



## Medical Relief Operation in Rural Northern Ethiopia: Addressing an Ongoing Disaster

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### Abstract

**Background:** Following the recent drought in Ethiopia, the Jewish Agency, aided by the Israel Ministry of Foreign Affairs, launched a medical relief mission to a rural district in Ethiopia in May-August 2000.

**Objectives:** To present the current medical needs and deficiencies in this representative region of Central Africa, to describe the mission's mode of operation, and to propose alternative operative modes.

**Methods:** We critically evaluate the current local needs and existing medical system, retrospectively analyze the mission's work and the patients' characteristics, and summarize a panel discussion of all participants and organizers regarding potential alternative operative modes.

**Results:** An ongoing medical disaster exists in Ethiopia, resulting from the burden of morbidity, an inadequate health budget, and insufficient medical personnel, facilities and supplies. The mission operated a mobile outreach clinic for 3 months, providing primary care to 2,500 patients at an estimated cost of \$48 per patient. Frequent clinical diagnoses included gastrointestinal and respiratory tract infections, skin and ocular diseases (particularly trachoma), sexually transmitted diseases, AIDS, tuberculosis, intestinal parasitosis, malnutrition and malaria.

**Conclusions:** This type of operation is feasible but its overall impact is marginal and temporary. Potential alternative models of providing medical support under such circumstances are outlined.

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populations, dry land and dying cattle. Various governments and non-governmental organizations are currently involved in efforts to alleviate the crisis; these include distribution of food supplies, reconstruction of infrastructure (roads, transport systems, water supply), providing guidance to upgrade agriculture and land handling (terracing, reforestation, irrigation systems), and addressing the increasing health needs due mainly to famine and to the evolving outbreak of human immunodeficiency virus and tuberculosis [1,2]. The Jewish Agency, a Zionist non-governmental organization, aided by the Israel Ministry of Foreign Affairs and its embassy in Addis Ababa, initiated a medical relief operation in Ethiopia – called "Mission Abie" (in honor of the Israeli humanitarian, Mr. Abie Nathan). As requested by the Ethiopian health authorities, the mission provided primary healthcare in the rural north Wollo administrative zone.

The ongoing health crisis in this region is outlined in this report. We present and discuss the chosen mode of operation of the medical relief mission and its outcome and propose alternative types of health support projects for comparable situations.

### The ongoing regional medical crisis

The primary care medical system in northern Wollo, a typical rural region of central Africa, is based on health centers that each serve approximately 120,000–220,000 people. Most of these medical centers function without physicians and are run by a few well-trained nurses/physician assistants, a laboratory technician and additional health assistance personnel. Their tasks include immunization, health education, follow-up and supervision of treated patients with tuberculosis, and current running of the clinic and infirmary. Some of these tasks are conducted through outreach missions, either as small satellite clinics (health units) or as major operations, e.g., immunization programs, and epidemic evaluation and management.

The medical back-up of the districts' health centers consists

Repeated droughts and war have had disastrous consequences for extended populations in East Africa over the last few years. The media worldwide have initiated campaigns for humanitarian support by distributing images of starving migrating

of a few small (50 bed) hospitals, each serving a population of about 2,500,000. These hospitals, which are poorly supplied, basically include a medical, pediatric and surgical/orthopedic/gynecology ward and are run by a small team of physicians. They are located in regional towns at a distance of 1–4 hours drive from the surrounding health centers.

The local people, who have a very low economic status and live in small huts with no electricity or running water, densely and evenly populate the region. They survive on agricultural produce and cattle. Hygiene is poor and mortality is high, the average life expectancy being about 45 years. The major traditional morbidity comprises diarrheal diseases, malaria, pneumonia, intestinal parasitosis, trachoma and malnutrition (especially among children) [1,3–5], as well as sexually transmitted diseases [6,7]. Over the last decade, HIV infection and related disorders, including TB, have become the main cause for outbreaks [6–9] that threaten to wipe out a substantial part of the population [1]. Many of these patients are left by their spouses to die on their own. Owing to the distribution of food supplies by the international community as well as to rainfalls occurring at the appropriate time, severe starvation at present is probably low, with the exception of babies and lone sick patients. Nevertheless, with the absence of water reservoirs and irrigation systems, the next drought-induced famine is probably only a matter of time.

The local health problem originates from the burden of disease and the insufficient number of health providers, clinics and medical supplies. Moreover, many chronically and severely ill patients do not have access to the medical system due to the distance of the closest health center and they often have to travel some 30 miles to seek medical advice. In addition, most patients cannot afford the small payment required for the clinic visit, not least the extra costs for laboratory examination and medications. Finally, the bureaucracy required to obtain free medical service is cumbersome and complex. Thus, with the exception of programmed health services (such as immunizations and treatment supervision of patients with TB), very few patients (about 10 to 20) arrive daily at the health centers, most of them from the neighboring areas. Also, due to the lack of efficient transportation, referrals from these health centers to the regional hospital are impractical in most cases. In fact, such hospitals function mainly as extended primary care clinics for the relatively denser population in the areas in which they are located.

The medical staff and laboratory technicians in most medical centers are poorly qualified or unequipped to diagnose active TB [10]. Patients are thus referred to the regional hospital for confirmation of the diagnosis (by acid-fast stain and/or radiographic studies) in order to be included in the TB program [9]. Unfortunately however, they often do not get there because they cannot afford transportation, and those that ultimately arrive may not be properly evaluated for various reasons (lack of X-ray

films, no electricity, unavailable acid-fast reagents, etc.). Diagnosis and treatment of uncommon and complicated conditions, such as malignancies or eye surgery, are in effect unavailable to the majority of the population.

“Private medicine” delivered by physicians, unauthorized pharmacists and folk medicine providers flourishes under these circumstances and substitutes the failing system. Consequently, the inadequate and inappropriate use of antibiotics is overwhelming. The income of health personnel is low according to western standards, and this, together with frustration, motivates health personnel to seek their way out of the rural regions. The few non-private physicians allocated to this area work on a compulsory basis: after graduation from medical school they are obligated to serve four years in a rural region, the first year in a primary care clinic (health center), and later within a regional hospital, before they are allowed to specialize in a large hospital.

### “Mission Abie”

Mission Abie was executed by four consecutive medical teams, each drafted for a period of 3 weeks. Each team consisted of two physicians (preferably a pediatrician and an internist familiar with tropical infectious diseases, primary care or disaster medicine) and two to three nurses (preferably Israelis of Ethiopian origin who could translate the local dialect and thus enable direct contact with patients). The team was based in the regional town of Waldia and operated a mobile primary care clinic, a hired four-wheel station wagon loaded with medical supplies that rotated between three health centers. Traveling time to the health centers varied from 1 to 3 1/2 hours along dirt roads. In the health center the teams operated two clinics, each manned by a physician and a nurse and supplemented by local staff who participated in screening and triage, obtaining medical histories and documentation, and directing patients to other facilities and follow-up treatment. A third nurse, if available, prepared and dispensed medications and took care of patients kept in the infirmary. Medical supplies, brought from Israel or bought in Ethiopia, were stored in an improvised pharmacy in the hotel in Waldia. The drugs and supplies were arranged in transportable improvised containers (“daily rations”) for distribution to patients at no cost. The laboratory at the health center performed blood smears for malaria and stool evaluation for parasites. Most patients were treated on an ambulatory basis, and a few critically ill patients were kept in the infirmary within the health center for continued treatment and close monitoring by the local staff. Very few patients were referred to the regional hospital in Waldia, which also served as the referral center for the confirmation of active TB infection, and for patients’ registration and initiation of treatment.

### Outcome

The arrival of a foreign medical team with free medical supplies led to an overflow of the clinics by hundreds of people, some with acute illness and some with chronic unattended severe

HIV = human immunodeficiency virus

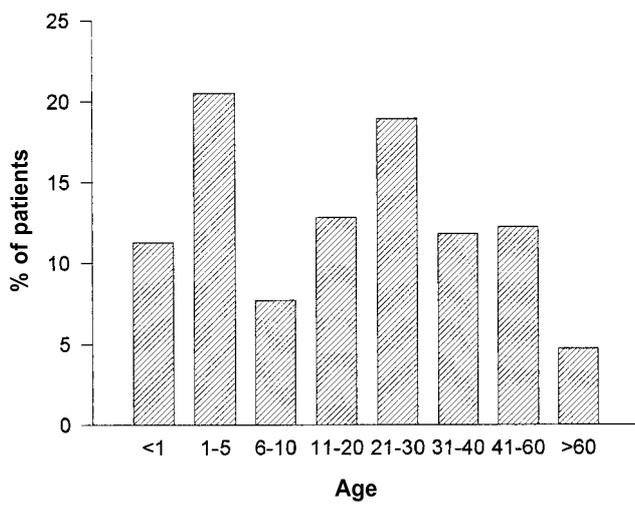
TB = tuberculosis

**Table 1.** Morbidity among patients

Diagnoses	% of patients
Gastrointestinal disorders	22.3
Skin diseases	14.5
Respiratory diseases (other than TB)	14.3
Eye disorders (predominantly trachoma)	11.7
Ear, nose and throat diseases	9.3
Symptomatic intestinal parasites	8.6
Genitourinary disorders (including STDs affecting genitalia)	7.6
Musculoskeletal disorders	6.7
Malaria (predominantly <i>P. vivax</i> )	5
TB	4.1
Malnutrition (moderate to severe)	3.3
Neurologic disorders	2.5
Viral infections	1.9
Hematology (predominantly anemia)	1.6
Trauma/Surgery	1.3
Cardiovascular	0.8
Congenital disorders	0.5
Meningitis	0.3
Kidney diseases	0.3
Metabolic disorders (mostly diabetes)	0.3
Miscellaneous	11.1

medical conditions. Others were just seeking assurance and free medical supplies. Initially most people came from the local areas but, with momentum and the establishment of a routine, patients arrived from remote areas as well. None of these patients was provided with a referral letter from the nearby clinic/health post.

Altogether, about 2,500 patients were attended to by the Israeli medical teams. Data of 2,150 patients were available for evaluation and summarized in the mission's computerized logbook. The gender distribution was even. As shown in Figure 1, some 40% of patients were under the age of 10, and 11% were less than one year old. The most common clinical diagnoses (> 10% of patients) were diarrheal diseases, respiratory tract infections, skin and ocular disorders, particularly

**Figure 1.** Age distribution among patients

trachoma [Table 1], followed (in 5–10% of patients) by symptomatic intestinal parasites, disorders of the genitourinary and otolaryngeal systems, musculoskeletal complaints and malaria (predominantly *Plasmodium vivax*, with some cases of *P. falciparum* as well). Many of the patients classified as “miscellaneous” presented with chronic progressive cachexia, often associated with fever, night sweats, non-responding diarrhea, oral thrush or treated/clinically active TB (chronic productive cough, often hemoptysis, and draining fistulae). It is conceivable that the majority of these patients might have AIDS, considering the high prevalence of HIV carriers [1,6–8].

Two children with far-advanced, untreated meningitis died while being treated by our teams. Several other critically ill patients survived (including six additional patients with meningitis, a few patients with life-threatening Ludwig's angina, some patients with overwhelming pneumonia and over 15 severely dehydrated babies). Fortunately they arrived at the health center during the visit of the medical team, and some of them were already receiving appropriate medical treatment initiated by the local health personnel prior to the arrival of the mission.

Five percent of the patients were referred to the regional hospital in Waldia, most of them for the confirmation of active TB while a few others were mostly trauma cases or patients who required surgical procedures.

The estimated overall cost of the mission was \$120,000, about \$48 per patient examined or treated, including medical supplies, travel expenses and accommodation of the medical team.

## Comments and Discussion

### The medical history

Obtaining the medical history from the local population was found to be difficult and time-consuming. As outlined by Hodes [11] who has worked for 15 years with the Joint Distribution Committee mission (a non-governmental American Jewish organization) in Ethiopia, and Israeli physicians attending to Ethiopian immigrants [12], patients' histories are often obscured by folkloristic beliefs and indirect hints. People lack the appropriate perspective of time or exaggerate the presumed duration and extent of symptoms in order to receive more attention. Some patients may also present with confusing and bizarre behavioral culture-bound syndromes (termed *Zar*) [13]. While Hodes' written guidance [11] was immeasurably helpful to the Israeli nurses of Ethiopian origin, they had difficulty in obtaining medical histories and were substantially assisted by the local health personnel who are familiar with the local dialects and folkloristic beliefs. Experience gained throughout the mission further improved their capabilities and hastened the obtaining of medical histories.

### Clinic routines

After providing their medical histories the patients were thoroughly examined by the physician wearing latex gloves and TB masks as required, followed by routine hand washing

with the use of antiseptic solution. Medical documentation was performed using local files. Blood smears for malaria and stool evaluation for parasites were done in the laboratory when required. Patients were given medications for the entire treatment course, and when indicated were invited for a follow-up visit. Very sick patients requiring intravenous fluids and medications remained in the infirmary and were handed over to the local team towards evening with medical instructions and medications.

Treatment protocols were decided upon and modified according to the availability of medications, experience gained and feedback from the local medical staff. Local clinical practice often illuminated different points of view unfamiliar to the Israeli health provider. For example, in regions heavily infested with *Plasmodium vivax*-carrying mosquitos, the elimination of the extra-erythrocytic phases of the parasite following chloroquine by a 2 week primaquine course seems to be useless. Similarly, in poverty-stricken societies the substitution of breast milk by a provided formula for malnourished babies [14] may be hazardous if the continued supply of formula is uncertain once the mission is over.

### **Cooperation with local health personnel**

The local health providers were well trained in the diagnosis and management of common problems and were often consulted. They were frequently highly motivated and cooperative, though frustrated. Work was facilitated by triage, performed by the local staff (not always according to accepted medical standards...). The inclusion of a local health provider in each medical team facilitated the obtaining of medical histories and documentation in local files, and enabled an appropriate follow-up and continuing treatment of chronic or acute medical conditions. Working together with the local staff contributed to the Israeli team's understanding of the local system and therapeutic policies and at the same time provided the opportunity for the Israeli team to teach appropriate standards for diagnosis and patient management. There was excellent feedback from the local health providers regarding this ongoing medical instruction. Most importantly, working together underlined our role in assisting rather than substituting for the local staff.

### **Evaluation and suggested alternatives**

In the past, most Israeli medical relief operations were organized for relatively short-lived disasters and consisted of airborne field hospitals operating for a limited period [15]. The present project was aimed at addressing an ongoing critical insufficiency of medical services at the primary care level. The health of many of the treated patients was positively affected by the mission and more than a few lives were saved. Nevertheless, in view of the fact that this widespread ongoing disaster has a severe continuous negative effect on the health of this African population, the project seems to have a very limited impact and that once discontinued would hardly leave a mark. Adding the issue of cost-effectiveness (estimated cost of \$48 per examined

patient) raises the question whether this is the best operative mode for medical relief in similar settings.

The local health system is weak in every aspect: the burden of morbidity, the inadequate health budget, and the insufficient personnel, medical facilities and supplies. Since all levels of the health services are severely deficient, any mode of operation would be able to address only a few links in the health service chain. Outlined below are some suggested projects that may have a continuous positive impact in the long term.

#### ● *Non-medical projects*

The contribution of non-medical projects to improve the health status cannot be overemphasized; for example, the development of water resources and irrigation systems and the introduction of modern agricultural technologies will have a lasting impact on the economy and health of the population. Notwithstanding, all such projects should be first tested in small-scale pilot trials as unexpected adverse effects may evolve. Typical examples include the surge in malaria, schistosomiasis and intestinal parasites in the vicinity of dams [3,16] and irrigated lands [17]; the emergence of lathyrism resulting from urbanization of a population and from land diversification schemes; and the outburst of iron deficiency and growth retardation among children due to the substitution of iron by aluminum cooking pots [18]. The construction of secured drinking-water resources is mandatory. Food/seed supplies will further be needed, necessitating the improvement of distribution systems and road and railroad infrastructure.

#### ● *Health education projects*

We were surprised by the total ignorance among patients in this rural region regarding the prevention of sexually transmitted diseases, including HIV [19]. We observed that numerous youngsters repeatedly obtain such infections following unprotected sex with the same partners, including prostitutes. Some presenting with gonorrhea or penile lesions believed that numerous sex partners would weaken the disease. Health educational projects with the distribution of appropriate pamphlets and free condoms are clearly a cost-effective means. Other educational activities can be aimed at establishing safe drinking-water supplies, improving baby feeding [14,20], providing home treatment for children with malaria [21], establishing 'TB clubs' [9], and controlling the adverse impact of folkloric medicine [11] and the inappropriate use of medications.

#### ● *Education of health providers*

We were impressed by the knowledge and pragmatic approach of the trained health personnel at the health centers. Nonetheless, particularly in primary care centers lacking physicians, further medical education is critically needed. As previously noted [22], the evaluation and management of patients, especially children, by local health providers seemed to be improved by our instruction, including the adherence to standard clinical routines. Training of medical personnel in pediatrics [22], dermatology and other disciplines [23] *at their site of action* is highly recommended, as is the training of primary

care physicians in basic surgical procedures. Much can be done in directing quality control projects and upgrading medical services such as the laboratory [10], patient management [24] and immunization programs [25].

- *Physicians in health centers*

In addition to the above objective of training, there is a desperate need for trained personnel, especially physicians since most health centers function without them. A relatively simple and inexpensive project could be the allocation of volunteer physicians to health centers, without the accompanying logistics, following a short course in the management of tropical diseases. Working together with local nurses who serve as interpreters will improve communication. Local accommodations may not be optimal but are reasonable for young enthusiastic volunteers. A group of such physicians can be sent together and distributed among the health centers, to be taken care of by the health center manager and meeting over weekends in the regional hospital for relief, discussions and instruction. Though this suggested project is based on qualified manpower that is dependent on medications and facilities available in the clinic only, they should be supplied with the means to buy local medications, essential instruments and selected medical supplies that do not exist in the health centers. Such a mission may require a reliable mode of two-way communication between the assigned physicians and the support of a physician based in the regional hospital. This may also enable better utilization of the hierarchic chain of medical facilities (see below), and improve the inter-relationships between the regional hospital and health centers. Israeli medical professional organizations may recognize such a period of activity as a specialization course in internal or family medicine, clinical microbiology, or even internship. In addition to their current work, these physicians may participate in the projects of medical education as outlined above.

- *Creating a model clinic (health center)*

This long-lasting commitment requires either adapting an existing clinic or establishing a new one. Such a project may include constructing and maintaining the infrastructure, hiring and training local staff, providing medical supplies, and establishing professional work standards. Incorporating health workers from Israel and the Diaspora within the framework of local employees seems to be feasible, such as laboratory technicians and nurses, and students in Nursing or Health Management (BA/MA courses) from academic institutes in Israel, in addition to physicians. Institutes may consider including such an experience in their requirements for qualification.

- *Supporting a regional hospital*

The core of the first echelon level of primary care medicine in the rural region is the health center. This was the rationale for our mission and our belief that most efforts should be directed to their improvement. However, the regional hospitals that are meant to back up the health centers are severely handicapped

in terms of professional manpower, medical equipment and supplies. Their upgrading may be an objective for large medical institutes abroad. One possibility would be to send personnel on a rotation basis for routine work or in teaching projects. Physicians from specialties unavailable in the rural region may serve in a regional hospital for a limited period in their specialty, such as eye, plastic or reconstructive orthopedic surgery. Additional support could be the donation of medical supplies and equipment.

- *Providing a transport system for the sick*

A major obstacle in the management of patients in rural areas is the lack of affordable public transportation. While little can be done to ensure that patients referred from the health centers will go to the hospital, many are precluded due to the long distances, the lack of transportation and the expense involved. During our mission some critical patients were transported to Waldia Hospital by our rented vehicle while we were engaged working in the clinic, and additional patients in need were given money for transportation.

A vehicle moving between the clinics and the regional hospital is urgently needed for both acute and ambulatory patients. An example of unmet ambulatory needs is the failure to fully implement the anti-TB program since many patients cannot reach the regional hospital for confirmation of the diagnosis. With an organized transport system working in concert with these two levels of medical facilities, these patients will be able to enroll in TB programs or attend other planned projects, such as an eye clinic or reconstructive orthopedic surgery in the regional hospital.

## Conclusion

We have outlined the current medical needs and deficiencies in the district of Northern Wollo, a representative rural region of central Africa, and briefly described the mission's mode of operation and patients' characteristics. Finally, we proposed possible models of providing medical support by willing governments or non-governmental organizations.

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## References

1. Voelker R. An ancient nation braces to fight AIDS. *JAMA* 2000;283:593-5.
2. Yohannes KA. Child undernutrition in war-torn society: the Ethiopian experience. *J Biosoc Sci* 1999;31:403-18.

3. Alemayehu T, Ye-ebiyo Y, Ghebreyesus TA, Witten KH, Bosman A, Teklehaimanot A. Malaria, schistosomiasis and intestinal helminths in relation to microdams in Tigray, northern Ethiopia. *Parasitologia* 1998;40:259–67.
4. Haidar J, Demissie T. Malnutrition and xerophthalmia in rural communities of Ethiopia. *East Afr Med J* 1999;76:590–3.
5. Fontanet AL, Sahlu T, Rinke-de-Wit T, Masho W, Woldemichael T, Yeneneh H, Coutinho RA. Epidemiology of infections with intestinal parasites and human immunodeficiency virus (HIV) among sugar-estate residents in Ethiopia. *Ann Trop Med Parasitol* 2000;94:269–78.
6. Assefa A, Ishak A, Stevens R, Fergussen E, Giles M, Yohannes G, Kidan KG. Prevalence of HIV, syphilis and genital chlamydial infection among women in north-west Ethiopia. *Epidemiol Infect* 1998;120:171–7.
7. Rahlenbeck SI, Yohannes G, Molla K, Reifen R, Assefa A. Infection with HIV, syphilis and hepatitis B in Ethiopia: a survey in blood donors. *Int J STD AIDS* 1997;8:261–4.
8. Mitike G, Kebede D, Yeneneh H. HIV infection and antituberculosis drug resistance among pulmonary tuberculosis patients in Harar Tuberculosis Center, Ethiopia. *East Afr Med J* 1997;74:154–7.
9. Getahun H, Maher D. Contribution of 'TB clubs' to tuberculosis control in a rural district in Ethiopia. *Int J Tuberc Lung Dis* 2000;4:174–8.
10. Kassu A, Aseffa A. Laboratory services in health centers within Amhara region, north Ethiopia. *East Afr Med J* 1999;76:239–42.
11. Hodes R. Cross-cultural medicine and diverse health beliefs. Ethiopians abroad. *West J Med* 1997;166:29–36.
12. Reiff M, Zakut H, Weingarten MA. Illness and treatment perceptions of Ethiopian immigrants and their doctors in Israel. *Am J Public Health* 1999;89:1814–18.
13. Grisaru N, Budowski D, Witzum E. Possession of 'Zar' among Ethiopian immigrants to Israel: psychopathology or culture-bound syndrome? *Psychopathology* 1997;30:223–33.
14. Tesemma T, Haifu A. Childhood feeding practice in north Ethiopia. *East Afr Med J* 1997;74:92–5.
15. Heyman SN, Eldad A, Wiener M. Airborne field hospital in disaster area: lessons from Armenia (1988) and Rwanda (1994). *Prehosp Disaster Med* 1998;13:21–8.
16. Ghebreyesus TA, Haile M, Witten KH, Getachew A, Yohannes M, Teklehaimanot HD, Lindsay SW, Byass P. Incidence of malaria among children living near dams in northern Ethiopia: community based incidence survey. *Br Med J* 1999;319:663–6.
17. Ghebreyesus TA, Haile M, Witten KH, Getachew A, Yohannes M, Lindsay SW, Byass P. Household risk factors for malaria among children in the Ethiopian highlands. *Trans R Soc Trop Med Hyg* 2000;94:17–21.
18. Adish AA, Esrey SA, Gyorkos TW, Jean-Baptiste J, Rojhani A. Effect of consumption of food cooked in iron pots on status and growth of young children: a randomised trial. *Lancet* 1999;353:712–16.
19. Sahlu T, Kassa E, Agonafer T, Tsegaye A, Rinke-de-Wit T, Gebremariam H, Doorly R, Spijkerman I, Yeneneh H, Coutinho RA, Fontanet AL. Sexual behaviours, perception of risk of HIV infection, and factors associated with attending HIV post-test counselling in Ethiopia. *AIDS* 1999;13:1263–72.
20. Bekele A, Berhane Y. Magnitude and determinants of bottle feeding in rural communities. *East Afr Med J* 1999;76:516–19.
21. Kidane G, Morrow RH. Teaching mothers to provide home treatment of malaria in Tigray, Ethiopia: a randomised trial. *Lancet* 2000;356:550–5.
22. Simoes EA, Desta T, Tessema T, Gerbresellassie T, Dagnew M, Gove S. Performance of health workers after training in integrated management of childhood illness in Gondar, Ethiopia. *Bull WHO* 1997;75(Suppl 1):43–53.
23. Parry E, Parry V. Training for health care in developing countries: the work of the Tropical Health and Education Trust. *Med Educ* 1998;32:630–5.
24. Desta Z, Abula T, Beyene L, Fantahun M, Yohannes AG, Ayalew S. Assessment of rational drug use and prescribing in primary health care facilities in north west Ethiopia. *East Afr Med J* 1997;74:758–63.
25. Gedlu E, Tesemma T. Immunization coverage and identification of problems associated with vaccination delivery in Gondar, north west Ethiopia. *East Afr Med J* 1997;74:239–41.

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