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Editorial

The burden of visceral leishmaniasis in South Asia

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This supplement presents a collection of studies that were undertaken in India and Nepal on the burden of visceral leishmaniasis (VL), investigating issues related to the epidemiology and economic impact of the disease.

Since 2005, the governments of India, Nepal and Bangladesh are engaged in a collaborative effort to control and eliminate visceral leishmaniasis from the Indian subcontinent. With 60% of the global VL burden in South Asia, this disease remains an important public health problem in the region. VL not only leads to tremendous human suffering since untreated cases result in death, but also has a profound impact on the livelihood of affected households (Boelaert *et al.* 2009). Renewed interest given to VL over the past decade resulted in important innovations in diagnosis and treatment. However, many aspects of the VL burden of disease are still not clear. One of the major challenges for the elimination initiative is the absence of reliable epidemiological surveillance data on VL morbidity and mortality in the region. Without these data it is difficult to assess whether the initiative is achieving its stated goal – the reduction of the annual incidence of VL to <1/10 000 population at the district level in Nepal, and the sub-district and upazila level in India and Bangladesh respectively (World Health Organization 2005) – or whether the various control interventions have their intended effect.

The current officially reported figures are obtained through passive case detection in government health services and usually do not include cases detected by the private for-profit sector, which constitutes a majority of the health providers in the Indian subcontinent. These figures therefore largely underestimate the actual number of cases. For example Singh *et al.* (2006) documented underreporting by a factor of eight in a community development block in Muzaffarpur district in Bihar, India in 2001–2003 and more recently (Singh *et al.* 2010c) estimated underreporting by a factor of four in Vaishali district, also in Bihar. This 'decrease' in underreporting is attributed by some to the effect of the VL elimination initiative and the recent contribution of several not-for-profit NGOs operating in the area with specific VL care programs.

Population-based surveys such as those described above provide us with valuable information on local incidence rates, and repeating these surveys over time might allow us to not only monitor progress of the VL elimination initiative, but also to assess the effectiveness of VL control strategies. This supplement includes several population-based surveys that can shed further light on the true frequency of infection and disease in the region. VL incidence rates (and underreporting) vary greatly between countries (Mondal *et al.* 2009) as well as between districts and within districts as shown by Das *et al.* (2010) in this supplement. Moreover, VL cases tend to cluster within certain sections of the village at hamlet level and further at household level (Ahluwalia *et al.* 2003). Incidence rates can be ten times greater at hamlet level (in the range of 1–2% per year) than the aggregate figures recorded at district level (in the range of 1–2 per 1000 per year). Some of the work presented in this supplement by Singh *et al.* (2010b) and Rijal *et al.* (2010) has documented precisely what the burden is in such so-called 'hot spots' at hamlet level in endemic districts. The impact of VL in these affected communities tends therefore to be much stronger than would seem from aggregate figures, because those communities tend to be the most deprived ones, of lowest cast, and lowest economic status (Boelaert *et al.* 2009). Singh *et al.* also point to some gender-specific differences in burden of infection, a theme which is under-researched so far, apart from work in Bangladesh (Ahluwalia *et al.* 2003).

Our understanding of the risk factors for VL in South-Asia has greatly improved in recent years. Identified risk factors have been fairly similar across studies, with the presence of a previous case of kala-azar in the household as the strongest predictor of risk and living conditions as a recurrent theme. Killick-Kenrick coined the term 'paradise for sandflies' to describe the housing conditions in endemic villages. Damp earthen floors, mud-plastered walls with cracks, proximity to water bodies, soil littered with organic matter, sleeping on the ground etc. are all linked to poverty as well as to increased exposure to peri-domestic sandflies. Most of the published studies assessed the risk for VL

disease, while this supplement also includes information on risk factors for infection (Rijal *et al.* 2010; Singh *et al.* 2010b). Singh *et al.* (2010a) examine more closely the role of domestic animals as a risk factor for VL disease in a matched case-control design given the contradictory findings on the role of cattle in previous studies (Bern *et al.* 2010). They show that there was no statistically significant association between VL and keeping domestic animals inside the house at night, but VL was significantly associated with housing conditions (thatched house and damp floors). Improving housing conditions seems to have potential to reduce VL incidence, while the role of cattle needs further elucidation.

The burden of a disease is usually also expressed in terms of disability adjusted life years (DALYs) that allow more straightforward comparison across diseases and are often used by international donors as a guide for resource allocation. DALYs combine (premature) mortality, morbidity and disability, which can be quite important in a chronic disease such as VL. So far not much work has been done to estimate the DALYs related to VL. Moreover, the use of DALYs for neglected diseases, including VL, has been heavily criticized (Lutumba *et al.* 2007; Bern *et al.* 2008; King & Bertino 2008; Reithinger 2008). Besides the problems discussed above of not having accurate data on mortality and morbidity required for the DALY calculation, DALYs do not take account of the spatial clustering of VL. While at the global, national or regional level the burden of VL in terms of DALYs may be low, the burden at the community level can be very high.

Expressing disease impact in DALYs also ignores the disproportionate impact on the poor and the economic impact to affected individuals, their household and the community at large. Hence the need to document the economic impact of VL at household level. This is done, a.o. by Sarnoff *et al.* (2010) and Sundar *et al.* (2010) in this supplement. Both authors conducted patient/household surveys at community level in different districts in Bihar collecting information on direct costs and income foregone as a result of VL morbidity (i.e. indirect costs). Although the classification of costs is not the same in both studies, making comparisons difficult, their results are in line with previous work trying to capture the economic burden of leishmaniasis on households in cost-of-illness studies. Those previous studies found that the median total expenditure by the patient on VL treatment was 1.1–1.3 times their annual per capita income (Meheus *et al.* 2006; Rijal *et al.* 2006; Sharma *et al.* 2006). It seems that the economic impact of VL is catastrophic and clearly leads to 'iatrogenic poverty'. The variation and magnitude of costs incurred by affected individuals and their families is determined to a large extent by the health seeking behaviour before diagnosis and the VL patient management process. Because these data were collected before the VL elimination initiative got into full swing, future cost-of-illness studies could show whether the ongoing program succeeds in offering wider access to free diagnostics and care in a truly decentralised context. Pilot studies are underway to introduce more active case search models (World Health Organization/TDR 2009).

Last but not least for VL control ever to be successful, the perspective of the community is crucial, as it determines the uptake of any control method. Some limited evidence exists, and this supplement brings more work on health seeking behaviour and coping strategies in Sarnoff *et al.* (2010) and in Hasker *et al.* (2010). The paper by Mishra *et al.* (2010) describes community perceptions on kala-azar, the sandfly vector and bednets in endemic areas in Bihar.

For the VL elimination initiative to be successful, it will require a great deal of effort that needs to be sustained over the longer term. Ultimately, effective control of VL will depend on a mix of interventions, consisting of early and efficient diagnosis and treatment, with drug regimens that put as little burden as possible on both the patient and the health system. From this perspective single-dose treatment and combination therapies are an attractive alternative (Meheus *et al.* 2010). But the elimination initiative also needs to address demand-side factors. We need a better understanding of the processes by which patients seek care and we need to design policies that enable patients to present earlier at health facilities. This will require co-operation with private health providers on the one hand, and involvement of the community in more active case search and care delivery models on the other hand. While elimination might still seem a far-fetched dream at this point, every improvement in control of this devastating disease is a tangible change in the livelihood of many.

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Conflicts of interest

The authors have declared that they have no conflicts of interest.

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