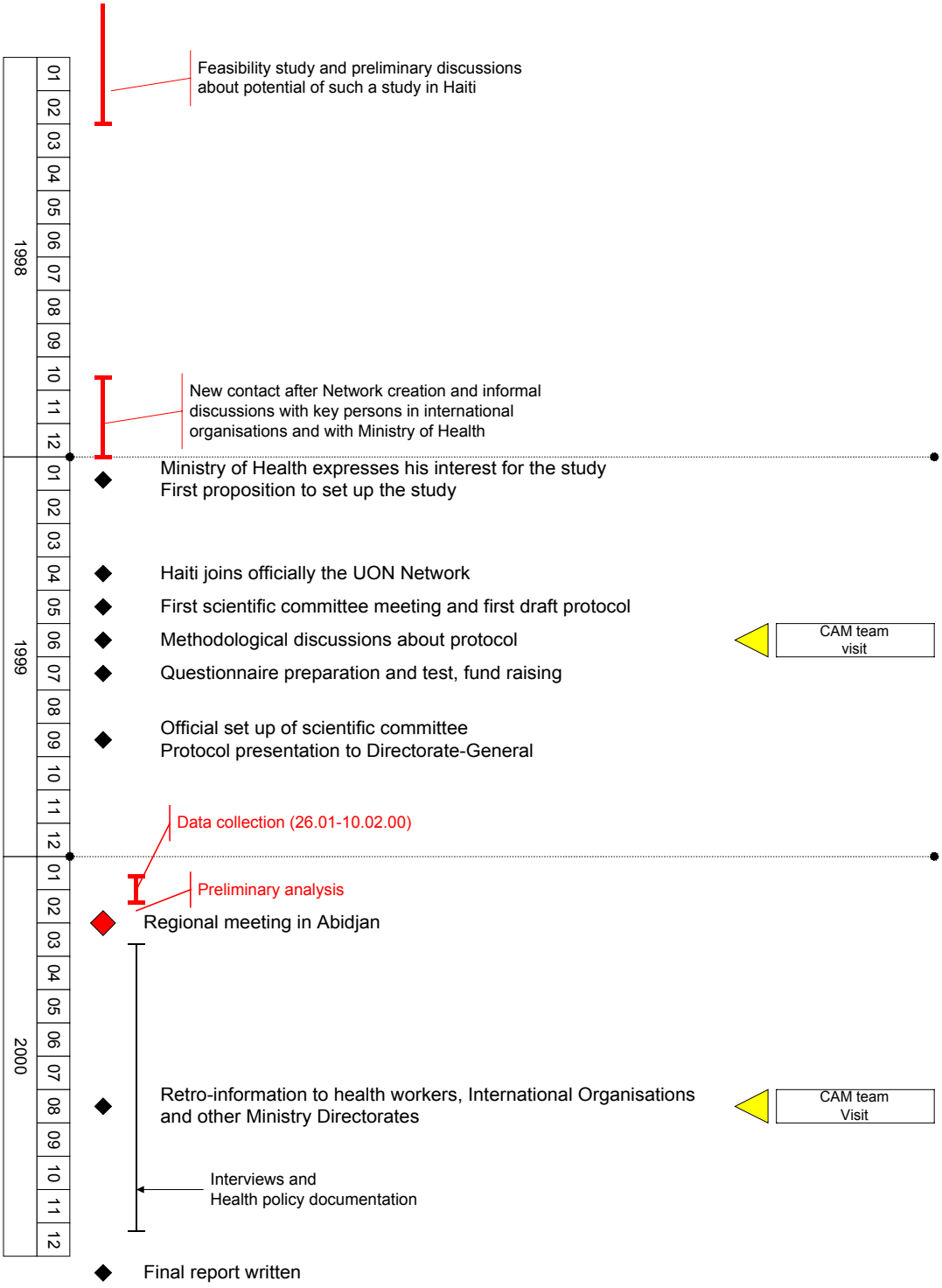
Nord

Nord-Ouest

Artibonite

The maps presented later in this document show only these three departments

Figure 1. CHRONOGRAM OF UON STUDY IN HAITI



The departmental sections, in addition to taking part in the adaptation of the questionnaires, were responsible for the carrying out of the study at local level. This concerned particularly the collection and local analysis of data. The drafting of the questionnaires and the analysis of data were done by a statistician from an inter-agency office.

At the outset of the study, the Haitian scientific team wanted to include in the lists of MOI and AMI a number of interventions and of indications, which were important in the Haitian context (particularly the abortions, their treatments and complications, eclampsias and their medical or surgical treatment, extra-uterine pregnancies and the medical treatment of peritonitis and shock). During the Abidjan meeting the necessity of obtaining data permitting international comparisons of the results and, it must be said, the difficulty of foreseeing the real need for certain indications

such as abortions convinced the Haitian scientific team to agree to the list proposed by the network of the MOI and AMI to be taken into account in calculating the indicator.

Method of collection of data in hospitals

The collection of data took place between 26 January and 10 February 2000. Visits to institutions were arranged in the course of preliminary meetings. The departmental sections brought together in advance the various records and files necessary for the collection of data. In the health structures, all women who had had a Major Obstetric Intervention were included[4], and a questionnaire was completed for each of them. The questionnaires were completed by members of the study team (central nucleus and departmental section). The presence and participation of the heads of the departments of obstetrics and gynaecology in the various hospitals enabled particular cases to be clarified where necessary – an essential aid in ensuring the quality of the collection of data.

An immediate check on the data collected was carried out on the spot. This consisted in re-reading each questionnaire to check that it contained all the data available and also that the data recorded agreed with the information in the various sources used. A second check was carried out on a sample of 50 questionnaires to check the internal consistency of the data (between the department and the commune, between the indication and the intervention…). No error was found in this sample.

Equipment and method

Introduction

The UON study has two complementary parts: one based on a questionnaire for women, analysing major obstetric interventions, their indications and their results for mother and child, and another based on a questionnaire for health formations, making it possible to draw up an inventory of the human and material resources of each health formation.

Population studied

This study is retrospective, covering data collected in January-February 2000. The population studied comprised all women who underwent a major obstetric intervention between October 1998 and September 1999 and/or died in hospital during the birth or from the consequences of the birth.

Table 1. POPULATION OF REFERENCE BY DEPARTMENT, HAITI, 1998

Department	Number of inhabitants	Expected births
Artibonite	1,091,374	37,107
Nord	811,467	27,590
Nord-Ouest	459,007	15,606
Total	**2,284,253**	**80,303**

Referral rate

The calculation of a referral rate raised a number of problems. A first option had been to use data from the first study carried out in 1997 in the Schweitzer Hospital in Deschapelles, which gave a rate of 0.98%; but this was based on the total population of the district and was not limited

[4] The list used for this collection of data includes a number of non-major obstetric interventions. The list of interventions to be taken into account in the calculation of the indicator was reviewed only after the collection of data, at the Abidjan meeting.

to the urban area. A second possibility was to make a fresh calculation in the same hospital; but it appeared that the geographical accessibility was not optimal for the whole population of the district. For the population assumed to have access to the hospital 3400 births were expected. With such a small number, the confidence interval was likely to be quite considerable. The last option, which was finally adopted by the team, was to take an arbitrary rate of 1%, which was in line with international data and data in the study carried out in 1997.

Criteria for inclusion

The criteria used in Haiti for inclusion in the "women" file differ from those proposed in the UON protocol. The file includes not only all women of Haitian nationality who underwent a major obstetric intervention or died between the 28th week of pregnancy and the 42nd day post-partum but also all pregnant women who underwent any of a number of interventions added to the list of MOI[5] (interventions not be taken into account in calculating the indicator) by the Haitian scientific committee. The part of the study concerning health formations covered all health formations, whether public, private or mixed, with an operating suite, capable of dealing with obstetric emergencies and situated in the three departments concerned in the study. This definition led to the exclusion of one of the hospitals in Artibonite (the Alma Mater Hospital).

The variables studied

Questionnaire for women

This questionnaire (presented in Annex 1) made possible the construction of a "women" file that provided the basis for an analysis designed to reveal deficits in each commune. The questionnaires were completed by the national study team in collaboration with directing team of the commune and the staff of maternity hospitals. Of the variables covered in the questionnaire the most important for the purpose of the analysis are the following:

Name of health formation

Commune in which the formation is situated: according to the administrative structure of Haiti.

Commune of origin of mother: This information is given by the mother on admission to hospital. It should be treated with caution, since the mother may declare as her area of residence not her real home but a temporary area of residence, usually situated near the health formation, where she has been staying for the last stages of her pregnancy.

Area of origin of the mother: urban or rural: The distinction between the two is made in Haiti on the basis of the time required to reach a health structure: area accessible in less than an hour on a motor road (recorded in the file as urban); area accessible in more than an hour on a motor road (recorded as rural); area not accessible on a motor road (a category which represents barely 1% of all cases and has not been taken into account in the differential analysis by area); not mentioned.

Type of intervention: as proposed in the basic UON protocol[6]. (And some interventions added by the scientific committee).

Indication for intervention: The indications considered are also as proposed in the UON protocol, and the scientific committee added some indications.

Results for mother: nothing to report, died, complication, referred.

Results for child: born living and living when discharged from hospital, stillborn, died within 24 hours of birth.

[5] Non-major obstetric interventions added to the list in the UON protocol: medical treatment of eclampsia, uterine curettage, medical treatment of peritonitis, medical treatment of haemorrhagic shock.
[6] Caesarean, laparotomy, hysterectomy, version and extraction, craniotomy.

Time and cause of mother's death: before, during or after intervention – infection, haemorrhage, hypertensive disease.

Questionnaire for health formations

This questionnaire was used to construct a "health formation" file, required for the analysis of the human and material resources of each health formation and for the linking of information with the "women" file.

Of the variables covered by this questionnaire the most important for the analysis are:

Name of health formation

Commune in which the formation is situated: according to the administrative structure of Haiti.

Type of formation: private, public or mixed (private and public). Mixed hospitals are the subject of a management contract between the State and a private organisation or association (usually an NGO) under which the State pays the salaries of staff and the structure is managed by the association.

Category of formation: departmental or communal hospital

Number of functional operating theatres

Number of gynaecologists and doctors with surgical competence: This includes not only gynaecologists but also all doctors in the health formation capable of carrying out major obstetric interventions.

Number of midwives and nurses with gynaecological competence: This includes all paramedical personnel capable of carrying out deliveries.

Total number of births

Number of dystocic births

Number of caesareans

Number of uterine ruptures

Material used in collection of data

For information on individual cases of major obstetric interventions for absolute maternal indications, the source of data was the questionnaire for women (see Annex 1). A questionnaire was completed for each case meeting the criteria. The sources of information for the questionnaire were all documents and records of the health formations concerning hospitalisation and the intervention performed (registers of births, operating theatre register, patients' files and statistics of the various departments).

For information on health formations, (maternity hospitals, i.e. all hospitals in which major obstetric interventions were performed in 1998) the source of information was the questionnaire for health formations (see Annex 2). A questionnaire was completed for each health formation selected at the same time as the questionnaires for women.

Data base

Description of data used

The "women" file

Originally, the database contained 1427-recorded cases. The Haitian team had to review the whole file, since the coding had been very badly done. Very fortunately, the checking procedure had been carefully carried out by the officers in charge of the project (27% of errors and 15% of serious errors detected in a first sample of 100 files and 16% of serious errors in a

second sample), and it was therefore possible to solve the problems. The whole database was reviewed and cleaned up. This entailed a slight delay in the analysis of the results.

The only corrections still required were the re-inclusion in the MOI/AMI category of two cases of caesareans for foeto-pelvic disproportion. This was possible because of the variable "precision of indication", which mentioned this disproportion, whereas the variable "indication for intervention" did not consider these cases as AMI.

As regards the mother's area of origin, missing data or unknown origins could not be corrected; but, taking account of the definition of area of origin, it was possible to make certain modifications. The populations of many communes[7] were regarded as entirely rural because of the absence of a functional operating suite in these Communes. Consequently, the area of origin of women living in these Communes is always rural

At the end of the day, the database still contains 1427-recorded cases: 953 MOI and 485 AMI, including 467 MOI for AMI. The proportion of MOI for AMI is only 33% of all cases recorded. This is due to the selection criteria used in Haiti (33% of cases concern interventions not considered as MOIs in the UON protocol but added by the Haitian scientific committee to the list of interventions to be taken into account in Haiti). Moreover, the frequency of interventions performed for non-absolute maternal indications (added by the scientific committee to the list in the UON protocol) is high (51% of MOI, for half of which the indication for the intervention is not known, though it is mentioned to be non-AMI). This lack of precision in the recording of data is due to the frequently careless completion of the medical files that are the source for the collection of data.

As **Table 2** above shows, much information is lacking in the "women" file in Haiti, particularly on the results for the child and the mother's area of origin. Very fortunately, the data on cases of MOI for AMI is better documented, except for the mother's area of origin. Nevertheless, since we lack information on the distribution of populations and expected births on the basis of the same criterion (accessibility in terms of the time required to reach a health structure), it will usually be possible to discriminate between urban and rural areas only for data aggregated by department on the basis of estimates of the urban population.

Table 2. MISSING AND UNRECORDED DATA IN THE "WOMEN" FILE, HAITI, 1998

Total number of cases

	Data					
	Missing		**Not reported**		**Total**	
Variable	*Number*	*%*	*Number*	*%*	*Number*	*%*
	Whole file (**1,427** cases)					
Area	223	16%			223	16%
Indication	20	1.4%			20	1.4%
Type of intervention			1	0.1	1	0.1%
Result for child	343	24%	17	1.2%	360	25%
Result for mother	35	2.5%	33	2 .3%	68	4.8%
	Mother died (**38** cases)					
Time of death	5	13%	1	2.6%	6	15.8%
Cause of death	7	18.4%	3	7.9%	10	26.3%

[7] All the communes excepted these where there is a health formation providing MOI: see **Table 9**

Major obstetric interventions for absolute maternal indications

	Data					
	Missing		Not reported		Total	
Variable	*Number*	*%*	*Number*	*%*	*Number*	*%*
	Whole file (**467** cases)					
Area			70	15%	70	15%
Result for child	7	1.5%	4	1%	11	2.4%
Result for mother	9	1.9%	5	1.1%	14	3%
	Mother died (**8** cases)					
Time of death	2	25%			2	25%
Cause of death	3	37.5%	1	12.5%	4	50%

The "women" file contains 1,427-recorded cases. No major corrections were made. **Table 3** shows the distribution of cases according to the type of indication and the type of intervention.

Table 3. DISTRIBUTION OF CASES ACCORDING TO CATEGORY OF INTERVENTION AND CATEGORY OF INDICATION, HAITI, 1998

		AMI		
		Yes	*No*	**Total**
MOI	*Yes*	467	486	**953**
	No	18	456	**474**
	Total	**485**	**942**	**1,427**

This distribution is based on the criteria in the UON protocol, and takes account only of the MOI and AMI proposed in Module 2[8], Establishment of the Protocol on the Collection of Data. This explains the considerable number of non-MOI and non-AMI cases included in the file, since the collection of data was carried out before the decision was reached to take account only of indications and interventions included in the protocol.

The "health formations" file

A questionnaire was completed for each health formation, which was functional in terms of ability to perform major obstetric interventions: i.e. nine hospitals in the three departments concerned (three in the Nord department, four in Artibonite and two in the Nord-Ouest department). One hospital in Artibonite was not included since it did not meet the essential criterion for selection.

Reconciliation of data from the "women" and "health formation" questionnaires

There are problems of agreement between the number of caesareans and uterine ruptures declared in the "health formation" and "women" questionnaires. Except in four hospitals the number of cases for these data is higher everywhere in the health formation file; the numbers of caesareans, for example, never exactly match (though the differences are relatively small) except in the HIC hospital in Port-de-Paix. Since the data for each questionnaire was collected at the same time by the same people and on the basis of the same sources, it is difficult to understand these divergences. There is a total "shortage" of 28 caesareans, which, taking account of the small total number of MOI for AMI recorded, represents a proportion of 13% of data not analysed.

[8] UON Network 1999. Tackling Unmet Obstetric Needs. Establishment of the Protocol on the Collection of Data. http://www.uonn.org.

Discussion of biases

"Demographic" biases

The Haitian Institute of Statistics and Informatics provided the population data. It was the result of a projection from the 1982, and is therefore to be treated with reserve. This is unfortunately the only data at present available. The growth birth rate used (34 per 1000) comes from the survey of morbidity, mortality and use of services carried out in 1994[9]. This index does not take account of the differential fertility between different types of area (according to the EMMUS II survey of 1994/95, the general fertility rate is 113 per 1000 for all urban areas and 189 per 1000 for rural areas). It is probable, therefore, that the number of births expected differs from the number used here; but without knowing the figures for urban and rural populations, still less the numbers of women of child-bearing age in the two types of area, it is impossible to evaluate the error involved in using the gross birth rate to estimate the number of births expected.

The population figures and gross birth rate are fairly close to the estimates made by the United Nations[10] (total population 7,952,000, gross birth rate 1995-2000 32 per 1000), and it seems, therefore, that, given the objective of the study, the estimates made here are satisfactory for use in calculating the UON indicator.

Biases due to inexact diagnosis

Except in the Beraca private hospital there is at least one gynaecologist in each health structure, and the quality of diagnosis is probably the best possible. According to the members of the study team, however, there seems to be a problem about the diagnosis of foeto-pelvic disproportion. The frequency of this diagnosis is thought to be over-estimated because of confusion with dynamic dystocias: trial of labour, commonly used to confirm disproportion, is little used in Haiti.

In this file, foeto-pelvic disproportions represent 57.5% of AMI, 20% of all indications, 29% of MOI and 60% of MOI for AMI. It may be noted that the proportion of obstructed labours (disproportion, abnormal presentations and uterine ruptures) among all the AMI in other countries, which have carried out the study, is everywhere higher than the figure for Haiti (Burkina-Faso 89%, Benin 83%, Mali 82%, Pakistan 79% and Niger 75%, compared with 73% in Haiti). On the other hand, except in Pakistan, uterine ruptures are much more frequent in the other countries, with a minimum of 9% of AMI in Benin and a maximum of 20% of AMI in Niger, while in Haiti uterine ruptures represent only 1.2% of AMI. In the light of these figures, even if there is a possible confusion with dynamic dystocias, the proportion of foeto-pelvic disproportions seems quite reasonable.

Biases in collection of data

The maintenance and preservation of records and files, as noted in **Table 2**, is a major problem. The numerous items of information lacking prevent an optimal analysis of the "women" file. The recovery of files more than two years old is a problem which may be minimised in future if the study is pursued as a continuous process, for example through the health information system. In order to correct errors during the collection of data checks have been made at two stages: the systematic review of each questionnaire, with a comparison between the data recorded and the data in the sources, and a further check of a sample of 50 questionnaires for internal consistency of the data in the "women" questionnaire.

[9] Institut Haïtien de l'Enfance. Demographic and Health Surveys. Macro International Inc. 1995. Enquête Mortalité, Morbidité et Utilisation des Services. EMMUS II 1994/95, 363 p.
[10] United Nations, Department of Economic and Social Affairs, Population Division, 1999. World Population 1998.

Results

We begin by describing the overall results on the distribution of interventions, indications and deficits between communes. We then carry out a more specific analysis, seeking to identify possible differences between types of area, to establish levels and causes of maternal and infantile mortality and finally to link this data with information gathered in the "health formations" questionnaire.

The tables, graphs and maps presented below are constructed by reference to the categories in **Table 3**. Our concern will be more specifically with major obstetric interventions (953 cases), whatever their indication, absolute maternal indications (485 cases) and non-absolute maternal indications (942 cases). The following tables take account of cases for which the mother's area of origin is unknown. These cases represent 14% of MOI for AMI. This lack of information about the urban/rural distribution of population and thus of expected births prevents us from making any analyses by type of area for each commune; knowing the approximate proportion of urban and rural populations for each department[11], on the other hand, we shall be able to carry out this type of analysis at a higher level.

Major obstetric interventions

A total of 953 major obstetric interventions were recorded in 1998 (**Table 4**). This represents an average national rate of 1.2 MOI per 100 expected births. The disparity between different types of area is evident, the rate being 2.7 in urban areas and 0.5 in rural areas. One of the causes of this disparity may be the considerable number of cases for which the area of origin is unknown. Nevertheless, even if we assumed that all these cases came from rural areas, the rate of MOI per 100 expected births would still be only 0.7 – much lower than the urban rate.

Table 4. MAJOR OBSTETRIC INTERVENTIONS ACCORDING TO TYPE OF INTERVENTION AND AREA, HAITI, 1998

	Urban area		Rural area		Unknown area		Total	
	Number	*(%)*	*Number*	*(%)*	*Number*	*(%)*	*Number*	*(%)*
Caesarean	479	96.4	300	94%	123	89.8%	902	94.6%
Hysterectomy	4	0.8%	2	0.6%	3	2.2%	9	0.9%
Laparotomy	13	2.6%	15	4.7%	10	7.3%	38	4%
Craniotomy	1	0.2%	2	0.6%	1	0.7%	4	0.4%
Total	**497**	**100%**	**319**	**100%**	**137**	**100%**	**953**	**100%**

Most of the major obstetric interventions performed in Haiti are caesareans, whatever the mother's area of residence. The caesarean rate is 1.12 per 100 expected births, with a considerable disparity between urban areas, with 2.6 caesareans per 100 expected births, and rural areas, where the rate is 0.5 caesareans per 100 expected births.

The small number of hysterectomies could be due either to the speed with which obstetric emergencies are dealt with (uterine ruptures being rare), or, conversely, to such delay by women with uterine ruptures in seeking treatment in a health structure that they die before receiving such treatment. We shall see below (**Table 5**) that in view of the high numbers of foeto-pelvic disproportions admitted to health structures (60% of AMI) and delivered by caesarean the former explanation is the more probable.

[11] Data for 1995, supplied by the Haïtian Institute of Statistics and Informatics. Proportion of urban population: Nord: 26.9, Artibonite: 22.8 and Nord-Ouest: 14.13. Expected Births in urban area: 18,088 and in rural area: 62,213.

Women who have not had a major obstetric intervention

In view of the decision of the Haiti study team to extend the collection of data to most obstetric complications, the proportion of cases that are not MOIs is higher than in other countries (33%). Among the non-MOI, (474 cases) there are 18 AMI and 456 non-AMI.

Of the 18 AMI cases four women died, one before any intervention (a case of haemorrhage from placenta praevia). The other three women died from post-partum haemorrhages treated medically without success. The other 14 cases included 2 ante-partum haemorrhages treated medically and 12 post-partum haemorrhages (five having had uterine curettage and seven treated medically).

Of the non-AMI cases, the majority were post-abortum haemorrhages (63%); there were also 30% of eclampsias or toxaemias of pregnancy. Among these cases, there were 18 deaths, 16 of them from eclampsia.

Absolute maternal indications

There were 485 absolute maternal indications out of the total number of cases recorded (including 467 MOI). Foeto-pelvic disproportion was the principal indication (60%) for a major obstetric intervention, both in urban and in rural areas (**Table 5**).

Table 5. ABSOLUTE MATERNAL INDICATIONS ACCORDING TO TYPE OF AREA, HAITI, 1998

	Urban area	Rural area	Unknown area	Total
	Number (%)	*Number (%)*	*Number (%)*	*Number (%)*
Uterine rupture	3 1.2%	1 0.6%	2 2.7%	6 1.2%
Transverse, facial and front presentation	35 13.7%	24 15.3%	11 15.1%	70 14.4%
Foeto-pelvic disproportion an pre-rupture	153 60%	89 56.7%	37 50.7%	279 57.5%
Ante-partum haemorrhages	55 21.6%	39 24.8%	19 26%	113 23.3%
Severe post-partum haemorrhage	9 3.5	4 2.5%	4 5.5%	17 3.5%
Total	**255 100%**	**157 100%**	**73 100%**	**485 100%**

It is necessary, however, to keep in mind the possibility of an over-estimate of this indication by confusion between it and dynamic dystocias, which are few in number in this file (**Table 6**). If we add these cases of disproportion to the cases of abnormal presentation and uterine rupture, obstructed labour accounts for 73% of absolute maternal indications admitted to hospital. Among these rather less than 2% are complicated by uterine rupture. Admission to hospital seems, therefore, to have been rapid, which would explain the high proportion of foeto-pelvic disproportions and, in comparison, the low proportion of uterine ruptures, their most serious complication. Ante-partum haemorrhages represent around 23% of AMI, a proportion that differs very little according to the type of area and is indeed slightly higher in rural areas. This could point to the good accessibility of health structures whatever the mother's area of residence and/or rapid diagnosis and referral by the primary level of care for parturients. The ante-partum haemorrhage rate per 100 expected births, however, is five times higher in urban areas. The fatality from these pathologies is such that the time involved in getting to a health structure is crucial for the survival of the mother; and rural areas being by definition more than an hour's journey by road to any hospital, the chances of reaching hospital before the mother's death are low for women residing in such areas once the haemorrhage has been declared. The very early diagnosis of these pathologies is essential if there is to be any hope of survival for the mother. It may be noted that a prospective and multicentric survey carried out in 1994-96[12] on pregnant women living in large

[12] Prual A., Bouvier-Colle M.-H., 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 Organisation*, 78: 593-602

towns in various West African countries showed an incidence of ante-partum haemorrhages from retro-placental haematoma or placenta praevia of 0.3% of expected births. The rate observed here in urban areas is very close to the rate observed in Africa, at 0.29 per 100 expected births. In remoter areas with poor geographical accessibility, on the other hand, there is a ten times lower incidence of ante-partum haemorrhages (0.04 per 100 expected births).

Non-absolute maternal indications

Post-abortum haemorrhages are the principal non-AMI cause in the "women" file, with a considerably higher frequency in urban areas. Next, come eclampsias and antecedents of caesareans, which are proportionately slightly more frequent in rural areas.

Table 6. NON-ABSOLUTE MATERNAL INDICATIONS ACCORDING TO TYPE OF AREA, HAITI, 1998

	Urban		Rural		Unknown		Total	
	Number (%)		*Number (%)*		*Number (%)*		*Number (%)*	
Post-abortum haemorrhage	193	37.3%	45	17.8%	51	34.2%	289	31.3%
Eclampsia	75	14.5%	59	22.8%	28	19.2%	162	17.6%
Antecedent of caesarean	63	12.2%	38	14.7%	21	14.4%	122	13.2%
Other cause	57	11%	29	11.2%	12	8.2%	97	10.5%
Breach presentation	35	6.8%	27	10.4%	7	4.8%	69	7.5%
Foetal distress	31	6%	15	5.8%	7	4.8%	53	5.7%
Hypertension. pre-eclampsia	25	4.8%	18	6.9%	9	6.2%	52	5.6%
Ectopic pregnancy	11	2.1%	14	5.4%	9	7.2%	35	3.8%
Dynamic dystocia	13	2.5%		0			13	1.4%
Complications connected with cord	4	0.8%	7	2.7%	1	0.7%	12	1.3%
Post-abortum peritonitis	5	1%	3	1.2%	1	0.7%	9	1.0%
Obstructed labor for other cause	3	0.6%		0	1	0.7%	4	0.4%
Other obstetric antecedent	1	0.2%	3	1.2%			4	0.4%
Puerperal infection	1	0.2%		0			1	0.1%
Total	**517**	**100%**	**258**	**100%**	**147**	**100%**	**922**	**100%**
Not recorded	11	2.3%	5	1.5%	4	2.7%	20	2.1%
Total	**528**	**100**	**263**	**100**	**151**	**100**	**942**	**100**

Abortions (which are still illegal in Haiti) represent a serious health problem, particularly in urban areas where their haemorrhagic complications are the main non-absolute cause for recourse to a hospital structure (37% in urban areas. 15% in rural areas). Very fortunately, when such cases are admitted to hospital no maternal deaths are reported. If the rate of incidence per 100 expected births is calculated for each type of area (**Table 7**) these haemorrhages are seen to be 24 times more frequent in urban areas. This may be due to a greater recourse to abortion in towns, but also to higher mortality before admission to hospital, women having died at home without having recourse to a health institution. This problem affects women of all ages, since the distribution by age group of non-AMI cases and post-abortum haemorrhages differs very little, and the average age of occurrence of a non-AMI (27.7 years) is slightly lower than the age of occurrence of a post-abortum haemorrhage (28.4 years).

Table 7. NON-ABSOLUTE MATERNAL INDICATIONS: RATIO OF URBAN RATES TO RURAL RATES, HAITI, 1998

Indication	Urban rate (‰ EB)	Rural rate (‰ EB)	Ratio U/R
Post-abortum haemorrhage	10.67	0,74	14
Toxaemia, eclampsia	4.15	0.95	4
Antecedent of caesarean	3.48	0.61	6
Breach presentation	1.93	0.43	4
Foetal distress	1.71	0.24	7
Hypertension, pre-eclampsia	1.38	0.29	5
Ectopic pregnancy	0.61	0.23	3
Dynamic dystocia	0.72	0.00	
Post-abortum peritonitis	0.28	0.05	6
Complications connected with cord	0.22	0.11	2
Obstructed labor for other cause	0.17	0.00	
Other obstetric antecedent	0.06	0.05	1
Puerperal infection	0.06	0.00	

The numbers of expected births for the calculation of urban and rural rates were estimated on the basis of the proportions of urban and rural population in each department (source: Haitian Institute of Statistics and Informatics. 1995).

Toxaemias and eclampsias, which seemed more frequent (**Table 6**) in rural areas, are in fact, if the rates of incidence (**Table 7**) of each of these indications in relation to expected births in each type of area during the study period are calculated, four times more frequent in areas near a hospital.

Problems endangering the life of the child (foetal distress and problems connected with the cord) for which a caesarean is performed also occur more frequently in urban areas. One of the reasons for this, no doubt, is the diagnostic ability of rural midwives, who do not recognise these problems or have not the material resources required for making these diagnoses; but it is also due to the fact that the time required for evacuation from these remote regions do not always make it possible for the mother to reach hospital soon enough to ensure the survival of the child.

Major obstetric interventions for absolute maternal indications

The analysis of the data for Haiti on MOI for AMI according to the mother's type of area has a special feature in that the numerator is known for the majority of women (84%) but not the denominator broken down by type of area at commune level. It is thus not possible to compare MOI/AMI rates by commune according to type of area. It was, however, possible to estimate the number of births expected by type of area at departmental level. The mapping of rates and deficits was then carried out for each communal entity without differentiating according to type of area.

As can be seen in **Table 8**, virtually all MOI/AMI are caesareans (383/389, or 98.5%). It will also be noted that the number of uterine ruptures is extremely low.

Table 8. TYPE OF INTERVENTION ACCORDING TO TYPE OF INDICATION AND OF AREA, HAITI, 1998

Urban areas

	C-section	Hysterectomy	Laparotomy	Version extraction	Craniotomy	**Total**	Mother died before intervention
Uterine rupture		2	1			**3**	
Transverse, facial and front presentation	35					**35**	
Foeto-pelvic disproportion an pre-rupture	153					**153**	
Ante-partum haemorrhages	53					**53**	
Post-partum haemorrhage							2
Severe haemorrhage							
Unknown							
Total	**241**	**2**	**1**			**244**	**2**

Rural areas

	C-section	Hysterectomy	Laparotomy	Version extraction	Craniotomy	**Total**	Mother died before intervention
Uterine rupture			1			**1**	
Transverse, facial and front presentation	23				1	**24**	
Foeto-pelvic disproportion an pre-rupture	89					**89**	
Ante-partum haemorrhages	38					**38**	1
Post-partum haemorrhage		1				**1**	
Severe haemorrhage							
Unknown							
Total	**150**	**1**	**1**		**1**	**153**	**1**

Area unknown

	C-section	Hysterectomy	Laparotomy	Version extraction	Craniotomy	**Total**	Mother died before intervention
Uterine rupture		2				**2**	
Transverse, facial and front presentation	11					**11**	
Foeto-pelvic disproportion an pre-rupture	37					**37**	
Ante-partum haemorrhages	19					**19**	
Post-partum haemorrhage			1			**1**	
Severe haemorrhage							
Unknown							
Total	**67**	**2**	**1**			**70**	

The MOI/AMI rate per 100 expected births is 0.58. The disparity between different types of area is still higher than for the number of MOI (there are 5.3 times more major obstetric interventions in urban than in rural areas), since here MOI/AMI per 100 expected births are 5.5 times more frequent in urban areas (1.35 MOI/AMI per 100 expected births) than in rural areas (0.25 MOI/AMI per 100 expected births).

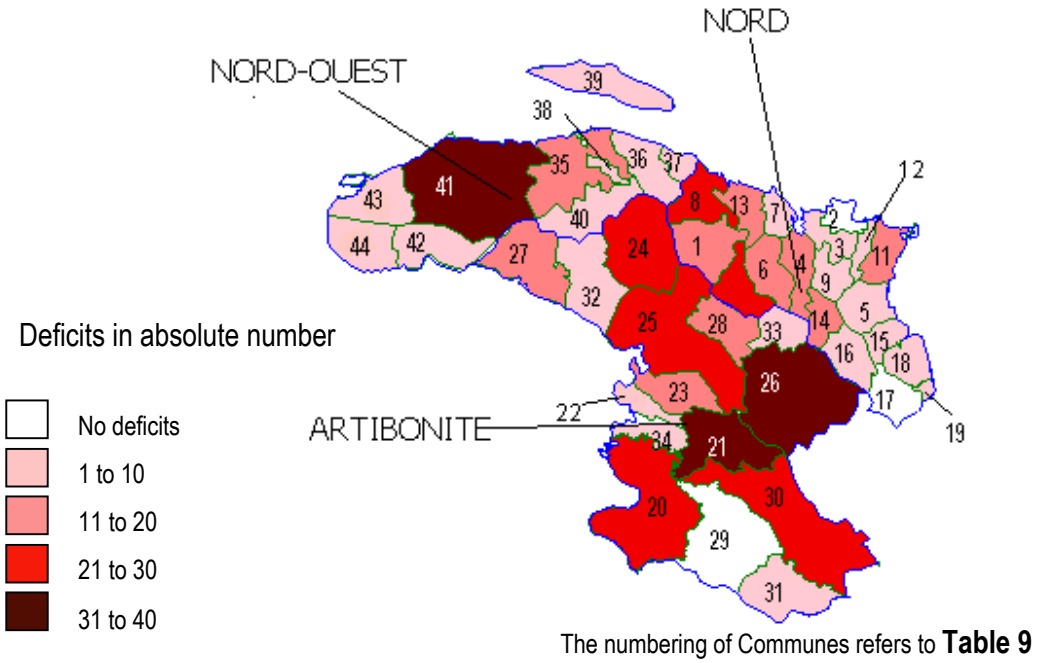
To these two tables must be added 78 cases for which the mother's area of origin is not known.

Deficits in urban areas

There are negative deficits in three communes. In each of these, there is a large hospital, which, as we shall see (**Table 15**), are all highly attractive. It is therefore very likely that women from other communes when admitted to hospital have given a temporary address situated close to the hospital, thus contaminating the numerator and producing an over-estimate of the number of cases of MOI for AMI from that commune.

It can be concluded that most of the hospitals are fulfilling their role in providing specialist care for patients reasonably well. The communes in which they are situated have all (except Marchand-Dessalines) deficits of less than 50%.

Figure 2. DEFICITS IN MAJOR OBSTETRIC INTERVENTIONS FOR ABSOLUTE MATERNAL INDICATIONS, HAITI, 1998



The numbering of Communes refers to **Table 9**

The commune of Marchand-Dessalines, situated approximately in the centre of the department, shows a deficit of 64%. There is a gynaecologist working full-time in the hospital in this commune, there is also a surgeon who can perform urgent interventions, and the hospital has the material resources required for emergency operations. In terms of human resources, the most notable point is the lack of a midwife (though this is also the case in seven out of the nine hospitals covered by the study, which have much better results). In terms of the quality of the results obtained (proportions of maternal and infant deaths) this institution is around the average for the nine hospitals, with 2.9% of intra-hospital maternal deaths (average 2.7%) and 9% of early infant deaths (average 13%: still-births and deaths within 24 hours of birth), taking all indications and interventions together. On the information available to us, therefore, there is no explanation for the poorer performance of this hospital, to which 85% of women in the commune seeking hospital care for childbirth problems go (with 10% preferring to go to the Hospital Saint-Nicolas in the neighbouring commune. perhaps because it is nearer some of the villages). There is perhaps a problem of geographical accessibility, although the fact that 20% of women admitted to this hospital come from areas more than an hour's journey away by road (the average for all hospitals being 21.4%) suggests that it is not so difficult to reach this structure.

Of the 44 communes in the three departments, 30 have deficits of more than 50%, and 12 of them have deficits of 100%. For the Nord-Ouest department, this may be due to the distance of these communes from the hospitals. This is also the case in some communes in the Nord and Artibonite departments; but some communes in these departments seem quite close to health structures and it is difficult to explain the deficits with the information available.

Table 9. DEFICITS IN MAJOR OBSTETRIC INTERVENTIONS FOR ABSOLUTE MATERNAL INDICATIONS, HAITI, 1998

Department	Nr	Communes	Expected births	MOI for AMI		Deficit	
				Expected	*Performed*	*Number*	*(%)*
Nord	1	PILATE	2,066	21	8	13	62%
	2	† CAP HAÏTIEN	4,517	45	110	-65	-144%
	3	PLAINE DU NORD	1,162	12	7	5	42%
	4	ACUL DU NORD	2,461	25	7	18	72%
	5	GRANDE RIVIERE	1,472	15	8	7	47%
	6	LIMBE	1,574	16	3	13	81%
	7	BAS LIMBE	439	4	2	2	50%
	8	LE BORGNE	2,076	21	0	21	100%
	9	† MILOT	911	9	9	0	0%
	10	PLAISANCE	2,270	23	2	21	91%
	11	LIMONADE	1,408	14	2	12	86%
	12	QUARTIER MORIN	631	6	2	4	67%
	13	PORT MARGOT	1,174	12	1	11	92%
	14	DONDON	1,467	15	2	13	87%
	15	BAHON	756	8	0	8	100%
	16	SAINT RAPHAEL	1,645	16	8	8	50%
	17	† PIGNON	766	8	13	-5	-63%
	18	RANQUITTE	548	5	3	2	40%
	19	LA VICTOIRE	247	2	0	2	100%
Artibonite	20	† SAINT MARC	5,361	64	36	28	44%
	21	† MARCHAND DESSALINES	5,473	55	20	35	64%
	22	DESDUNES	1,024	10	2	8	80%
	23	L'ESTERE	1,241	12	0	12	100%
	24	GROS MORNE	3,131	31	7	24	77%
	25	†GONAIVES	4,517	45	23	22	49%
	26	SAINT MICHEL	4,116	41	7	34	83%
	27	ANSE ROUGE	1,127	11	0	11	100%
	28	ENNERY	1,202	12	1	11	92%
	29	† VERETTES	2,486	25	32	-7	-28%
	30	PETITE RIVIERE	4,156	42	17	25	60%
	31	LA CHAPELLE	864	9	3	6	67%
	32	TERRE NEUVE	838	8	0	8	100%
	33	MARMELADE	726	7	0	7	100%
	34	GRANDE SALINE	847	8	0	8	100%
Nord Ouest	35	†† PORT DE PAIX	3,677	37	21	16	43%
	36	SAINT LOUIS	1,782	18	12	6	33%
	37	ANSE A FOLEUR	955	10	3	7	70%
	38	CHANSOLME	434	4	3	1	25%
	39	LA TORTUE	1,094	11	3	8	73%
	40	BASSIN BLEU	1,261	13	3	10	77%
	41	JEAN RABEL	3,919	39	0	39	100%
	42	BAIE DE HENNE	513	5	0	5	100%
	43	MOLE SAINT NICOLAS	976	10	0	10	100%
	44	BOMBARDOPOLIS	994	10	0	10	100%
		Total	**80,304**	**814**	***423**	**434**	**53.3%**

† Presence of a hospital in the commune.

* The total number of MOI/AMI observed includes cases for which the mother's commune of origin is not known if it is within one of the departments in which the study took place (43 cases). Not included here are cases for which the mother's department of origin is not known (26 cases) and cases of mothers from a department other than those in which the study was carried out (18 cases).

Uterine ruptures

As explained above, uterine ruptures are very rare in this study (6 cases observed out of 467 MOI/AMI). It is possible that women with pathology of this kind may not have time to reach a health structure; but in view of the high number of foeto-pelvic disproportions observed it is more likely that the very low frequency of this rare complication is due to early referral to hospital in the case of a problem associated with childbirth. Moreover, even though the number of cases is so low that no conclusions can be drawn from an analysis of them, it can be noted that 4 of the women operated on for uterine rupture survived the operation without presenting any complications – suggesting that the care provided in these hospitals (the Hospital Justinien. the Gonaïves hospital and the Hospital Saint-Nicolas. in which the four women were operated on) is of good quality.

Maternal deaths in hospital

Of the 38 maternal deaths observed in the 9 hospitals covered by the study in 1998, 16 occurred after an MOI. These 16 deaths represent a fatality rate after intervention of 1.7%. In half of these cases, the indication was not one of the absolute maternal indications selected (they included 3 extra-uterine pregnancies and 3 eclampsias or pre-eclampsias).

There were 22 deaths in the group of 474 women who had not had an MOI. This group can be subdivided into 456 non-AMI and 18 AMI. Among the 18 cases of AMI in this category (15 post-partum haemorrhages and 3 placenta praevia), which had not had a major intervention, 4 women died, 3 of them before any intervention, representing a mortality rate of 22%[13]. Among the 456 non-AMI cases, there were 18 deaths, representing a mortality of 4%.

There is a disparity in the risk of dying according to type of area, which is higher in rural than in urban areas, 1.8% higher if there has been a major obstetric intervention and 2.5% higher if there has been no such intervention.

Table 10. MATERNAL DEATHS ACCORDING TO TYPE OF INTERVENTION AND TYPE OF AREA, HAITI, 1998

	MOI			Non-MOI			Total		
	Number	*Death*	*%*	*Number*	*Death*	*%*	*Number*	*Death*	*%*
Urban	497	6	1.2%	286	9	3.1%	783	15	1.9%
Rural	319	7	2.2%	102	8	7.8%	421	15	3.6%
Unknown	137	3	2.2%	86	5	5.8%	223	8	3.5%
Total	**953**	**16**	**1.7%**	**474**	**22**	**4.6%**	**1,427**	**38**	**2.7%**

The number of deaths is insufficient to permit a fuller analysis. Nevertheless, it can be observed that the risk of dying varies very little according to the type of area when the indication is an absolute maternal indication. On the other hand, the risk of dying is almost 2.5 times higher in rural areas when the indication is non-absolute (**Table 11**). The main causes of mortality in non-AMI cases are problems of eclampsia or toxaemia, which account for almost three-quarters of non-AMI deaths.

[13] In two of the placenta praevia cases mentioned, it is probable, since these women had vaginal deliveries, that the diagnosis was marginal or partial placenta praevias.

Table 11. MATERNAL DEATHS ACCORDING TO TYPE OF INDICATION AND TYPE OF AREA, HAITI, 1998

	AMI			Non-AMI			Total		
	Number	*Death*	*%*	*Number*	*Death*	*%*	*Number*	*Death*	*%*
Urban	255	6	2.4%	528	9	1.7%	783	15	1.9%
Rural	157	4	2.5%	264	11	4.2%	421	15	3.6%
Unknown	73	2	2.7%	150	6	4%	223	8	3.6%
Total	**485**	**12**	**2.5%**	**942**	**26**	**2.8%**	**1,427**	**38**	**2.7%**

Child deaths

Early perinatal mortality, among women who have had an MOI, is very high whatever the type of area.

Almost one infant in five dies in the early perinatal period if the indication is AMI, compared with only 5% if it is not. Here too toxaemias and eclampsia are responsible for most of these deaths (31% of perinatal deaths), followed by ante-partum haemorrhages (28%) and problems of obstructed labour (25%).

Table 12. NUMBER OF CHILDREN STILLBORN AND DYING WITHIN 24 HOURS AFTER AN MOI ACCORDING TO GROUP OF INDICATIONS AND TYPE OF AREA, HAITI, 1998

	AMI			Non-AMI			Total		
	Number of MOI	*Number of deaths*	*(%)*	*Number of MOI*	*Number of deaths*	*(%)*	*Number of MOI*	*Number of deaths*	*(%)*
Urban	244	36	15%	253	9	4%	497	45	9%
Rural	153	30	20%	166	11	7%	319	41	13%
Unknown	70	16	23%	67	3	4%	137	19	14%
Total	**467**	**82**	**18%**	**486**	**23**	**5%**	**953**	**105**	**11%**

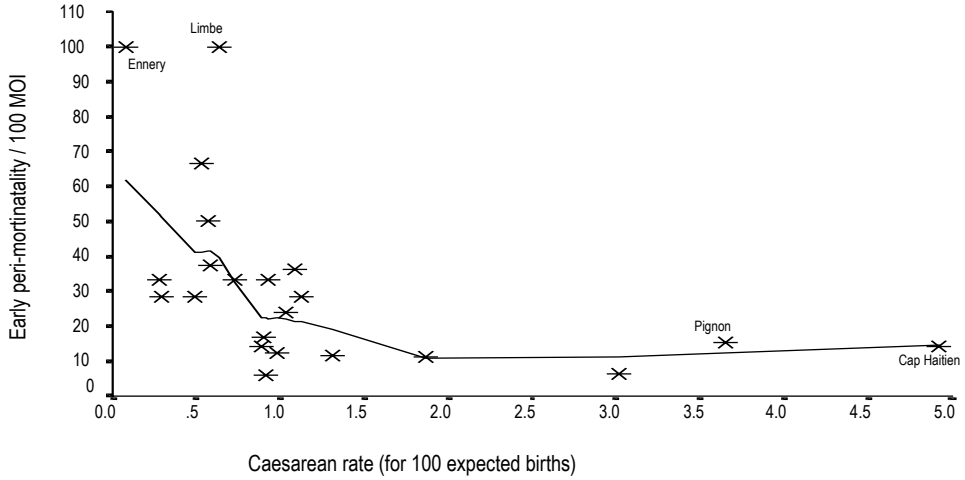
Perinatal mortality due to eclamptic or pre-eclamptic states is 26% (30% for eclampsia and 13% for pre-eclampsia). When eclampsia is established caesareans save more than 90% of children, while the medical treatment of the eclampsia has a favourable result for the neonate in only 62% of cases.

The caesarean rate is closely correlated to the reduction in early perinatal mortality (which falls from 60 to 25% per 100 MOIs), down to a caesarean rate of 1%.

Between caesarean rates of 1 and 2% the gain in survival time of the neonate is still appreciable though much smaller (with peri-mortinatality falling from 25 to 10%). Beyond a caesarean rate of 2%, there is no longer any gain; and indeed there is a slight increase in early peri-mortinatality beyond a threshold of 3% of caesareans.

Caesareans are least frequently “effective” in cases of problems associated with the cord, saving only 57% of infants (most frequently stillborn), whereas the average number of infants saved by these interventions, taking all indications together, is 88% (92% in urban and 87% in rural areas). The main reason for this is no doubt delay in tackling these problems, perhaps because of increased delay in referral decision if the primary level structure which deals with such cases has no staff with the necessary diagnostic ability, particularly competent midwives.

Figure 3. MORTINATALITY AND NEONATAL MORTALITY WITHIN 24 HOURS AMONG WOMEN WHO HAVE HAD AN MOI ACCORDING TO CAESAREAN RATE, HAITI, 1998



Work load and resources

There are only 9 functional hospitals (i.e. functional in terms of their capacity to deal with obstetric emergencies) in the three departments concerned in the study, with 80.303 expected births in the year 1998. Other primary level structures (health centres with a doctor on the staff) also handle deliveries.

Table 13 shows the proportions of deliveries in hospital, but does not take account of deliveries in primary level structures.

Table 13. HOSPITAL ACTIVITIES BY REGION, HAITI, 1998

	Expected births (EB)	**Intra-hospitals deliveries**	
		Number	*% of EB*
Nord	27,590	3,283	12%
Artibonite	37,107	5,661	15%
Nord-Ouest	15,606	1,308	8%
Total	**80,303**	**10,252**	**13%**

Overall, the proportion of hospital deliveries is not very high; but these figures relate to the total population of the departments and do not include deliveries in non-hospital structures (hospitals without a functional operating suite. village maternity homes without an operating suite. supervised home confinements). The population of the communes in which the nine hospitals in these departments are situated represents respectively, for the Nord, Artibonite and Nord-Ouest departments, 22%, 48% and 57% of the population of the department (assuming – which is certainly an over-estimate – that all women living in the commune in which the hospital is situated have easy access to the hospital). **Table 14** shows that hospital deliveries are much more frequent if the number of expected births is confined to the population of the commune in which the hospital is situated, assuming that most of the women giving birth in one of these hospitals live in the commune in which it is situated.

Table 14. VOLUME OF DELIVERIES AND MAJOR OBSTETRIC INTERVENTIONS BY HEALTH FORMATION AND STATUS OF THE FORMATION, HAITI, 1998

	Commune	Hospital	Type of hospital	Expected births (EB) in the commune	Intra-hospital deliveries		MOI		MOI/AMI	
					Number and % of EB		*Number and % of intra-hospital deliveries*		*Number and % of MOI*	
Nord	Cap-Haïtien	Justinien	Public	4,517	2,863	59%	375	13%	170	45%
	Pignon	Bienfaisance	Mixed	766	290	38%	70	24%	34	49%
	Milot	Sacré Coeur	Public	911	130	14%	20	15%	13	65%
Artibonite	Gonaïves	Providence	Public	4,517	2,266	50%	118	5%	64	54%
	St Marc	St Nicolas	Mixed	5,361	1,578	29%	100	6%	54	54%
	Verettes	*A.Schweitzer	Private	2,486	625	25%	125	20%	54	43%
	Marchand-Dessalines	Claire Heureuse	Public	5,473	1,192	22%	57	5%	28	49%
Nord-Ouest	Port de Paix	Immaculée Conception	Private	3,677	937	25%	57	6%	34	60%
	Port de Paix	CM Beraca	Mixed		371	10%	31	8%	16	52%
		Total		27,708	10,252	37%	953	9%	467	48%

* Private hospital, non-profit

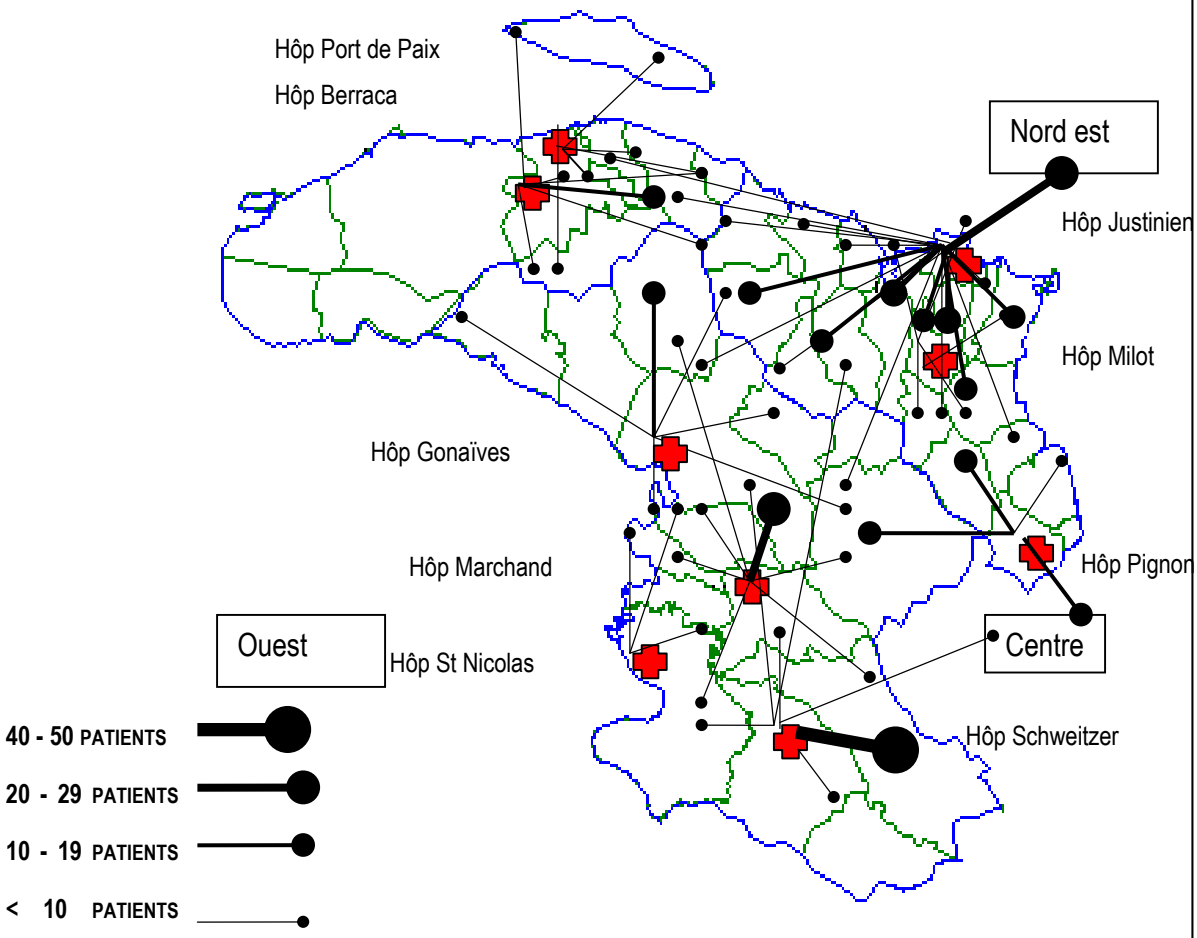
In almost all communes served by a hospital a quarter of all deliveries take place in the hospital; indeed the Justinien Hospital and Providence Hospital appear to attract 50% or more of parturients. It is necessary to take account of the attractiveness of certain structures in which many women (**Table 15**) from other communes in the same department, and indeed from other departments, go to have their child. The **Table 15** shows in column 3 the proportion of women admitted to hospital and included in the "women" file who come from the department in which the health formation is situated, and in column 4 the proportion of these women coming from another commune in the department in which it is situated. For example, in the Justinien Hospital, out of 654 women admitted to the hospital in 1998 and included in the "women" file, 575 came from the department in which the hospital is situated. Of these 575 women 75% come from the commune in which the hospital is situated. The coverage of areas in immediate proximity to health structures is probably not so high as it seems, for some structures are particularly attractive and their coverage is over-estimated as a result of the inclusion of cases from neighbouring communes.

Table 15. PROPORTION OF PATIENTS COMING FROM THE DEPARTMENT IN WHICH THE HEALTH FORMATION IS SITUATED AND OF CASES COMING FROM ANOTHER COMMUNE IN THE DEPARTMENT, HAITI, 1998

Health facility (1)	Whole cases (women file) (2)	Of which : cases from the department Number (%) (3)		Of which: cases from another commune of the department Number (%) (4)	
Justinien hospital	654	575	88%	142	25%
Pignon hospital	86	60	70%	22	37%
Milot hospital	20	20	100%	8	40%
Gonaïves hospital	160	143	89%	20	14%
Saint Nicolas hospital	148	105	71%	11	10%
Marchand hospital	105	103	98%	51	50%
Schweitzer hospital	160	155	97%	57	37%
Port de Paix hospital	63	58	92%	17	29%
Berraca hospital	31	29	94%	17	59%

The map in **Figure 4** shows in schematic form the flow of patients from other communes to the various hospitals.

Figure 4. FLOW OF PATIENTS FROM COMMUNES TO HOSPITALS, HAITI, 1998



The Justinien Hospital attracts only 25% of patients from outside the commune, but these come from 15 different communes at varying distances from the hospital, while the Marchand-Dessalines hospital attracts 50% of women from other communes, though most of these come from one neighbouring commune (Gonaïves). Similarly, the Schweitzer Hospital attracts almost exclusively women from Petite-Rivière.

The attractiveness of an hospital thus consists of two elements: on the one hand the proportion of women from other communes coming to the hospital, on the other the number and distance of the communes from which it draws its "customers".

In the Nord department the most attractive hospital is the Justinien Hospitalin Cap-Haïtien – not in proportion to the number of cases coming from another commune, but because it attracts women from distant communes, some of them near another health structure (for example Grande Rivière and Dondon), and even women from a commune containing a functional hospital (11 cases from Milot).

The Pignon hospital draws women from surrounding communes but none from distant communes. The Milot hospital, on the other hand, draws very few women; its attractiveness seems high in proportion, but this is due to the small total number of women attending this hospital (which in any case. as **Table 14** shows. accounts for only 14% of expected births in the

commune). This low level of activity can be partly explained by the fact that the hospital has only one whole-time gynaecologist and no midwives or assistant midwives, deliveries being handled by nurses. From the point of view of equipment, the hospital has adequate resources, even if the number of beds (4) seems somewhat inadequate in view of the number of expected births (911).

No woman from the commune of La Victoire, which adjoins Pignon, attended that hospital, though 25 cases of complications of pregnancy might be expected in the commune. No explanation for this considerable deficit was given in the retro-information workshop.

In the Artibonite department, the attractiveness of the Saint-Marc and Gonaïves hospitals is confined to the surrounding communes. The Marchand hospital seems more attractive, because the population in the south of Gonaïves commune are relatively near that hospital. The Schweitzer Hospital draws many women living in the adjoining commune of Petite-Rivière de l'Artibonite: a third of the women admitted to the hospital come from that commune.

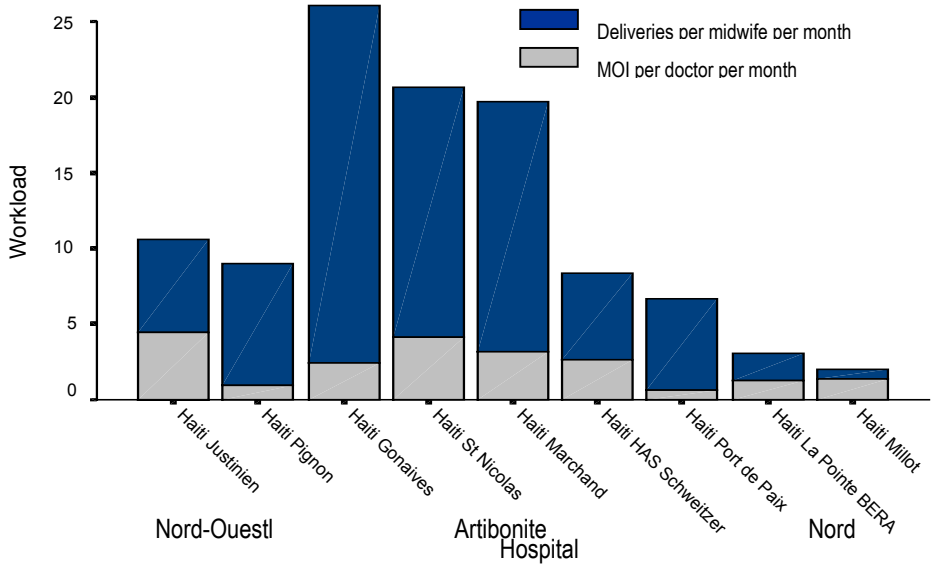
Two communes in the Artibonite department appear to be very poorly covered, since no pregnant women living in them have been admitted to a hospital included in the study. These are the communes of Terre-Neuve, which adjoins Gonaïves commune, and Marmelade, which is at a considerable distance from any health structure, either in Artibonite department or in the neighbouring Nord department.

In the Nord-Ouest department, the situation is peculiar in that its two hospitals are in the same commune, Porte-de-Paix, in the north of the department. Moreover, these two hospitals are off-centre, situated far to the north in the commune. These institutions are thus at a considerable distance from other communes in the department, and this may explain their low attractiveness. The Beraca private hospital, however, draws many patients from other communes in the department.

What are we to make of the problem of the inadequacy and poor distribution of personnel? **Table 14** above shows that almost half the parturients admitted to hospital have a major obstetric intervention. The doctors' work load, however, varies from one structure to another: from less than one MOI per doctor per month in the Port-de-Paix and Pignon hospitals (which have respectively 7 and 6 doctors capable of performing such interventions) to over 4 MOI per doctor per month in the Justinien Hospitaland Saint-Marc hospital (which have respectively 6 and 2 doctors capable of performing such interventions). Two hospitals have less than 2 doctors (including one full-time gynaecologist and a part-time doctor with surgical competence) on their permanent staff; and in these conditions it is difficult, if not impossible, to provide a service 24 hours out of 24 throughout the year. In other structures there are between 2 and 7 doctors per hospital, at least one of them being a gynaecologist. From the point of view of human (medical) resources the situation does not seem to give cause for any particular concern, but it may prove desirable to reinforce the medical teams in certain hospitals. There are more serious problems concerning resources in paramedical personnel, since only two hospitals (Saint-Marc hospital and the Schweitzer Hospital) have a midwife on their staff. Auxiliary midwives and nurses handle most deliveries in health structures.

From the point of view of material resources, there do not seem to be any serious problems, except perhaps for water supply, which is lacking or not continuously available in all hospitals. Only one hospital has neither forceps nor vacuum extractors, and only the Schweitzer Hospital has permanent facilities for blood transfusion.

Figure 5. MONTHLY WORKLOAD OF MEDICAL AND PARAMEDICAL STAFF, HAITI, 1998



While the situation of Haitian hospitals seems reasonably good in terms of resources, there are a number of problems, mainly organisational:

- Difficulty in maintaining an effective 24-hour service (doctors and anaesthetists not in hospital during duty periods, shortage of midwives, duty nurses incapable of performing certain emergency procedures)
- Delays in providing effective treatment for patients due to non immediate availability of drugs and electricity supply (frequently provided by generator)
- Financial accessibility: the charge for a caesarean ranges between 30 and 230 euros, and it is sometimes increased for patients residing outside the commune
- Inadequate training of duty paramedical personnel and matrones working in primary level formations
- Lack or inadequate availability of blood products
- Almost total absence of referral/counter-referral systems, although most hospitals have an ambulance

Particular efforts will therefore be required in Haiti for improving the organisation of health services and making medical personnel aware of the needs in order to make the best use of existing hospital infrastructures.

4. UTILISATION OF RESULTS

Retro-information

A descriptive analysis of the results of the study was produced by the study team; but it was only at a workshop bringing together the various officials and health workers involved in the study – including staff in both the central nucleus and the departmental sections – and with the help of the Director-General of the Ministry of Health, the head of the Directorate of Health Service Organisation and a member of the UON network, that a qualitative analysis was carried out. This workshop carefully prepared by the members of the study team was intended to lead the participants to consider, using the results of the study, what action could be taken to reduce maternal mortality and at the same time optimise the overall functioning of health services. It made it possible to establish priorities of action for each department, to determine priority CHUs and to define for each of them the most effective interventions to undertake. The systemic approach used in this seminar involved the presentation not only of the results of the study but

also of the conceptual model of the health system and a description of certain Haitian initiatives for the reduction of maternal mortality.

The conclusions of the workshop reflected a determination to take action at all levels of the health system. "*Overall, the study has fulfilled the objectives set over a year ago: the deficit has been identified, the documentation and measures for dealing with obstetric emergencies have been initiated, factors blocking access to care have been identified, and action for making good the deficit adapted to resources available in the field has been defined. The results achieved by the whole process will nevertheless remain fragile until the various elements have been incorporated into the structure of the health system. This study has had the distinctive feature of being carried out by field workers in the health services. The process pursued in the study (involvement of health workers at all levels) and during the retro-information discussions (global, systemic approach, directed towards structural changes, and in terms of local strategies) has made possible a new approach in the campaign for the reduction of maternal mortality in Haiti. The policies previously followed had had admirable objectives but had been conceived in such general terms as to give no stimulus to action at peripheral level. The vision of a health system which underlay the whole process made possible the contextualisation of approaches to the problem and a restoration of confidence in departmental initiatives*."[14]

In his speech closing the retro-information workshop, the Director-General of the Ministry of Health laid stress on the synchronisation of action, maternal mortality being not only a technical but also a political, structural and organisational problem.

Then, following this workshop, representatives of the central directorates of the Ministry of Public Health and Population and of international agencies, together with members of the scientific team, were invited to a meeting devoted to a synthesis of the work done and retro-information on the results. Strategies for the reduction of maternal mortality at the national level and arrangements for the follow-up of the conclusions of the retro-information workshop were also discussed.

The study in Haiti has thus been totally taken on board by health workers in the field, both in the collection of data and the analysis of the data collected. The participatory nature of the process was made possible by its dynamic organisation.

Perception

Methodological note

The interviews were carried out by one of the members of the scientific team who was familiar with the country and also knew most of those working in the field of maternal health. Altogether there were eight interviews, the criteria for the selection of people to be interviewed being:

Membership of an organisation with influence on policy, programmes and practices in the field of maternal health

Ability to mobilise resources (human and financial), links with decision-makers, past achievements, ability to influence public opinion in the field of maternal health, innovative approach

The people finally selected for interview included five members of the staff of the Ministry of Health at central and peripheral level, an academic from the State University and representatives of international organisations (WHO, UNICEF and USAID).

[14] Ministry of Public Health and Population 2000. Étude sur les besoins obstétricaux non couverts en Haïti (Départements Artibonite, Nord et Nord-Ouest), Octobre 1998-Septembre 1999, Rapport Final, pp. 42.

Results

Some of the persons interviewed were involved in varying degree in the UON process, while others knew little about it. The interviews revealed a sharp difference in perception of the study between the two categories, the former being extremely enthusiastic, the latter sometimes bitter and apprehensive about the results.

Health workers who took part in the study are unanimously enthusiastic, particularly about the involvement of field workers in the process. All hope that the study will provide planning tools both for those working in the field and those concerned at central level. It seems to them a valuable new approach, permitting the diagnosis of problems at the level of the commune and thus the taking of concrete decisions locally and, unlike earlier programmes, taking account of what they consider to be the direct cause of maternal mortality, lack of access to obstetric interventions. Some fears, however, have been expressed: the risk that the results may have limited impact because the study was confined to three departments; the difficulty of pursuing the dynamic established by the study, given the small number of people supporting the process; the risk that an indicator which does not take account of certain indications may be misunderstood by some of those who are interested in it and make use of it.

For those who are not involved in the study, or indeed do not know about it, the process does not seem entirely clear, even after an explanation by the person carrying out the interviews of the basic principles of the indicator.

5. CONCLUSION

The study in Haiti was carried out in a difficult context, due to the isolation of those involved in it from other members of the staff of the Ministry of Health, and also perhaps to the reluctance of the gynaecologists to face the consequences of the revelation of unmet needs. The attempt to define an indicator revealing the scale of the problems of maternal mortality was not an end in itself. The study was seen from the outset as a means of planning health programmes both at central level and at departmental and indeed communal level.

The participation of field workers both in the collection of data and in the analysis and interpretation of the results was intended to make health personnel as well as those politically responsible aware of the problem of maternal mortality in Haiti; for the coverage of health services and the human and material resources necessary for the proper functioning of hospitals are problems that must be resolved and cannot be resolved without an improvement in the organisation of health services. The systemic vision, based on the communal health units, of an integrated health network which is supported by certain senior staff in the Ministry of Health deserves to be more rapidly realised, both to improve the arrangements for dealing with obstetric emergencies and to improve the functioning of the health system as a whole.

The introduction of a simple, accessible and reproducible technique which will make it possible not only to quantify deficits but above all to analyse them with a view to planning further action will be a major asset for those working in the field. By applying this approach at their different levels, community and departmental teams will be able to develop effective plans for action and also to evaluate what has been achieved.

The interest shown not only by the initiators of the project, and also by all those who were involved in it, gives real hope of the redynamisation of departmental teams, who will be able in future to manage and direct more effectively the policies laid down by the political decision-makers, undoubtedly laudable though they are, though sometimes expressed in too general terms. Thus, everyone in the health pyramid will have his own role, from the settlement of the main lines of the country's health policy to its effective application in the field, taking account of the realities of the situation and of regional peculiarities.

Annex 1. Questionnaire for Women

Q1 **Identification of health facility:**
Department:
Type: Public/Mixed
Name:

Q2 **Identification of parturient**
Name of parturient
File admission number
Questionnaire number

Q3 **Date of admission**: -------/-----/----- (day/month/year)

Q4 **Age of parturient (in years)**
If not noted, write UNKNOWN

Q5 **Address of parturient**
Department
Commune (If not noted, writes UNKNOWN)
Communal section City Street

Q6 **Area (tick)**
(1) Commune less then 1 h
(2) Commune more then 1 h
(3) Unknown

Q7a **Place of delivery (tick)**
(1) At home
(2) This facility
(3) Another facility
(4) Other

Q7b **Another facility (Specify name)**

Q8 **Date of delivery**: -------/-----/----- (day/month/year)

Q9 **Major Obstetric Intervention**
Yes No

Q10 **Major Obstetric Intervention**
Date of intervention: -------/-----/----- (day/month/year)

Q11 **Major Obstetric Intervention (tick off the principal intervention)**
(1) Caesarean
(2) Laparotomy for uterine rupture
(3) Hysterectomy
(4) Version extraction
(5) Symphysiotomy
(6) Craniotomy/Cranioclasy
(7) Medical treatment for severe eclampsia
(8) Laparotomy for ectopic pregnancy
(9) Laparotomy for peritonitis
(10) Uterine curettage

Q12 **Absolute Maternal Indication (tick off the principal indication)**
(1) Severe Ante-partum haemorrhage (placenta praevia, abruptio placenta)
(2) Post-partum haemorrhage
(3) Foeto-pelvic disproportion with uterine rupture
(4) Dystocic presentation (transverse, front, bregma, face with incarceration)
(5) Eclampsia
(6) Ectopic pregnancy
(7) Post-partum peritonitis
(8) Post-abortum peritonitis
(9) Post-abortum haemorrhage

Q13 Non-Absolute Maternal Indication (Thick off the principal indication)
(1) Foeto-pelvic disproportion
(2) Antecedent of caesarean
(3) Foetal distress
(4) Breach presentation (primipara)
(5) Cord procidentia
(6) Other: specify
(7) Not noted

Q14 Results for child
(1) Born alive
(2) Stillborn
(3) Born living and died within 24 hours
(4) Not noted

Q15 Results for the mother
(1) Nothing to report (go to Q21 to Q25)
(2) Complication (go to Q16 to Q25)
(3) Died (go to Q18 to Q25)
(4) Not noted

Q16 Type of complication (specify)

Q17 Place of complication treatment
(1) This facility
(2) Referred: name of health facility
(3) Died
(4) Other
(5) Not noted

Q18 Time of death (thick)
(1) Before intervention
(2) During intervention
(3) After intervention
(4) Not noted

Q19a Cause of mother's death (thick)
(1) Hypertensive disorder
(2) Haemorrhage
(3) Infection
(4) Other (see Q19b)
(5) Unknown

Q19b If other cause of death: specify

Q20 Date of mother's death: -------/-----/----- (day/month/year)

Q21 Date of mother's discharge: -------/-----/----- (day/month/year)
Note UNKNOWN if not noted

Q22 Name of interviewer

Q23 Date of completion of questionnaire: -------/-----/----- (day/month/year)

Q24 Control: Yes

Q25 Other information

Annex 2. QUESTONNAIRE FOR HEALTH FACILITY

Q1 Identification of health facility

Department

Name

Q2 Type of institution

(1) Public
(2) Mixed
(3) Private

Q3 Category of institution

(1) Departmental hospital
(2) Communal hospital
(3) University hospital
(4) Health centre with beds
(5) Other (specify)

Material resources

Q4 Number of maternity beds
Q5 Number of gynaecological beds
Q6 Total number of beds in health facility
Q7 Number of operating theatres
Q8 Number of operating theatres reserved for obstetric
Q9 Number of functional vacuum extractor (mechanical)
Q10 Number of functional vacuum extractor (electronic)
Q11 Number of functional forceps
Q12 Number of functional ambulances
Q13 Number of blood transfusion centre
Q14 Number of delivery kits
Q15 Number of hysterectomy kits
Q16 Number of caesarean kits
Q17 Number of autoclaves
Q18 Number of sterilizers
Q19 Source of energy (thick) yes no
Generator
City power
Inverter
Solar energy
Q20 Number of generators

Human resources Medical

Q21 Number of gynaecologists
Q22 Number of surgeons
Q23 Number of junior doctors (gynaecologists)
Q24 Other medical staff with gynaecological skill
Specify

Human resources Paramedical

Q25 Number of midwives
Q26 Number of midwives assistants
Q27 Number of nurses with delivery practice (not specialised)
Q28 Number of nurse's assistant with delivery practice (not specialised)
Q29 Number of student

Activities (October 98 - September 99)

Q30 Number of admissions to maternity ward
Q31 Total number of deliveries
Q32 Total number of dystocic deliveries

Q33 Total number of eutocic deliveries
Q34 Total number of stillbirths
Q35 Total number of maternal deaths
Q36 Total number of maternal deaths within 48 h
Q37 Total number of maternal deaths after 48 h
Q38 Total number of caesareans
Q39 Total number of uterine rupture
Q40 Name of interviewer
Q41 Date of questionnaire's completion ----/----/---- (day/month/year)
Q42 Result of survey
Questionnaire completed (1)
Questionnaire not completed (2)

Q43 Control Yes

Annex 3. LIST OF MAINS DOCUMENTS PUBLISHED BY THE UON IN HAITI

Ministry of Health

Décembre 2000, Ministère de la Santé Publique et de la Population, Etude des Besoins Obstétricaux Non Couverts en Haïti, (Département Artibonite, Nord, Nord-Ouest, Octobre 1998-Septembre 1999), Rapport final (draft), 60 p.

Décembre 2000, C. Roenen, Documentation des politiques, des stratégies et des pratiques de lutte contre la mortalité maternelle, Haïti, Mars-Décembre 2000, 17 p.

Décembre 2000, C Roenen, Documentation des politiques, des stratégies et des pratiques de lutte contre la mortalité maternelle, Haïti, Mars-Décembre 2000, Revue critique du processus, 6p.

Août 2000, Ministère de la Santé Publique et de la Population, Etude sur les Besoins Obstétricaux Non Couverts Haïti 2000, Atelier de synthèse et de restitution des résultats, Rapport, 16 p.

Janvier 2000, Rapport préliminaire de l'équipe scientifique: Adaptation des définitions IMA, IOM, Taux de référence, 14 p.

Juillet 1999, Ministère de la Santé Publique et de la Population, Etude sur les Besoins Obstétricaux Non Couverts: Protocole d'étude, 16 p.

Co-ordination and management team

Juin 1999, V. Litt, Rapport de mission en Haïti du 10 au 22 juin 1999, 10 p.

Août 2000, V. Litt, Rétro information de l'étude des *besoins obstétricaux non couverts* en Haïti. Une approche systémique qui puisse contribuer au développement du système de santé, 7 p.