Orang Asli (Indigenous Malaysian) Biomedical Bibliography
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As in my past ventures into bibliography writing, I am indebted to many people, especially those living in Malaysia and those who have worked diligently on Orang Asli problems. Special thanks go to Edith Mirante and Colin Nicholas.

Glossary/abbreviations
AIDS Acquired immune deficiency syndrome
AJTMH American Journal of Tropical Medicine and Hygiene
Anon. anonymous
Bkt. Bukit (hill)
Bull. Bulletin
Dept. Department
DNA Deoxyribose nucleic acid; the genetic material
E. East, or Escherichia in E. coli
Ed. Editor, edition
e. g. for example
et al. and others; used in cases of more than three authors
G6PD Glucose-6-phosphate dehydrogenase deficiency
Hb Hemoglobin
HIV Human immunodeficiency virus
HLA Human leucocyte antigen
IMR Institute for Medical Research, Kuala Lumpur
Internat. International
J. Journal
JHEOA Jabatan Hal Ehwal Orang Asli (Dept. of Orang Asli Affairs), earlier JOA
Kg. Kampung (village)
Med. Medicine, medical
MJM Medical Journal of Malaysia, or (earlier) Malaya
mtDNA mitochondrial DNA
N. North
no. number
NY New York
Orang Asli the indigenous people of West Malaysia
p., pp. page; pages
post or/pos originally an inland military fort; now a core service area
SEAJTMPH Southeast Asian Journal of Tropical Medicine and Public Health
S. South
Sch. School
Sci. Science
SNP single nucleotide polymorphism
Soc. Society
SSM Social Science and Medicine
TB tuberculosis
TRSTMH Transactions Royal Society of Tropical Medicine and Hygiene
Univ. University
Vol. Volume
W. West
WHO World Health Organization
Introduction

The Orang Asli are the first people of the Malayo-Thai Peninsula. The first edition of the Orang Asli biomedical bibliography was appended in a book; the second edition was part of a general bibliography on Orang Asli. This third edition includes more recent studies but is also timely because Orang Asli healthcare has plummeted over recent decades. New revelations have made this situation widely known. Some officials in West Malaysia have chosen to ignore the problem, others have denied it exists, and still others have said that Orang Asli are dirty or negligent and thus justify blaming them for their poor health. Officialdom takes a lordly stance with all policies and practices being “top down.” There is no attempt at “bottom up” solutions. The top-down measures include eviction of Orang Asli from their native lands to make way for golf courses, palm oil plantations, and cities. Orang Asli are moved into small quarters on bulldozed tracts with scant access to areas for foraging, fishing, or even gardening, but with promises of modern infrastructure. New-village medical clinics may indeed be built but too often no doctor or nurse is ever seen there. The Gombak hospital near Kuala Lumpur, once dedicated to Orang Asli healthcare, is now run largely by non-Orang Asli for non-Orang Asli. Doctors and nurses there can be prejudiced against Orang Asli, ignorant of their cultures and languages, and derelict in their duty to provide basic care to Orang Asli, both in hospital and in home villages. For example, when a British dentist who worked at the hospital in the 1960s revisited it decades later, he learned that Gombak dentists were primarily interested in the income level of dentists in England.

Another excuse for poor Orang Asli healthcare, besides invoking fault-finding, is that many of them live in remote areas. This excuse is belied by the situation in the Malaysian state of Sarawak, which is just as vast and has fewer roads but more mountainous terrain. There, rural health clinics are manned conscientiously and competently, and many distant villages have volunteer health promators equipped with medical kits. When a Sarawak medical official was asked by a West Malaysian colleague how he got people to show up for work at rural clinics, the Sarawak man replied, “We don’t have that problem in Sarawak.” In West Malaysia, man’s inhumanity to man is complacently at home.

This bibliography contains over 500 entries on health issues, organized under 19 topical headings. It covers general topics plus individual diseases, demography, dentistry, ethnobotany, genetics, and on through to women’s health. Many of the entries are annotated to identify study locations, the ethnic groups investigated, and other data. A problem with some entries is that health information is sequestered in texts that are primarily on a non-health topic. Another problem is that reports such as theses and government documents are readily available only at the one institution where they were produced.

Many reports in the bibliography are now available on-line. While some are only available through library databases, a growing number are in the “open access” category on the internet. Readers are encouraged to navigate the net to obtain downloadable copies. The best general database for medical topics is Medline; while it does not provide full texts, it does provide abstracts, whenever available.

The entries in this bibliography stretch back more than 100 years, to a time when the British were consolidating their control over Malaya. The British, however, provided few health services to the people of the country and had little interest in doing so, despite epidemics of smallpox, cholera, and other plagues. The Orang Asli were the last to receive government

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1 Baer, 1999; Lye, 2001.
2 Anon., The Sun, 2010a, b; Nicholas and Baer, 2007; Yip, 2010.
4 Mohamed Idrus, 2000; Swainson and MacGregor, 2008).
5 Baer, 2006.
services. Modern health services were not continually available even to a minority of Orang Asli until several years after World War II ended. Since that time Malaysia has risen out of the ranks of poor countries, but Orang Asli healthcare, purportedly free to them by the government, has stagnated. The minority Orang Asli still are far behind other Malaysians in major measures of health status, including life expectancy, childhood nutrition, and other indicators of well-being.

The lack of parity for Orang Asli is based on intolerance of ethnic differences and on political ineptitude, ignorance, and abuse, problems also found in other countries. Given this situation, the health of Orang Asli cannot be expected to improve much in the near future. On the contrary, it might get worse. New menaces such as HIV/AIDS, drug-resistant infections, and widespread environmental destruction and pollution are among the woes that will increasingly plague the Orang Asli.

This bibliography, then, provides a basic outline of the health risks that Orang Asli face. Some reports in it also suggest ways to improve the situation, but too often such suggestions have not been provided, or when provided, not implemented.

In terms of research, the two major drawbacks to prioritizing Orang Asli health problems are the paucity of longitudinal studies and of large, randomized studies. Commonly, reports reveal only the health situation of one village at one point in time. Even then, for example, nutrition may be studied without any attention to dental problems or infectious disease. And nutrition may be studied only in one age group, not village-wide. This “hit or miss” approach multiplies authored publications nicely but is of scant value in the long run.

One final point: To encourage researchers in the social sciences and humanities to incorporate health issues in their studies, I have included index information on the ethnic groups studied and their locations. Such information may also encourage more biomedical writers to note such data in their reports. This is important because medical workers from other ethnic groups in Malaysia, who may know little about Orang Asli diversity, are routinely assigned to situations in which Orang Asli are clinic or hospital patients, and these workers need to know the problems particular to each ethnic sub-group. Ethnic and site information can also help in the planning of “follow-up” studies. Indeed, longitudinal studies on particular places and peoples often provide information not obtainable in other ways. Topical and author indices may also be found here.

In all, fuller information on people, their environments and cultures, and all other basic elements of existence and experience can only enrich our understanding of humanity now and into the future. Much of human life has changed radically over the past few centuries in Southeast Asia and elsewhere and has been lost to human memory, or is now vanishing during our lifetimes. The Orang Asli and other disadvantaged minorities of the world must adapt nimbly to many changes, both biologically and culturally, to avoid catastrophes such as pandemics, food shortages, and other lethal problems. The goal of biomedical research, then, is to foresee a myriad of problems and inform our fellow human beings as to possible ways to solve them. This challenge has yet to be met in any systematic way.
Topical Bibliographies

I. General bibliography


4. Al-Mekhlafi, M., et al. Prevalence and distribution of soil-transmitted helminthiases among Orang Asli children living in peripheral Selangor, Malaysia. SEAJTMPH 37 (1):40-47, 2006. (All the children studied in 8 villages had helminths. Up to 26% had severe infections, which can lead to other health problems.)


6. Al-Mekhlafi, M., et al. Patterns and predictors of soil-transmitted helminth reinfection among aboriginal schoolchildren in rural Peninsular Malaysia. Acta Tropica 107 (2): 200-204, 2008. (Studied Post Betau, Kuala Lipis, Pahang; 66% of the Semai children studied had at least one intestinal helmint; after deworming, the reinfection rate 3 months later was 50%, thus frequent deworming is required. Al-Mekhlafi is listed as Hesham in some databases)


10. Anisah, N., et al. Isolation of Acanthamoeba species from conjunctival sac of healthy individuals using swab. Tropical Biomedicine 22 (1):11-14, 2005. (286 healthy Orang Asli school children were studied, but no Acanthamoeba were found.)


13. Ariff, R. H. T., et al. Health status of aboriginal children in Post Brooke, Kelantan. *Malaysian J. Child Health* 9 (1): 60-64, 1997. (This and therein-cited studies showed that Temiar health problems occur in all age groups; government health services were far from comprehensive.)

14. Baer, A. *Health, Disease and Survival: A Biomedical and Genetic Analysis of the Orang Asli of Malaysia.* Center for Orang Asli Concerns, Subang Jaya, Malaysia, 1999. (Considers the health problems of Orang Asli ethno-linguistic groups individually; has separate chapters on malaria and nutrition.)


17. Bedford, K. J. A. Gombak hospital, the Orang Asli hospital. *Indonesia and the Malay World* 37 (107):23-44, 2009. (Discusses the misinformation and prejudices by the Malay elites about Orang Asli and the “institutionalized laziness” of the largely Malay staff at Gombak hospital; contrasts this with the much better healthcare available to indigenous peoples of Sarawak and Sabah.)

18. Bisseru, B. Skin text suggesting human toxocariasis in West Malaysia. *MJM* 23 (1):35-40, 1968. (In an unidentified Temuan village, dogs were a common reservoir of roundworm infections for humans; 11% of Gombak hospital Orang Asli patients had positive skin texts for toxicaria.)

19. Bisseru, B., and A. A. Aziz. Intestinal parasites, eosinophilia, hemoglobin and gamma globulin of Malay, Chinese, and Indian school children. *MJM* 25:29-33, 1970. (51% of Orang Asli children had hookworm; over 90% had some kind of parasitism.)


23. Brearley, A. Serum proteins, hematocrits, heights, and weights of aborigine subjects in W. Malaysia. *MJM* 24:183-186, 1970. (Among 109 Orang Asli visitors to Gombak hospital aged 4 to 45 years, ethnicity unspecified, 21 were from deep forest; none were from uprooted sites. Serum protein levels were healthy, suggesting that nutrition was adequate.)

25. Burns-Cox, C., and J. MacLean. Splenomegaly and blood pressure in an Orang Asli community in West Malaysia. *American Heart J.* 80:718-719, 1970. (On 85 River Nenggiri Temiar, male and female; found little risk of coronary heart disease; today, with pressure to turn to store-bought food, this finding is no longer secure.)


34. Dissanaike, A. S., H. T. Ong, and S. P. Kan. Trypanosome infections in Orang Asli (Aborigines) in West Malaysia. *TRSTMH* 68 (4):494-495, 1974. (2 Semelai cases were found, 1 at Post Iskandar, Pahang, and 1 at Kg. Guntor, Negri Sembilan.)


36. Dissanaike, A. S., et al. Studies of parasitic infections in Orang Asli (Aborigines) in Peninsular Malaysia. *MJM* 32:48-55, 1977. (Studied unidentified hospital patients: 25% had amebic antibodies, 21% had E. coli infections, and over 90% had intestinal helminths; 11% had
falciparum malaria parasitemia and 89% were seropositive for falciparum; 14% had microfilariae; 16% were seropositive for toxoplasmosis.)


48. Gilman, R., et al. Seroepidemiology of amoebiasis in the Orang Asli (Western Malaysian aborigines) and other Malaysians. *AJTMH* 25:663-666, 1976. (On Satak, Pahang Semai and Belatim, Kelantan Temiar; Satak had high and Belatim low levels of amoebic antibodies.)

50. Greer, G., and H. Anuar. Serological evidence of schistosomiasis among Orang Asli from three areas of Peninsular Malaysia. *SEAJTMPH* 15:303-312, 1984. (On Temuan at Bkt. Lanjan, Selangor; Semelai at Post Iskandar and Batek at Kuala Tahan, both in Pahang; all three groups had a low but significant serological response to schistosomes.)

51. Greer, G., et al. Malaysian schistosomiasis: description of a population at risk. *J. Tropical Med. Hygiene* 92 (3):203-208, 1989. (79% of 56 Semai at Kuala Koyan, Lipis, Pahang had roundworms, 93% had whipworms, 84% had hookworm, and none had schistosomes; by serology less than 10% had anti-schistosome antibodies.)

52. Hakim, S. L., et al. Seroprevalence of Toxocara canis antibodies among Orang Asli (aborigines) in Peninsular Malaysia. *SEAJTMPH* 23 (3):493-496, 1992. (Human toxocariasis, caused by a dog nematode, is associated with visceral larval migrans; of 480 Orang Asli studied at Gombak hospital, 32% had relevant antibodies. Note: the lead author is cited as Lokman Hakim, S., or Lokman, H. S. in some databases.)


54. Hakim, S. L., et al. Parasitic infections among Orang Asli (aborigine) [sic] in the Cameron Highlands, Malaysia. *SEAJTMPH* 38 (3):415-419, 2007. An outbreak of acute diarrhea that claimed the lives of 4 young children was attributed to rotavirus(es), but high levels of parasitic infections may have worsened the problem; the outbreak started in Terisu Post and spread to Mensun and Lemoi Post, all Semai areas in the Cameron Highlands, Pahang, and to the Post Brooke Temiar in Kelantan. The communities were said to be at fault by being unsanitary.


56. Haug, N., et al. Studies on bacterial disease in West Malaysian Orang Asli: distribution of bacterial enteropathogens. *MJM* 24:24-31, 1969. (Found deep-forest groups differed little from forest-fringe groups in diarrhea level; those under 12 years were most commonly affected.)


58. Hill, A. *Notes on traditional healing and modern medicine among the Orang Hulu (Jakun) of Johore.* Dept. Anthropology, Sydney Univ., Australia, 1974. (Johore Utara, Bekok, Segamat, Johore; note: in 1996 the Dept. in Sydney had no record of this report.)


62. Hoe Ban Seng. *Semelai Communities at Tasek Bera.* A. Baer and R. Gianno, eds. Center for Orang Asli Concerns, Subang Jaya, Malaysia. (Revised ed. of the 1964 report; includes health beliefs, midwifery, and health services covering several kampungs.)


66. Jeyakumar Devaraj. *Between myth and reality: why are Orang Asli more prone to illness?* Paper presented at the World Conference on Primary Care Physicians, Kuching, Malaysia, March. 1999. [http://www.aliran.com/oldsite/monthly/2000/05f.html](http://www.aliran.com/oldsite/monthly/2000/05f.html) (Perak Orang Asli had 4.4 times more TB than the state average; Orang Asli had over 70% of the recorded cases of malaria in W. Malaysia.)

67. Jinam, T. A., et al. An update of the general health status in the indigenous populations of Malaysia. *Ethnicity and Health* 13 (3):277-287, 2008. (Temuan and the Bidayuh of Sarawak had higher cholesterol levels than Kensiu or Jehai but had less evidence of immune response to infection or allergy than the latter two groups; the differences were attributed to greater urbanization for the Temuan and Bidayuh.)


69. Kamath, S. Hepatitis B surface antigen subtypes in Malaysia. *American J. Epidemiology* 102 (2):191-195, 1975. (Senoi were like Sarawak “Dayaks,” but unlike other Malaysian groups studied, in having a certain antigen subtype in high frequency.)


71. Kandasamy, Y., and P. Somasundram. A review of Orang Asli newborns admitted to a neonatal unit in a Malaysian general hospital. *Singapore Med. J.* 48 (10):926-928, 2007. (In Temerloh hospital, Orang Asli average birth weight was 2.57 kilograms for those admitted to the neonatal unit, with 29% falling into the “low birth weight” category; jaundice secondary to G6PD deficiency was the usual basis for admission; Orang Asli newborns made up 4.2% of those in the unit, about 8 times the population frequency of Orang Asli in W. Malaysia; this is the first study on the health status of Orang Asli newborns.)

73. Karim, R., et al. Parasitic infections in the aboriginal community at Temengor, Hulu Perak, Malaysia. *Malaysian Nature J.* 48:425-432, 1995. (73% of Temiar girls had intestinal worms versus 48% of the boys; pour-flush latrines and gravity-fed water supplies were advocated for the study sites of Sungai Samlor and Sungai Tekam, neither of which had piped water or toilet facilities; logging occurred near these sites)

74. Khoo, T. E. Health priorities in the resettlement of the Orang Asli. *Federation Museums J.* 24:177-184, 1979. (Lists 6 negative impacts of forced relocation and 1 potentially positive one.)


76. Kinzie, J., K. Kinzie, and J. Tyas. A comparative health survey among two groups of Malayan Aborigines. *MJM* 21:135-139, 1966. (Reports on weight, height, dental problems, goiter, malaria, filariasis, anemia, intestinal parasites, diabetes, respiratory infections, and pre-adult mortality in Temuan at Bkt. Cheeding, Selangor, and Jehai at Fort Banding, Upper Perak River. Found 26% Temuan and 54% Jehai pre-adult mortality and a 17% microfilarial rate for all adults; 1 of 53 Temuan and 4 of 43 Jehai had elephantiasis; hematocrit levels were normal in men, indicating little iron deficiency, but were lower in women.)


79. Lim, H. F. *Orang Asli, Forest and Development.* Forest Research Institute Malaysia, Kepong, 1997. (Some health information; reports that only 67 of 774 Orang Asli villages, or 9%, had a medical clinic in the 1990s.)

80. Lim, K. G. *A Review of Disease in Malaysia.* Pelanduk, Petaling Jaya, Malaysia, 1993. (Minor mention of Orang Asli.)

81. Lim, Y. A., and R. A. Ahmad. Occurrence of Giardia cysts and Cryptosporidium oocysts in the Temuan Orang Asli (aborigine) river system. *SEA J TMPH* 35 (4):801-810, 2004. (River water is a probable route for Giardia and Cryptosporidium transmission in the Temuan village studied; provision of toilets was recommended.)


92. Mohammed Mahdy, A. K., et al. Risk factors for endemic giardiasis: highlighting the possible association of contaminated water and food. *TRSTMH* 102 (5): 465-470, 2008. (Of 321 Post Betau, Pahang, Semai studied, 96% had at least one intestinal parasite; 24% had giardiasis infections, which cause gastroenteritis, with children having the highest frequency.)

93. Mohammed Mahdy, A. K., et al. Giardia intestinalis genotypes: risk factors and correlation with clinical symptoms. *Acta Tropica* 112 (1):67-70, 2009. (Based on fecal samples from 321 Pahang Semai, 26% were positive for Giardia; contaminated raw food, such as fruit, is the likely method of transmission, especially in children.)


99. Nevin, H. Annual report of the Institute of Medical Research, Federated Malay States, for the year 1937. IMR, Kuala Lumpur, 1938. Pp. 145-147. (A health survey on Semai at Kuala Denak, Perak, revealed 85% of those under 10 years of age, but only 6% of adults, had malaria parasitemia; after 2 years of anti-malarials, only 5% of all ages had parasitemia; over 10%, all ages, had filarial infections and 74% had intestinal helminths.)


101. Noone, H. D. Report on the settlements and welfare of the Ple-Temiar Senoi of the Perak-Kelantan watershed. J. Federated Malay States Museums 19:1-85, 1936. (Describes physical stereotypes of Orang Asli groups and of Malays; in the appendices, mentions yaws but lack of goiter in the Temiar and skin diseases common in nomadic “Negritos;” mentions malaria in Ulu Plus; estimates infant mortality rates at 29-45% and provides other demographic data.)


103. Nor Aini, U., et al. Serum iron status in Orang Asli children living in endemic areas of soil-transmitted helminths. Asia Pacific J. Clinical Nutrition 16 (4):724-730, 2007. (On Selangor children; all had at least one intestinal worm, 25% had giardiasis, 42% were anemic; stunting and wasting were associated findings.)


107. Norhayati, M., et al. Hookworm infection and reinfection following treatment among Orang Asli children. MJM 50 (4):314-319, 1995. (Among 193 Temuan children, 31% had hookworm; only 8% did so after 4 months of treatment, but reinfection rates were high.)


113. Ong, H. T. Medical services for the Orang Asli (Aborigines) of West Malaysia. *MJM* 30:30-37, 1975. (Includes information on the “Emergency” era origins of government medical services for Orang Asli and the founding of the Gombak hospital.)


115. Osman, A., et al. Promoting community participation in determining prevalence of malnutrition, goiter, and diabetes mellitus: Malaysia’s experience. *J. Perubatan UKM* (Malaysia) 15 (2):105-115, 1993. (Studied Semai at Betau and Lanai, Pahang, and Temuan at Bkt. Lanjan, Selangor; overall, 72% of the 2-6 year olds were stunted, indicating chronic malnutrition; among 675 over the age of 2 years, 38% were goiterous.)


118. Pike, D. Gombak Hospital. *Nursing Times* 64 (45):1519-1521, 1968. (The photographs in this article show the magnitude of Orang Asli employment in medical services for them in the 1960s, unlike the situation today.)


122. Polunin, I. The medical natural history of Malayan Aborigines. *MJM* 8:55-174, 1953. (A doctoral dissertation; has genetic, infectious-disease, and nutritional data; reports resettled Semai had a death rate 3.9 times that of the birth rate; gives some age-sex data and data on Orang Seletar in Johore and on Lanoh; reports over 70% of one lowland Semai group had malaria, as judged by enlarged spleens.)


126. Prathap, K. Liver fluke in a Malaysian Orang Asli (Aborigine.) *TRSTMH* 67:881-882, 1973. (Showed the fluke to be endemic in Pahang.)


130. Prathap, K., and G. Montgomery. Aortic and coronary atherosclerosis in the Malaysian Orang Asli. *Pathology* 6:255-261, 1974. (76% of hospital-located Orang Asli deaths were due to TB and other infections, 9% to cancer, and virtually none to heart disease: atherosclerotic lesions in aortas and coronary arteries, postmortem, were rarer than in other global populations.)


132. Ramah, N., et al. Parasitic infections among aborigine children at Post Brooke, Kelantan, Malaysia. *MJM* 52:412-414, 1997. (On Temiar; 60% had Ascaris, 35% had dental caries, 45% showed signs of anemia, and 50% of families reported that at least one of their children had died. Med. teams visited 4 times/year and there was a small clinic with a medical aide. The authors urged that a larger clinic be established there.)


139. Seow, H-F., et al. Seroprevalence of antibodies to hepatitis E virus in the normal blood donor population and two aboriginal communities in Malaysia. *J. Med. Virology* 59:164-168, 1999. (Compared Semai in Betu and Parit Tanjong with an outside group; Semai were at much higher risk of exposure to the virus.)


144. Soong, F-S. Some beliefs and practices affecting the health of the aborigines (Orang Asli) of Bukit Lanjan, West Malaysia. *SEAJTMPH* 3 (2):267-276, 1972. (On Temuan, but excludes midwifery; Temuan beliefs about health devalued.)


150. Swainson, L., and A. McGregor. Compensating for development: Orang Asli experiences of Malaysia’s Sungai Selangor dam. *Asia Pacific Viewpoint* 49 (2):155-167, 2008. (Two Temuan communities in northern Selangor, Gerachi and Pertak, were forcibly dispossessed to make way for this dam. As has been recorded in other Orang Asli areas, the medical buildings later provided had no nurses or doctors or medical supplies in them; the dispossession led to an increase in male alcohol consumption.)

151. Tan, D. S. K. Leptospirosis in rural West Malaysia *MJM* 24 (4):261-266, 1970. (This zoonotic disease was found in Orang Asli and others.)


153. Thomas, V., and B. Sinniah. Seroepidemiology of amoebiasis in Peninsular Malaysia. *Annals Tropical Med. Parasitology* 76 (2):602-606, 1977. (Among 84 Temuan at Bkt. Lanjan, Entamoeba infection had an 8.3% prevalence overall but increased with age. No sex difference or acute amoebic dysentery was found.)

154. Thomas, V., B. Sinniah, and P. L. Yap. Prevalence of antibodies including IgM to toxoplasma gondii in Malaysia. *SEAJTMPH* 11 (1):119-125, 1980. (Of the 268 Orang Asli blood samples tested, 19% had significant levels of Toxoplasma antibodies, as compared to 34% for Malays.)


157. Venugopalam, B., et al. Hepatitis A outbreak in Hulu Langat District, Selangor State, Malaysia. *MJM* 59 (5):670-673, 2004. (Both Malays and Orang Asli were victims of this April-October, 2002, outbreak; the upriver Orang Asli were blamed for the river contamination, citing their lack of toilet facilities or adequate water supply.)

(Head lice, previously found in over 60% of Semai in Kuala Milot, disappeared 9 months after the nets were distributed there, a benefit additional to protection against disease-carrying mosquitoes.)


160. Williams-Hunt, P. *An Introduction to the Malayan Aborigines.* Government Press, Kuala Lumpur, 1952. (Chapter 7 is on health.)


167. Yahaya, N. Review of toxoplasmosis in Malaysia. *SEA JTMPH* 22 (suppl.):102-106, 1991. (Rural Malaysians, including Orang Asli, were commonly seropositive.)


**II. Cancer**


### III. Cholera


### IV. Demography

176. Abdullah, Ramie b. *Semaq Beri*. Kolej Agama Sultan Zainal Abidin, Kuala Trengganu, Malaysia, 1991. (Pp. 11-15 are on demography; a deficit of men aged 20-39 years is notable, as is the sex ratio of 2 males:1 female for those over 39 years. Note: the author has also been cited in database as Ramie b. Abdullah.)


**V. Dengue**

203. Rudnick, A., T. W. Lim, and J. Ireland, eds. *Dengue fever studies in Malaysia*. Bull. No. 23, IMR, Kuala Lumpur, 1986. (Studied Kg. Tanjong Rabok, Selangor, Temuan and other Orang Asli elsewhere; found 73% of 636 serum samples were antibody-positive for dengue and related viruses; those lacking such antibodies were mainly children, as detailed on pp. 67-73 and 114-119; dengue antibodies were rarer in non-Orang Asli.)

204. Smith, C. E. G. The history of dengue in tropical Asia and its probable relationship to the mosquito Aedes aegypti. *J. Tropical Med. Hygiene* 59:3-11, 1956. (On Temuan in Ulu Langat, Selangor, and Semai in Cameron Highlands, Pahang; virtually all adults over 30 years of age had anti-dengue antibodies.)

**VI. Dentistry**


208. Abdul-Kadir, R., and A. Yassin. Dental health beliefs and attitudes of a group of rehabilitated Selangor Proto-Malays (Temuan tribe) in Malaysia. *Kajian Malaysia*, 11 (2):74-84, 1993. (The term rehabilitated seems to refer to forced resettlement, with success being measured as “only semi-isolated with access to outside stores.”)
209. Mummery, C. F. The teeth of the Che Wong. *British Dental J.* 84:69-72, 1948. (Caries increased with age; fever was common; 2 of 51 persons had yaws.)

210. Saub, R., and N. Jaafar. A dental-anthropological study of health and illness behavior among Orang Asli of the Semai tribe: the perspective of traditional healers. *MJM* 56 (4):401-407, 2001. (If a Semai healer, a hala, thinks “germs” are causing a tooth problem, he immediately sends the patient to a doctor, otherwise he attempts traditional treatment; if that doesn’t work, he reverts to sending the patient to a doctor; urges that efforts to promote oral health seek the cooperation of traditional healers).

**VII. Ethnomedicine and ethnobotany**

211. Anbu Jeba Sunilson et al. Ethnomedical survey of plants used by the Orang Asli in Kampung Bawong, Perak, West Malaysia. *J. Ethnobiology and Ethnomedicine* (an e-journal) 6:5, 2010. (The authors wrote that they worked with “Semang” informants but Kg. Bawong is Temiar; Medline lists the first author as A. J. Samuel.)


213. Azriani Ab. Rahman, et al. The use of herbal medicines during pregnancy and perinatal mortality in Tumpat District, Kelantan, Malaysia. *SEAJTMPH* 38:1150-1157, 2007. (Reported that the use of unidentified herbs collected by Orang Asli plus coconut oil in late pregnancy were negatively associated with perinatal mortality, suggesting that these two factors favor infant viability.)


222. Lim, K. W. Ethnobotanical study of medicinal plants used by the Jah Hut people of Malaysia. *Indian J. Med. Sci.* 59 (4):156-161, 2005. (At Kg. Keboi, Pahang, 16 species and their traditional uses were recorded via interviews with traditional healers.)


227. Siti Mastura h b. Ismail. *The politics of indigenous knowledge and intellectual property rights: Batek challenges to Western epistemologies.* B. A. thesis, Middlebury College, Vermont. (Discusses Batek forest products and ideas of health; near Kuala Tahan, Pahang, Batek sell medicinal plants cheaply to outsiders as a favor to them to improve their health, disregarding the possible misuse of Batek intellectual property rights by others to gain high profits via “biopiracy.”)

228. Taylor, C. E., and K. M. Wong. Some aspects of herbal medicine among the Orang Hulu community of Kampung Peta, Johore, Malaysia. *Malayan Nature J.* 41:317-328, 1987. (Many of the plants documented in this Endau area are used as prophylactics or in relation to pregnancy and childbirth by the Jakun.)


230. Werner, R. Can the medicine-man be substituted—medical services for the aborigines (Orang Asli) in West Malaysia. *Öffentliche Gesundheitswesen* 41 (1):17-28, 1979. [In German.]

**VIII. Filariasis**


Temiar/Lanoh of Dala, both in Perak, had 25% and 23% microfilaremia, respectively, indicating deficits in the provision of government health care.


234. Mak, J. W. Studies on filariasis amongst Orang Asli in Peninsular Malaysia with special reference to chemotherapy. M. D. thesis, Univ. Singapore, 1978. (Studied 2645 Orang Asli at Gombak hospital; found a microfilarial rate of 6.3% with no sex difference, but the rate increased with age, to late teens, then stabilized; only 27 “Negritos” were tested; 6% of the 2645 had malarial parasites.)


237. Mak, J. W. Medical research in Malaysia: Parasitic diseases. In Proceedings 90th Anniversary Scientific Seminar: Health Research, IMR, Kuala Lumpur, 1992. Pp. 29-69. (On malaria and filariasis; concludes that while med. research on Orang Asli has been diligent, it has not translated well into government health services. On Temuan, Temiar, Jahai, Batek, Semai, Semelai, and unidentified groups from Johor.)


239. Marzhuki, M., A. Tham, and S. Poovaneswari. Current state of filariasis in Malaysia. SEAJTMPH 24 (suppl. 2):10-14, 1993. (Includes surveys of Orang Asli areas, as shown in maps, but no discussion of ethnic groups.)

240. Onyah b. Itam. Filariasis among Malayan aborigines examined at the Gombak Hospital during the period 1961-1967. MJM 21:384-385, 1967. (Found 11% filariasis among 1964 Orang Asli tested; this is the first biomedical report published by an Orang Asli. Note: the correct spelling of the author’s name is Unyah.)

241. Polunin, I. Observations on the distribution of filariasis in the interior of the Malay Peninsula. MJM 5:320-327, 1951. (On Pahang, Perak, Selangor, Johore: 9 of 2200 Ulu Jelai Semai moved involuntarily in 1949 to Bkt. Bentong had elephantiasis; Grik area Lanoh at Kg. Ulu Kendrong, Perak, were another filariasis focus, with 66% showing microfilariaemia; 2 of 70 Temuan at Ulu Beranang, Negri Sembilan, had elephantiasis; 100 Temuan at Ulu Langat, Selangor, had no elephantiasis and 18 tested had no microfilariae; 18% of Jakun at Lenek, Johore had microfilaria; the foci were mainly up-river and high altitude.)


110 Malays, a 17% rate in 167 adult and pre-adult Bkt. Lanjan Temuan; no elephantiasis was found. “Temiar” in this report=Temuan.)

244. Vythilingam, I., et al. Anopheles donaldi incriminated as a vector of periodic Brugia malayi in Grik, Perak, Malaysia. SEAJTMPH 27 (3):637-641, 1996. (Filariasis-carrying mosquitoes were studied in Banum, a Jahai community, and at Dala, a Temiar/Lanoh community.)

245. Wharton, R., A. Lai, and W. Cheong. Studies on the distribution and transmission of malaria and filariasis among aborigines in Malaya. Annals Tropical Med. Parasitology 57:235-254, 1963. [Has map of filariasis in Malaya; malaria parasitemia varied by locale from 0 to 86% and the microfilarial rate from 0 to78%. Studied Temuan at Bkt. Kem andul, Bkt. Tampoi, Pulas, Ulu Kuang, Bkt. Manchong, Ulu Lui, “Ponsom” (Pangsoon), Lalong, Bkt. Legong, and Bkt. Lanjan in Selangor; Mah Meri at Sungai Judah, Selangor; Semelai at Tasek Bera, Pahang; Temuan at Janda Baik, Pahang; Jakun (?) at Peramu, Pahang; and Temiar at Chabai and Betis, Nenggiri River, and at Perias River, Kelantan.]

IX. Genetics


253. Baer, A. The genetic history of the Orang Asli: uniting patchwork data. Bull. Indo-Pacific Prehistory Association 19:3-10, 2000. (Suggested too little was then known about Orang Asli genes to support any currently popular or political scenarios of prehistory.)


and Tekir Labu in Negri Sembilan; 29% of 404 Temuan had malaria parasitemia, but those with ovalocytosis showed resistance to high levels of parasitemia.)


263. Endom Ismail et al. Dermatoglyphics: comparison between Negrito Orang Asli and the Malays, Chinese, and Indians. *Sains Malaysiana* 38 (6):947-952, 2009. (On Batek at Post Lebir, Gua Musang, Kelantan; Jahai at Post Sungei Rual, Jeli, Kelantan; Kensiu at Kg. Lubok Legong, Baling, Kedah; Kintak at Kg. Bukit Asu, Grik, Perak; Lanoh at Kg. Air Bah, Grik, Perak; finger and palm dermatoglyphics were studied but the findings have no strong basis in genetics.)


273. Foo, L. C., et al. Ovalocytosis protects against severe malaria parasitemia in the Malayan aborigines. *AJTMH* 47(3):271-275, 1992. (Studied Betau, Pahang, Semai; 25% of the population per month was positive for parasitemia.)


280. Hong Lih Chun. *Biomedical parameters of an Orang Asli group in West Malaysia*. B. Biomedical Sci. thesis, Dept. Molecular Med., Univ. Malaya, 2004/2005. (Studied Temuan at Parit Gong, Jelebu, Negri Sembilan; found no malaria but 45% were hypertensive; HLA diversity found but no indication of ovalocytosis.)


283. HUGO Pan-Asian SNP consortium. Mapping human genetic diversity in Asia. *Science* 326:1541-1545, 2009. (Contains autosomal DNA information showing ancient lineages of Temuan, Kensiu, and Jahai; concludes that Southeast Asia was a major source of East Asia populations; HUGO stands for the Human Genome Organization.)


290. Lewis, G., et al. Duffy phenotypes in Malaysian populations: correction of previous unusual findings. *TRSTMH* 82:509-510, 1988. (Reports on Semai, Temiar, Jah Hut, Semaq Beri, Semelai, Mah Meri, Temuan, and Jakun; no Duffy-negative phenotypes were found, correcting the report by Ooi, 1979.)


300. Lie-Injo, L. E., et al. Unusual albumin variants in Indonesians and Malayan aborigines. *Human Heredity* 21:376-383, 1971. (Two “Gombak” variants were found in a sample of 165 Orang Asli, but Baer et al., 1976, found none in 189 Temuan.)


303. Livingstone, F. *Frequencies of Hemoglobin Variants: Thalassemia, the Glucose-6-Phosphate Dehydrogenase Deficiency, G6PD variants, and Ovalocytosis in Human Populations*. Oxford Univ. Press, New York, 1985. (A thorough review of red-cell variants relevant to malaria resistance, including all Orang Asli groups studied before 1985.)

304. Lugg, J. Taste thresholds for phenylthiocarbamide of some populations. *Annals Human Genetics* 21:244-253, 1957. (Reports 18% of 50 Kintak Bong and 4% of 50 Semai were nontasters; see also PTC data in Baer et al., 1976.)


310. Ooi, W. L. Red cell polymorphisms and malaria in Malaysia. Masters Public Health thesis, Yale Univ., New Haven, Conn., 1979. (On Duffy blood group and Hb E in Orang Asli and others; results inconclusive; see Lewis et al., 1988, for correction about the “finding” of Duffy-negative phenotypes.)

311. Parra, E., et al. Analysis of five Y-specific microsatellite loci in Asian and Pacific populations. American J. Physical Anthropology 110:1-16, 1999. (Unlike an earlier report on Semai DNA, this one shows as much, or more, genetic diversity within Semai as within larger groups, such as Cambodians and Malays.)

312. Parra, E., et al. Genetic variation at nine autosomal microsatellite loci in Asian and Pacific populations. Human Biology 71 (5):757-779, 1999. (Semai were found to be most unlike the other Asian populations studied.)


319. Stoneking, M., and F. Delfin. The human genetic history of East Asia: weaving a complex tapestry. Current Biology 20 (4):R188-R193, 2010. (Reviews earlier data, including those on Jehai and Kensiu; notes that the usual method used to date DNA findings is unreliable and thus groups like the Orang Asli may have originated less than 50,000 years ago; the distinctiveness of Orang Asli, however, from hunter-gatherer groups in the Philippines or from other ethnic groups, is not in question; discusses the impact of social practices on genetic variation.)


326. Welch, Q. In *1971 Annual Report, Univ. California Internat. Center for Med. Research*, San Francisco. (Reports Orang Asli dermatoglyphics are quite different from those of Europeans; Semai and Temuan are alike.)


X. Goiter


337. Osman, A., et al. (published as O. Ali et al.) Thyroid function and pubertal development in malnutrition. *Annals Academy Med. Singapore* 23 (6):852-855, 1994. (207 Orang Asli were studied; poor nutrition was found to affect thyroid function, including goiter formation, as well as growth hormone levels in children.)


339. Osman, A., et al. The prevalence of goiter in remote inland versus coastal areas. *MJM* 50 (3):256-262, 1995. (Mah Meri on Carey Island, Selangor, and Kensiu, perhaps with Kintak, at Kg. Lubok Legong, Baling District, Kedah, were studied; 6% of Mah Meri and 30% of Lubok Legong people had goiters, despite the fact that the iodine level in drinking water in the Kedah area was “surprisingly high.”)


342. Polunin, I. Endemic goiter in Malaya. *MJM* 5:302-319, 1951. (53% of 45 female and 14% of 63 male Temuan, all ages, at Ulu Lui and Ulu Langat, Selangor, and Ulu Berenang, Negri Sembilan, had enlarged thyroids/goiters; the frequency was highest for inland, upland peoples, such as the Semai, Temiar, and Lanoh; adults were most affected; the coastal Orang Selatar, in Johore, had far fewer goiters.)


children. *Clinical Endocrinology* 45:79-83, 1996. (On Sinderut and Lanai Semai in Pahang and Orang Asli at Gombak hospital; for ages 4-15 years, 79%, 78%, and 31%, respectively, were malnourished.)


346. Zaleha, M. I., A. R. Noor Hayati, and A. Osman. Knowledge of goiter among Orang Asli in the urban fringe area of Hulu Selangor District. *MJM* 57 (Suppl. D.):96, 2002. (On Temuan in Kuala Kubu Bharu district at Bkt. Manchong, Kuala Kerling, Gerachi, and Pertak. Goiter prevalence in these villages ranged from 48% to 86% in people 15 years or older. Most of those questioned did not believe that goiter is due to lack of good nutrition, that certain foods can cause goiter, that it can impact mental development, or that it can be prevented. Less than 1% had heard of iodine. Health education was recommended.)

XI. Leprosy


XII. Malaria

348. Amal, N. M., and S. Yussof. The effectiveness of permethrin-impregnated bed nets for malaria control in Kg. Ganoh, an Orang Asli area of Rompin district, Pahang, Malaysia. *MJM* 51 (4):491-493, 1996. (This Jakun kg. had 63 malaria cases before nets were given and 3 cases a year later; a long-term study with proper research controls would have been useful.)

349. Andre, R., et al. In vivo and in vitro studies of chloroquine-resistant malaria in West Malaysia. *TRSTMH* 66:644-652, 1972. (Studied chloroquine resistance in 33 Semai school children near Tapah, Perak who had malaria parasites; found 51% of 126 Orang Asli children in the study area had parasitemia, much higher than the 20% prevalence found overall for West Malaysia.)


351. Archibald, C., et al. Antibodies to Plasmodium falciparum in an indigenous population from a malaria endemic area. *Acta Tropica* 48:149-157, 1991. (In 1985-87 Betau, Pahang, Semai were receiving no malaria control services although malaria was know to exist there.)

352. Baer, A. Rainforest malaria, mosquitoes, and people. *Malaysian Nature J.* 53 (4):299-305, 1999. (Discusses a number of conditions that may explain why Orang Asli continue to suffer from relatively more malaria than other Malaysians, such as inadequate control programs following forced displacement, the influx of non-immunes into Orang Asli areas, and large-scale land clearance leading to the loss of a subsistence base.)
353. Bolton, J. The control of malaria among the Orang Asli in West Malaysia. *MJM* 27 (1):10-19, 1972. (Reviews earlier malaria surveys on Semai in the 1930s and 60s, Temuan in the 60s, and Temiar with Jehai in the 60s; discusses malarial control measures at the time.)

354. Chiang, G. L., et al. Effectiveness of repellent/insecticidal bars against malaria and filariasis vectors in Peninsular Malaysia. *SEATMPH* 21 (3):412-417, 1990. (On Semai of Betau; the interesting findings by this team did not lead to including the bars in anti-malarial programs.)


357. Gordon, D., et al. Significance of circumsporozoite-specific antibody in the natural transmission of *Plasmodium falciparum*, *Plasmodium vivax*, and *Plasmodium malariae* in an aboriginal (Orang Asli) population of central Peninsular Malaysia. *AJTMH* 45 (1):49-56, 1991. (Studied 275 Temiar; 56% of the 0-4 year age group had malarial parasitemia, but the over-40 group had 0%; the study focused on acquired immunity and ignored genetic resistance to malaria.)


360. Huehne, W. H., et al. A comprehensive account of the malaria eradication pilot project in Malaya. *MJM* 21:3-25, 1966. (A few Selangor Temuan areas were studied: Bkt. Manchong, Bkt. Kelubi, Bkt, Legong, Rantau Panjang, Sungai Choh Estate, Jinjang, Ulu Kuang, and Ulu Serendah; Orang Asli were not included in the project until 3 years after it was started.)

361. Huehne, W. H., M D. Ahmad, and D. S. Ling. Malaria, a primary health problem in rural West Malaysia. *MJM* 22:60-71, 1967. (Few Orang Asli areas studied; data analyzed at state level; cited in Lie-injo, 1969, as showing an erroneously low malaria rate.)

362. Institute for Medical Research, Kuala Lumpur. *Annual Report, 1987*. (Pp. 181-182 record a 37-40% prevalence of malarial parasitemia in Post Legap Temiar, with nearly 60% in children less than 10 years of age, according to Lambros et al., 1989.)

363. Jamaiah, I., et al. A retrospective prevalence study of malaria in an aborigine hospital in Gombak, Selangor, Malaysia. *SEATMPH* 37 (suppl.3):1-4, 2008. Studied malaria records at Gombak hospital for 1999-2004; few cases were recorded, the majority of them in Semai and
Temiar children from Pahang, especially girls; Plasmodium falciparum was the most common parasite.)

364. Kaur, G. Malaria endemicity in an Orang Asli community in Pahang, Malaysia. *Tropical Biomedicine* 26 (1):57-66, 2009. (Studied 520 Raub Orang Asli; found 24% malarial prevalence, with Plasmodium falciparum being the commonest species. Children less than 12 years of age were at least 3.7 times more likely to be parasitemic than older persons. Malarial prevalence for those 2 up to 10 years of age was 38%. Suggested control work should focus on protecting children and that longitudinal studies are necessary to assess if control work is effective. Note: the author is listed as K. Gurpreet in some databases.)

365. Kaur, G. Predictors of malaria among the Malaysian aborigines. *Asian Pacific J. Public Health* 21 (2):205-215, 2009. (Malaria is most common in W. Malaysia among the Orang Asli; Orang Asli in Raub District, Pahang, were most susceptible to malaria if they were outside at night, were children, and did not wear protective clothing.)


367. Khoo, A., et al. Nested polymerase chain reaction for detection of Plasmodium falciparum infection in Malaysia. *TRSTMH* 90:40-41, 1996. (On Betau, Pahang, Semai; 12% of supposedly malaria-negative people were in fact infected, as shown by this methodology.)

368. Lambros, C., D. Davis, and G. Lewis. Antimalarial drug susceptibility of Plasmodium falciparum isolates from forest fringe dwelling aborigines (Orang Asli) of Peninsular Malaysia. *AJTMH* 41 (1):3-8, 1989. (Parasites from Temiar at Post Legap, Perak, and from Pahang and Selangor patients at Gombak hospital were studied; 93% of falciparum isolates were susceptible to chloroquine; found that anti-malaria prophylaxis and medicines were rarely available to Orang Asli in their villages.)

369. Lee, M., et al. Interaction of Malaysian sera with Plasmodium vivax sporozoite antigen. *AJTMH* 39 (6):535-539, 1988. (49% of Post Legap, Perak, Temiar had malarial parasites; 76% of 0.5-4 year olds had parasitemia, but adults had about 40%, attributed to high acquired immunity; human genetic resistance variation was not studied.)

370. Lewis, A., T. Dondero, and J. T. Ponnampalam. Falciparum malaria resistant to chloroquine suppression but sensitive to chloroquine treatment in West Malaysia. *TRSTMH* 67:310-312, 1973. (Found a monthly rate of 6% for new falciparum and 5.7% for new vivax parasitemia in Negri Sembilan Temuan.)


Pahang, Semai; malarial parasitemia rates were high, higher at Betau, with a 62% rate in the 0-9 year group there.)


378. Nicholas, C.  Medicines are for curing, not killing.  *Aliran Monthly* 17 (3):7-8, 1997.  (Criticizes the malaria-control program for Orang Asli, following the deaths of Jah Hut children at Seboi, Kuala Krau, Pahang, in February, 1997, following administration of faulty anti-malarial drugs.)


384. Rohani, A., et al.  Comparative field evaluation of residual-sprayed deltamethrin WG and deltamethrin WP for the control of malaria in Pahang.  *SEAJTMPH* 37 (6):1139-1148, 2006.  (On Orang Asli areas in Kuala Lipis where Anopheles maculates is the malaria vector; deltamethrin WG was found to be effective against the vector for up to 9 months.)

385. Sandosham, A. A.  *Malariology, with special reference to Malaya*.  Univ. Malaya Press, Singapore, 1965.  (Reprint, distributed by Oxford Univ. Press, London.)  (Orang Asli are referenced in the index as “Sakai;” surveys found malaria parasite rates ranging from 1 to 49% and spleen rates from 1 to 40% “among the Sakais.”)
386. Sandosham, A. A. Malaria in rural Malaya. *MJM* 24 (3):221-226, 1970. (A review that deplores the use of primaquine in malaria treatment for Orang Asli, given that they have a high frequency of G6PD deficiency, an inherited condition that can produce acute hemolysis upon ingestion of primaquine or related compounds.)


388. Thomas, V., and A. S. Dissanaike. Malaria endemicity among Orang Asli (Malaysian aborigines) as determined by indirect fluorescent antibody tests. *AJTMH* 26 (4):602-606, 1977. (Studied 288 Gombak hospital patients and visitors; 89% showed past exposure to malaria; immunity increased with age.)


XIII. Mental health


400. Tan, E. K., and H. Armstrong. Mental illness in the Orang Asli (Aborigines) of West Malaysia. *MJM* 31 (2):87-92, 1976. (Gombak hospital patients were studied over a 5-year period.)

**XIV. Nutrition**

401. Al-Mekhlafi, M., et al. Giardiases as a predictor of childhood malnutrition in Orang Asli children in Malaysia. *TRSTMH* 99 (9):686-691, 2005. (25% of Selangor Orang Asli children had Giardia duodenalis; 56%, 61%, and 15% of the children were underweight, stunted, or wasted, respectively. Giardiases was statistically a strong predictor of wasting.)


403. Al-Mekhlafi, M., et al. Prevalence and predictors of low serum retinol and hypoaalbuninaemia among children in rural Peninsular Malaysia. *TRSTMH* 101 (12):1233-1240, 2007. (Studied 281 Orang Asli children in Selangor, 2-15 years of age; found severe ascariasis, severe stunting, and giardiases were associated with low serum retinol. Intestinal parasitemia and low household income were predictors of hypoaalbuminemia. Recommended reduction of intestinal parasitemia be included in programs to prevent malnutrition and vitamin A deficiency in Orang Asli.)

404. Al-Mekhlafi, M., et al. Current prevalence and predictors of protein-energy malnutrition among schoolchildren in rural Peninsula Malaysia. *SEAJTMHP* 39 (5):922-931, 2008. (Among 241 Post Betau Semai children, 90% were underweight, 87% were stunted, and 49% were wasted. Children up to the age of 10 years were most affected by stunting. Remediation programs were suggested.)


409. Foo, E-L. *The ethnobotany of the Orang Asli, Malaysia, with a special reference to their food crops*. Univ. Malaya, Botany Unit, Kuala Lumpur, 1972. (Mainly on Semelai.)
410. Iskandar Zulkarnain Alias, et al. The effect of increased consumption of edible palm oil on the nutritional status, lipid profiles and lipid peroxidation among Malaysian aborigines. *Malaysian J. Nutrition* 8 (2):137-156, 2002. (Studied Semai at Tual Post, the oil treatment group, and at Sinderut Post, the control group, both in Kuala Lipis, Pahang. Oil treatment over 18 months led to increased calorie intake, reduced systolic blood pressure, and decreased total cholesterol, low density lipoprotein, and triglyceride. The oil served as a good source of fat and energy.)

411. Ismail, M. N., T. S. Wong, and Zawiah Hashim. Anthropometric and food intake studies among Semai children. *J. Malaysian Soc. Health* 6 (1):19-25, 1988. (In 13 villages in Betau, Pahang, most preschool Semai children and over a third of the 7-10 year olds studied were underweight or stunted, despite the fact that pupils in the school-age group received school meals.)


414. Khoo, T. E. *Some aspects of the nutritional status of Temiar in Kemar*. Master Public Health thesis, Univ. Malaya, Kuala Lumpur, 1977. (The Kemar, Perak, Temiar were bereft of forest to forage for food resources after the Temengor Dam was built, the resulting reservoir having flooded their traditional lands; children were underweight and stunted; women were iron-deficient.)

415. Khor, G. L. *A study of the nutritional status of the Semai*. PhD dissertation, Univ. Malaya, Kuala Lumpur, 1985. (Batang Padang District, Perak, Semai had shorter lifespans than Malaysians in general; prevalence rates for malaria parasitemia in the 1980s ranged from 1% to 21%, with over 90% of parasitemia being in those 0-18 years of age; major child mortality causes were diarrhea and fevers; the diet was deficient in protein, calories, calcium, and iron.)

416. Khor, G. L. Malnutrition among Semai children. *MJM* 43 (4):318-326, 1988. (Among 1180 Semai of Batang Padang, Perak, 24-44% had iron-deficiency anemia, 42-78% stunting, and 30-65% low weight, by age group; 14-57% of those 0-12 years of age had intestinal worm infestations.)


420. Lee, S. S., Y. S. Chang, and M. N. P. Noraswati. Utilization of macrofungi by some indigenous communities for food and medicine in Peninsular Malaysia. *Forest Ecology and Management* 257 (10):2062-2065, 2009. (Studied Semai, Temuan, Batek, Chewong, and Jakun villagers; over 31 species of macrofungi were collected for food and 14 species used for indigenous medicine; one kind, susu rimau, was also sold to urban herbalists.)


423. Massita Mohd. Sin. *Penilaian taraf pemakanan kanak-kanak Orang Asli di Rancangan Pengumpulan Semula (RPS), Betau, Pahang*. B. S. thesis, Faculty Human Ecology, Univ. Pertanian Malaysia, Serdang, 1992. (Cited in Chee, 1995; among 129 Semai children 0-8 years of age, over a third were underweight or stunted; energy nutrition averaged only 77% of the recommended daily allowance.)


429. Ng, W. C., et al. Perceptions and knowledge of Orang Asli mothers on child health and nutrition. *Malaysian J. Nutrition* 11 (2):75-88, 2005. (Studied 4 Temuan and 4 Mah Meri areas in Selangor; mothers were generally knowledgeable about which foods were nutritious but less so about why they were nutritious.)


433. Osman, A., and M. I. Zaleha. Nutritional status of women and children in Malaysian rural populations. *Asia Pacific J. Clinical Nutrition* 4 (3):319-324, 1995. (Studied 343 Betau and Lanai Semai; 80% of 2-6 year olds and 35% of women were malnourished. For Betau versus Lanai children, 80% versus 60% had protozoan infections, 30% versus 8% had roundworms, 30% versus 16% had threadworms, and 9% versus none had hookworm. Goiter generally increased with age, from 23% for 2-12 years of age to 50% for older ages, with a 2 to 1 bias toward goiter in females. Cassava and millet were mentioned as local goitrogens.)

434. Osman, A., et al. Thyroid function and pubertal development in malnutrition. *Annals Academy Med., Singapore* 23 (6):852-855, 1994. (207 Orang Asli were studied; poor nutrition was found to affect thyroid function, as well as growth hormone levels in children; authors listed as “O. Ali et al.” in some databases.)


436. Robson, P., J. Bolton, and A. Dugdale. The nutrition of Malaysian aboriginal children. *American J. Clinical Nutrition* 26:95-100, 1973. (Found Orang Asli nutrition to be the same as for an urban sample; 75 Orang Asli studied, including Temiar, were in upland sites: Betis, Blau, Gemala, Sat, Tenau, Wias; 86 were in lowland Jakun sites by Sungai Endau: Labong, Dura, Mentelong, Sungai Muk, Peta, and Punan.)


441. Zaleha, M. I. Micronutrients and its [sic] correlation with mental performance among school children in Bario, Sarawak. *MJM* 58 (3):309-319, 2002. (Iodine and other micronutrients were ample in 7-12 year olds in Bario but mental test scores averaged below normal, with girls scoring lower than boys; contrasted these test results with those for Semai, see Osman et al., 1996.)


443. Zulkifli, A., A. K. Anuar, and A. S. Atiya. The nutritional status of children in resettlement villages in Kelantan. *SEAJTMPH* 30 (1):122-128, 1999. (On Kuala Betis; Temiar children were in poorer health than Malay children, with preschoolers being the worst off; supported a comprehensive health care program in displacement villages that targeted preschoolers.)
XV. Sexually transmitted infections
444. Anita, S., et al. HIV/AIDS knowledge, attitudes and risk behaviours among Orang Asli in Peninsular Malaysia. *MJM* 62 (3):227-233, 2007. (On a survey of 2,706 Orang Asli age 13 years and older in Kelantan, Perak, Pahang, Selangor, Negeri Sembilan, Melaka, and Johor; 97% had never been tested for HIV but 89% in the survey consented to be tested and of these 7 were positive, 6 of them males; of these 7, 6 acquired the virus through heterosexual transmission and one through injecting drug use; 7% of those surveyed said that they had relatives, friends, or neighbors who were HIV-infected; 0.5% said they had injected drugs during the past year. The low rate of infection found contrasts with the higher rate reported previously by JHEOA for Orang Asli injecting drug users. Orang Asli, especially the women, knew little about AIDS; condoms were rarely in use. Some demographic information was also elicited.)


XVI. Tuberculosis
446. Bolton, J., and M. Snelling. Review of tuberculosis among the Orang Asli (aborigines) in West Malaysia from 1951-1970. *MJM* 30 (1):10-29, 1975. (Found males and the elderly at greatest risk for contracting TB; at the time, patient cost at Gombak hospital was only 28% that of other government hospitals.)


XVII. Typhus
448. Brown, G., D. Robinson, and D. Huxsoll. Serological evidence for a high incidence of transmission of *Rickettsia tsutsugamushi* in two Orang Asli settlements. *AJTMH* 27:121-124, 1978. (On scrub typhus among Temuan of Bkt. Lanjan and Semelai of Post Iskandar; noted that scrub typhus was understudied and can have severe consequences.)


451. Tay, S. T., et al. Diagnosis of scrub typhus in Malaysian aborigines using nested polymerase chain reaction. *SEAJTMPH* 27 (3):580-583, 1996. (24 Gombak hospital patients suspected of having scrub typhus were studied; not all of them had it, as shown by analysis of the parasite’s DNA.)

452. Tay, S. T., et al. Antibodies to *Orientia tsutsugamushi*, *Rickettsia typhi* and spotted fever group of *rickettsiae* among febrile patients in rural areas of Malaysia. *TRSTMH* 94:280-284, 2000. (Serological tests of rural Orang Asli patients confirmed the general knowledge that they had a high exposure to scrub typhus.)

XVIII. Women’s health
453. Baba, Y. K. A. P. study of family planning among married Orang Asli women of Kuala Langat district, Selangor. Malaysian J. Reproductive Health 8 (2):72-76, 1990. (A knowledge-attitude-practice study of 69 women, average age 16.3 years, found 19% were married before age 15. Most of the women and their husbands approved of family planning.)


460. Harrison, M. Healthcare Decisions among Semelai Women of Malaysia. Honors thesis, Dartmouth College, Hanover, New Hampshire, 2001. (Discusses pros and cons of biomedicine for women at Sungai Sampo, Negri Sembilan; notes government personnel can be demeaning, waiting-room time hours-long, and that invasive procedures in hospital are disliked.)

461. Hema Apparau. Reproductive health of Orang Asli women who used the antenatal services of the Gombak Hospital. B. Med. Sci. thesis, Univ. Putra Malaysia, Serdang, 2002. (Reports that 55% of 42 pregnant women studied were anemic; Orang Asli women have the highest rates of postpartum hemorrhage and puerperal sepsis in W. Malaysia.)

462. Jamsiah, Mustafa. Family planning among the Orang Asli women in the district of Hulu Langat, Selangor. M. Public Health, Univ. Kebangsaan Malaysia, Bangi. (On Temuan, with a review of relevant health services.)


468. Ong, H. C. Hematological values in pregnancy in Orang Asli (Aboriginal). *MJM* 27:240-242, 1973. (26% of 278 pregnant Orang Asli women at Gombak hospital were anemic.)


470. Ong, H. C. Hemoglobin E variants and pregnancy in Malaysian aborigines. *Acta Haematologica* 52 (4):220-222, 1974. (48% of Hb E women analyzed were anemic; other genetic factors were not assessed.)


XIX. Journalistic materials


477. Alyaa Alhadjri. New director for Orang Asli hospital. *The Sun*, 16 March, 2010. (A human rights commissioner reported that Orang Asli feel threatened because the Gombak hospital, originally built to cater to their medical needs, has been taken over by non-Orang Asli; the hospital’s outpatient unit is now open to many others in the Gombak area and Orang Asli have to compete for limited resources.)

479. Anonymous. JOA sahkan kegiatan judi di Hospital Orang Asli Gombak. *Berita Harian*, 10 March, 1984. (Commentary on the 3 March report in the same newspaper; JOA was later renamed JHEOA.)


481. Anonymous. Why blame the Orang Asli? *The Star*, 2 December, 1985. (Health authorities blamed unhygienic practices of an Orang Asli village for causing jaundice in nearby settlers in Perak and called for the village to be forcibly moved elsewhere, although nearby non-Orang Asli villages were not threatened with such moves; then the jaundice outbreak was found to be due to poor chlorination at the local water-treatment plant.)

482. Anonymous. Orang Asli encouraged to give birth in hospitals. *Sunday Star*, 29 September, 1996. (62% of the 42 reported West Malaysian women who died during home births were Orang Asli.)

483. Anonymous. Jaleha gets assurance from police. *New Straits Times*, 28 June, 1997. (A federal minister ordered late-pregnant Orang Asli to stay at birth centers; this warding for a month or so before delivery was both stressful and boring for the women and a burden on their families in terms of child care and work duties; home births were discouraged or forbidden.)

484. Anonymous. Charge the guilty ones, A-G urged. *The Sun*, 1 April, 2000. (When Jah Hut children died in Seboi, Pahang shortly after anti-malarial overdoses, the parents were accused of general negligence by government officials, but a coroner’s inquiry found that the deaths were indeed due to an overdose.)

485. Anonymous. Spooked by ‘mysterious’ deaths. *New Straits Times*, 2 May, 2004. (Orang Asli were blamed by officials for the deaths of 4 Semai children over 5 days with symptoms of vomiting and diarrhea.)


487. Anonymous. Danger lake. *The Star*, 26 July, 2004. (A university study found high levels of Escherichia coli in shallow Tasek Chini, and Orang Asli headmen pointed out that the problem arose only after the government dammed the Chini River so that lake water couldn’t flow into the Pahang River.)


490. Anonymous. Development blamed for Tasik Chini’s woes. *The Star*, 27 July, 2004. (The university study found that the pollution was caused not by the Orang Asli but by improper sewage disposal from the new resort and the local national service camp there.)

491. Anonymous. Gombak Hospital to remain under JHEOA. *Bernama*, 21 May, 2007. (A health ministry official stated that the Gombak hospital was well run by the JHEOA.)


493. Anonymous. Hospital built to cater to Orang Asli needs. *The Sun*, 9 March, 2010b. (A statement that the quality of government healthcare at Gombak hospital and elsewhere for Orang Asli has deteriorated since the 1970s when it was run by the British.)


496. Anonymous. 30 families live 20 years without water, electricity. *Malaysiakini*, 29 March, 2010. (On Kg. Pelam near Rompin, Pahang where lack of potable water has produced gastric distress and vomiting; copied from a Bernama report, but the accompanying photos are from elsewhere, the second one being of a Jehai mother in Kelantan who lost her husband to a tiger attack.)


498. Ding, J-A. Orang Asli hospital not fulfilling role. *The Nut Graph*, 22 March, 2010. (While the Gombak hospital was ostensibly for Orang Asli alone, over two-thirds of the hospital’s patients were non-Orang Asli, a physician said; she added that trips to outstations were irregular and medicines were dispensed on an ad-hoc basis, and further that the hospital did not carry out the Health Ministry’s basic food basket program for malnourished children.)


502. Mohamed Idrus, S. M. Keep out country’s healthcare statistics information up to date. *New Straits Times*, 12 September, 2000. (Reported that static rural medical posts stand empty, with no medical personnel present; this was confirmed in Anonymous, *Malaysiakini*, 19 March, 2010, which see.)


**Later insertions**


511. Anonymous. Hospital denies presence of young Orang Asli mums. *New Straits Times*, 5 July, 2009. (An official rashly misstated that the Cameron Highlands hospital had an 11-year-old in the maternity ward, but the youngest Orang Asli there were 17 and 23 years old.)


520. Ding, J-A. Orang Asli converted against will. *The Nut Graph* 27 April, 2010. (Reports that Gombak hospital staff have attempted to convert Orang Asli to Islam by trickery or bribes.)
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