

UNMET NEED FOR OBSTETRIC INTERVENTIONS IN NIGER:

BETWEEN FAILING REFERRAL SYSTEMS AND INADEQUATE MANAGEMENT OF HUMAN RESOURCES

AUTHORS

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SUMMARY

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A nation-wide survey was conducted in Niger to measure unmet obstetric needs and related factors. Taking the number of major obstetric interventions for absolute maternal indications from the capital city as a benchmark, the performances of Niger's 37 districts are analysed. In most rural areas the number of major life-saving interventions was less than 10% of that expected from this low-end benchmark. The maternal mortality associated with the major obstetric interventions was 7% and peri-natal mortality 34%.

Factors that explain this situation include: the lack of adequate infrastructure – only 12 out of 37 districts outside Niamey have a hospital with a theatre -, the absence of a referral and emergency evacuation system, and the inadequate deployment, management and productivity of the human resources required for implementation of safer motherhood guidelines. Key staff was often either inexistent, absent from duty during longer periods, discouraged because of working conditions or, in the case of general practitioners, dissuaded from exercising their skills by a powerful lobby of specialists. Auxiliary staff like anaesthetist nurses and surgical assistants were concentrated in the capital city or were assigned to hospitals where no surgery was performed in absence of a competent medical practitioner.

Though the combination of poverty and geographical barriers cause patients to present late at the health facilities, much could improve at the supply-side of Niger's health system in expanding the infrastructure network, in setting up effective emergency referral systems, and most crucially, in managing and deploying human resources more adequately.

Keywords Safe motherhood, unmet obstetric needs, mother and child health, maternal mortality, human resource management, referral system, district health system, Niger

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INTRODUCTION

The prototype of a patient in acute need of professional health care is a woman with a major obstetric problem. Failure to intervene promptly, with well-known technical interventions, can lead to the death of mother and newborn. In Niger, one of the poorest countries in the world, the maternal mortality ratio is estimated at 1,600 per 100,000 live births: one woman out of seven dies for reasons related to pregnancy. (1) In such a situation, to be able to perform the intervention needed in situations that pose an immediate threat to the survival of the mother, i.e. those required for "absolute maternal indications (AMI)" is a priority. This paper documents the distribution of the unmet needs for such major obstetric interventions (MOI).

To map the distribution of unmet need, we established a benchmark low-end estimate of the need for major obstetric interventions for absolute maternal indications (AMI) in the country, using the number of MOI for AMI per 100 expected births for women living in Niamey, the capital city. (2) Plotting actual performances of the 37 other individual districts against this benchmark makes it possible to identify system-wide problems that determine poor performance and contribute to Niger's persistent high maternal mortality.

It shows how the absence of a network of referral hospitals for much of this essentially rural and widely dispersed population, the failing referral systems and the inadequate management

of human resources deprive large numbers of women of vital care. In much of Niger the services for providing close-to-client, first level maternal and newborn care are as yet poorly developed, and most often the referral level technical platform at district level, required for providing the back-up maternal and newborn care, is either absent or dysfunctional. (3)

METHODS

The first step in establishing the benchmark was to define the obstetric interventions and the absolute maternal indications that were of interest. They are listed in Table 1 and were established by a national expert committee. The list was similar to that used in other countries and includes life threatening conditions and major interventions.(4) It did not include certain life threatening conditions such as eclampsia, foetal distress, previous C-section, puerperal sepsis, severe anaemia, retained placenta and extra-uterine pregnancy because these were difficult to standardise or collect in a reproducible way. The number of interventions was extracted from the files of the two hospitals in Niamey that perform such interventions, using the inclusion criteria listed in Table 1. The number of such interventions performed for women living in Niamey, i.e. excluding referrals from elsewhere in the country, was related to the expected number of births in the city, and the resulting ratio was used as a benchmark for a low-end estimate of need for the rest of the country.

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Table 1: Inclusion criteria for the major obstetric interventions and their absolute maternal indications considered in the assessment of unmet obstetric need

Major Obstetric Interventions
Caesarean section, hysterectomy, laparotomy for ruptured uterus, craniotomy, internal version and extraction, suturing of hypo-gastric arteries
Absolute Maternal Indications
Ruptured uterus, transverse or face presentation, foeto-pelvic disproportion, placenta previa, abruptio placentae, post-partum bleeding

Applying this benchmark to the expected number of births in each district (calculated by applying a crude birth rate of 52 ‰ to population figures extrapolated from the 1988 census, in a context where total fertility rates remained stable over the past 10 to 15 years (5) yields an expected minimum number of MOI for AMI that can be compared with the number actually performed. The difference between the number of MOI for AMI expected from the benchmark ratio and the number actually performed in each district was used as a low-end estimate of the unmet need.

All case records (patient's files, anaesthetist's notes, surgery reports and partograms) in all hospitals that performed such interventions in 1998 were analysed by a specifically prepared survey team during the early months of 1999. On this occasion, interventions were also discussed with the medical personnel that had performed it, in order to determine whether the indication satisfied the inclusion criteria. Foetal and maternal outcomes were recorded. As most mothers and babies were hospitalised for at least a week after the intervention, it was possible to measure perinatal mortality associated with the

interventions, albeit with some underestimation. Staffing levels and availability of key health personnel and theatre equipment during 1998 were also documented.

The case records were often incomplete. However, cross-matching the information contained in the patient's file, the surgery notes and the partograms, completed with the comments of the medical doctors in charge, usually provided a consistent determination of indications and outcome. Because of the very few cases recorded in the small hospital units outside Niamey, clinicians often remembered individual cases. Nevertheless the indications for the interventions could be determined in about 97% of cases. Also, in 97% of cases it was possible to determine from which district the women who had had a MOI came, and whether they came from the rural or urban areas in those districts. The cases where geographical origin or indication could not be determined, were excluded from the analysis, without affecting the overall results and conclusions.

RESULTS

MOI FOR AMI

In 1998 major obstetric interventions were performed in the two hospitals of Niamey and in twelve other health facilities throughout the country: six regional hospitals, four district hospitals, one mission hospital and one private hospital belonging to a private mining company. None of the other hospitals in the country performed any of these interventions in 1998.

In Niamey, 889 major obstetric interventions took place in the 2 major maternities of the city. Two hundred and five (23%) were for women living outside the capital city, and 31 (3.5%) for women whose origin could not be retraced. There were 653 major obstetric interventions (73.5 %) from Niamey. Nearly half of these interventions (296) were for absolute maternal indications.

Table 2: Unmet need for major obstetric interventions for maternal indications in Niger per region in 1998 (aggregation of individual district data), as compared to the Niamey benchmark of 0.9%: 296 interventions for 32,714 expected births

Region	Expected number of births	Expected number of (0.9% Niamey benchmark low-end estimate of need)	Actual number of MOI/AMI	Absolute deficit	
				Absolute deficit	Relative deficit
Agadez	18,782	169	31	138	82 %
Diffa	11,202	102	22	80	78 %
Dosso	76,778	690	115	575	83 %
Maradi	105,743	953	279	674	71 %
Tahoua	89,722	808	245	563	70 %
Tillaberi	97,886	882	139	743	84 %
Zinder	102,011	919	241	678	74 %
Total Niger without Niamey	502,124	4,523	1,072	3,451	76 %

In the same period the number of expected births in Niamey was 32,714. With 296 major obstetric interventions for absolute maternal indications this gives a MOI for AMI ratio of 0.9 per 100 expected deliveries. This ratio was used as the low-end benchmark for obstetric needs in Niger.

According to the Niamey benchmark the number of MOI for the defined set of indications for the rest of the country would have been 4,523, for the estimated 502,124 women who gave birth during that year. In actual fact 1,611 MOI were performed, of which 1,072 were for the absolute maternal indications

listed in Table 1: a ratio of less than 0.3 per 100 expected deliveries (**Error! Reference source not found.**, UON per region). Most of the 3,451 women who were expected to require an intervention but failed to get it probably died or suffered major complications.

The deficits compared to benchmark expectations were much larger for rural areas than for the much smaller urban population, both in relative and absolute terms. (Figure 1, Figure 2) The deficits in absolute numbers give an indication of the distribution of unmet need throughout the country; the relative deficits illustrate the degree of mismatch between needs and health service performance.

Figure 3 shows the distribution of the hospital infrastructure and the relative and absolute deficits per district. Outside the capital city only 12 districts, with a population of 3,018,000 in an area totalling 453,000 km², had a hospital where MOIs were performed. Nine districts, with a population of 2,797,000 in an area totalling 154,000 km², had a hospital with a theatre, but performed no MOIs during the study period; there was no surgical infrastructure whatsoever in 15 districts, with a population of 3,844,000 in an area totalling 660,000 km². With few tarred roads or vehicles outside the major towns accessibility to proper hospital care is extremely low.

In the 25 districts outside Niamey that had to rely on surgical facilities in other districts, less than 20% of the benchmark-expected number of women benefited from a MOI for AMI. However, the situation was not much better in districts where the district hospital had a theatre

and a general practitioner performing surgery (30%), nor in the districts that had a regional hospital with a functional theatre and specialists (36%). Uptake of surgical care was low everywhere, and regional hospitals did not meet the needs of their population much better than the functional district hospitals.

OUTCOMES OF THE INTERVENTIONS

Four percent of the women undergoing a MOI died during or after the intervention. In Niamey only 6 women died during or after a MOI, less than 1 %, in Galmi, a private hospital, 0.3%. Elsewhere 7% died, with the highest case-fatality (3 deaths for 14 interventions) in Tessaoua district. The high case-fatality is related to important delays between the onset of the problem and the adequate response of the health services. Country wide, 19.5% of the women who presented for a MOI for AMI had a ruptured uterus. Distance is undoubtedly in part responsible for this high rate, but even in Niamey as many as 13.2% of MOI for AMI were for a ruptured uterus, showing that other delays than those caused by distance *per se* also play a role.

If maternal mortality was high among women undergoing a major obstetric intervention, outcomes for the newborns were even worse. The peri-natal mortality associated with MOI was 34 %. The districts of Loga and (again) Tessaoua noted the highest mortality rates, with respectively 78 and 63 %. Even for the central maternities in Niamey with 10 gynaecologists, 20% of the babies were registered as being stillborn or as having died within the first week of life. In the central maternity of Zinder, the

second largest town of Niger with 3 gynaecologists, 51% of the babies died. Ninety percent of cases were recorded as stillbirths, 8% as having died within 24 hours and 1% after 24 hours. Discussions with the medical personnel revealed that many of these recorded 'stillbirths' were newborns who did not breathe at birth but had a heartbeat. There often were no ventilation masks for newborns and there was no systematic reanimation of the newborns in the operating theatres.

STAFF AVAILABILITY AND UNMET NEED

At the time of the study Niger had 42 medical professionals who performed major obstetric interventions: 35 (83%) gynaecologists or surgeons and 7 general medical officers with a specific training for obstetric surgery in district hospitals. Twenty (48%) of these doctors were located in Niamey, Zinder and Maradi, the 3 major towns in Niger, and 29% in the capital Niamey alone. (Table 3) Other regional hospitals had a total of 13 specialists and the 2 private institutions had a total of 5 specialists. Fifty percent of the midwives of the country resided in Niamey.

The private hospital of Galmi performed the highest number of major obstetric interventions per staff with obstetric surgery skills, followed by the Zinder and Niamey maternities. At the other extreme the district hospital of Loga with 3 doctors with surgical skills (one of whom a specialist) performed only 9 interventions in 1998. Only in Niamey and in three other hospitals surgical staff performed more than one intervention per week. (Figure 4) None of the

doctors in district hospitals came close to that level of productivity.

Only 4 out of 29 district hospitals combined all the material and human conditions necessary to perform basic surgery in 1998. These 4 district hospitals had 9 staff with surgical skills of which 2 were expatriate specialists. In 1995 and 1996. Niger had trained 17 general practitioners in basic surgical skills, with a particular focus on C-sections. Two years later only 7 of these 17 had actually performed some surgery, and then only an average of 7 C-sections per year. By 2005 all 17 had left the districts, never to be replaced. UNFPA funded an expatriate specialist in Loga district for several years in order to support the 2 national GP trained in the national program. Together they realised 9 MOI for the whole of 1998. (Table 3)

According to the recent recommendations made by WHO (3) Niger should have some 3,000 professional midwives; the actual number, 334, is far below those benchmarks. All midwives were stationed in the hospital facilities, mainly in the capital and the regional hospitals. The variation in unmet need from district to district was unrelated to the presence or absence of these few midwives ($R^2 = 0.02$).

Table 3: Distribution and productivity of key staff for major obstetric interventions, Niger, 1998.

Health facility performing MOI in 1998	Surgeons and gynaecologists	General practitioners with basic surgical skills	Surgical nurses	Anaesthetist nurses	Midwives	Number of interventions per doctor per year
2 central maternities Niamey	10	0	2	5	53	88
National Hospital Zinder	3	0	1	4	6	104
Regional Hospital Agadez	1	0	1	2	5	28
Regional Hospital Diffa	2	0	0	1	5	13
Regional Hospital Dosso	3	0	0	3	6	36
Regional Hospital Maradi	7	0	1	4	8	50
Regional Hospital Tahoua	2	0	1	1	8	69
District Hospital Gaya	0	2	2	1	1	13
District Hospital Loga	1	2	1	1	1	3
District Hospital Tera	0	2	2	2	3	13
District Hospital Tessouoa	1	1	0	1	4	10
Private Hospital Galmi	3	0	0	2	6	114
Private Hospital Somair	2	0	1	2	1	19
Other District Hospitals (25)	0	10	8	12	100	0
Urban HC in Niamey	0	0	0	0	127	
Total	35	17	20	41	334	55

DISCUSSION

In this study the benchmark low-end estimate of the need for major obstetric interventions for absolute maternal indications was set at 0.9 per 100 deliveries. (6) In similar exercises in other countries in the sub-region benchmarks were set between 1.1 and 1.5%. The 0.9% Niamey benchmark undoubtedly underestimates the needs: first, because it is unlikely that all Niamey women, even in this capital city, have access to services providing MOI when they require it; second, because the need for MOI is likely to be

greater outside the capital, where there is less skilled attendance at childbirth, allowing complications to degenerate into life-threatening situations requiring surgical intervention; third, because not all important indications were taken into consideration, nor were all potentially useful interventions; and finally, because not all the major obstetric interventions that were performed were so done timely and effectively.

However, even compared to such a low and underestimated benchmark, the amount of unmet need was staggering. Three women out of

four, and in rural areas as many as eight or nine out of ten failed to get the major obstetric intervention they required to save them from a life-threatening acute complication.

Niger has a dispersed population, in a hostile environment where communication is a real challenge and families can hardly afford emergency transport, should this be available. In that context the health system has not been able as yet to provide adequate answers to three crucial problems: the lack of infrastructure (15 out of 37 districts have a hospital without a theatre), the absence of a referral-emergency evacuation system between the (sparse) health centre network and the hospitals, and the planning and management required for the deployment and productivity of its human resources.

Only 14 health facilities in Niger perform major obstetric interventions. Four of them are in the 3 major towns of the country and another 4 in the other regional capitals. Only 4 out of 29 rural districts perform major obstetric interventions, in numbers well below even very low-end estimates of the needs. There is obviously a major problem of supply of services to cover the needs.

But even in districts with functional operating theatres few patients in need of a major obstetric intervention reached the hospital and those that did, came in late: one out of five had a ruptured uterus. The case fatality rates of the interventions were extremely high, for both mothers and babies. There were obviously major obstacles and delays in seeking care and in the overall functioning of the district system and its

referral mechanisms. In Niger's context it is difficult to deploy female staff in isolated rural areas, and in the best of cases midwives are stationed in district hospitals. The mainly male nursing staff of the rural health centres is not prepared for providing obstetric care. Given the inability of antenatal care to predict serious complications during delivery (7-9) the absence of emergency evacuation systems remains a major bottleneck. (10-11) Health centres cannot call for ambulances and private transport for emergency evacuation is scarce and expensive. (12) Tahoua district, for example, has a central maternity and a well-functioning mission hospital run by 15 expatriates, including five specialists. Though it scored somewhat better than the other regions, it is clear that the mere presence of a maternity care centre or hospital with surgical activities is not in itself enough to meet the needs. In Maradi, the most densely populated department of Niger and one of the smallest, there were almost no cases coming from beyond a distance of 20 km from the hospital, although the district has a relatively dense network of health centres. On the other hand, attempts to organise a radio-ambulance system in rural areas of Niger have shown that it is possible to significantly increase the uptake of referral obstetric care, at a cost of US\$ 49 per obstetric case effectively referred. (12)

Low staff availability and morale also contributes to low productivity and the persistence of the unmet need. The average number of major obstetric interventions per doctor per year was 55 - considering only those doctors who in principle had the required skills and performed at least one intervention in 2003. (Figure 4) Part

of this low productivity is the frequent absence of those doctors from the hospital where they are posted: they often have to leave their district to perform various administrative or political duties, or to attend one of the many donor-sponsored training sessions. In both Agadez and Dosso, for example, two of the major towns outside Niamey, the hospital's gynaecologists were absent during 6 and 4 months respectively in 1998. As the nearest other hospitals where obstetric interventions could be performed were at respectively 400 and 150 km, this urban population often had no significantly better access to adequate care than the rural population - which was indeed reflected in extremely low intervention ratios. In Loga rural district the (expatriate) consultant gynaecologist was absent from his duty station for so long that the hospital performed only nine interventions for the women of the district during the whole year. Only very few districts, with or without operating theatres, have more than one of each key cadre, making it difficult to ensure continuity.

Inadequate staffing contributed particularly to the persistence of unmet need in the rural areas. Only one out of nine district hospitals newly constructed and equipped under a World Bank project performed a limited number of major obstetric interventions in 1998. Even five years later this situation had not improved significantly. Though some of these hospitals had general practitioners trained to do MOI and other basic surgery, the psychological barrier to start operating proved too high. The lobby of specialists gave ambiguous signals and in no way supported the process of delegating the

responsibility for major obstetric interventions to general practitioners. In 1997 and 1998, a total of 17 district medical officers were trained for district surgery, but this programme was discontinued as specialists and officials showed little commitment and no complementary remuneration for the doctors involved could be secured. Most of these general practitioners with basic surgical skills have since left the system. In the meantime an ambitious training programme for specialist surgeons and gynaecologists was started with support of WHO. It is unlikely, however, that it will be possible to efficiently deploy specialists under the harsh conditions of the rural areas.

There were similar problems in terms of auxiliary surgical theatre staff. Niger trains several anaesthetist nurses and surgical assistants each year. The vast majority of these cadres leave the rural areas within the year after being assigned, and move to Niamey where patients have more ability to pay, either under-the-counter, or in private practice. Rural allowances are often not paid out and when they are, remain well below this potential additional income. Moreover, anaesthetist nurses and surgical assistants often are assigned to hospitals where no surgery is performed for lack of doctor with surgical skills. In yet other districts, medical doctors with surgical skills are not performing the interventions they could carry out for lack of these intermediate cadres.

Much of this seems related to the low priority system managers give to clinical work as opposed to administrative and management functions. Out of 1,100 nurses, doctors and

midwives on the Ministry of Health pay-roll in 2003, about 340 were enrolled in 2 or 3 years training courses: 240 in a WHO sponsored national public health training school, most of the others in hospital management courses in Togo. These cadres are not available for operational work during the 2-3 years duration of these training programmes, and are likely to abandon future clinical work in favour of better-remunerated management tasks. This results in steadily diminishing effective clinical coverage in an already highly understaffed system. This situation is aggravated by the recruitment stop that is supposed to decrease the public sector salary mass.

Patient delay is undoubtedly a problem in Niger, where patients are often reluctant to make use of services and the communication between health personnel and the population is regularly dysfunctional. (13) Blaming the victim, however, would be inappropriate in a context where so much could and should be done to invest on the supply side: in expanding the infrastructure network, in setting up effective referral and emergency evacuation systems, and, most crucially, in managing and deploying human resources.

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financial and operational support of the GTZ-‘Alafia’ project, WHO and UNICEF, which are here gratefully acknowledged.

The authors warmly welcome the recent initiative of the Ministry of health to newly recruit 150 medical practitioners to strengthen the health system and, under the impulse of the presidency, to take up again the training programme of general medical practitioners in basic surgical skills (Caesarean Sections), all this despite the famine which is striking Niger badly at this moment.

LIST OF REFERENCE

1. AbouZahr, C and Wardlaw, T. Maternal Mortality in 2000: Estimates Developed by WHO, UNICEF and UNFPA. 1-39. 2003. Geneva, WHO.
2. De Brouwere V, Van Lerberghe W. Les besoins obstétricaux non couverts. Paris: L'Harmattan; 1998.
3. World Health Organisation. The World Health Report 2005. Make every mother and child count. Geneva: World Health Organisation; 2005.
4. Unmet Obstetric Needs Network. www.itg.be/UONN/eng/home1.html . 2005.
5. Attama, Sabine, Seroussi, Michka, Kourguéni, Alichina, Idrissa, Koché, Harouna, and Barrère, Bernard. Enquête Démographique et de Santé, Niger, 1998. CARE, International. 1-278. 1999. Niamey, Niger, Macro International Inc. Calverton, Maryland USA.

6. Les besoins obstétricaux non couverts au Niger en 1998. 1-73. 2001. Ministère de la Santé Publique.

7. Dujardin B, Clarysse G, Criel B, De Brouwere V, Wangata N. The strategy of risk approach in antenatal care: evaluation of the referral compliance. *Social Science and Medicine* 1995;40(4):529-35.

8. De Brouwere V, Tonglet R, Van Lerberghe W. Strategies for reducing maternal mortality in developing countries: what can we learn from the history of the industrialized West? *Tropical Medicine and International Health* 1998;3(10):771-82.

9. Chalumeau M. Identification des facteurs de risque de mortalité périnatale en Afrique de l'Ouest: consultation prénatale ou surveillance de l'accouchement. *J.Gynecol.Obstet.Biol.Reprod.* 2002;31:63-9.

10. Murray FS, Davies S, Phiri RK, Ahmed Y. Tools for monitoring the effectiveness of district maternity referral systems. *Health Policy and Planning* 2001;16(4):353-61.

11. Maine D, Akalin ZM, Chakraborty J, de Francisco A, Strong M. Why Did Maternal Mortality Decline in Matlab. *Studies in Family Planning* 1996;27(4):179-87.

12. Bossyns, Paul, Abache, Ranaou, Abdoulaye, Mahaman Sani, and Van Lerberghe, Wim. Unaffordable or cost-effective?: introducing an emergency referral system in rural Niger.

Tropical Medicine and International Health. 2005.

13. Bossyns P, Van Lerberghe W. The weakest link: Competence and prestige as constraints to referral by isolated nurses in rural Niger. *Human Resources for Health* 2004;2(1):1-11.

CONFLICT OF INTEREST STATEMENT

The named authors alone are responsible for the views expressed in this paper. No conflicts of interest are mentioned.

AUTHOR'S CONTRIBUTIONS

Dr Paul Bossyns and Dr Hamidou Miyé initiated and guided the UON research initiative in Niger. Both were actively involved in the data collection and the major contributors to the data analysis and the national report writing.

Dr Wim Van Lerberghe and Dr Anne-Marie Depoorter contributed in the conception of this article, more specifically by making the link between the deficit of obstetric needs and Niger's health personnel management. They contributed to the writing of the article

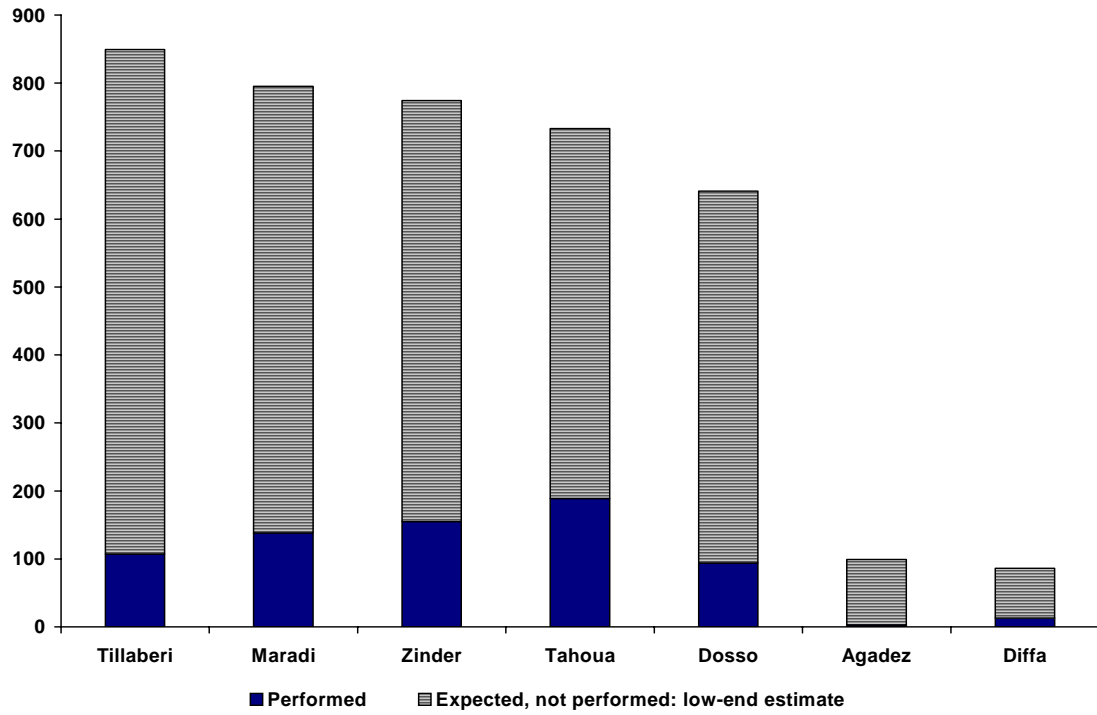


Figure 1: The number of major life-saving interventions performed, and the number not performed of a low-end benchmark of the need for such interventions: rural population, per region, Niger 1998.

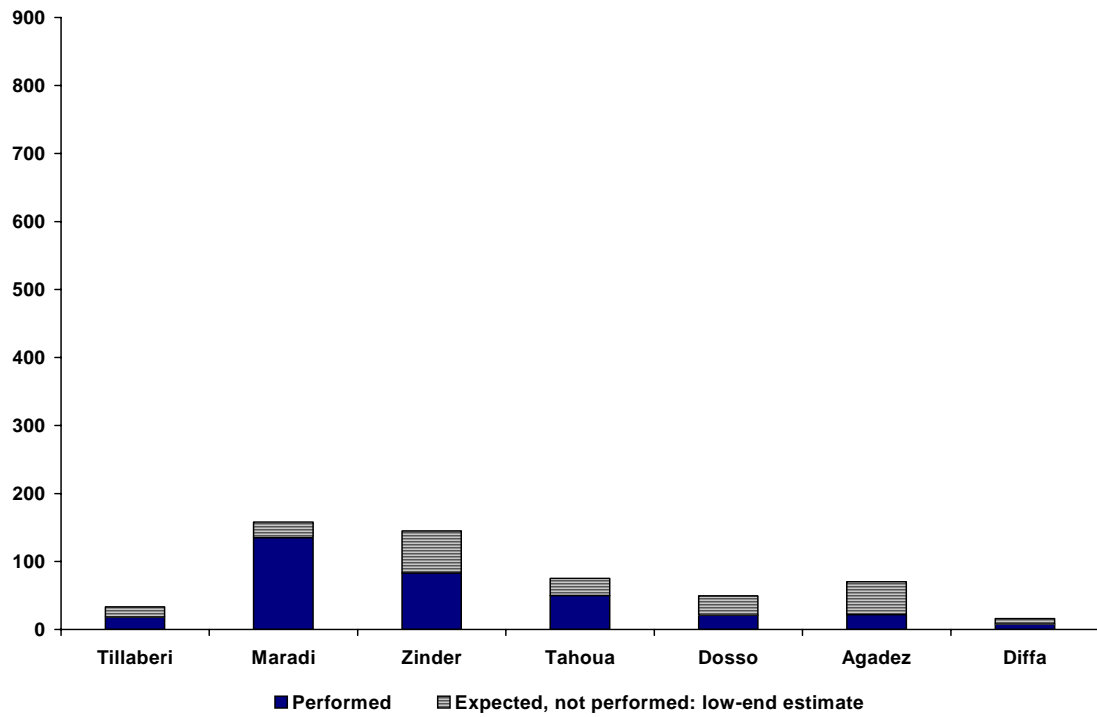


Figure 2: The number of major life-saving interventions performed, and the number not performed of a low-end benchmark of the need for such interventions: urban population, per region, capital city excluded, Niger 1998.

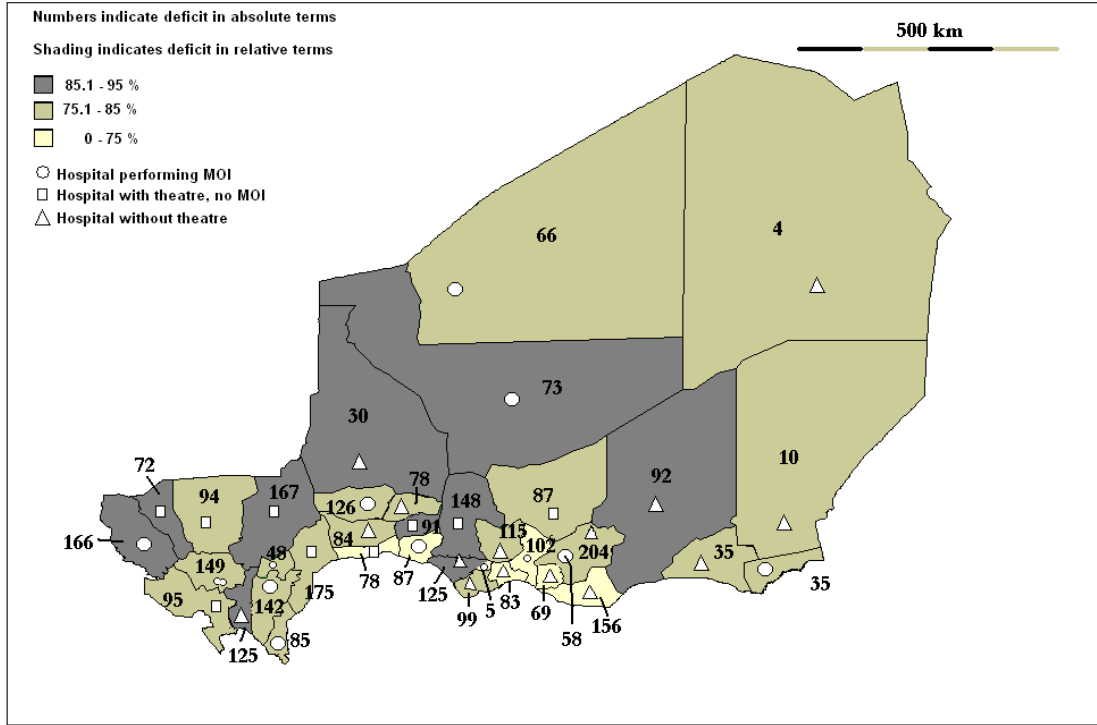


Figure 3: Hospital infrastructure per district, with the relative and absolute deficit in interventions compared to a low-end benchmark of the need for such interventions, rural and urban population combined, Niger 1998

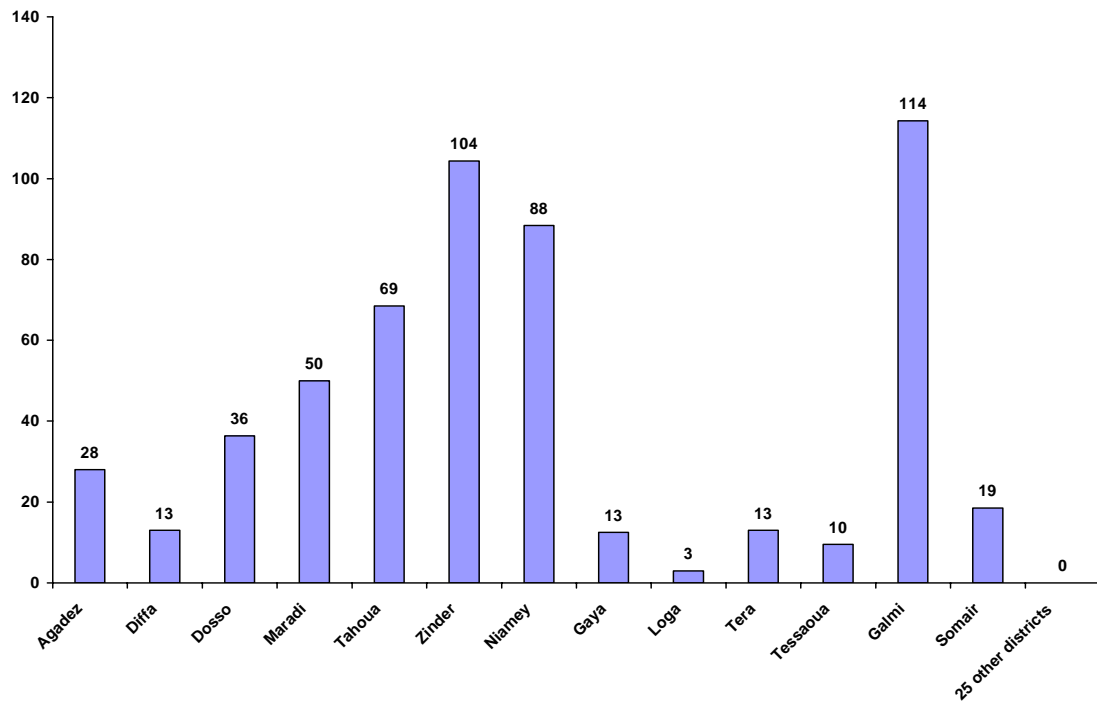


Figure 4: Number of major obstetric interventions per year per doctor with surgical skills, per district, Niger 1998.