Lymphatic filariasis is widely distributed in tropical and subtropical areas of the world, where it results in considerable suffering and debilitating clinical disease (Onapa et al, 2001). Estimates indicate that more than 50 million people in Sub-Saharan Africa are affected (Onapa et al, 2001). In rural areas of Eastern Africa the disease is mainly due to the parasitic nematode *Wuchereria bancrofti*, transmitted by the Anopheles mosquito vector. Cultivation of land puts people in close contact with the vector and leads to a higher risk of contracting lymphatic filariasis (LF). The population may be exposed to the risk of infection and morbidity caused by LF while working around swampy areas. The commonly known physiological symptoms of LF are: elephantiasis (lymphoedema), scrotal swelling (hydrocele), breast swelling and hand swelling, but there are also reports of less obvious symptoms such as kidney damage and defects in immune responsiveness (World Health Organization [WHO], 1997). In resource-poor communities where treatment is not accessible, these complications can lead to loss of employment and stigmatisation. Patients with chronic filariasis have been found to spend 10–60% less time working (WHO, 1997), resulting in a high frequency of poverty among the patients and their families.

In Rwanda, where infection of LF was considered high by the WHO and the Global Alliance to Eliminate Lymphatic Filariasis (GAELF), there was no reliable data on distribution and prevalence of LF. In Rwanda, where infection of LF was considered high by the WHO and the Global Alliance to Eliminate Lymphatic Filariasis (GAELF), there was no reliable data on distribution and prevalence of LF. According to the health information system of the Rwandan Ministry of Health, a few LF cases were reported.
from the former Cyangugu, Kibuye, Gisenyi and Ruhengeri provinces in 1987 and 1988, although most of the cases were from the former Cyangugu province with 59 cases (Ministère de la Santé et des Affaires Sociales, 1987, 1988). Interviews carried out by personnel from the neglected tropical diseases (NTD) control program (www.theaccessproject.com/index.php/about/ntd) during their field work in districts to gather information on LF, found that health workers indicated that chronic lower leg lymphoedema (elephantiasis) was the key sign for diagnosis.

The objective of this study was to obtain data on the geographical distribution of LF in Rwanda as a prerequisite to initiating national disease elimination activities. The results presented are from a community-based mapping survey on LF, which, in the authors’ opinion, was the first of its kind conducted in Rwanda.

Materials and methods

Population
It is widely agreed that LF transmission occurs only at altitudes below 1200m (Onapa, 2008). To provide a modicum of range, the study population was selected in any areas of Rwanda located below 1500m. This led the cross-sectional survey to be conducted in 13 villages distributed in five administrative districts. The surveyed districts were Bugesera, Rwamagana, Kayonza and Nyagatare (in the eastern province where the altitude is generally below 1500m), and Rusizi (one village in the Rusizi plain where the altitude is generally 900m).

The study population was any resident adult, defined as being over 15 years old and having lived in his/her village for more than 10 years, without ever being absent for more than six months during this period. The study was carried out in January and May 2008.

Selection of participants
After explaining the purpose of the study to the village leaders and obtaining their permission, all resident adults of the village (over 15 years old) were asked to gather at a central point. The study was then explained in Kinyarwanda, and those willing to participate were asked to form two lines, one with males and another with females. Twenty-five individuals were randomly selected from each line using systematic sampling, resulting in an overall sample of 25 males and 25 females. In some villages, 100 individuals (50 males and 50 females) were randomly chosen via the same method. Data was recorded on the data sheets as soon as the participants were selected.

Diagnosis of W. bancrofti infection
Informed consent was obtained from the individuals or their parents and the test was performed by trained laboratory technicians, according to the manufacturer’s instructions.

The patient’s left index finger was cleaned with 70% isopropanol and punctured using a sterile lancet. The initial sample of blood was removed using a cotton swab, and sufficient fresh blood was then obtained to fill a 100-µl capillary tube (Figure 1). The blood was transferred from the capillary tube to the pad on an immuno-chromatographic test (ICT) card and the card was sealed (Figure 2). ICT™ filariasis cards allow for the detection of circulating W. bancrofti antigen (ICT Diagnostics, Balgowlah, New South Wales, Australia, product number FLO.1; patent now sold and produced as NOW®, ICT filariasis kits; Binax, Portland, ME) (Weil et al, 1997). The result of each ICT card was read after 15 minutes. A positive result was when two pink lines appeared on the card’s window, and a negative result was when a single line was seen. Test results with the individual’s ID number were recorded both on the card, and on each individual’s data sheet. A nocturnal thick blood smear was required as a confirmation test when the ICT card was twice positive for any individual.

Statistical analysis
Data were entered and analysed in Epi-Info 3.2.2 (Centers for Disease Control and Prevention, Atlanta, GA) and Stata/MP 10.0 programmes.

Ethics
The survey received ethical clearance from the National Ethics Committee.
and the Institutional Review Board of Columbia University, USA. Individual informed consent was obtained from each participant or (if they were aged <21) from one of their parents or guardian. The confirmed *W. bancrofti* infection was treated by co-administration of one tablet of albendazole 400mg and the required dose of ivermectin, as indicated by a dose-pole.

**RESULTS**

**Demographic data**

Seven hundred ninety-seven individuals (400 males: 50.2% and 397 females: 49.8%), aged from 15 to 97 years (median age 37; mean: 39.5; SD 15.8) were included in the study (Table 1).

Using ICT cards to detect circulating *W. bancrofti* antigen, only one individual was found positive, indicating a very low prevalence of LF in the surveyed population of 0.1% and 2% (1/50) in the village (Table 2).

**Discussion**

In Rwanda, there was no mass drug administration (MDA) by diethylcarbamazine (DEC) and ivermectin for lymphatic filariasis, nor were there any control programmes before the initiation of the NTD control programme in 2007.

The present survey shows that infection with *W. bancrofti* in Rwanda is unlikely to be endemic, contrary to previous information on the disease.

The survey on lymphatic filariasis presented in this report is part of several surveys on neglected tropical diseases (NTDs), which include soil-transmitted helminths, schistosomiasis and trachoma. Results on the other parasites will be reported elsewhere.

**The present survey shows that infection with *W. bancrofti* in Rwanda is unlikely to be endemic, contrary to previous information on the disease.**

Lymphatic filariasis is one of the forms of elephantiasis. Indeed, several non-filarial forms do exist, which lead to similar clinical manifestations. Because the previously reported LF cases in Rwanda were defined by clinical assessment, the authors hypothesise that these cases were wrongly diagnosed and were, in fact, non-filarial. The distribution of non-filarial elephantiasis of the lower legs in Rwanda was studied elsewhere (Price, 1976).

To the authors’ knowledge, this community-based mapping survey on LF using ICT cards was the first in Rwanda. It has been shown that the results of ICT filariasis cards better reflect the real situation of the frequency of *W. bancrofti* infection than detection by microscopy (Freedman et al, 1997; Weil et al, 1997). From the only one case of lymphatic filariasis detected, the authors concluded that this disease does not have public health significance in Rwanda.
### Acknowledgements

We would like to thank the following: the Rwanda Ministry of Health for its continuing help and support; the WHO Country Office in Kigali for their help obtaining ICT cards — we are particularly grateful to Dr Christina Lulu Makene from the Tanzania LF Program for training offered to our survey team and Dr Likezo Mubila from WHO/Afro for her technical advice; the National Reference Laboratory for its participation in the supervision of mapping activities; and all the villagers for their cooperation. The NTD Control Program in Rwanda is an initiative of The Earth Institute at Columbia University in collaboration with the Rwanda Ministry of Health, with financial support from Geneva Global, the Global Network for Neglected Tropical Diseases, Legatum, and the Sabin Vaccine Institute.

### References


