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SPATIAL PATTERNS OF MENINGITIS IN NIGER

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In Africa, meningitis outbreaks occur only during the dry season. Previous analyses from Niger have suggested that population density peaks during the dry season and that this is strongly correlated with increased transmission of measles. We propose that the strong seasonality in meningitis incidence is similarly affected by seasonal fluctuations in host aggregation. Although climatic factors are widely believed to play a role in meningitis seasonality, here we specifically focus on the potential role of human movement and density. A strong environmental component to meningitis dynamics would lead us to predict a correlation in meningitis within rainfall contours. However our analysis shows that spatial patterns of meningitis fadeouts and reintroductions are more highly clustered in regions along primary roads and migration corridors, suggesting that population density also contributes to the spatiotemporal spread of meningitis. We further show that districts in Niger with high meningitis reintroduction rates also have high measles reintroduction rates. In spite of the epidemiological differences between the two diseases, human movement patterns can be seen in the spatial dynamics of both. This analysis gives us a better understanding of regional contact patterns and disease dynamics to identify areas important for disease surveillance and vaccination.

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RE-EMERGENCE OF CHIKUNGUNYA FEVER IN NARATHIWAT PROVINCE : A STUDY ON CLINICAL MANIFESTATIONS

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Since chikungunya virus (CHIKV) infection was first reported in Bangkok in 1958, and disappeared in the late 1970s, there have been small localized outbreaks in 7 isolated provinces between 1976 and 1995. In September 2008, Narathiwat Provincial Health Office was notified by Community hospitals of suspected chikungunya fever. This re-emergence of CHIKV has spread to other 4 adjacent provinces. Chikungunya fever cases which were admitted in hospitals from September to November 2008 were investigated. Epidemiological and clinical data were collected from 64 confirmed CHIKV infection and were analyzed by Epi Info. CHIKV was isolated from both *Aedes albopictus* and *Ae. aegypti* mosquitoes. Majority of the cases were adult s(87%) with the mean age of 41.1 years. The male to female ratio was 1:1.4. Most of them were wage earners (37%), rubber plantation workers and farmers (26.6%). Major clinical manifestations include fever (84.4%), arthralgia (82.8%), headache (54.7%), rash(40.6%). Onset is usually abrupt with high fever, 50% of cases had the temperature higher than 39°C. The duration of fever ranged from 1 to 4 days (mean 2.9 days). Arthralgia usually involved multiple small joints and were migratory. Joint swelling was noted in only 3% of cases. Skin rashes are erythematous and maculopapular with itching (80.8%). The CBC were normal in most cases. The treatment was entirely symptomatic. Acetaminophen was used in 95.3% for fever and pain while NSAID was used in 64% for severe arthralgia. The length of stays in hospital ranged from 1 to 5 days (mean 2.6 days). In conclusion, this outbreak has spread to adjacent provinces wider than before. The clinical manifestations are similar to other previous reports. There were however some differences which include lower incidence of joint swelling and higher incidence of skin itching. The clinical triad of acute onset of fever, arthralgia and rash are useful for surveillance of CHIKV infection. The presentation of multiple

and small joint pain with joint swelling help in differential diagnosis from dengue fever.

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DIABETIC RETINOPATHY IN AN URBAN DIABETIC CLINIC IN MALAWI

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Diabetes is increasing in prevalence in resource poor countries where it is under diagnosed and under treated. Present healthcare systems struggle to cope with this chronic serious disease. Diabetic retinopathy is a microvascular complication of diabetes that can severely affect the vision of diabetics of all ages, often during the peak years of their professional lives. Early diagnosis and treatment of diabetic retinopathy improves visual outcome. The purpose of this study was to record the prevalence and severity of retinopathy in a diabetic population in an urban diabetic clinic in Malawi. We recruited 279 consecutive new patients who had not undergone systematic retinal assessment before from the diabetic clinic in Queen Elizabeth Central Hospital in Blantyre, Malawi. All patients were examined by 1 experienced ophthalmologist who graded retinopathy using a slit lamp after pupil dilation. 26.9% had at least mild pre proliferative retinopathy or any maculopathy or both. 21.1% had sight threatening eye disease (STED). 12.9% had STED affecting the macula. 11.8% had STED affecting the retina. 2.5% had active proliferative retinopathy. 3.6% (10/279) had fibrovascular proliferation, of which 5 had tractional retinal detachment, 3 with active proliferation. 9% had background diabetic retinopathy only. 64.1% had no diabetic retinopathy. In conclusion, we found a significant level of treatable diabetic retinopathy in a previously unscreened population. Many patients would have benefitted from laser treatment, which is not available in Malawi.

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CORRELATION OF DERMATOLOGICAL AND OPHTHALMOLOGICAL MORBIDITY IN ONCHOCERCIASIS (FOREST TYPE)

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Although there is ample information about the prevalence of skin and eye disorders in African onchocerciasis (river blindness), it is unknown to what extent these two disease entities occur simultaneously in individual patients. Apart from a perspective of pure biological interest, concomitance of dermatological and ophthalmological morbidity is also important when estimating the global burden of disease (GBD) of onchocerciasis. The current study investigated the possible occurrence of specific combinations of morbidity in onchocerciasis (forest type). Dermatological and ophthalmological data from a cross-sectional, population-based survey (Cameroun, 1998) were matched at the individual level (N = 840). Only individuals who had been in the area for 3 months or longer were included in the analysis (N = 765). At the time of survey, the source population was still naive for mass treatment with ivermectin. However, 30% of the population reported having used ivermectin at some point in time. Data was analysed using logistic regression, while adjusting for study site, age, gender, social economical status (SES), ivermectin use and several proxies for exposure to *Onchocerca volvulus*. Onchocerciasis was highly endemic (nodule prevalence 65% in men aged 20 years and above). The prevalence of visual impairment (low vision or blindness), troublesome itch and skin depigmentation were 9%, 17% and 23% respectively. All three were strongly associated with the presence of nodules. Troublesome itch was not associated with blindness (odds ratio 0.7; 95%-CI: 0.3 - 1.9) or depigmentation (0.8; 0.5 - 1.5). However, there was a significant association between skin depigmentation

and visual impairment (any), even after adjusting for study site, age, gender, SES, ivermectin use and the presence of nodules, microfilariae in the anterior chamber of the eye, reactive skin lesions and troublesome itch (2.2; 1.2 - 4.3). In conclusion, there seems to be a predisposition towards the co-occurrence of skin depigmentation and visual impairment (any) in onchocerciasis of the forest type. When including the impact of skin depigmentation in future estimations of the GBD of onchocerciasis, an overestimation of the GBD should be avoided by taking into account the overlap with visual impairment.

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PATIENT TREATMENT COSTS FOR MANAGEMENT OF LYMPHEDEMA AND ACUTE ATTACKS IN TOGO

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Lymphatic filariasis (LF) is a major contributor to disability in the developing world. Togo is a West African country with 1.1 million persons living at risk for LF and high prevalence of poverty, with 61.7% of the population living on less than US\$1.30 per day. This cohort survey was designed to collect baseline data in 2005, before the implementation of a national lymphedema program, and had to be redone in 2007 due to a delay in release of program funding. A convenience sample of 188 lymphedema patients from six LF endemic districts was enrolled. The survey questions covered many LF-related issues, but this abstract focuses on questions related to the cost of treatment of lymphedema and acute attacks, and family wealth. Questions were translated from French into the local language by interviewers who entered the responses into personal digital assistants. Cost data were recorded in the local currency and, for in-kind payments, animal values were estimated based on market costs. The total cost estimates include payments to the provider, as well as cost of treatments and treatment related travel. The 2005 data are presented here; 2007 data will be included in the final presentation. A total of 188 patients with leg lymphedema were included in the analysis, and costs for lymphedema management and treatment of acute attacks were estimated separately. Cash payments to medical providers comprised 44% of the cost of lymphedema management prior to implementation of a lymphedema program. Only traditional healers accepted animals for payment (27; 20.3%). The median annual total cost for treatment of lymphedema was US\$5.00 (range US\$0.00-US\$1,173.07). Payments for materials comprised 75% of the cost of acute attacks. Animals were accepted as payment for several traditional therapies but not for pharmaceuticals. The median total cost for treatment of acute attacks was US\$1.92 (range US\$0.00-US\$336.54). Most patients (124; 72.5%) reported a change in occupation due to their lymphedema, with 59 (34.5%) working less time and 48 (28.1%) stopping work altogether. This is the first report detailing lymphedema treatment costs in Africa. Given the extreme poverty of Togo and much of sub-Saharan Africa, alleviating the chronic manifestations of LF could contribute significantly to the economic well-being of those people living in endemic areas. Data to determine the impact of lymphedema management programs on the cost to patients of chronic LF are needed.

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THE WEST AFRICAN LF MORBIDITY PROJECT: TRAINING IN LF SURGERY AS AN AVENUE TO LYMPHATIC FILARIASIS ELIMINATION

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To disseminate WHO-recommended LF-hydrocele (filaricele) surgery where postgraduate medical education is inadequate, The West African LF Morbidity Project was started in 2004. 25 million LF patients have scrotal fluid, often enough to be socio-economically incapacitating. In some areas, 25%-50% of men have filaricele. One and now 2 urologists do workshops for teachers of surgery, district surgeons, etc. Through 2008, 323 were trained in 12 African countries, and at least 3118 patients treated. In 2006, an external evaluation was done in 3 countries. For Ghana, a socio-economic survey of ex-patients was made by the Atlanta LF-Support Center and CDC. In Burkina Faso and Togo, head of surgery at the Dakar medical school who later joined the project (S.M.G.) interviewed surgeons, led focus-groups, and interviewed and clinically examined convenience-sampled patients. Conclusions of the evaluation and observations in 2 additional countries have suggested: (1) LF-hydrocele (filaricele) repair as recommended by WHO is popular among surgeons and patients, easy to learn, easy to do, requires shorter hospital stays, and gives excellent clinical and socio-economic results when done well in West African district hospital settings. Surgeons express surprise and pleasure at how much better the new procedure is than what they used previously; (2) When antibiotic cover is not properly implemented, patients living far away leave before skin seals, or patients do not receive adequate care until skin integrity is reestablished in about 7 days, then unacceptable rates of postoperative infections, often mild but sometimes catastrophic, regularly occur in West African district hospital settings; (3) Attention to details of the procedure (e.g. careful skin closure without gaps, applying the recommended bandaging technique, and antibiotic cover pre- and post-operatively) makes a major difference to LF-surgery outcomes in African district hospitals; and (4) Surgical "campaigns" can have disadvantages and may lead to worse outcomes than the same surgeons achieve routinely in the same under-resourced settings.

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A RODENT MODEL OF LYMPHATIC PATHOLOGY DUE TO ADULT FILARIAL WORMS

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The range of pathological and constitutional tissue changes that occur in lymphatic vessels associated with the presence and death of adult filarial worms remains relatively poorly understood. A rat model of infection with *Brugia* sp induces changes in the tissues that appear to be similar to those seen in humans with filarial parasites. In this study standard histochemical and special stains were used to identify specific components and changes in the progression of pathological changes in and around the lymphatics containing the adult parasites. The tissue changes involved extensive alterations in different components of the vessels; endothelial polyps, valvular proliferation, and cellular infiltrates, both peri-vascularly and within the wall tissues. B cell and eosinophil responses predominated the cellular infiltrates associated with the presence of living adult worms. Increases in the cells were associated with parasite stage change and the initiation of microfilariae release. The changes associated with dead or dying adult worms had a different immunocytochemical profile to that seen with the living parasites; a distinct profile of T cell subsets and monocytes were associated with degenerating adult worms. The similarity

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