

How robust are district health systems? Coping with crisis and disasters in Rutshuru, Democratic Republic of Congo

Denis Porignon^{1,2} Etienne Mugisho Soron'Gane², Tarcisse Elongo Lokombe³, Déogratias Katulanya Isu², Philippe Hennart¹ and Wim Van Lerberghe⁴

1 Centre for Scientific and Medical Research of the Free University of Brussels for its overseas co-operation activities (CEMUBAC) team, Brussels and School of Public Health, Free University of Brussels, Belgium

2 CEMUBAC team, Goma, North Kivu, Democratic Republic of Congo

3 CEMUBAC team, Rutshuru Health District, North Kivu, Democratic Republic of Congo

4 Department of Public Health, Institute of Tropical Medicine, Antwerp, Belgium

Summary

BACKGROUND Since the eighties, the North Kivu Province socio-economic environment has been deteriorating. This province also faced an influx of Rwandan refugees in July 1994. The objective of the paper is to show how a rural health district has been able to adjust and maintain its medical activities under unfavourable conditions.

METHOD Performances of the local health system were assessed through the analysis of routine medical data collected in the Rutshuru Health District (RHD) between 1985 and 1995. Specific data collected during the Rwandan refugee crisis measured the workload of RHD due to the refugees.

RESULTS For 11 years, health infrastructures have remained accessible and functional in RHD. The curative utilization and preventive coverage rates increased. Obstetrical activities were intensified from a quantitative as well as from a qualitative point of view. Between July and October 1994, the RHD treated 65 000 cases of various pathological conditions in Rwandan refugees settled outside the camps. This corresponds to 9.3% of consultations for Rwandan refugees settled on RHD's territory and represents a 400% increase in the curative workload for the RHD health services. Human and financial resources remained at a very low level, especially when compared with those available in the camps through relief agencies.

CONCLUSION The RHD was severely affected by various stresses but its services managed to provide significant and efficient response to these crises. Health district systems may constitute an effective tool to provide health care under adverse conditions.

keywords Health services research, district health system, preventive health services, maternal health services, refugees, disasters, Democratic Republic of Congo

correspondence Dr D. Porignon, CEMUBAC, Free University of Brussels, School of Public Health, Route de Lennik 808 (CP 595), 1070 Brussels, Belgium

Introduction

Since the Harare conference and the Bamako Initiative in 1987, the dominant paradigm for rational organization of health care delivery in Africa is that of the 'Health District', recognized as an organizational and operational vehicle of comprehensive primary health care in a context of decentralization (WHO 1988; World Bank 1993; World Bank 1994). In Africa, district health systems often have to be implemented in unstable or unfavourable socio-economic

circumstances. In such situations it may seem attractive to revert to the selective approaches that were advocated in the late seventies (Walsh & Warren 1979). District strategies may be abandoned or bypassed because of their expected inability to cope. The same kind of reasoning then easily justifies shifting management authority from local officials to international development agencies.

Given the frequency of unfavourable conditions in Africa, key questions remain: do district systems really work? Are they affordable? Can they work in the absence of a strong and

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effective public authority? Are they robust and resilient enough to withstand a chronic crisis situation? Is there any role for them in dealing with emergency crises (Porignon *et al.* 1995; Van Damme 1995)?

The Democratic Republic of Congo's health policy has been a precursor in terms of district organization (Van Lerberghe & Pangu 1988). Developed in the late seventies and early eighties, this policy is still the way health care is managed in the country, in a context of *de facto* decentralization. In the meantime, the Congolese health care system has been exposed to a number of severe stresses: a profound economic and administrative crisis, interethnic strife and a massive influx of refugees. In fact, for about 10 years, the Democratic Republic of Congo has progressively become – especially in its eastern part – the scene of what is now technically known as a 'complex crisis' (Burkholder & Toole 1995; Toole 1997).

In the Democratic Republic of Congo, the global socio-economic conditions have been deteriorating since the beginning of the eighties. The annual growth rate of the gross national product was –1.8% between 1980 and 1992 (WHO 1995). The Congolese currency devaluation reached $1.5 \times 10^{11}\%$ between 1985 and 1995. Average income per inhabitant per year has fallen from 350 US\$ in 1959 to 100 US\$ in 1995 (UNICEF 1996). The deterioration of the formal economy was compounded by a slump in informal economic activities, the disintegration of the state's administrative power, the growing difficulties of transport, supply problems including availability of drugs and vaccines, military exactions, violent interethnic disorders and important population movements (Rwandan refugees in Kivu and displaced people in Shaba, Kasai and Kivu).

In the North Kivu Province, in the east of the Democratic Republic of Congo, interethnic conflict between the Congolese people and immigrants of Rwandan origin resulted in 5000–10 000 deaths and 165 000 displaced people between March and October 1993. Moreover, following the Rwandan genocide, about 1 million people crossed the border to settle in the Province in July 1994, mostly in camps (Paquet & Van Soest 1994; Goma Epidemiology Group 1995).

All these closely linked events put a heavy burden on the health care system in the Province. The various stresses can be considered as a litmus test of the robustness and resilience of the district health care strategy. This paper describes how Rutshuru, a rural health district in the North Kivu Province, managed to cope with the socio-economic breakdown of the Democratic Republic of Congo and with a major refugee crisis, maintaining and even expanding activities in such an adverse environment. It confirms the adequacy of the district model as a workable strategy, even in extreme circumstances, and the potential of local health services in dealing with an acute refugee crisis.

Materials and methods

Rutshuru is a health district with 215 000 inhabitants in the east of the Democratic Republic of Congo. Since the beginning of the eighties the Rutshuru Health District (RHD) was organized as a two-tier district health system. It comprised a network of health centres supplying primary curative and preventive care and a 111-bed reference hospital mainly responsible for referral-level curative care. A Congolese team of medical, paramedical and administrative staff was responsible for planning, training and supervision. There were 3 Congolese doctors and 60 nurses in the district. A management committee comprised of population and health personnel representatives met once a month. Given the progressive decrease of the government's monetary contribution, financial contributions by the local population and external funding were the main sources of finance for the health district activities.

Since 1985, RHD was affected by both the general deterioration of the socio-economic situation and by interethnic strife. These chronic stresses put increasing pressure on the health care system as the situation progressively deteriorated. Moreover, in July 1994, RHD had to face the massive and sudden influx of some 300 000 Rwandan refugees. Most were settled in camps, where their health care was provided by international relief agencies. Some 80 000, however, self-settled outside the camps, where they constituted an extra burden for the district health system.

This study covers the period 1985–95. Routine medical data were collected to analyse (i) the development of the health centre network; (ii) outputs and performances, as measured by data on curative care, antenatal care, vaccination coverage; (iii) effectiveness in dealing with priority problems, using caesarean section rates as a tracer; and (iv) cost and financing of care for the RHD population. Data related to care provided for refugees by relief agencies in the camps, and by the district health services outside the camps were collected through standard United Nations data collection forms compiled in weekly epidemiological reports. Estimations of the population were based on a census carried out in the RHD in 1990, and estimating the crude birth rate at 45‰ and the population growth rate at 25‰.

Evolution of the different obstetrical outputs (proportion of assisted deliveries in the RHD's health facilities, proportion of deliveries at the district hospital maternity ward and proportion of caesarean sections among deliveries at the district hospital) according to time (1985–95) were analysed with simple linear regression. Regression coefficients and their 95% Confidence Intervals (95% CI) are presented.

Results

In the RHD, the number of health centres doubled from 7 to 14 between 1985 and 1993. This happened in two phases: an increase up to 12 by 1989 in order to ensure access for the whole district population; and up to 14 by 1993 to absorb the population increase. In 1995, the 14 health centres were carrying out curative, preventive (antenatal consultations, preschool consultations including immunization) and health promotion activities. Between 1985 and 1993, the reference hospital and all but two health centres had set up their management committees. Since 1992 at least 80% of monthly reports were transmitted every year to the district team.

The annual number of new cases at the curative care clinic increased from 18 000 in 1985 to 85 000 in 1995, excluding all

Rwandan refugees. This represents a curative utilization rate increasing from 0.101 new cases per inhabitant per year to 0.391 (Figure 1a). Antenatal care coverage (number of new contacts as a percentage of expected births) increased from 52.9% in 1985 to 79.0% in 1995. The proportion of women attending a follow-up visit during the 9th month of pregnancy increased from 38.0% in 1992 to 41.9% in 1995. Complete diphtheria-tetanus-pertussis protection was provided to 13.8% and 58.9% of the target population, in 1985 and 1995, respectively. Measles immunization coverage increased from 14.0% in 1985 to 43.5% in 1995 (Figure 1a).

Of about 94 000 expected deliveries between January 1985 and December 1995, approximately 38 000 occurred in health centres and 11 250 at the maternity ward of the RHD hospital. Of the latter 1382 were caesarean sections. Figure 1b shows that the proportion of assisted deliveries remained stable (b coefficient = +0.22 [95% CI: -1.99; +2.44]), the proportion of expected births that took place in the hospital decreased (b coefficient = -0.86 [95% CI: -1.15; -0.57]), and the proportion of hospital deliveries that occurred through caesarean section increased (b coefficient = +2.63 [95% CI: +1.86; +3.40]). Case fatality following caesarean sections decreased from 7.1% in 1985 to 0.9% in 1995, with an average of 2.9% over the 11 years.

Figure 1c shows that the proportion of caesarean sections among deliveries at the hospital was higher among the mothers coming from areas less than 5 km away (< 90 min walking with a stretcher) or from where an ambulance was available than for the rest of the population. For the population in the immediate catchment area of the district hospital (≤ 5 km) there was an increase from 3.4% in 1985 to 5.9% in 1995, with an unexplained peak in 1992. For the more distant population (> 5 km), levels were much lower, but also increased, from 0.5% in 1985 to 1.4% in 1995. Approximately one quarter of the caesarean sections were done primarily for absolute maternal indications.

Government contributions towards the RHD had been extremely limited since the end of the eighties, and stopped completely from 1993 onwards. The external funding remained below US\$ 3.0 per inhabitant per year (Figure 1d) and was mainly orientated towards the hospital and the district health team. The population's out-of-pocket payments - an average of US\$ 0.5 per inhabitant per year - mainly went to the health centres, and to a lesser extent to the hospital. The drastic decrease in external funding observed in 1990 was due to the break in diplomatic relations between the Belgian and the Congolese Governments. From 1991, the RHD benefited from European Union funds, which steadily increased between 1992 and 1995. However, in 1994, notwithstanding the funds from European Union, the total amount of financial external inputs remained below US\$ 1.5 per inhabitant.

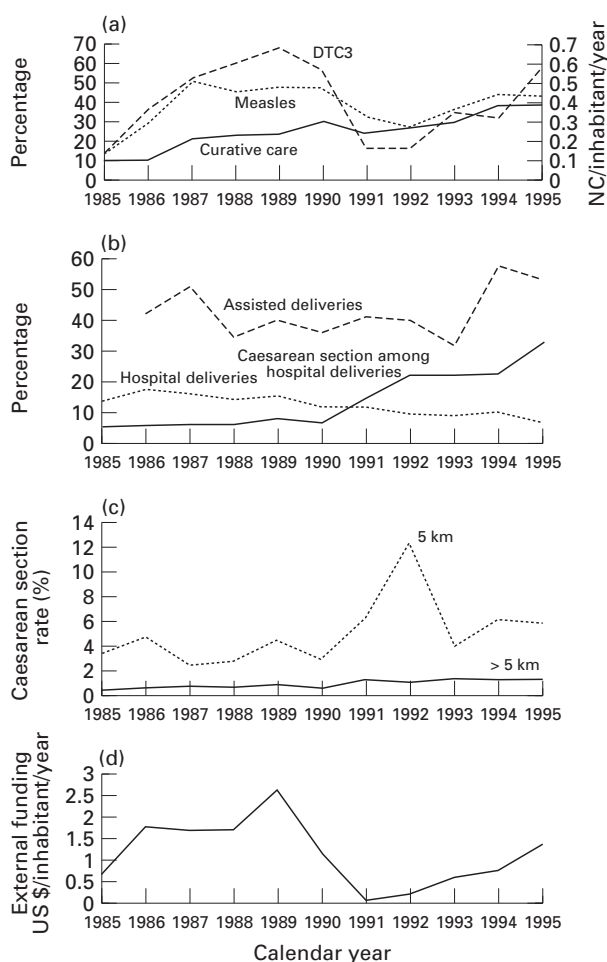


Figure 1 Evolution of activity indicators (a-c) and external funding (d) in the Rutshuru Health District between 1985 and 1995. (a) Measles (· · · · ·) and DTC3 (-----) coverage are expressed as percentage; curative care utilization rate (—) is expressed as new cases/inhabitant/year (NC/inh/year).

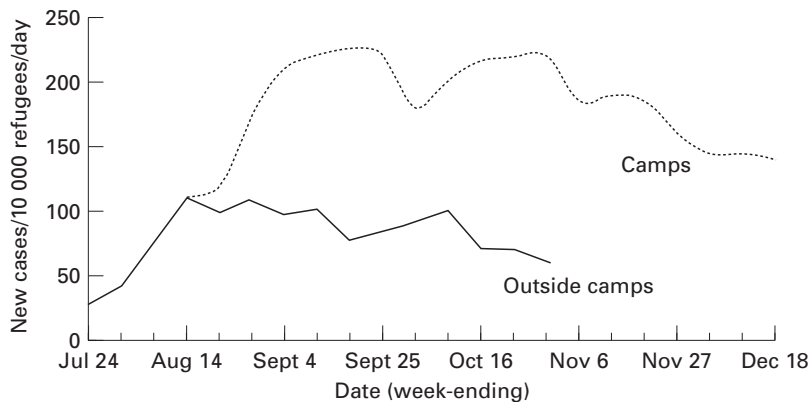
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Figure 2 Evolution of curative care workload inside (· · · · ·) and outside (—) the camps between July and December 1994.

In July 1994, the influx of refugees from Rwanda started. Most went straight into camps, but some 80 000 were scattered among the district population until October 31 when the UNHCR resettled them in camps. Before resettlement, health care for these self-settled refugees was provided by RHD's health facilities which reacted immediately after refugees' arrival. The RHD continued to function normally with regular committee meetings. It was decided to give free access to care for the refugees self-settled outside the camps. This was financed by the RHD, in the hope that costs would be recuperated from relief agencies at a later stage.

The district provided care for the self-settled refugees who represented 27% of the total refugee population settled on its territory, and 9.3% of its total curative care consultations were provided for all refugees. Caring for the self-settled refugees quadrupled the curative care workload in the district in 1994 compared to previous years.

Health centres and hospital of RHD treated $\approx 65\,000$ illness episodes in Rwandan refugees who were self-settled outside the camps during the period between mid-July and end of October 1994. For the refugee population in the camps, no data are available for the first 4 weeks, because

curative activities started later than outside the camps. From the month after the influx, data are available for both the RHD health facilities and the refugee camp services. They reached similar consultation rates of 110 new cases (NC) per 10 000 persons per day, which is equivalent to 4 NC/person/year. Subsequently consultation rates in the camp population peaked at 200 NC/10 000 persons/day two months after the refugee influx, and later levelled off down to 150 NC/10 000 persons/day. For the self-settled refugees outside the camps, the utilization rates never exceeded the fourth week peak of 110 NC/10 000 persons/day, and levelled off to 50 NC/10 000 persons/day (Figure 2).

The refugee population was in extremely bad shape. Case-mix was similar inside and outside the camps, with non bloody diarrhoea (mainly diagnosed as cholera) and dysentery as the main problems (Goma Epidemiology Group 1995; Siddique *et al.* 1995; Milleliri *et al.* 1995). The self-settled refugee population cared for by the RHD's health centres also presented with more common problems such as malaria (Figure 3). This was also probably the case in the camps. Cases of meningitis detected in the camps led to mass vaccination campaigns in the camps (Haelterman *et al.* 1996), but not outside, neither for refugees nor for local populations.

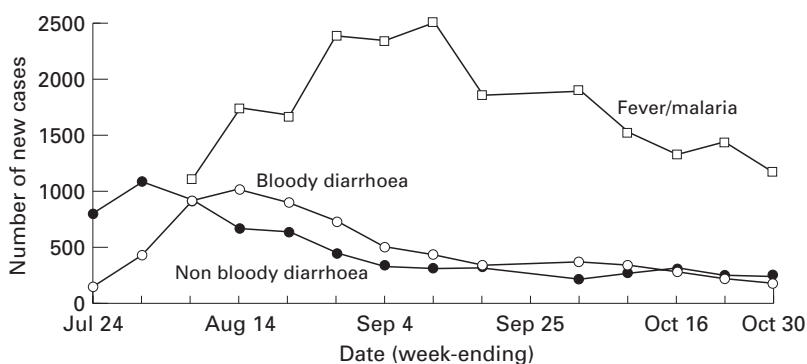


Figure 3 Number of new cases of fever/malaria (□), bloody diarrhoea (○) and non bloody diarrhoea (●) among self-settled refugee population outside the camps between July and October 1994.

D. Porignon *et al.* **How robust are district health systems?****Table 1** Evolution of indicators related to obstetrical activities in the Rutshuru health district between 1985 and 1995

Indicators	Means (1985-95)	Evolution (1985-95)	Comparative data	Reference
Casarean sections/expected births (%)	1.5	0.7-2.3	1.1	Van de Broeck <i>et al.</i> 1980
Casarean sections/deliveries at hospital (%)	12.3	5.6-32.8	9.3-29.1 7.0-32.0 9.9	De Muylder (1993) Notzon (1990) Family Health International (1988)
Case fatality after casarean section (%)	2.9	7.1-0.9	0.6-5.0 0.1-0.2	van Roosmalen (1990) Danforth (1985)

In the camps significantly more human and financial resources were available than in the RHD. There were 8 times less nurses and 20 times less doctors per 10 000 refugees in the RHD. During the first six weeks of the refugee influx, the RHD catered for the self-settled refugees with very little extra assistance or funds. For the self-settled refugees outside the camps, the expenses for medical care during the initial three months were estimated between US\$ 3 and 6 per refugee per year. Part of these expenses for the self-settled refugees were recuperated by RHD from UNHCR at the end of 1994 and at the beginning of 1995, i.e. 4-6 months later. Though it was very difficult to post all financial, material and human resources engaged in health care for the refugees settled in camps in the North Kivu Province, we tried to appraise costs of refugees' health care through information supplied by the UNHCR. Average expenses for medical care were estimated at around US\$ 14 per refugee per year (UNHCR-Goma, personal communication).

Discussion

Between 1985 and 1995, the health care network expanded and became available to the entire district population; utilization and coverage rates for curative and preventive activities remained low, but increased steadily. Coverage of antenatal care improved markedly throughout this period. An exception was immunization, where coverage rates dropped between 1991 and 1993. This, however, was not a sign of a district malfunction, but the consequence of the region being out of stock of vaccines. Overall, the offer of services and the volume of outputs increased; utilization rates indicate a fair degree of confidence of the population in the health services.

Obstetrics performances can be considered as indicators of the functioning of the referral system and of quality of care. This is particularly the case for caesarean sections. The proportion of caesarean sections increased at the hospital maternity ward. In part this can be explained by modifications in surgical indications for caesarean sections. But Rutshuru's doctors did not seem to be more

interventionist than their other Congolese or African colleagues (Table 1; Longombe *et al.* 1990; De Muylder 1993). The opening of two new health centres between 1990 and 1993, located close to the hospital, equipped with well-functioning maternity wards and headed by experienced expatriate nurses, probably modified the pattern of utilization of the hospital maternity resulting in less eutocic deliveries in the hospital. This may also partly explain the growing proportion of caesarean sections among hospital deliveries. Since the proportion of assisted births has remained stable and the proportion of caesarean sections has increased, it seems likely that the hospital was increasingly playing its role as referral facility.

Of more relevance are the caesarean sections rates compared to the expected number of births, which can be interpreted in terms of ability to meet the population's needs (De Brouwere *et al.* 1996). Average caesarean sections ratios for close (≤ 5 km: 5.2%) and remote (> 5 km: 1.0%) population appear to be a little higher than ratios described in situations where caesarean sections are done only for absolute maternal indications (Van Lerberghe *et al.* 1988; Van Den Broeck *et al.* 1989; De Brouwere *et al.* 1996).

Figure 1c compares women living in the neighbourhood of the hospital with those living further away. Women living nearby have higher caesarean section rates. This can possibly be explained by better geographical accessibility, broader indications and pressure of experienced nurses in charge of both health centres close to hospital. Nevertheless, the slow but consistent increase of the rates for women living at greater distance shows that accessibility has improved over this period.

No decrease in the quantity and quality of activities was noticed. The case fatality after caesarean section dropped, and is of the order of magnitude of what has been reported in similar conditions (Table 1) (Danforth 1985; Family Health International 1988; Notzon 1990; van Roosmalen 1990). The drop in case fatality cannot only be explained by widening indications that would include women with less serious conditions. Major contributing factors were no

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doubt faster access and referral and increasing technical quality of care.

The different indicators combined – diminishing case fatality, stable proportion of assisted births, slowly increasing section ratios and improving access for the rural population – provide evidence of improvement in quality of delivery care in an *a priori* unfavourable context.

Faced with the influx of refugees, the RHD managed to react immediately, providing health care to those refugees who were not immediately settled in camps. The RHD managed to absorb the extra workload and cost of this crisis situation and to provide its assistance in a cost-effective way. The expenditures per self-settled refugee outside the camps were less than half of that for those inside. Moreover, the 14 US\$ supposed to be spent to cover health care for refugees settled inside the camps were probably underestimated in the three to six months following refugee influx, due to the fact that, during this period, the incalculable massive aid that came from all over the world (including Africa and Asia) through many other agencies did not all pass through UNHCR.

Outside the camps, consultation rates for self-settled refugees were between 2 and 4 new cases per refugee per year, while in the camps, where health infrastructures were accessible without geographical barriers and where services were provided free, there were between four and eight new cases per refugee per year.

In the camps there were 25 staff per 10 000 refugees, including a significant number of expatriates; outside the camps, care was provided with 8 national staff per 10 000 refugees. The staff outside the camps did not only care for self-settled refugees but also had the Congolese host population in the district to care for. The latter continued to use health care facilities during the first three months after self-settled refugees' arrival despite the fact that RHD's health care facilities were overcrowded by self-settled refugees who used services 12 times more than the Congolese population during this period.

Common sense would have predicted a general collapse of all activities in a district such as RHD, under these conditions of extreme and prolonged complex crisis. The data presented here paint a different picture. Health services in this district expanded; performances increased; there was some evidence that quality of care improved; and the district system proved its efficiency.

One can only speculate about the conditions that made such a surprising – but by no means unique – success possible: (i) the structure of the district and the complementarity between health centres and hospital, (ii) the experience of self-reliance and *de facto* decentralization which made possible the rise of collegial decision-making process, (iii) the long-term build-up of a human resource

capital over the last 10 years of district policy, as well as (iv) a limited but constant support that provided a minimum of resources for health centres and hospital, and, perhaps as importantly, gave the district team the opportunity to maintain contact with the outside world. Those involved definitely had the impression that this helped the team cope with the considerable challenges they faced.

Three lessons can be learnt from this experience. First, in the long run, districts appear to be viable systems that prove very robust even under extreme conditions. Second, maintaining a life-line such as minimal financial support and supervision to such districts can yield very significant results, without the need to substitute expatriates for nationals. The cliché of ubiquitous de-motivation of African health personnel clearly was not seen here. Third, this experience shows the considerable potential of local health services in making efficient contributions to coping with emergency crises.

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References

- Burkholder BT & Toole MJ (1995) Evolution of complex disasters. *Lancet* **346**, 1012–1015.
- Danforth D (1985) Caesarean section. *Journal of the American Medical Association* **253**, 811–818.
- De Brouwere V, Laabid A & Van Lerberghe W (1996) Quels besoins en interventions obstétricales? Une approche fondée sur l'analyse spatiale des déficits. *Revue d'Epidémiologie et de Santé Publique* **44**, 111–124.
- De Muylder X (1993) Caesarean sections in developing countries: some considerations. *Health Policy and Planning* **8**, 101–112.
- Family Health International (1988) Pregnancy care monitoring: Karawa Health Zone, Zaire. Final Report.
- Goma Epidemiology Group (1995) Public health impact of Rwandan refugee crisis: what happened in Goma, Zaire, in July, 1994? *Lancet* **345**, 339–344.
- Haelterman E, Boelaert M, Suetens C, Blok L, Henkens M & Toole MJ (1996) Impact of a mass vaccination campaign against a meningitis epidemic in a refugee camp. *Tropical Medicine and International Health* **1**, 385–392.
- Longombe A, Wood P & Dix R (1990) Caesarean section – indications and risks in rural Zaire. *International Journal of Gynecology and Obstetrics* **33**, 199–202.
- Milleliri JM, Soares JL, Signoret J *et al.* (1995) Epidémie de dysenterie bacillaire dans les camps de réfugiés rwandais de la région de Goma (Zaire, Nord-Kivu) en août 1994. *Annales de la*

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- Société belge de Médecine Tropicale* **75**, 201–210.
- Notzon FC (1990) International differences in the use of obstetric interventions. *Journal of the American Medical Association* **263**, 3286–3291.
- Paquet C & Van Soest M (1994) Mortality and malnutrition among Rwandan refugees in Zaire. *Lancet* **344**, 823–824.
- Porignon D, Tonglet R, Mugisho E, Elongo T, Noterman J-P & Hennart P (1995) The role of the Zairian health services in the Rwandan refugee crisis. *Disasters* **19**, 356–360.
- van Roosmalen J (1990) Safe motherhood: Caesarean section or symphysiotomy? *American Journal of Obstetrics and Gynecology* **163**, 1–4.
- Siddique AK, Salam A, Islam MS *et al.* (1995) Why treatment centres failed to prevent cholera deaths among Rwandan refugees in Goma, Zaire? *Lancet* **345**, 359–361.
- Toole MJ (1997) Complex emergencies: refugees and other populations: In *The public health consequences of disasters* (ed. EJ Noli), Oxford University Press, Oxford, pp. 419–442.
- UNICEF (1996) *Enquête nationale sur la situation des enfants et des femmes au Zaïre en 1995*. UNICEF, Kinshasa.
- Van Damme W (1995) Do refugees belong in camps? Experiences from Goma and Guinea. *Lancet* **346**, 360–362.
- Van Den Broek N, Van Lerberghe W & Pangu K (1989) Caesarean sections for maternal indications in Kasongo (Zaire). *International Journal of Gynecology and Obstetrics* **28**, 337–342.
- Van Lerberghe W & Pangu K (1988) Comprehensive care can be effective: the influence of coverage with a health center network on the hospitalisation patterns in the rural area of Kasongo, Zaire. *Social Science and Medicine* **26**, 949–955.
- Van Lerberghe W, Pangu K & Van Den Broek N (1988) Obstetrical interventions and health center coverage: a spatial analysis of routine data for evaluation. *Health Policy and Planning* **3**, 308–314.
- Walsh J & Warren K (1979) Selective primary health care. An interim strategy for disease control in developing countries. *New England Journal of Medicine* **301**, 967–974.
- WHO (1988) *The challenge of implementation: district health systems for primary health care* (WHO/SHS/DHS/88.1/Rev.1). WHO, Geneva.
- WHO (1995) *World Health Report 1995*. WHO, Geneva.
- World Bank (1993) *World Development Report 1993. Investing in Health*. Oxford University Press, Oxford.
- World Bank (1994) *Better health in Africa*. World Bank, Washington, D.C.