

PRIMARY HEALTH CARE SERVICES IN RURAL SARAWAK

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Sarawak with a population density of 25 persons per square mile is largely a rural country in which the aim is to have primary health care provided by paramedics and auxiliaries based in over 100 *Klinik Desa*, and by newly trained village health promoters scattered around some of these *Klinik Desa*. A core of trainers for village health promoters have been established in each of the seven geographical divisions of Sarawak and work has begun to train a total of 2000 such village health promoters for the whole of Sarawak. However due to the variety of ethnic and geographical variations present, local modifications and culture-specific adaptation of the content and goals of the training of these village health promoters are being further developed. One specific problem is that faced by the semi-nomadic Punans in the remoter hills of Sarawak. Culture-specific training methods and manuals for these largely illiterate Punans have been developed with IDRC support and a special primary health care service for Punans has been developed and integrated into the national health care system. To link these isolated Punan village health promoters to the *Klinik Desa* and to ensure proper supervision and quality assurance, these village health promoters are regularly visited by existing mobile health teams travelling by boat, land and helicopter, and radio-communication links on an experimental scale have been established. Existing mobile health teams have been retrained to provide guidance, support and supervision for these Punan village health promoters. The ultimate aim is to ensure that essential health care is available to all communities including the most remote semi-nomadic and nomadic peoples of Sarawak.

IMPACT OF RAPID URBANIZATION AND MUNICIPAL DEVELOPMENT ON *Ae. Aegypti* IN ACCRA AND TEMA, GHANA

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This paper which is illustrated with graphs, maps and histograms uses survey data on *Aedes aegypti* compiled during pre-urbanization period (1911-24) in Accra and a period of urbanization (1964-65) in Accra and Tema to determine the impact of rapid urbanization in these localities as well as proper town planning and development in Tema on the breeding of this mosquito. Unlike Tema, municipal development in Accra lagged behind rapid urbanization resulting in a variety of conditions such as slum areas, shanty towns, built-up areas, partially developed areas and well developed areas.

In 1911-1924, mosquito survey was limited to search for larvae mainly from traditional domestic water containers and adult mosquito catches over a few years. In 1964-65 all potential breeding waters and receptacles were examined and spray-sheet collection of adults routinely carried out.

Variation in the incidence of occurrence of *Ae. aegypti* in domestic water receptacles was not marked and not correlated with variation in rainfall in pre-urbanization years. In urbanization years, frequency in breeding varied considerably and correlated well with variation in rainfall in both Accra and Tema. Generally, the impact of rapid urbanization and municipal development in Accra on *Ae. aegypti* is a marked reduction in its breeding in traditional domestic water containers (viz. a mean incidence of occurrence of 83.03 ± 2.66% in 1911-24 and 44.98 ± 1.38% in 1964-65). This is due mainly to ecological changes associated with rapid urbanization in Accra including elimination of adult resting places and some natural breeding sites of this species such as tree holes, ponds, and swamps in which it bred appreciably to very frequently in 1964-65 (viz. incidence of occurrence of 61.6%, 9.35% and 4.7% respectively). These changes favoured breeding of *Cx. p. fatigans* and *An. gambiae* s.s., which also bred increasingly in domestic water containers (viz. 32.42 ± 0.67% and 41.65 ± 11.67% respectively). This is underscored by the finding in the better planned town of Tema with climate and vegetation similar to Accra and where container habitats associated with its prolific breeding are fewer than absolute incidence of occurrence of *Ae. aegypti* was much lower (viz. 4.35%) than in Accra (viz. 46.37%). Further more, *Ae. aegypti* bred less frequently in domestic and peridomestic water containers in Tema (viz. 14.36 ± 4.83% for Tema and 24.05 ± 4.3% for Accra). In both localities building construction provided compensatory breeding sites for *Ae. aegypti* in which it bred frequently (viz. 11.36% - 35.28% in Accra). In Accra, *Ae. aegypti* bred most frequently in peripheral areas which are not only settlement areas with inadequate infrastructural facilities but also interestingly closest to forested areas. It bred most frequently in industrial areas and peripheral villages in Tema.

SNAKE BITE EPIDEMIOLOGY IN IVORY COAST

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A retrospective study had been performed in 36 hospitals upon 57, and in 130 infirmaries upon 300, and in 18 extensive plantations of various crops, in Ivory Coast, a West African country which population is about 8 Millions people. Concurrently, a prospective survey had been done between 1976 and 1979 in the 2 main hospitals of the country, 5 infirmaries and 12 industrial plantations.

These studies lead to appraise the incidence of snake-bites, and their severity, in different ecological areas. Forested region seems to be the most concerned by the number of snake bites (more than 200 per 100,000 people) but fatality is quite weak (the mean of lethality reaches 2% of total bites and can approach in few places 17%). Incidence in plantations, mainly implanted in forested zone, can exceed 4,000 bites per 100,000 workers in a year. In savana areas, the incidences vary from 130 bites to 190 per 100,000 people a year and could be influenced by ecological aspects: increases appear in bush places. Mean of lethality is greater than 3% and can reach 28% in few villages or their vicinity.

However, ecological conditions and human activities affect both morbidity and lethality probably more strongly than seasonal variations could do it in equatorial climate. This is not true in plantations where seasonal human activities lead to greater periods of risk in a greater population at risk.

Arranged data following ecological conditions, social and density aspects of population lead us to predict a total average of about 13,500 snake bites a year in Ivory Coast, and approximately 200 deaths of which near by 50% registered by official sanitary services.

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IMMUNIZATION OF MICE AGAINST CHINESE AND TAIWANESE STRAINS OF SCHISTOSOMA JAPONICUM USING N-METHYL-N'-NITRO-NITROSOGUANIDINE (NTG)-TREATED CERCARIAE

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This study attempts (1) to determine the degree of protection in mice immunized with *Schistosoma japonicum* cercariae attenuated with N-methyl-N'-nitro-N-nitrosoguanidine (NTG) against subsequent challenge; (2) to compare the differences that exist between mice exposed to Chinese and Taiwanese strains of *S. japonicum*, NTG-treated cercariae. Studies by other investigators involved primarily the attenuation of cercariae through high dosages of x-irradiation (Hsu et al. 1962, '63, '65, '69, '81; Sadun et al. '64; Vilella et al. '61). We used NTG as the attenuating agent because NTG-treated *Trypanosoma brucei* did protect mice against a homologous challenge (Johnson and Chi, '81).

C3H mice were initially infected with 40 cercariae attenuated by 30 µg/ml NTG for 60 min. (62 test and 48 control mice with the Chinese strain; 54 test and 67 control with the Taiwanese strain). After reinfection at 2-4 weeks, the mice were challenged with 40 non-treated cercariae at 8-10 weeks. Control mice received similar treatment with non-attenuated cercariae. In addition a challenge control (7 and 21 mice) was conducted at the challenge date. Upon sacrifice at 14-16 weeks, all mice were examined for worm burden, liver granuloma and survival rate. Both studies revealed that mice immunized with NTG-treated cercariae had an increased survival rate (test: 93.8%, 94.2% vs. control: 50.0%, 61.4% for Chinese and Taiwanese strains respectively). Of the surviving mice, worm burden, (mean # worms/mouse) was significantly lower in the immunized group as compared to the control group of both strains (test: 15, 14 vs. control: 23, 23 for Chinese and Taiwanese strains respectively). Of particular significance was the decreased number of female worms per mouse in both strains studied in non-challenged mice (test: 0, 0.30 vs. control: 13.0, 8.9 for Chinese and Taiwanese strains respectively). In contrast, results in liver conditions (scaled in increasing severity from 0-4+) revealed a difference between the Chinese and Taiwanese strains. While the liver conditions in the Taiwanese strain showed significant difference between the test and control (1+ vs. 2.8+), the difference was less pronounced in the Chinese strain (3.6+ vs. 4.0+). The % worm reduction was calculated by the formula: $(A - (B - C)) / A \times 100$, where A = mean worm recovery from challenge control, B = from test, C = from immunization control. There was no significant difference in the % worm reduction of the two strains. These results indicate more similarities than differences in the immunogenic properties of the Chinese and Taiwanese strains. In addition, when cercariae were treated with NTG, they seemed to cause sufficient immunogenicity to protect mice against subsequent challenge.

RESISTANCE TO FANSIDAR DESPITE IN VITRO POTENTIATION OF SULFADOXINE AND PYRIMETHAMINE AGAINST PLASMODIUM FALCIPARUM FROM THAILAND

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The effectiveness of therapy and prophylaxis with the combination of pyrimethamine and sulfadoxine (Fansidar) has diminished in regions of Southeast Asia due to the emergence of drug resistant malarial parasites. We have examined the *in vitro* sensitivities of strains of *Plasmodium falciparum* isolated from the Thai-Kampuchean border, an area with marked clinical resistance to Fansidar, to sulfadoxine and pyrimethamine and their combination. Drugs were added to microtiter plates in two-fold serial dilutions of 8×10^{-4} M to 0.5×10^{-9} M sulfadoxine and 1.6×10^{-4} M to 2.5×10^{-9} M pyrimethamine. Infected cells from patients were washed, suspended in RPMI-1640 media depleted of FBS and folate and supplemented with 10% AB plasma at a 1:5X haematocrit, and added to each well. Plates were incubated in gas-tight chambers with a mixture of 90% N₂, 5% CO₂, and 5% O₂ at 37°C. Cells were harvested at 48 hours and prepared as thick films. Two hundred parasites were counted and normally-appearing parasites were scored. The strains which were tested were resistant to pyrimethamine and highly resistant to sulfadoxine. Tested singly, sulfadoxine showed no evidence of an inhibitory effect at even the highest concentrations (8×10^{-4} M) and pyrimethamine gave a 90% inhibition as compared to the control at 8×10^{-4} M. However, there was a definite potentiation of the two drugs when tested at various combinations with the maximum effect at approximately 2×10^{-4} M sulfadoxine and 1×10^{-4} M pyrimethamine. These results suggest the resistance to Fansidar may be due to resistance to both components and although there was a potentiating effect it was probably not sufficient to be effective *in vivo*. This may explain the reduction in clinical areas with the sulfadoxine/pyrimethamine combination.

EYE CARE IN MALAWI (1): OTHER BLINDING DISEASES AND THE DELIVERY OF EYE CARE IN THE TROPICS

Dr. M. C. Chirambo

Preventable and curable blindness is a serious public health problem in Malawi, with rates of between 0.8 to 1.00% of the national population. The main causes of visual impairment and blindness are cataract (40%), trachoma and bacterial eye infections (15%), measles associated Vitamin A deficiency (15%) degenerative/inflammatory eye disease (15%), glaucoma (3%), trachoma (4%) onchocerciasis (2%) and others (4%). Over 70% of blindness is either curable or preventable if eye care services can reach the rural areas where over 80% of the population live.

There are 5 ophthalmologists and 37 ophthalmic medical assistants (OMA's) serving 6.2 million Malawians, where all but two of the 24 districts have a resident OMA. This is a marked improvement since 1974, when there was no provision for eye health services existed outside Blantyre district. The effort to expand eye health services was achieved by establishing a course for OMA's at the Central hospital in Blantyre.

Trainees are recruited from young medical assistants and enrolled nurses who had completed a three-year training in government or mission hospitals. The course lasts for one academic year and includes both theoretical and practical training in the clinic and ward setting. Basic extra-curricular procedures are also taught. At the end of the training period, most of the assistants are posted to district hospitals to set up small static units for eye care; some are retained at the central hospitals while a few are assigned to a mobile eye unit. This is supported by the Royal Commonwealth Society for the Blind and Operation Eyesight Universal in each of the three regions of Malawi. Six training courses have been instituted since 1969 to provide the total of 5 OMA's.

In the outlying units, most OMA's set up the eye clinic through the use of a room that can be darkened when needed. Visual testing charts are available and all OMA's can admit emergency eye cases into hospital beds. The cases are mainly purulent conjunctivitis, damage from traditional medicine applications, and those requiring surgery. The OMA has at his disposal, diagnostic and surgical instruments that are provided on completion of training.

A great amount of cooperation from the hospital authorities is required to make these eye care activities possible, but the system usually works. It should be pointed out that the OMA's time is not totally spent in ophthalmic work; usually half that time is spent in supporting and dealing with other medical and surgical cases.

The ophthalmologists travel once every three months to outlying eye units. He helps to smooth the rapport between the OMA and the hospital authority, examines selected ophthalmic cases, and ensures a regular supply of drugs from the central hospital either in Blantyre or Lilongwe. The aim is also to ensure that the OMA's role in diagnosis, treatment, patient referral and health education is maintained to the best advantage.

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