MEDLARS BIBLIOGRAPHY

PUBLICATIONS OF RELEVANCE TO PAPUA NEW GUINEA AND MELANESIA

Bibliographic Citation List generated from MEDLARS

1 **Allen S, O'Donnell A, Alexander N.**
Causes of coma in children with malaria in Papua New Guinea.
Lancet 1996 Oct 26;348(9035):1168-1169.

2 **Allen SJ, O'Donnell A, Alexander ND, Clegg JB.**
Severe malaria in children in Papua New Guinea.
QJM 1996 Oct;89(10):779-788.

The clinical features of severe falciparum malaria and risk factors for mortality were studied in 489 children admitted with malaria to Madang Hospital, Papua New Guinea. The most common severe manifestations of malaria were severe anaemia (22%) and coma (16%). Children with severe anaemia were younger than those with coma (median age 2.2 vs 3.7 years) and had been ill for longer before admission (median 7 vs 4 days, respectively). Although the clinical features of coma in Madang children with malaria resembled closely those reported in African children, mortality was lower (8% vs 17-25%, respectively). Overall, 17 (3.5%) children died, most within 12 hours of admission. A high level of plasma lactate (≥ 5 mmol/l) was common (20%) and was the major predictor of death in multiple regression analysis. Raised plasma creatinine and decreased plasma bicarbonate were also independent predictors of mortality. Coma was not predictive of death, although a high proportion of children with profound coma died. Investigation of the causes of acidosis in children with malaria is a high research priority. In view of the short time interval between admission and death in many children, emphasis must be placed on the prevention or early recognition and treatment of acidosis in the district health clinic as well as the central hospital.

3 **Al-Yaman FM, Mokela D, Genton B, Rockett KA, Alpers MP, Clark IA.**
Association between serum levels of reactive nitrogen intermediates and coma in children with cerebral malaria in Papua New Guinea.
Trans R Soc Trop Med Hyg 1996 May-Jun;90(3):270-273.

Serum levels of reactive nitrogen intermediates (RNI; nitrate plus nitrite) were measured in 92 patients with cerebral malaria in the Madang Province of Papua New Guinea. RNI levels were compared to disease severity and clinical outcome, and correlated with both the depth of coma on admission and its duration. Median levels were higher among children with deeper coma than among those with lighter coma (35.6 microM vs 16.7 microM; p = 0.008) and also among children with longer duration of coma (72 hours; 59.3 microM vs 19.3 microM; p = 0.004). RNI levels also correlated with clinical outcome, fatal cases having significantly higher RNI levels than survivors (41.2 microM vs 18.5 microM; p = 0.014). Thus, high RNI levels are associated with indices of disease severity and may predict outcome in children with cerebral malaria. These data are consistent with the hypothesis that nitric oxide is involved in the pathogenesis of coma in human cerebral malaria.

4 **Barclay L.**
Creating nursing links in our region.
Aust J Adv Nurs 1996 Autumn;13(3):5-6.

5 **Beaso J.**
Treatment of tibial defects due to osteomyelitis by postero-lateral cortico-cancellous bone grafting.
Trop Doct 1996 Jul;26(3):118-120.

Four cases of children with tibial defects due to osteomyelitis are presented. Tibialization of the fibula using postero-lateral cortico-cancellous bone grafting achieved a stable weight-bearing limb in all four patients. The surgical technique employed should be within the skills of any tropical surgeon able to take a bone graft and expose the tibiofibular joints.

6 **Bockarie MJ, Alexander N, Bockarie F, Ibam E, Barnish G, Alpers M.**
The late-biting habit of parous *Anopheles* mosquitoes and pre-bedtime exposure of humans to infective female mosquitoes.
Trans R Soc Trop Med Hyg 1996 Jan-Feb;90(1):23-25.

Using the all-night landing catch method (18:00-06:00) we showed, for *Anopheles gambiae* in Sierra Leone and *A. punctulatus* in Papua New Guinea, that parous females have a tendency to bite later than nulliparous ones. The biting habit of sporozoite-infected *A. punctulatus* was also investigated. The sporozoite rates for *Plasmodium falciparum* and *P. vivax* were 1.8 and 1.4% respectively, but only one (1.3%) of 76 females infected with *P. falciparum* was caught between 18:00 and 21:00. A significantly higher proportion (11.6%) of mosquitoes infected with *P. vivax* was caught in the same period. The late-biting habit of mosquitoes infected with *P. falciparum* is discussed in relation to the differential biting habits of parous and nulliparous females. We conclude with a hypothesis that, in areas where *Anopheles* mosquitoes have a late-biting cycle and low parous rate, exposure to mosquitoes infected with *P. falciparum* during the pre-bedtime period (18:00-22:00) is very low. This hypothesis could explain why insecticide-treated bed nets protect children better in areas of seasonal transmission, where nulliparous females tend to predominate, than in areas of perennial transmission, where parous females are usually more numerous. The same

hypothesis is compatible with the finding in Papua New Guinea that insecticide-impregnated bed nets are more protective against *P. falciparum* than against *P. vivax* malaria.

7 **Bourdy G, Francois C, Andary C, Boucard M.**
Maternity and medicinal plants in Vanuatu. II. Pharmacological screening of five selected species.
J Ethnopharmacol 1996 Jul 5;52(3):139-143.

An ethnobotanical survey of reproductive behaviour in Vanuatu and an extensive literature search have resulted in the selection of five plant species (*Asplenium nidus, Hemigraphis reptans, Homalanthus nutans, Dysoxylum gaudichaudianum, Pemphis acidula*) used for purposes relating to human reproduction in that country. Preliminary screening was carried out to identify possible oestrogenic activity in these species as well as their effects on isolated rat uteri. *Dysoxylum gaudichaudianum* presented the most interest due to its spasmolytic activity (musculotropic type). Its mode of action has yet to be determined.

8 **Bourgeois D, Gaillard P, Doury J.**
Caries prevalence in 12-year-old schoolchildren in New Caledonia.
Community Dent Health 1996 Jun;13(2):93-95.

This study reports on the most recent epidemiological survey undertaken in New Caledonia, a French dependency in the South Pacific. 325 12-year-old children were selected from schools using the World Health Organization pathfinder sampling methodology. The results showed a DMFT of 4.09. This places New Caledonia in the 'moderate' category on the World Health Organization scale of caries severity for 12-year-old children. Two oral health risk groups were identified: Melanesian and Wallisian children. Different approaches to promoting oral health in New Caledonia, taking into account local socio-cultural traditions, are proposed.

9 **Bryan JH, Burwell C, Maitland K, Williams T.**
Culicine mosquitoes (Diptera: Culicidae) attracted to humans on Espiritu Santo, Vanuatu.
Med Vet Entomol 1996 Jan;10(1):101-102.

10 **Clem KJ, Green SM.**
Emergency medicine expeditions to the developing world: the Loma Linda University experience in Papua New Guinea.
Acad Emerg Med 1996 Jun;3(6):624-633.

Emergency physicians (EPs) are increasingly participating in international medicine in regions that are chronically medically underserved. In August 1994, a ten-member emergency medicine team from the Loma Linda University School of Medicine staffed a 70-bed bush hospital in the primitive highlands of Papua New Guinea, providing both outpatient and inpatient medical care. Typhoid fever, malaria, polio and numerous other infectious diseases were encountered. Rampant local tribal warfare resulted in regular penetrating injuries from arrows, spears and machetes. The expedition was judged highly successful, in that 1) substantial medical service was provided to tribespeople accustomed to minimal care, 2) education was provided to local health care providers, and 3) team participants became adept at managing medical conditions uncommon in industrialized societies, and gained valuable ethical and utilitarian perspectives regarding health care delivery in underserved areas. In this article the objectives, organization and experiences of the team members are described. This information may encourage other EPs to participate in medical expeditions to the developing world, and to provide general principles to assist in their organization and implementation.

11 **Dubey SP, SenGupta SK, Vele DD.**
Nasopharyngeal osteosarcoma as second malignant neoplasm in a post-treated unilateral retinoblastoma: report of a case and review of literature.
Int J Pediatr Otorhinolaryngol 1996 Feb;34(3):265-271.

A rare case of osteosarcoma primarily originating in the nasopharynx of an 11-year-old Papua New Guinean female who received irradiation and multi-agent chemotherapy for unilateral non-hereditary retinoblasma is described. The relevant literature is briefly reviewed. The complex role of radiation, cytotoxic drugs and genes in the development of a second malignant neoplasm in association with retinoblasma is also discussed.

12 **Dwyer DE, Ge YC, Bolton WV, Wang B, Cunningham AL, Saksena NK.**
Subtype B isolates of human immunodeficiency virus type 1 detected in Australia.
Ann Acad Med Singapore 1996 Mar;25(2):188-191.

The human immunodeficiency virus type 1 (HIV-1) can be subtyped on the basis of nucleotide sequence variability. Knowledge of circulating HIV-1 genotypes or subtypes allows understanding of the origin and spread of HIV-1 in different geographical regions, and is required for rational vaccine development. A study was undertaken to determine the predominant HIV-1 subtype in Australia. Part of the HIV-1 envelope gene (including the variable domain, V3) was sequenced directly from DNA extracted from peripheral blood mononuclear cells of 17 HIV-1 seropositive people in Sydney, Australia. Phylogenetic analysis based on nucleotide sequence suggested that all patients (including individual cases acquired in New Zealand, Papua New Guinea and Thailand) were infected with HIV-1 subtype B. Octapeptides from the HIV-1 envelope V3 loop tip indicated variation but included a predominance of the most common subtype B octapeptides HIGPGRAF (4 cases), NIGPGRAF (3 cases) and PIGPGRAF (1 case). These data suggest that subtype B is the major HIV-1 strain in Australia (and probably in New Zealand and Papua New Guinea), although the importation of HIV-1 acquired overseas is likely to lead to the detection and dissemination of other subtypes in Australia.

13 **Gessain A, Mahieux R, De Thé G.**
Genetic variability and molecular epidemiology of

human and simian T-cell leukemia/lymphoma virus type I.
J Acquir Immune Defic Syndr Hum Retrovirol 1996;13(Suppl 1):S132-S145.

In the past few years, numerous investigators have demonstrated that human T-cell leukemia/lymphoma virus type I (HTLV-I) possesses a great genetic stability, and recent data indicate that viral amplification via clonal expansion of infected cells, rather than by reverse transcription, could explain this remarkable genetic stability. In parallel, the molecular epidemiology of HTLV-I proviruses showed that the few nucleotide changes observed between isolates were specific for the geographical origin of the patients but not for the type of the associated pathologies (adult T-cell leukemia/lymphoma, tropical spastic paraparesis/HTLV-I-associated myelopathy). Thus, based on sequence and/or restriction fragment length polymorphism analysis of more than 250 HTLV-I isolates originating from the main viral endemic areas, three major molecular geographical subtypes (or genotypes) emerged, strongly supported by phylogenetic analysis (high bootstrap values). Each of these genotypes (Cosmopolitan, Central African and Melanesian) appeared to arise from ancient interspecies transmission between monkeys infected with simian T-cell leukemia/lymphoma virus type I and humans. Furthermore, careful sequence analyses indicate that, within (or alongside) these three main genotypes, there are molecular subgroups defined clearly by several specific mutations but not always supported by phylogenetic analyses. Thus in Japan, there is evidence for two ancestral HTLV-I lineages: the classical Cosmopolitan genotype, representing approximately 25% of the HTLV-I present in Japan and clustering in the southern islands; and a related subgroup that we called the Japanese group. Similarly, within the Central African cluster, there are molecular subgroups defined by specific substitutions in either the env or the long terminal repeat. Furthermore, recent data from our laboratory indicate the presence of a new molecular phylogenetic group (fourth genotype) found among inhabitants of Central Africa, particularly in Pygmies. While geographical subtyes vary from 2 to 8% between themselves, HTLV-I quasi-species present within an individual appear to be much lower, with a variability of < 0.5%.

14 **Hanna JN, Ritchie SA, Phillips DA, Shield J, Bailey MC, Mackenzie JS, Poidinger M, McCall BJ, Mills PJ.**
An outbreak of Japanese encephalitis in the Torres Strait, Australia, 1995.
Med J Aust 1996 Sep 2;165(5):256-260.

OBJECTIVES: To determine the distribution of virus infection during an outbreak of Japanese encephalitis (JE) in the Torres Strait, and to describe the environmental factors facilitating the outbreak. DESIGN: Human and porcine serological surveys for JE virus activity throughout the Torres Strait, and mosquito and household surveys on the island of Badu. SETTING: The island of Badu (where the clinical cases occurred) and the other islands of the Torres Strait, Australia, during April-May 1995. RESULTS: The serological surveys identified recent JE virus infection among residents or domestic pigs on at least nine outer Torres Strait islands. A JE virus, confirmed by nucleotide sequencing, was isolated from two asymptomatic Badu residents. Virus isolations and mosquito surveys implicated *Culex annulirostris* as the major vector involved in the outbreak. There was prolific *Cx. annulirostris* breeding in a variety of water bodies close to and within the Badu community. Over half (53%) of the households kept pigs in pens, and many (63%) of the pigpens were situated near standing water; in 56% of these 'wet' pigpens *Cx. annulirostris* was breeding. CONCLUSIONS: There was evidence of widespread JE virus activity throughout the outer islands of the Torres Strait. We suggest that migratory birds and/or wind-blown mosquitoes could have imported the virus into the Torres Strait from a focus of viral activity, possibly in Papua New Guinea, thereby initiating the outbreak. A combination of environmental factors, with large numbers of domestic pigs in close proximity to human dwellings and mosquito breeding sites, undoubtedly facilitated the outbreak on Badu.

15 **Hodge AM, Dowse GK, Zimmet PZ.**
Microalbuminuria, cardiovascular risk factors, and insulin resistance in two populations with a high risk of type 2 diabetes mellitus.
Diabet Med 1996 May;13(5):441-449.

A total of 359 Wanigelas from Papua New Guinea and 1041 Nauruans had urinary albumin concentrations (UAC), serum insulin, and a number of cardiovascular disease (CVD) risk factors measured during population-based surveys of non-insulin-dependent diabetes mellitus. These data were used to explore the hypothesis that microalbuminuria is closely associated with insulin resistance and the metabolic syndrome. In both Nauruans and Wanigelas, worsening glucose tolerance was associated with increasing prevalence of micro- and macro-albuminuria. Within each category of glucose tolerance, microalbuminuria was associated with general worsening of cardiovascular risk factors including lipid concentrations, blood pressure and obesity, although few of the associations were statistically significant. Correlations between UAC and markers of insulin resistance (fasting insulin, fasting insulin/glucose ratio and HOMAS%, a computer-modelled estimate of insulin sensitivity) were weak and inconsistent irrespective of glucose tolerance status. Relationships between insulin sensitivity and urinary albumin in normoglycaemic Wanigelas and Nauruans, and in diabetic Nauruans, were no longer significant after adjusting for fasting glucose and body mass index. While microalbuminuria in Nauruans and Wanigelas was associated with cardiovascular risk factors irrespective of glucose tolerance, it seems unlikely on the basis of these results that the relationship is mediated through a common association with insulin resistance.

16 **Hodge AM, Montgomery J, Dowse GK, Mavo**

B, Watt T, Zimmet PZ.
A case-control study of diet in newly diagnosed NIDDM in the Wanigela people of Papua New Guinea.
Diabetes Care 1996 May;19(5):457-462.

OBJECTIVE - To study the association between diet and newly diagnosed NIDDM in the Wanigela people of Papua New Guinea, a population with an extraordinary susceptibility for NIDDM. RESEARCH DESIGN AND METHODS - We performed a case-control study of Wanigela people from an urban settlement (Koki). Case patients (n = 145) were asymptomatic subjects in whom NIDDM was newly diagnosed using a 2-h 75-g oral glucose tolerance test. Control subjects with glucose tolerance (n = 140) were group-matched on the basis of age and sex. A detailed food frequency questionnaire was used to determine energy and nutrient intakes. Nutrient intakes were compared directly and after calculation of residuals to correct for energy intake. Odds ratios for NIDDM were computed in relation to total energy and specific nutrient intakes, adjusting for age, sex, BMI, waist-to-hip ratio, and physical activity. RESULTS - There were no differences between case patients and control subjects in mean values of total energy-adjusted nutrient intakes. In logistic regression models, neither total energy nor any specific nutrients were associated with increased risk of NIDDM. When models were repeated with nutrients categorized by textiles, there were marginally significant associations with intakes of fiber (positive) and cholesterol, protein and sugar (negative). CONCLUSIONS - This study does not support the hypothesis that saturated fat is an independent risk factor for NIDDM. The weak associations of intakes of fiber and cholesterol with newly diagnosed NIDDM were in the opposite directions to those expected and are probably due to chance. Relative homogeneity of diet within a community, such as that found in Koki, makes it difficult to demonstrate risk factor-disease associations. However, changes in diet and reduced levels of physical activity accompanying urbanization undoubtedly contribute to the high prevalence of obesity observed in this community, and hence diet is likely to contribute to NIDDM risk at least by indirect means.

17 **Kaitilla S, Yambui A.**
Disaster management and government intervention in PNG: the case of Lae. *Disasters* 1996 Mar;20(1):61-67.

This paper describes government intervention in two flood disasters in Lae before and after the establishment of the Papua New Guinea disaster management body. It first describes the objectives behind the establishment of this, and second, it examines the organisational response to the 1983 and 1992 disasters in Lae. Disaster response in terms of relief operations is generally prompt and spontaneous but can at best be described as haphazard, unsystematic and often uncoordinated. Both national and provincial disaster committees are, in many aspects, ill equipped in terms of capabilities, skills and resources. Many disaster operations are unable to ensure an immediate return of the victims' lives to normality - the ultimate objective of any disaster management.

18 **Kere NK, Arabola A, Bakote'e B, Qalo O, Burkot TR, Webber RH, Southgate BA.**
Permethrin-impregnated bednets are more effective than DDT house spraying to control malaria in Solomon Islands.
Med Vet Entomol 1996 Apr;10(2):145-148.

A field trial compared DDT house-spraying with permethrin-impregnated bednets for malaria control in Solomon Islands from 1987 to 1991. Mortality rates of malaria vector *Anopheles farauti* in exit window traps were 11.6% from an untreated hut, 10.1% from a hut sprayed with DDT 2 g/m^2, and 98% of those from a hut in which the occupants used bednets treated with permethrin 0.5 g/m^2. Since bioassays of the DDT-sprayed walls (15 minute exposure in WHO standard test cones) gave 77% mortality of *An. farauti*, it was concluded that the insignificant impact of DDT could be explained by the exophilic behaviour of endophagic vectors, whereas the greater impact of permethrin was attributed to the more effective exposure of *An. farauti* females to the impregnated bednets - attracted by the occupants. The parous rate was higher indoors, except in the area with permethrin-impregnated bednets. It was therefore concluded that permethrin-impregnated bednets reduced the mean longevity of *An. farauti* and hence its vectorial capacity. The circumsporozoite (CS) antigen positivity rate of *An. farauti* in the DDT area was 0.18% outdoors, significantly less than 1.42% indoors. In the comparison area CS rates were 0.65% outdoors and 0.75% indoors. CS antigen was not detected in *An. farauti* from the bednet area, indicating the apparent prevention of malaria transmission. As DDT spraying was so much less effective, it was discontinued in 1993 and permethrin-impregnated bednets are now the principal malaria control method in Solomon Islands.

19 **Khan MA.**
Epidemiology of HLA-B27 and arthritis.
Clin Rheumatol 1996 Jan;15 Suppl 1:10-12.

HLA-B27 is present throughout Eurasia but is virtually absent among the genetically unmixed native populations of South America, Australia, and among equatorial and southern African Bantus and Sans (Bushmen). It has a very high prevalence among the native peoples of the circumpolar arctic and subarctic regions of Eurasia and North America, and in some regions of Melanesia. Results of recent epidemiologic studies of spondyloarthropathies in populations with a relatively high prevalence of B27 are also reviewed.

20 **Koella JC, Packer M.**
Malaria parasites enhance blood-feeding of their naturally infected vector *Anopheles punctulatus.*
Parasitology 1996 Aug;113(2):105-109.

We investigated the blood-feeding behaviour of a natural population of the human-feeding mosquito *Anopheles punctulatus* in Iguruwe, Papua New Guinea. In particular we investigated the

relationship between the mosquitoes' blood-feeding behaviour and their infection by the malaria parasites *Plasmodium falciparum* and *P. vivax*. Female mosquitoes were caught at 4 times of the night, the amount of blood they had obtained was measured and their status of infection was evaluated. Among uninfected mosquitoes the bloodmeal size steadily increased through the night, possibly because they were progressively less likely to be disturbed by human activity as the night drew on. Infected mosquitoes, on the other hand, tended to feed maximally at all times of the night. This suggests that infected mosquitoes were more tenacious in their blood-feeding behaviour, being either less readily disturbed during a bout of feeding (and thus feeding longer) or more likely to return to continue their feed following disturbance (and thus feeding several times). Either change would increase the parasites' rate of transmission. We conclude that in this natural situation the two species of malaria parasites modified the mosquitoes' behaviour with the effect of increasing their own transmission.

21 **Kriechbaum AJ, Baker MG.**
The epidemiology of imported malaria in New Zealand 1980 -1992.
NZ Med J 1996 Oct 25;109(1032):405-407.

AIM: To describe the epidemiology of imported malaria in New Zealand for the years 1980-1992. METHODS: Malaria cases were identified from notification data and hospital discharge data. Records were matched using the discharge date, area health board, age, sex and ethnicity of the case, producing an electronic database, which was analysed. RESULTS: During 1980-1992, a total of 867 cases of malaria were identified, an average of 67 per year. Only 43% of hospitalized cases were notified. There was a predominance of male cases (69.9%) and of cases aged 20-39 (60.2%). Over 60% of cases were European. Three cases (0.3%) were fatal. The leading source regions were Papua New Guinea, Solomon Islands and Vanuatu. South-East Asia, South Asia (India), East Asia (China) and Africa were source regions of more moderate importance. The species of malaria was recorded in 80% of cases of which *Plasmodium vivax* malaria was the most common (67.5% of cases), with *P. falciparum* accounting for 22.5% of cases. While the rate of malaria among arrivals to New Zealand declined between 1980 and 1992 there was a significant rise in the incidence of *P. falciparum* over this period. CONCLUSIONS: The New Zealanders most at risk are essentially those travelling to high-risk areas. There is a need to encourage the use of chemoprophylaxis for travellers to such regions - notably Vanuatu, Solomon Islands and Papua New Guinea. Medical practitioners should notify all cases of malaria to support effective surveillance of this disease.

22 **Lalloo DG, Trevett AJ, Black J, Mapao J, Saweri A, Naraqi S, Owens D, Kamiguti AS, Hutton RA, Theakston RD, Warrell DA.**
Neurotoxicity, anticoagulant activity and evidence of rhabdomyolysis in patients bitten by death adders (*Acanthophis* sp.) in southern Papua New Guinea.
QJM 1996 Jan;89(1):25-35.

Thirty-two patients with enzyme-immunoassay-proven death adder (*Acanthophis* sp.) bites were studied in Port Moresby, Papua New Guinea. Eighteen were envenomed; local signs were rare and none had incoagulable blood, but all except one had signs of neurotoxicity. Five (27.7%) envenomed patients required intubation and ventilation. One patient developed renal failure, previously undescribed following death adder bites. Laboratory investigations showed mild prolongation of prothrombin and partial thromboplastin times in some patients. In vitro studies showed that the venom contains anticoagulant activity, but does not cause fibrinogenolysis. In contrast to taipan envenoming, neurotoxicity did not progress after antivenom administration, and there was reversal of neurotoxicity, evident within 6 hours, in three severely envenomed patients treated less than 12 hours after the bite. One patient treated with antivenom and anticholinesterases had the most dramatic response to treatment; the optimum management of bites by this species may include prompt treatment with both antivenom and anticholinesterases in addition to effective first aid.

23 **Lalloo DG, Trevett AJ, Paul M, Korinihona A, Laurenson IF, Mapao J, Nwokolo N, Danga-Christian B, Black J, Saweri A, Naraqi S, Warrell DA.**
Severe and complicated falciparum malaria in Melanesian adults in Papua New Guinea.
Am J Trop Med Hyg 1996 Aug;55(2):119-124.

Severe falciparum malaria usually occurs in children, but also occurs in nonimmune migrants or partially immune adults in areas of unstable transmission. We have studied prospectively 70 adult patients with strictly defined severe malaria from the south coast of Papua New Guinea where malaria transmission is not intense. Only 19 (27.1%) were migrants from areas where malaria transmission does not occur; many other patients were periurban dwellers who had become infected after visits to their home villages. The most common clinical features were jaundice or hepatic dysfunction, impaired consciousness, renal failure, cerebral malaria, and anemia. Hypoglycemia was common following treatment with quinine. The overall case fatality rate was 18.6%; renal failure and cerebral malaria in particular were associated with a poor outcome. Reduction in mortality might be achieved by aggressive therapy of renal failure with earlier institution of dialysis; the use of preventive measures for immigrants or urban dwellers returning to high transmission areas might reduce the incidence of this dangerous disease.

24 **Laurenson IF, Trevett AJ, Lalloo DG, Nwokolo N, Naraqi S, Black J, Tefuarani N, Saweri A, Mavo B, Igo J, Warrell DA.**
Meningitis caused by *Cryptococcus neoformans* var. *gattii* and var. *neoformans* in Papua New Guinea.
Trans R Soc Trop Med Hyg 1996 Jan-Feb;90(1):57-60.

Eleven cases of cryptococcal meningitis were diagnosed and biotyped from September 1991 to August 1992 in Papua New Guinea (PNG). Seven isolates were *Cryptococcus neoformans* var. *gattii* from paediatric and adult patients, one with diabetes mellitus, and 4 were *C. neoformans* var. *neoformans* from adults, of whom 2 had human immunodeficiency virus type 1 (HIV-1) infection, and one each had tuberculosis and *Plasmodium vivax* malaria. Significant clinical findings were headache, fever, meningism, vomiting, photophobia, papilloedema and cranial nerve lesions. Five patients (45.5%) died; 3 of these were adults with var. *gattii* and 2 were men with both var. *neoformans* and HIV-1 infections. This prospective tropical study documents the emergence of *C. neoformans* var. *neoformans* in patients with HIV-1 infection in a country where previously var. *gattii* had predominated in the immunocompetent. There has been no earlier report of cryptococcosis in an HIV-1 seropositive patient in PNG. Despite presumed exposure to both varieties of *C. neoformans*, var. *gattii* infections had been most frequent. As HIV-1 spreads, the proportion of hosts infected with var. *neoformans* may rise. The course of meningitis caused by the 2 varieties of *C. neoformans* may differ, with mortality in the tropics remaining particularly high. In PNG the environmental source of *C. neoformans* remains elusive.

25 **Lauwo JA, Rai PP, Hill L.**
Pharmacy technicians and pharmacists in Papua New Guinea.
World Health Forum 1996;17(1):80-81.

26 **Lipscombe RJ, Beatty DW, Ganczakowski M, Goddard EA, Jenkins T, Lau YL, Spurdle AB, Sumiya M, Summerfield JA, Turner MW.**
Mutations in the human mannose-binding protein gene: frequencies in several population groups.
Eur J Hum Genet 1996;4(1):13-19.

Mannose-binding protein (MBP; mannan-binding protein, mannan-binding lectin) is a member of the collectin family of proteins and is thought to be important in innate immunity. We have previously shown high frequencies of two distinct mutations in codon 54 and codon 57 of exon 1 of the MBP gene in non-African and African populations, respectively. These result in low levels of the protein and an opsonic deficiency but the frequencies also suggest some selective advantage for low MBP levels. A third mutation in codon 52 occurs at a much lower frequency. We have now extended our earlier studies to other populations. In the south-west Pacific (Papua New Guinea and Vanuatu) neither the codon 52 nor the codon 57 mutation was detected and the codon 54 mutation was significantly less common (gene frequencies of 0.07 and 0.01, respectively) than in other non-African populations (gene frequencies 0.11-0.16). This could be explained by relatively recent admixture. The ancestral Melanesian population probably diverged some 50,000-60,000 years ago and our data suggest that the codon 54 mutation may have occurred after that even but before the divergence of European-Asian groups (40,000 years ago). Two further sub-Saharan populations were also studied: a group of Xhosa from South Africa were similar to Gambians, with a high gene frequency for the codon 57 mutation (0.27) and no evidence of the codon 52 or 54 mutations. In contrast, San Bushmen from Namibia had low frequencies of both the codon 57 mutation (0.07) and the codon 54 mutation (0.03). Again the codon 52 mutation was not found. This pattern is unique amongst sub-Saharan populations studied to date and suggests that this population may have been subjected to different selective pressures.

27 **Matthew PK, Kapua F, Soaki PJ, Watters DA.**
Trauma admissions in the southern highlands of Papua New Guinea.
Aust NZ J Surg 1996 Oct;66(10):659-663.

BACKGROUND: Trauma is a common cause of surgical admission in Papua New Guinea (PNG) but to date there has been no study of the whole trauma burden in provincial hospitals. METHODS: A 1-year retrospective study was made of all surgical admissions to the provincial hospital at Mendi. RESULTS: Trauma was the third commonest reason for hospital admission and accounted for 43% of all surgical cases. The common causes of injury were tribal fights (24%), domestic violence (14.3%), assault (16.7%), road accidents (14%) and domestic accidents (25.1%), which comprised falls, penetrating wounds and bites. Males accounted for two-thirds of cases, and 19% were children below the age of 16. Only 8 of 454 patients died (1.8%), because most trauma deaths occur before the patient reaches hospital. There were only 37 multiple injuries and only 5 patients had an injury severity score of greater than 16. The average inpatient stay for trauma admissions was 10.6 days. CONCLUSIONS: The cost of trauma in Mendi is difficult to calculate, but is enormous. In addition to 11% of the recurrent hospital expenditure (over US$1.1 million, excluding pharmaceuticals), the community costs include loss of earnings and productivity, as well as permanent disability. The social disruption caused by tribal fights results in cessation of the local economy, burning of aid posts, schools and homes and destruction of gardens for subsistence farming. Those who reach hospital alive tend to have single injuries and survive.

28 **Mgone CS, Koki G, Paniu MM, Kono J, Bhatia KK, Genton B, Alexander ND, Alpers MP.**
Occurrence of the erythrocyte band 3 (AE1) gene deletion in relation to malaria endemicity in Papua New Guinea.
Trans R Soc Trop Med Hyg 1996 May-Jun;90(3):228-231.

South-east Asian ovalocytosis status was determined in 1629 individuals originating from 12 different geographical areas of Papua New Guinea, representing different ethnic groups and degrees of malaria endemicity. This was achieved by using polymerase chain reaction amplification to demonstrate a 27 base pair deletion in the erythrocyte band 3 (AE1) gene. By using this method, the prevalence of erythrocyte band 3 gene deletion was determined to range from zero in both

the lowland inland area of Wosera, East Sepik Province and the highland region of Goroka, Eastern Highlands Province to 35% on the north coast of Madang Province. In general, the prevalence correlated well with altitude, being highest on the coast where malaria transmission is high, intermediate in the lowlands, and lowest in the non-malarious highlands. However, Wosera, a lowland area in the Sepik River Plains, which is hyperendemic for malaria, was an exception in that no ovalocytosis was detected. These results largely confirm the prevalence rates that have been reported in the past using microscopy. In keeping with the autosomal dominant mode of inheritance, the male:female ratio was 1.02 and no homozygote was detected, indicating that homozygosity for the ovalocytosis band 3 gene deletion is lethal.

29 **Miyake H, Kim HS, Kawai S, Yamane A, Kimura M, Wataya Y.**
DNA diagnosis of malaria using microtiter plate hybridization.
Nucleic Acids Symp Ser 1995;34:241-242.

We have developed a new diagnostic method 'microtiter plate-hybridization' (MPH) for the detection of human malaria parasites in which the target DNA sequence of the 18S ribosomal RNA gene is amplified by polymerase chain reaction and hybridized with the species-specific probes immobilized on a microtiter well. The PCR products bound on a well are visualized by the biotin-streptavidin system and the following chromogenic reaction. This method has allowed us to detect and identify the four species of human malaria parasites. We obtained blood samples by finger puncture from 435 donors in Japan, Solomon Islands and Vietnam. The results of our method showed good correlation with the results of Giemsa staining microscopy. Furthermore, we developed a new system for the detection of new human malaria parasites. This system involves an acridine orange (AO) staining microscopic examination and 'microtiter plate-hybridization'. Using the system, we found a case of new variant of *Plasmodium ovale* whose PCR-amplified DNA did not hybridize with a probe for typical *P. ovale* in Vietnam. These results indicate that our new method can serve as a useful tool for the clinical management, epidemiological research of malaria, and investigation of the new type of malaria parasite.

30 **Mola G, Sapuri M, Bergstrom S.**
Simplified care of women with prolonged or persistent retention of the placenta: the use of paracervical block.
Trop Doct 1996 Jul;26(3):116-118.

Thirty patients with prolonged or persistent retention of the placenta were randomized to either paracervical block or intravenous cocktail of pethidine and diazepam. When paracervical block worked, the analgesia produced was better than that usually achieved with intravenous cocktail of pethidine and diazepam. From a cost-benefit point of view paracervical block is preferable to intravenous cocktail. No significant side-effects occurred during the trial.

31 **Nakazawa M, Ohtsuka R, Kawabe T, Hongo T, Inaoka T, Akimichi T, Suzuki T.**
Iron nutrition and anaemia in a malaria-endemic environment: haematological investigation of the Gidra-speaking population in lowland Papua New Guinea.
Br J Nutr 1996 Sep;76(3):333-346.

Blood examination was conducted for the four Gidra-speaking village groups in Papua New Guinea, who were characterized by high Fe intake and high malaria prevalence with marked inter-village differences. The northern riverine villagers, whose Fe intake was higher than the other three village groups, did not suffer from Fe-deficiency anaemia in their malaria-endemic environment; nor did the inland villagers, with their second highest Fe intake and their malaria-free environment, suffer from Fe-deficiency anaemia. However, several individuals of the southern riverine village suffered from anaemia in a malaria-endemic environment, although their Fe intake was almost the same as the inland villagers'. A considerable proportion of the coastal villagers were anaemic, reflecting the lowest Fe intake and the highest malaria prevalence. An inter-village comparison of the relationships between haemoglobin levels and transferrin saturation revealed that the southern riverine villagers needed smaller amounts of circulating Fe for erythropoiesis than the northern riverine and inland villagers, reflecting the long-term human-environment conditions such as the density of malaria vectors and the people's dietary habits. Fe supplementation was not judged effective against hypoferraemia and/or anaemia in such a population. As the incidence of malaria had no significant long-lasting effect on Fe stores or circulating Fe concentration, but did have an effect on anaemia, the hypothesis that malaria causes a transfer of Fe from the blood to parenchymal tissues as a defence against infectious diseases was not supported.

32 **Nick A, Rali T, Sticher O.**
Biological screening of traditional medicinal plants from Papua New Guinea.
J Ethnopharmacol 1995 Dec 15;49(3):147-156.

Based on ethnopharmacological literature, 17 species of medicinal plants used in the traditional medicine in Papua New Guinea were collected. Extracts of different polarities were tested in a preliminary biological screening for their antimicrobial (*Escherichia coli*, *Bacillus subtilis*, *Micrococcus luteus* and *Penicillium oxalicum*) and molluscicidal activity against *Biomphalaria glabrata* as well as for their toxicity to brine shrimp. The pretreated plant extracts were also investigated for their ability to inhibit protein kinase C and tyrosine-specific protein kinase of epidermal growth factor receptor. Furthermore, all plants were screened for the presence of alkaloids.

33 **Norgan NG.**
Changes in patterns of growth and nutritional anthropometry in two rural modernizing Papua New Guinea communities.
Ann Hum Biol 1995 Nov-Dec;22(6):491-513.

In Papua New Guinea growth is slow and adult

body size is small. This is often considered an adaptation to the low energy and nutrient densities of the diets in which tubers and root crops predominate. Social and economic change have been a feature of Papua New Guinea, particularly in recent times. In 1969 the human biology of two contrasting communities, one coastal with a long interaction with external influences and cash cropping, the other a highland community with a history of more recent contacts, was investigated. In 1984 repeat measurements of nutritional anthropometry were made on the villagers and those born in the previous 14 years. The coastal boys and girls were taller and heavier in 1984 compared with 1969 but remained below the 5th percentile of reference North American data. Increases were also found in the highland children, particularly girls, but significantly lower means were found in children under 2 years. Although stunting was less common in the coastal children in 1984, 156 cases (37%) versus 175 cases (43%) ($\chi^2 = 7.69$, $p < 0.05$), wasting increased in prevalence from 11 cases (3%) to 20 cases (5%) (n.s.), either because of recent food shortages or because height change was greater than weight change. Stunting rose by 3% to 53% (165 cases) in highland children ($\chi^2 = 7.24$, $p < 0.05$). In adults, heights were 2-3 cm greater in 1984 than 1969, and weights 2-3 kg greater, with peak differences in the 30-39-year-olds. The percentage of coastal women with body mass indices of less than 18.5 kg/m^2 fell from 32% to 15% ($\chi^2 = 27.4$, $p < 0.01$). Mid-upper arm circumferences and triceps skinfolds were significantly higher in all groups. National and regional data suggest that the communities were better off in 1984 than 1969, but social and economic changes were associated with variable benefits in growth and nutritional status.

34 **Painter D, Clouston D, Ahn E, Kirwan P, Ledoux F, Tivollier JM, Bouvier P, Friend J, Coste P, Masselot JP.**
The pattern of glomerular disease in New Caledonia: preliminary findings.
Pathology 1996 Jan;28(1):32-35.

202 renal biopsies from 181 patients in New Caledonia were classified into either primary glomerulonephritis or glomerulopathy associated with systemic disease. These were then compared with 670 similar biopsies from 634 in-patients at Sydney's Royal Prince Alfred Hospital (RPAH). The most prevalent primary glomerular disease among the New Caledonian cases was focal segmental glomerulosclerosis, compared with IgA disease among the RPAH cases. Mesangiocapillary glomerulonephritis, post-infectious glomerulonephritis and minimal lesion nephropathy were all relatively commoner among the New Caledonian biopsies, but the numbers were small. The most prevalent systemic glomerulopathy in the New Caledonian cases was amyloidosis. This was the least common among our RPAH group. Diabetes mellitus and lupus nephritis were also slightly more common in the New Caledonian group. Focal necrotizing/crescentic glomerulonephritis was unusual in the New Caledonian samples, while it was the most common systemic glomerulopathy among the RPAH group.

35 **Pridmore S, Rao G, Abusah P.**
Hereditary spastic paraplegia with dementia.
Aust NZ J Psychiatry 1995 Dec;29(4):678-682.

OBJECTIVE: Hereditary spastic paraplegia (HSP) with dementia is a very rare condition. The aim of the paper is to present the first report of HSP in a Fijian Indian family. METHOD: A psychiatrist and a general physician examined the affected members of the family on five occasions over three years. RESULTS: There are three affected individuals in a sibship of seven. The parents are without symptoms and the marriage is non-consanguineous. The course of the disease has been remarkably similar. All subjects were healthy and performing well in the early years of school. In two, symptoms of cognitive loss preceded difficulty with ambulation and in the third, these symptoms appeared concurrently. All subjects had both symptoms by 13 years of age; they were unable to ambulate independently by the mid to late teens, at which time there was dysarthria, spastic paraplegia and dementia. One subject suffered a three-month episode of hypomanic behaviour. Over the three-year study period deterioration was slight but noticeable. CONCLUSIONS: It is possible that HSP is more commonly associated with pre-senile dementia than is currently recognised. HSP with dementia is a very rare cause of failing school performance. Physical examination of the patient and other family members is indicated if this diagnosis is being considered.

36 **Pridmore S, Ryan K, Blizzard L.**
Victims of violence in Fiji.
Aust NZ J Psychiatry 1995 Dec;29(4):666-670.

OBJECTIVE: The aim of the paper is to examine the statistics for violence performed by self or others in Fiji during the period 1969-1989 in the following sub-classifications: (1) fatal vs non-fatal; (2) Fijian vs Indian; and (3) male vs female. METHOD: Crude rates per 100,000 were determined and the data sets were statistically examined. RESULTS: (1) Violence by self, which includes suicide and non-fatal injury by self, has significantly increased; (2) Indian violence by self has increased in both males and females; (3) suicide is 4 times more common than homicide, whereas non-fatal injury by others is 4 times more common than non-fatal injury by self; (4) non-fatal injury by self is 8 times more common than suicide, whereas non-fatal injury by others is over 100 times more common than homicide; (5) Indian violence by self is 6 times more common than Fijian violence by self, whereas Fijians experience violence by others 2.5 times more commonly than Indians; (6) female violence by self is 1.5 times more common than male violence by self, whereas male violence by others is 3 times more common than female violence by others; (7) the rates of suicide and homicide are low by international standards; and (8) Fijian violence by self is particularly low, but consistent with the low suicide rate of the indigenous populations in

surrounding geographical regions. CONCLUSION: Our findings suggest that racial differences in violence are likely to be due to cultural factors.

37 **Reeder JC, Rieckmann KH, Genton B, Lorry K, Wines B, Cowman AF.**
Point mutations in the dihydrofolate reductase and dihydropteroate synthetase genes and in vitro susceptibility to pyrimethamine and cycloguanil of *Plasmodium falciparum* isolates from Papua New Guinea.
Am J Trop Med Hyg 1996 Aug;55(2):209-213.

Plasmodium falciparum isolates from 24 Papua New Guinean patients with symptomatic malaria were tested for susceptibility to pyrimethamine and cycloguanil. Thirteen isolates were sensitive to both agents and the remainder exhibited varying degrees of resistance. No isolates were found to be resistant to one agent yet sensitive to the other and a positive correlation suggesting cross-resistance was found. Parasite DNA extracted from the patients' stained blood slides was amplified and sequenced to examine point mutations in the dihydrofolate reductase (DHFR) and dihydropteroate synthetase genes (DHPS) associated with antifolate resistance. All resistant isolates possessed mutations in the DHFR gene at codon 108, the majority changing from Ser to Asn, but one isolate from Ser to Thr, a change not previously reported in field isolates. A second mutation of the DHFR gene at Cys-59 to Arg was present in isolates with higher level resistance, but not exclusively so. Sequencing the DHPS gene, as a predictor of sulfadoxine resistance, revealed only one example that was different from DHPS alleles of sensitive isolates.

38 **Rogerson SJ, Beck HP, Al-Yaman F, Currie B, Alpers MP, Brown GV.**
Disruption of erythrocyte rosettes and agglutination of erythrocytes infected with *Plasmodium falciparum* by the sera of Papua New Guineans.
Trans R Soc Trop Med Hyg 1996 Jan-Feb;90(1):80-84.

People living in areas endemic for *Plasmodium falciparum* develop humoral responses which may contribute to protection against clinical disease but the specificity of such protective antibody responses remains to be defined. Antibodies disrupting erythrocyte rosettes have been associated with protection against cerebral malaria, and antibodies agglutinating infected erythrocytes with reduced episodes of clinical disease. We have studied the capacity of serum from Papua New Guinean adults and children with a spectrum of malaria exposure, including children and adults at the time of clinical disease, to disrupt erythrocyte rosettes and cause agglutination of infected erythrocytes. Using a single parasite isolate, almost all sera from adults from highly endemic areas agglutinated infected erythrocytes, and the majority disrupted rosettes, in some cases at greater titres than hitherto described. There was a correlation between rosette disruption and agglutination in highly exposed adults. Rosette-disrupting antibodies were equally frequent in children with cerebral and uncomplicated malaria. Antibodies causing rosette disruption were frequent only in adults with a long history of malarial exposure. Rosette-disrupting antibodies do not appear to protect Papua New Guinean children or adults against cerebral malaria.

39 **Saint Yves IF.**
Family planning in the Solomon Islands.
Aust NZ J Public Health 1996 Jun;20(3):321.

40 **Schieffelin EL.**
Evil Spirit Sickness, the Christian disease: the innovation of a new syndrome of mental derangement and redemption in Papua New Guinea.
Cult Med Psychiatry 1996 Mar;20(1):1-39.

This essay analyses the cultural and historical processes involved in the emergence of Evil Spirit Sickness, a form of mental or behavioral derangement that appeared among the Bosavi people of Papua New Guinea during a period of intense Christian evangelization and religious excitement. It explores the emergence of the disorder both as a form of psychological breakdown under the burden of intolerable life stress and a socially innovated, ritually structured, and performatively achieved mode of seeking redemption in a Papuan Christian context.

41 **Seaton RA, Hamilton AJ, Hay RJ, Warrell DA.**
Exposure to *Cryptococcus neoformans* var. *gattii*: a seroepidemiological study.
Trans R Soc Trop Med Hyg 1996 Sep-Oct;90(5):508-512.

An enzyme-linked immunosorbent assay was developed to study prevalence of immunoglobulin G (IgG) antibody to non-capsular *Cryptococcus neoformans* var. *gattii* antigen in a population of healthy Papua New Guinea (PNG) controls and patients. Patients with acute *C. neoformans* var. *gattii* meningitis had elevated levels of IgG which declined significantly following treatment ($p = 0.034$). Levels in the sera of convalescent patients were significantly higher than those in PNG controls ($p < 0.001$), which in turn were significantly higher than in a UK control group ($p < 0.001$). Clear differences were observed amongst the PNG controls. Adults had significantly higher levels than children ($p = 0.002$) and men had significantly higher levels than women ($p = 0.047$). No difference was observed between levels in patient-related and unrelated controls. IgG responses in PNG controls mirror the prevalence of disease in this population. It is postulated that exposure to *C. neoformans* var. *gattii* is less common in children and women due to some as yet unidentified behavioural difference and that exposure occurs away from the home environment.

42 **Seaton RA, Naraqi S, Wembri JP, Warrell DA.**
Predictors of outcome in *Cryptococcus neoformans* var. *gattii* meningitis.
QJM 1996 Jun; 89(6):423-428.

In Papua New Guinea, *Cryptococcus neoformans* var. *gattii* meningitis has a high fatality rate even

in immunocompetent patients. Our retrospective study attempted to identify markers of poor prognosis. Of 88 immunocompetent patients, 30 (34.1%) died, usually soon after admission, and mortality was higher in men ($p = 0.025$) and older patients ($p = 0.039$). Death was associated with altered consciousness ($p < 0.001$), a history of convulsions prior to treatment ($p = 0.002$) and a maximum systolic blood pressure of > 150 mmHg ($p = 0.017$). These data suggest that death results from raised intracranial pressure and subsequent tentorial herniation. However, CSF opening pressure measured on admission was raised in 29/36 (81%) patients and did not predict outcome. In survivors, relapse was uncommon and was not predicted by discharge serum cryptococcal antigen titres, which were frequently raised on completion of therapy in asymptomatic patients. Mortality may be reduced if efforts are made to lower intracranial pressure in those patients who present with markers of poor prognosis.

43 **Seaton RA, Wembri JP, Nwokolo NC.**
Clinical associations with human T-cell lymphotropic virus type I in Papua New Guinea.
Med J Aust 1996 Oct 7;165(7):403, 406.

44 **SenGupta SK, Ades CJ, Cooke RA.**
Malignant lymphomas in Papua New Guinea: an immunohistological study of 125 cases.
Pathology 1996 Jan;28(1):36-38.

A total of 179 cases of lymphoma, both nodal and extranodal, recorded in the Papua New Guinea Tumor Registry were reviewed and classified by the updated Kiel classification. 15 (8.4%) were Hodgkin's disease, 39 (21.8%) probable Burkitt's lymphoma (poorly preserved), 46 (25.7%) Burkitt's lymphoma, 33 (18.4%) Burkitt's-like lymphoma, 36 (20.1%) other B-cell subtypes and 10 (5.6%) T-cell lymphoma. No case of follicular B-cell lymphoma was encountered.

45 **Sharaz J.**
Motherhood in Papua New Guinea.
Midwives 1996 Apr;109(1299):102-103.

46 **Shimouchi A, Yaohua D, Zhonghan Z, Rabukawaqa VB.**
Effectiveness of control programs for pneumonia among children in China and Fiji.
Clin Infect Dis 1995 Dec;21(Suppl 3):S213-S217.

This article summarizes the implementation and efficacy of the World Health Organization's standard case management program for pediatric pneumonia in three counties in China and in the Western Division of Fiji. The information provided through this program was simple enough to be understood by parents and health care workers with a basic educational background. The program reduced mortality from pneumonia even when implemented through the existing health care system in a relatively poor county in China. The factors important in the success of the program included improved recognition of the signs of childhood pneumonia by parents, earlier presentation of children with these signs to health care facilities, availability of antimicrobial agents at the primary health care level, and rational decisions by health care workers about the use of these agents.

47 **Shirakawa T, Nishiyama K, Poh San L, Ishida T, Matsuo M.**
Comparison of insertion rate of L1 retroposon into intron 30 of the neurofibromatosis type 1 gene in seven Asian and Pacific populations.
Jpn J Hum Genet 1996 Mar;41(1):209-214.

The allele frequency of a L1 retroposon insertion into intron 30 of the neurofibromatosis type 1 (NF1) gene was determined by analyzing amplified fragment lengths in seven Asian or Pacific populations; namely, Japanese, Chinese, Indian, Malay, Filipino, Indonesian and New Guinean. Nearly 100 chromosomes from each group were analyzed. The presence of the L1 insertion was identified by the appearance of an abnormally large PCR-amplified product. The insertion frequency varied from 0.45 to 0.75, depending on the population group. Malay and Indonesian populations were found to have the highest insertion frequencies (0.75 and 0.72, respectively), while the wild-type genotype was more prevalent in Indians. The lowest insertion frequency (0.45), observed in Indians, was nearest to that reported in Westerners (0.35). The different L1 insertion frequencies found in Asian and Pacific groups reflect a major divergence in these human populations. Japanese and Chinese populations showed the highest heterozygosity (0.50), suggesting the usefulness of this polymorphism in linkage analysis in these populations.

48 **Simondon KB, Gartner A, Berger J, Cornu A, Massamba JP, San MJ, Ly C, Missotte I, Simondon F, Traissac P, Delpeuch F, Maire B.**
Effect of early, short-term supplementation on weight and linear growth of 4-7 month old infants in developing countries: a four-country randomized trial.
Am J Clin Nutr 1996 Oct;64(4):537-545.

The effect of supplementation on growth was tested by means of four similar controlled randomized trials in the Congo (n = 120), Senegal (n = 110), Bolivia (n = 127) and New Caledonia (n = 90). Four-month-old infants were randomly allocated to supplement or control groups. A cereal-based precooked porridge was offered twice daily for 3 months and consumption was monitored. Both groups were free to eat local food. At 7 months of age, all infants were still breast-fed in the Congo, Senegal and Bolivia compared with 47% in New Caledonia. Mean daily consumption of the supplement varied among countries (558-790 kJ/d). Mean length at 4 months was lowest in Bolivia, higher in Senegal and the Congo, and near the National Center for Health Statistics reference in New Caledonia. The mean 4-7 month length increment was 0.48 cm higher for supplemented than for control infants in Senegal ($p < 0.05$), whereas weight increments did not differ. No significant effect was found in the other countries.

49 **Stark R.**
Ethical considerations in rural health nursing.

Med Law 1996;15(2):277-282.

Nurses are the health workers most frequently found providing primary health care services in rural communities throughout the world. In these settings, often with limited resources and far from professional support systems, nurses may encounter ethical dilemmas quite different from those experienced by their colleagues in urban hospital settings. Consider the following example from a remote island community. A young nurse with two years experience in an urban hospital is posted to a remote village. In this country there are very few doctors, so nurses diagnose and treat common health problems. On this day a traditional political leader, a middle-aged man, is brought to the small clinic by his adult son to be treated for his cough. Other patients are waiting to be seen, but the son makes it clear that he expects his father to be cared for immediately. The nurse doesn't think it is right to give preferential treatment, but the other patients back away and she defers to the son's demands. The nurse examines the man and concludes that he has a common viral infection requiring only symptomatic treatment. When she tries explaining this to the patient, he becomes annoyed and insists that what he needs is a penicillin injection. That's how the last nurse working in this clinic had treated him when he was sick and he had recovered within days. Finally, the young nurse overwhelmed by his age and status and under pressure from his family gives the injection. Shortly afterwards the patient collapses in shock and very nearly dies. The family blamed the nurse, and the community council demanded that she be removed. The case was eventually investigated by the authorities, and the nurse was formally reprimanded for giving the patient an unnecessary injection which caused him harm. Rural nurses - indeed all rural health workers - need support in order to maintain ethical standards in practice. The purpose of this paper is to examine four potential sources of such support: nursing education programs; the Ministries of Health; the law; and the professional nursing organization.

50 **Thong KL, Passey M, Clegg A, Combs BG, Yassin RM, Pang T.**

Molecular analysis of isolates of *Salmonella typhi* obtained from patients with fatal and nonfatal typhoid fever.

J Clin Microbiol 1996 Apr;34(4):1029-1033.

Molecular characterization of a total of 52 human isolates of *Salmonella typhi* from Papua New Guinea was performed by using pulsed-field gel electrophoresis (PFGE) after digestion of chromosomal DNA with three restriction endonucleases, XbaI (5'-TCTAGA-3'), AvrII (5'-CCTAGG-3') and SpeI (5'-ACTAGT-3'). Of the 52 isolates tested, 11 were obtained from patients with fatal typhoid fever and 41 were obtained from patients with nonfatal disease. The 52 isolates showed limited genetic diversity as evidenced by only three different PFGE patterns detected following digestion with XbaI (patterns X1 to X3; F [coefficient of similarity] = 0.86 to 1.0), four patterns detected following digestion with AvrII (patterns A1 to A4; F =0.78 to 1.0), and two patterns detected following digestion with SpeI (patterns S1 and S2; F = 0.97 to 1.0). Of the 52 isolates, 37 were phage typed, and all belonged to phage type D2. All 11 isolates obtained from patients with fatal typhoid fever were identical (F = 1.0) and possessed the PFGE pattern combination X1S1A1, whereas the 41 isolates from patients with nonfatal typhoid fever had various PFGE pattern combinations, the most common being X2S1A2 (39%), X1S1A1 (24%) and X1S1A2 (15%). Thus all the isolates from patients with the fatal disease had the X1 and A1 patterns, whereas the majority of the isolates from patients with nonfatal typhoid fever possessed the X2 and A2 patterns. The data suggest that there is an association among strains of *S. typhi* between genotype, as assessed by PFGE patterns, and the capability to cause fatal illness. Analysis of blood and fecal isolates of *S. typhi* from the same patient also indicated that some genetic changes occur in vivo during the course of infection.

51 **Tracer D.**

Lactation, nutrition and postpartum amenorrhea in lowland Papua New Guinea.

Hum Biol 1996 Apr;68(2):277-292.

Prolonged on-demand breast feeding is known to delay the resumption of postpartum ovarian cyclicity. At present, however, little is known about the factors that influence the effectiveness of breast feeding as a natural contraceptive. Here, I examine the effects of maternal nutritional status on the duration of postpartum amenorrhea in two socioeconomic groups of Au forager-horticulturalists of lowland Papua New Guinea. Although women in both groups continue to breast-feed their offspring for approximately three and one-half years, well-nourished wage-earning Au women experience their first postpartum menses just over one year earlier (median = 12.5 months) than their more poorly nourished traditional counterparts (median = 26.6 months). Probit analyses are used to demonstrate that, even after controlling for time since delivery, maternal age, parity and supplementation of infants' diets, the duration of postpartum amenorrhea is significantly ($p < 0.05$) negatively associated with indexes of maternal fat mass. No associations between indexes of maternal lean body mass and the duration of postpartum amenorrhea were found. The results of this study suggest that components of maternal nutritional status, in particular, adiposity, play an important role in influencing fecundity in human populations.

52 **Verma N.**

Trabeculectomy and manual clot evacuation in traumatic hyphaema with corneal blood staining.

Aust NZ J Ophthalmol 1996 Feb;24(1):33-38.

BACKGROUND: The management of traumatic hyphaema with raised intraocular pressure and corneal blood staining is difficult. Residual blood clots after anterior chamber washout are responsible for sustained postoperative elevation of intraocular pressure, even after trabeculectomy and clot evacuation. METHODS: Thirty-five patients with traumatic hyphaema, elevated intraocular

pressure and varying degrees of corneal blood staining underwent a combined trabeculectomy with manual clot evacuation from the anterior chamber in a general hospital. RESULTS: The postoperative control of intraocular pressure was found to be adequate in all patients at the end of two months. Examination of the posterior segment was made possible earlier. Although the procedure is more complex, no significant complications were encountered. CONCLUSION: In patients presenting with traumatic hyphaema, secondary glaucoma and corneal blood staining, trabeculectomy with manual extraction of the clot through a large incision appears to be a safe and reliable procedure where medical therapy fails to control the intraocular pressure.

53 **Wagner G, Bhatia K, Board P.**
Glucose-6-phosphate dehydrogenase deficiency mutations in Papua New Guinea.
Hum Biol 1996 Jun;68(3):383-394.

We characterize the molecular basis of two G6PD deficiency variants from Papua New Guinea (PNG) and use the information to examine the extent of molecular heterogeneity underlying G6PD variation in the country. The Wosera G6PD enzyme was found in a male from the East Sepik Province; it had unique biochemical characteristics compared with other previously described G6PD variants from PNG. The Wosera mutation occurred in exon 12 and led to an Arg463→His substitution. The Kalo mutation, which led to G6PD deficiency in a male from the Central Province along the south coast of PNG, was found in exon 11 and resulted in an Arg454→Cys substitution. Although screening for the two molecular mutations using sequence-specific oligonucleotide (SSO) hybridization revealed a wide distribution for the Kalo variant along the coastal belt, no additional copy of the Wosera variant was found in a range of samples. Moreover, 28 G6PD genes from various parts of PNG failed to hybridize with oligonucleotides encoding either the Kalo or Wosera variants. This suggests that more than the two G6PD mutations exist in PNG, confirming the previously noted biochemical heterogeneity of G6PD deficiency in the Melanesian populations of this region.

54 **Warrell DA, Hudson BJ, Lalloo DG, Trevett AJ, Whitehead P, Bamler PR, Ranaivoson M, Wiyono A, Richie TL, Fryauff DJ, O'Shea MT, Richards AM, Theakston RD.**
The emerging syndrome of envenoming by the New Guinea small-eyed snake *Micropechis ikaheka*.
QJM 1996 Jul;89(7):523-530.

The New Guinea small-eyed or ikaheka snake, *Micropechis ikaheka*, which occurs throughout New Guinea and some adjacent islands, is feared by the indigenes. The first proven human fatality was in the 1950s and this species has since been implicated in many other cases of severe and fatal envenoming. Reliable attribution of envenoming to this species in victims unable to capture or kill the snake recently became possible by the use of enzyme immunoassay. Eleven cases of proven envenoming by *M. ikaheka*, with two fatalities, were identified in Papua New Guinea and Irian Jaya. Five patients showed no clinical signs of envenoming. The other six patients showed symptoms typical of envenoming by other Australasian elapids: mild local swelling, local lymphadenopathy, neurotoxicity, generalized myalgia, spontaneous systemic bleeding, incoagulable blood and passage of dark urine (haemoglobinuria or myoglobinuria). Two patients developed hypotension and two died of respiratory paralysis 19 and 38 hours after being bitten. In vitro studies indicate that the venom is rich in phospholipase A2, is indirectly haemolytic, anticoagulant and inhibits platelets, but is not procoagulant or fibrinolytic. It shows predominantly post-synaptic neurotoxic and myotoxic activity. Anecdotally, Commonwealth Serum Laboratories (CSL) death adder antivenom has proved ineffective whereas CSL polyvalent antivenom may be beneficial. Anticholinesterase drugs might prove effective in improving neuromuscular transmission and should be tested in patients with neurotoxic envenoming.

55 **Watters DA.**
The future of surgery in Papua New Guinea and the South Pacific.
Aust NZ J Surg 1996 Sep;66(9):580-583.

Surgery in the South Pacific is different in many respects from surgery in Australia and New Zealand. It is primarily the surgery of trauma, infection, advanced malignancy, hollow-tube obstruction and congenital abnormalities. Specific tropical infections such as tuberculosis, typhoid, pigbel and amoebiasis occur regularly but constitute only a small proportion of all cases. The patients tend to be young, rural and poor, and often present late because access to surgical services is limited. The treatment patients receive is also compromised by a lack of resources - the result of underfunding and inefficient administration. Standards for appropriate surgical practice should be determined in-country and based at least on surgical audit and clinical studies. Even though Western diseases are emerging in the tropics, the best management may sometimes be different. Training of national surgeons is a priority if a sustainable surgical service is to be established. Such training is more effectively carried out in the home country, or at least in one with similar pathology and problems, rather than overseas. Project aid should support these schemes and encourage regional cooperation through the Fiji and Papua New Guinea medical schools. There remains an important role for visiting surgical specialists, but they need to ensure that they transfer skills and encourage the professional development of promising local doctors rather than simply focusing on treating patients.

56 **Williams TN, Maitland K, Bennett S, Ganczakowski M, Peto TE, Newbold CI, Bowden DK, Weatherall DJ, Clegg JB.**
High incidence of malaria in alpha-thalassaemic children.
Nature 1996 Oct 10;383(6600):522-525.

The alpha+-thalassaemias are the commonest known human genetic disorders, affecting up to 80% of some populations. Although there is good evidence from both epidemiological and clinical studies that these gene frequencies reflect selection by, and protection from, malaria, the mechanism is unknown. We have studied the epidemiology of malaria in childhood on the southwestern Pacific island of Espiritu Santo in Vanuatu and here we report that, paradoxically, both the incidence of uncomplicated malaria and the prevalence of splenomegaly, an index of malaria infection, are significantly higher in young children with alpha+-thalassaemia than in normal children. Furthermore, this effect is most marked in the youngest children and for the non-lethal parasite *Plasmodium vivax*. The alpha+-thalassaemias may have been selected for their ability beneficially to increase susceptibility to *P. vivax*, which, by acting as a natural vaccine in this community, induces limited cross-species protection against subsequent severe *P. falciparum* malaria.

57 **Williams TN, Maitland K, Ganczakowski M, Peto TE, Clegg JB, Weatherall DJ, Bowden DK.**
Red blood cell phenotypes in the alpha+ thalassaemias from early childhood to maturity.
Br J Haematol 1996 Nov;95(2):266-272.

The alpha+ thalassaemias are the most common single gene disorders of humans, yet little is known about their haematological characteristics in childhood. Blood samples have been collected randomly from more than 2000 individuals in village communities in Vanuatu in the South-West Pacific and analysed for alpha thalassaemia and associated haematological changes. Here we describe the haematological effects of the alpha+ thalassaemias from early childhood through to maturity in this population. Mean cell volume (MCV) and mean cell haemoglobin (MCH) levels in individuals of normal, heterozygous and homozygous genotype differed significantly from one another throughout the entire age range ($2p < 0.05$). In contrast, haemoglobin levels in heterozygous and homozygous individuals were well maintained throughout development. Adults of normal genotype attain Hb levels which are indistinguishable from Caucasian reference values, a finding made all the more remarkable given the high frequency of clinical malaria in this population. It is clear from these findings that haematological data are valuable in screening for carriers of alpha+ thalassaemia in this population. MCH is clearly the most sensitive discriminator. None of the homozygous adults tested had an MCH of > 27 pg, whereas < 10% of normals had a value of < 27 pg. These data provide reference values for areas in which the alpha+ thalassaemias are common and often confused with iron-deficiency anaemia.

58 **Yang JC, Blanton RE, King CL, Fujioka H, Aikawa M, Sam-Yellowe TY.**
Seroprevalence and specificity of human responses to the *Plasmodium falciparum* rhoptry protein Rhop-3 determined by using a C-terminal recombinant protein.
Infect Immun 1996 Sep;64(9):3584-3591.

Rhoptry proteins participate in invasion of erythrocytes by malaria parasites. Antibodies to some of these proteins can inhibit invasion and partially protect monkeys from disease. To examine human serological responses to the 110-kDa component (Rhop-3) of the high-molecular-weight rhoptry protein complex, two cDNA clones corresponding to Rhop-3 were identified by immunologic screening. A recombinant protein representing the C-terminal one-third of the Rhop-3 was used to assess the seroprevalence to this protein in geographically isolated populations with different patterns of malaria transmission. The immunoglobulin G (IgG) positivity rate for the recombinant Rhop-3 in an enzyme-linked immunosorbent assay was 30% in an area of Papua New Guinea where malaria is holoendemic. In Kenya, the prevalence rates were 43 and 36%, respectively, in an area of hyperendemicity and an area of seasonal transmission. By contrast, rates of IgG seroprevalence to an extract of Gambian strain of *Plasmodium falciparum* were 48, 90 and 97%, respectively, in these populations. In these areas, the pattern of antibody recognition of Rhop-3 is more similar (1.7-fold maximum difference) than the parasite extract (5-fold difference). The difference in seroresponses may represent antigenic polymorphism in different parasite strains, while their similarity for the Rhop-3 fragment may represent conservation of this protein. Recombinant- and parasite extract-specific IgG was not found in individuals infected only with *Plasmodium vivax*. Cross-reactivity was seen in the IgM assay. In Mombasa (Kenya) maternal and cord Rhop-3-specific IgG activities were similar. Fetal antigen-specific IgM reactivity was generally undetectable for all antigens.

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