

Annex 7

contd.

Sr. no.	Name of Meeting	Sponsoring Agency	Period	Type of participants	Remarks
6.	Myanmar-Unicef Programme Planops Annual Review	UNICEF	12-14 Dec 89	Researchers from DMR, people from Education Ministry of Social and Welfare Home Industry Planning and Statistics	Annual review on projects carried out with UNICEF grant in Myanmar
7.	Medical Research Congress, Paper Reading Session, 89	DMR	19-22	Researchers from DMR and outside DMR	

Service provided by Instrumentation Division for 4 years

Types of service	major work	minor work
1. Equipment Repair Service	647	537
2. Installation Service	197	
3. Development Work	33	
4. Lighting Fixture Replacement	2081	
5. Repair Service for Drainage and water supply system	23	

Number of Laboratory Animals supplied during 1986-1989

YEAR	ANIMAL SPECIES			
	Mouse	Rat	Rabbit	Guinea-pig
1986	10,584	1,714	180	93
1987	4,394	993	116	39
1988	3,613	748	54	22
1989	4,668	634	70	41
	23,259	4,089	420	195

Names of Institutions utilizing DMR Animal Supply

- (1) Institute of Medicine(1) Yangon
- (2) Institute of Medicine(2) Yangon
- (3) Institute of Medicine, Mandalay
- (4) Myanmar Pharmaceutical Industry, Yangon
- (5) Nation Health Laboratory, Yangon
- (6) Arts and Science University, Yangon
- (7) General Hospital, Yangon
- (8) Children Hospital, Yangon
- (9) Orthopaedic Hospital, Yangon
- (10) Eye, Ear Nose and Throat Hospital, Yangon
- (11) Veterinary Research Institute, Yangon
- (12) Zoological Garden, Yangon
- (13) Rodent Control Unit, Yangon
- (14) DCPT, Yangon.(Development Center for
Pharmaceutical Technology)

Research Projects Utilizing Facilities Provided By JICA
(Non JICA Projects)

I. Bacteriology Research Division.

1. The application of microbial genetics to the study of transmission and pathogenesis of infantile diarrhoea in Yangon. (USAID project) (1985-87).
2. Food and water contaminations as possible risk factors of acute diarrhoea during the rainy season in Yangon. (WEC project) (1986)
3. Clinical studies of diarrhoea on super ORS therapy. (WHO project bacteriological component)(1986)
4. Quantitation of Hep-2 cell monolayer invasion by Shigella species. (DMR project)(1986)
5. Degree of contamination and importance of carriage of enteric bacterial pathogens. (DMR project) (1988)
6. Cholera like toxin production of environmental isolates of Non O1 V. cholerae. (DMR project) (1988)
7. Serotyping of Salmonella from human and environmental sources. (DMR project) (1988)
8. Bacterial agent study in community based prospective study of rotavirus diarrhoea in children under 2 years of age in Yangon. (WHO/CDD project)(in collaboration with virology research division) (1988)
9. Clinical trial of rice powder ORS in young children. (WHO bacterial component) (1988)
10. Epidemiological study of dysentery in Yangon. (WHO project) (1989)
11. Enteric bacterial contamination of some Burmese snacks (DMR project) (1989)
12. Effect of alum on bacteria in drinking water. (DMR project) (1989)

13. Comparative study of alum, bleaching powder and permanganate in decontamination of drinking water (DMR project) (1989)
14. Bacterial aetiological agent study in neonatal pneumonia.(DMR project)(1989).

II. Biochemistry Research Division

1. Research on snake bite.(DMR project).
2. Research on malaria.(DMR project).

III. Experimental Medicine Division.

1. Study on Mother - Infant Transmission of Hepatitis B. (WHO/CDC)
2. Study on Efficacy of Plasma derived Hepatitis B Vaccine (WHO/CDC)
3. Study on Efficacy of yeast derived Hepatitis B Vaccine (WHO).
4. Efficacy of Mammalian cell derived DNA hepatitis B vaccine in preventing HBsAg carriers State in infants born to HBsAg and HBeAg Positive mother (Pasteur Vaccine/Programme for appropriate Technology in Health PATH)
5. Development of HBsAg ELLSA (WHO/CDC)
6. Development of Immunodiagnostic Regents by Institution.(WHO/UNDP/C.D.C)

IV. Immunology Research Division

1. Snake bite project.(DMR project).

V. Parasitology Research Division

1. WHO regional collaborative studies on the In vitro study of P.falciparum to antimalarias.(WHO project).
2. Control of Ascariasis by the targetted chemotherapy. (WHO project).
3. Study of the relationship prevalence and severity of P.falciparum malaria. and some genetically determined red cell disorders.(WHO project).

4. Cytoskeletal protein patterns of red cells obtained from subjects with abnormal haemoglobins and G6PD deficiency.(submitted to WHO/TDR).

VI. Pathology Research Division.

1. Pathogenesis of cerebral malaria.(DMR project).
2. Human cerebral malaria.(WHO project).
3. Intestinal pathology in ascariasis.(DMR project).
4. Snake bite research on human patients.(Granted by IDRC).
5. Toxoid trial of Russell's viper snake venom. (DMR project).
6. Thalassaemia in Burma.(DMR project).
7. Cell mediated immunity of pulmonary tuberculosis (DMR project).

VII.Virology Research Division

1. Epidemiological study on DHF project.(WHO project).
2. Community based prospective study of rotavirus diarrhoea in children.(WHO project).
3. Preliminary study of role of viral agents in acute respiratory infections.(WHO project).
4. A study to develop rapid diagnostic technique for Chikungunya virus.(WHO project).
5. Preliminary trial of rhesus rotavirus vaccine in infants (WHO project).
6. Hospital based study of viral aetiology of acute respiratory infections.(WHO project).
7. Comparative evaluation of WHO and Dakopatts ELISA Kits for rotavirus detection.(WHO project).
8. A study of seroconversion of live attenuated measles vaccine in Myanmar children.(DMR project).
9. Rapid and sensitive detection of dengue viral antigen using immunogold technique.(DMR project).
10. The assessment of changes in serum complement and prostaglandins levels of dengue patients in Myanmar. (WHO project).

Utilization JICA facilities By The Scientists From
Other Institutions in Yangon.

1. Lipoprotein analysis by Dr. Win Win Myint from the department of Internal Medicine of the Institute of Medicine (1) Yangon.
2. Electron diffraction pattern of semiconductor crystals by Dr. Khine Nyunt from the Physics Department of the Yangon University.
3. Electron microscopy of various crystals by 6 scientists from the department of chemistry of Yangon University.
4. Electron microscopy of Corynebacterium xerosis and Corynebacterium ovis by Ms. Shenez from the chemistry department of Yangon university.

THE EFFICACY OF ARTEMISININE DERIVATIVES PLUS ORAL MEFLOQUINE IN THE TREATMENT OF CEREBRAL MALARIA

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*Malar Than, Tun Hlaing & Aung Nyein
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*Kyaw Soe Tun
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*Kyaw San, Mon Mon Gale, Tin Tin Htwe, Hla Myat Mon & Than Naing Oo
Department of Medical Research*

Cerebral malaria cases treated in the stage of unrousable coma usually carry a high mortality, particularly in cases where the causative *P. falciparum* strain is resistant to standard anti-malarial drugs as chloroquine and quinine. A multicentre study was conducted by testing 40 cases of cerebral malaria with parenteral Artemisinin derivatives, namely intramuscular Artemether and intravenous artesunate followed by oral Mefloquine. The overall mortality rate at all levels of impaired consciousness was 10% (4 out of 40), and 18% (3 out of 16) if only those in unrousable coma are analysed. Parasite clearance times was found to be significantly shorter than in cases treated with intravenous quinine. Four patients who remained in coma after 2-7 days of I.V. Quinine therapy all recovered from coma after parenteral Artemisine derivatives were received. Recrudescence rates after recovery significant in Artemisine monotherapy became insignificant when oral Mefloquine was administered to all patients as soon as they recovered from coma. Therefore, parenteral Artemisine derivatives presently offer the best chances for survival from cerebral malaria in comatose stages, and recrudescences after recovery from coma can be prevented by addition of oral Mefloquine as soon as clinical condition permits.

THE SHARING OF DRUG INJECTION EQUIPMENT AMONG INTRAVENOUS HEROIN ABUSERS IN MANDALAY

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Because of the important role of needle sharing and sexual contact in the spread of acquired immunodeficiency syndromes (AIDS), this study explore and examine the problems and practices of needle sharing and sexual behaviour among intravenous drug abusers (IVDAs). A total of 174 intravenous drug abusers were interviewed, 65 were selected from the Mandalay Drug Dependency Treatment Centre and 109 recruited from Mandalay Prison. Data were collected through direct observation and structured interviews. A data collection form containing 14 questionnaires was used to collect data from each subject. The results indicate that 54% of intravenous drug abusers showed least interest in the general topic of acquired immunodeficiency syndromes (AIDS) and for their potential risk for becoming infected with human immunodeficiency virus (HIV). Over 64% have multiple sexual partners

and almost all -99% of the intravenous heroin abusers reported that either they do not clean the infection equipment at all or use non-effective cleaning methods. In conclusion the authors discussed the need of specific strategies or measures to prevent the human immunodeficiency virus (HIV) spread among intravenous heroin abusers and suggested that serious thought be given to devising and implementing an effective health policy.

AMOEBA-LIKE ORGANISM FROM KNEE ASPIRATE

*Than Saw, Mar Mar Nyein, Maung Maung Oo, Tin Tin Aye, Myint Lwin
& Khin Maung Win*

Department of Medical Research

*Kyaw Myint Naing
Yangon General Hospital*

Organisms obtained from aspirate of swollen knee of a male patient was cultured in vitro by 3 different methods, i.e. axenically in TYI-33 medium (2) monoxenically in TYI-33 medium with Trypanosoma cruzi, as protozoal associate, and (3) poly xenically in Egg Yolk Infusion medium. The soluble antigen of the organism was tested by ELISA with monoclonal antibody raised by immunization with the HK-9 strain of E. histolytica. Immunoperoxidase staining was tested against this organism using the monoclonal antibody and a polyclonal serum against E. histolytica. Positive results in all of these tests indicated that the organism was E. histolytica.

EVALUATION OF HUMAN IMMUNODEFICIENCY VIRUS (H.I.V) POSITIVE PATIENTS PRESENTING TO A GENERAL MEDICAL WARD

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Yangon General Hospital*

*Than Myint, Soe Lwin, Khin Phone Kyi & Khin Yi Oo
National Health Laboratory*

All 19 patients presenting to a general medical ward during period of 5 months were male intravenous drug abusers. Mean age was 30.2 (\pm SE1.2) years. One of them was also a homosexual. Three patients presented with the acute H.I.V. syndrome (influenza like syndrome; self-limiting thrombocytopenia; meningoencephalitis), 4 had infective endocarditis (3 died), 5 had pulmonary tuberculosis, 2 had septicaemia, 2 had hepatitis, one malaria and 2 were admitted for non-narcotic overdose. Overall mortality was 36.8% (7/19). Immunoglobulins showed a polyclonal rise in 6 patients tested but nitrogen stimulation tests for T cell function were normal in the 3 patients tested. Serological tests for syphilis were positive in 18.8% (3/16). HB_s Ag was present in 18.8%, anti-HB_s in 12.5%, HB_s Ag in 12.5% and anti-HB_s in 75% of 16 patients tested. Mean haemoglobin was 10.79 (\pm SE 0.75) g/dl, mean white cell count 8785 (\pm SE 626)/cumm and mean lymphocyte count was 2085 (\pm SE218)/cumm among the 14 patients examined. Even though 3 of the patients can be considered to have suffered from the acute H.I.V. syndrome, none of the others fitted the description of Progressive Generalized Lymphadenopathy,

AIDS Related Complex, or the Acquired Immune Deficiency Syndrome (A.I.D.S.) as defined by CDC/WHO. Mortality was high especially among those with infective endocarditis, and it is stressed that focus should be placed on the entire spectrum of H.I.V. infection rather than on A.I.D.S. which represent a very late stage of disease.

VITAMIN A STATUS OF MYANMAR CHILDREN

Moe Moe Sunn, Thane Toe & Khing Maung Naing
Nutrition Research Division, Department of Medical Research

Field surveys including eye and physical examination together with collection of blood samples were conducted in 1015 children age 2-14 years from randomly selected villages in Monywa, Kyaukpadaung and Taunggyi townships. Eye lesions such as conjunctival xerosis with Bitot's spots (XIB Xerophthalmia) which is regarded as indicative of chronic vitamin A deficiency was found to be prevalent in Monywa and Kyaukpadaung areas. Using trifluoroacetic acid reaction, deficient serum vitamin A level ($< 10 \mu\text{g/dl}$) among 2-14 years old children was found in 4.7% in Monywa, 8.9% in Kyaukpadaung and none in in Taunggyi area. Low serum vitamin A level ($10-19 \mu\text{g/dl}$) was found in 11.1% in Monywa, 51.1% Kyaukpadaung and 6.7% in Taunggyi. Thus a clearer evidence of the magnitude of problem of vitamin A deficiency has been obtained in dry zone area, upper Myanmar.

CIRCULATING ANTIVENOM LEVELS IN HUMAN SUBJECTS FOLLOWING INTRAMUSCULAR ADMINISTRATION OF RUSSELL'S VIPER ANTIVENOM

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Biochemistry Research Division
Nuclear Medicine Division
Snake bite Research Unit
Department of Medical Research

The possibility of using intramuscular route of administration of antivenom as a first-aid measure was explored in this study. 18 Russell's viper bite patients with no severe clinical features were injected with two 5 ml i.m. doses of monospecific antisera (total 10 ml) into each buttock. Serum antivenom levels with time course were monitored by solid-phase RIA. Initially at 10 min after injection, serum antivenom concentrations ranged from 0.2 - 2.1 $\mu\text{g/ml}$. The serum levels were found to be persistently rising with time; the mean antivenom levels at 3, 6, 12, 24 and 66 hr were 8.8, 14.1, 19.5, 28.7 and 49.9 $\mu\text{g/ml}$ respectively. The results indicate that significant levels of circulating antivenom can be attained as early as 60 min and onwards following intramuscular injection of antisera.

**A COMPARATIVE TRIAL OF DOXYCYCLINE VERSUS SULPHADOXINE PYRIMETHAMINE
COMBINATION AS CHEMOPROPHYLAXIS AGAINST MALARIA**

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Antimalaria & Hygiene Unit*

Efficacy of Doxycycline as an anti-malarial prophylactic agent was tested in the South Eastern part of Myanmar, on a military unit, exposed to heavy transmission of Plasmodium falciparum malaria during the period of June 1988. The study involves (135) subjects, receiving Doxycycline and (108) subjects receiving sulphadoxine + pyrimethamine, (Doxycycline 1 capsule (100 mg)/day and sulphadoxine (500 mg) + pyrimethamine (25 mg) 1 tablet biweekly). At the end of 7 months period, slide positivity rate for malaria parasite among those receiving Doxycycline was (14.07%) and among those receiving sulphadoxine + pyrimethamine was (27.8%). If Plasmodium falciparum infection rate is separately analysed, slide positivity rate for Plasmodium falciparum become (9.63%) for the Doxycycline and (21.29%) for the other. For analysing the Plasmodium vivax infection, the difference was less significant, namely (9.63%) Vs. (8.33%). The study showed that Doxycycline can prevent more effectively than Sulphadoxine-Pyrimethamine combination from P. falciparum infection.

**A KNOWLEDGE-PERCEPTION-BEHAVIOUR STUDY ON MALARIA IN TWO ISLAND VILLAGES
AND TWO TIMBER EXTRACTION CAMPS IN TANINTHARYI DIVISION**

*Thein Hlaing & Tin Maung Maung
Epidemiology Research Division
Department of Medical Research*

A malaria related knowledge-perception-behaviour study was undertaken in Paw-law-ton-tone (8 km from Kaw-thoung) and Pan-zin (10 km from Byake) villages by interviewing heads, their spouses or adult member of household, and in Han-ka-dine (western coast in Byoke-bine township) and Han-ton (eastern border in Kaw-thoung township) timbers by questioning the personnel concerned. In both villages, more than 85% of the respondents had no or low level of the respondents had no or low level of knowledge concerning biting position and breeding places of anopheles mosquito, cause of malaria, awareness of chemoprophylaxis and of chemotherapy against malaria. However, in comparison with the latter respondents, the former did not know more significantly about the breeding time of mosquito (95% Vs 48%) and cause of spread of malaria (75% Vs 23%), and did not perceive more significantly on susceptibility (23% Vs 2%), severity characteristics (28 to 32% Vs 0 to 13%), and controllability (72% Vs 48%) of malaria, benefits and barriers of selected antimalarial control measures (35 to 70% Vs 5 to 40%). The greater number of people in Paw-law-ton-tone relied malaria treatment on general medical practitioners (37%) and self-medication (29%), while those in Pan-zin on Community Health Worker (38%) and basic health service staff (29%). Similarly, the pattern of lack or difference of knowledge and

perception between the Han-ka-dine and Nam-ton timber workers were comparable to those seen in the two villages. The causes of dissimilarity in knowledge and perception on malaria between the villages and the camps and the facts to be emphasized in providing health education are discussed.

**THE RELATIONSHIP BETWEEN POPULATION MOBILITY AND MALARIA IN
FOOTHILL FOREST-FRINGE AND PLAIN AREAS IN BAGO DIVISION**

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Epidemiology Research Division
Department of Medical Research*

This study was conducted under the project entitled "Dynamics of Malaria Transmission" in collaboration with Parasitology and Entomology Research Division during 1984 to 1986. The study area comprised three villages within one and a half from the foothill forest-fringe, and a plain village approximately seven miles away from the Bago Yoma mountain range. The study population in each area was collected by weekly house-to-house surveillance and ten-weekly demographic-parasitological surveys. The major population movement in these villages was in the form of travels into the forest for various reasons. Population movement for the two years was described by percentage of travellers by months or inter-survey periods, and the intensity of travel in terms of frequency and duration of stay by each forest traveller. Relationship between forest travel and parasitaemia was found only in the plain village where forest travellers had a consistently higher rate of parasitaemia. The risk of forest travelling in the acquisition of malaria in these situations and its implications for malaria control are discussed.

**A STUDY OF MOSQUITO-NET UTILIZATION IN A FOREST-FRINGE MALARIA
ENDEMIC AREA IN BAGO YOMA**

*Myint Myint Soe, Le' Le' Win, Thein Hlaing, Naing Lin,
Win Win Khine & Myint Htun
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Department of Medical Research*

A cross-sectional house-to-house interview of over two hundred heads of households or adult representatives was carried out during January 1988 in Waing and Kaing-Taw-Su villages in Okpo Township at the foot of Bago Yoma, where it is endemic. The objectives of the study was to determine the extent of mosquito-net and blanket utilization, the prevailing knowledge, attitude and practices, and the socio-economic factors associated with mosquito-net utilization in these areas. Data have been analysed to describe mosquito-net usage: by percentage of households owning bed nets; percentage of population sleeping under bed nets by age, sex and season; type of bed nets used, and reasons for utilization and non-utilization. The implications of this study in the assessment of feasibility and practicality of using mosquito-nets and blankets per se, or insecticide impregnated ones as

personal protective measure in the control of malaria, in these foothill and forest-fringe situations are discussed.

**THE EFFECT OF QUININE AND QUINIDINE ON PATIENTS WITH HIGHLY
PARASITISED FALCIPARUM MALARIA TO DOUBLE BLIND STUDY**

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60 patients with high level of parasites in the blood (i.e more than 2% of RBCs parasitised) were chosen for the study. They were paired in sex and associated complications as nearly as possible. The first group of patients was treated with drug A and the remaining with drug B. Drug A and drug B consisted of Quinine or Quinidine, (injection and tablets) which is unknown to investigators. 15 mg/kg Quinine or quinidine was given as a loading dose infused over 4 hours followed by 2 doses of 7.5 mg/kg base also infused over 4 hours at 8 hourly intervals. This was followed by oral therapy. The oral drugs were continued as 7.5 mg/kg base 8 times/day till day 7. The efficacy of the 2 drugs were compared in terms of mortality, development of complication, parasite and fever clearance time. All patients survived, significantly higher level of serum quinine was recorded when compared to quinidine through the study. There was no significant difference between the level of plasma insulin between the 2 groups. Blood glucose level in patients treated with quinine is significantly lower than quinidine from the first till 36 hours of treatment. Since the parasites clearance time, fever clearance time, and recrudescence rate, between the 2 groups of patients were comparable. We conclude that quinidine is clinically equal but not more potent than quinine. It is probably more toxic because of more ECG changes. Quinidine may be used as alternative only if quinine is not available.

**ELECTROCARDIOGRAPHIC EFFECTS OF QUININE IN THE TREATMENT
OF FALCIPARUM MALARIA**

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Institute of Medicine (1)*

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Quinidine has been suggested as an acceptable alternative to quinine in the treatment of falciparum malaria. To compare the electrocardiographic effects of quinine and quinidine in falciparum malaria, sixty patients with more than 2% of parasitized red cells were chosen and paired as closely as possible. The study was double blind. 15 mg/kg quinine or quinidine was given as a loading dose infused over 4 hours followed by two further infusions of 7.5 mg/kg at 8 hourly intervals. Oral quinine or quinidine

as 7.5 mg/kg base three times a day was then continued till day 7. Satisfactory 12 lead electrocardiograms were obtained from 58 patients on a day 0, after 24 hours, on day 3 and on day 7. Overall there was no significant change in PR interval or QRS duration. The pretreatment QT_C was 443±30 msec in the quinine group (n=30) and 438±25 msec in the quinine group (n=28) with no significant difference. Maximum QT_C prolongation occurred on the third day in both groups, being 481±28 msec in the quinine group and this was significantly less the 532±55 msec seen in the quinine group. QT_C 550 msec was found in 46.6% in the quinine group but in only one in the quinine group. T wave flattening occurred in 62% in the quinidine group but in only 25% in the quinine group. No dysrhythmias were recorded in this study but because of the excessive prolongation of the QT_C caused by quinidine, we conclude that we should be cautious about the use of quinidine for falciparum malaria.

THE EFFECT OF INTRAMUSCULAR LOADING DOSE OF QUININE ON FALCIPARUM MALARIA PATIENTS (ADULTS AND CHILDREN)

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Institute of Medicine (2) Yangon, Myanmar Pharmaceutical Industry Yangon & Development Centre for Pharmaceutical Technology

The effect of I.M quinine on 10 adult and 10 children with falciparum malaria (50% of each group is highly parasitised i.e. more than 5% of RBCs parasitised) were studied. Ten adult patients treated with quinine infusion was also included in this study as control. The level of plasma quinine in all the adults after I.M quinine reached above MIC from the second hour of administration of the drug. The serum level is comparable to infusion quinine. There are no complications associated with this method of therapy. So this method of administration may be recommended for adult patients with complicated malaria. Among the children, 8 responded well to the treatment. The plasma quinine level reached above MIC level from the first hour as in adults. There are two patients who failed to respond to the treatment. One had persistently high level of quinine. He developed cerebral signs and symptoms and was misdiagnosed as a case of cerebral malaria. He responded well when quinine was stopped and replaced with mefloquine. Another child had a persistently low level of quinine. He also developed cerebral signs and symptoms and responded to mefloquine. Thus it is suggested that if possible, the level of plasma quinine should be monitored in children. In general, I.M quinine is also recommended for children patients before they are transferred to hospital.

THE RELATIONSHIP BETWEEN INTENSITY OF PLASMODIUM BERGHEI INFECTION AND BLOOD GLUCOSE LEVELS

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This study was carried out to see the levels of blood glucose and blood

lactate in Plasmodium berghei infected mice after various treatment. Oral chloroquine, 25 percent glucose subcutaneous injection and oral rehydration salts were used to control the parasitaemia levels and mortality rates in rodent malaria. Oral chloroquine of 20 mg/kg for four days were found to be very effective against Plasmodium berghei infection in mice. When the parasitaemia rates were increased, the blood glucose levels were found to be decreased. The blood glucose level inversely proportional of the blood lactate levels ($p < 0.01$). The blood glucose levels reached to normal values very slowly even after the treatments with chloroquine. Twenty five percent glucose subcutaneous injection and oral rehydration salts were supplemented to elevate the blood glucose levels in Plasmodium berghei infected mice. 25 percent glucose subcutaneous injection was found not only to increase the blood glucose levels but also raise the parasitaemia rates. The high mortality rates and short survival time were observed in Plasmodium berghei infected mice treated only with 25 percent glucose injections. Although the increase in parasitaemia rates were observed in mice treated with oral rehydration salts, the low mortality rates and prolongation for survival times were significantly different from the control group ($p < 0.01$).

INTESTINAL PATHOLOGY IN HEAVY ASCARIASIS

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Pathology Research Division, Department of Medical Research

Small intestinal biopsy from 5 patients who had been operated for acute intestinal obstruction due to heavy ascariasis were examined under light and electron microscopy. Patients were 2 males and 3 females from Yangon Children's Hospital with the age range of 3½ to 7 years. Light microscopy showed a mild thickening of the intestinal wall, a heavy infiltration in the lamina propria by chronic inflammatory cells and distorted intestinal villi. Ultrastructural examination revealed normal appearing enterocytes with undistorted microvilli. Intraepithelial lymphocytes were frequently found. Among the chronic inflammatory cells in the lamina propria were proliferated fibroblasts and increased collagen deposition. The changes were those of nonspecific chronic inflammation of the small intestine.

INVASIVENESS AND ADHESIVE PROPERTIES OF SOME SALMONELLA STRAINS

Phyu Phyu Win & Tin Aye
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To estimate the virulence of Salmonella organism, some Salmonella strains collected from various sources were examined. They were 24 strains of Salm. derby, seven strains of Salm. anatum, 3 strains of Salm. enteritidis, 2 strains of Salm. agona and one strain of Salm. augesterberg. In this study the ability of enteroinvasive bacteria to invade cell culture monolayer has been used as a convenient measure of the invasive potential.

Out of 37 strains tested, only 6 salmonella show invasive potential of 13 to 70 percent. Some strains show different patterns of adhesion. Fourteen strains have no invasive potential at all. The invasiveness of above 6 salmonellae were confirmed by determining the viable count of intracellular bacteria.

**PRELIMINARY TRIAL OF RHESUS ROTAVIRUS VACCINE (MMU 18006)
IN MYANMAR NEONATES**

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*Virology Research Division & Epidemiology Research Division
Department of Medical Research*

Safety and immunogenicity of rhesus rotavirus vaccine (RRV) strain MMU 18006 were studied in a placebo-controlled trial in 48 neonates, 5-15 days old. Twenty-four neonates received a 10^7 PFU-dose of the vaccine and 24 neonates received a placebo. The vaccine was well tolerated with no significant difference in the incidence of fever, diarrhoea, vomiting and respiratory symptoms during the postvaccination period. Vaccine virus shedding was observed in 5 vaccinees. Eighteen vaccinees (75%) experienced a seroresponse as assessed by one or more of the serological assays.

**EFFECT OF CHOLERA TOXIN ON INTESTINAL LYSOSOMAL ENZYMES IN
THE SUCKLING RAT**

Aye Kyaw, Swe Swe Lynn, Khin Maung U & Tin Oo
*Clinical Research division
Department of Medical Research*

Lysosomal function, namely lysosomal enzyme activities and lysosomal membrane integrities were investigated in suckling rats which received cholera toxin intragastrically and in sham-operated controls using two typical lysosomal enzymes, acid phosphatase and cathepsin D. It was found that the maximal specific activities of both the enzymes were decreased in the infected group when compared with the control suggesting a reduction in the ability of intracellular digestion by lysosome. On the other hand, the value of the ratio between maximal and basal activity (an expression of the degree of retention of enzyme to lysosome or lysosomal membrane stability) of acid phosphatase was significantly increased suggesting lesser extent of leakage of the enzyme into cytoplasm when compared with the control. However, there was no difference in the lysosomal membrane stability when measured in terms of cathepsin D. This discrepancy between the two enzymes was explained by their latencies.

**THE APPLICATION OF MICROBIAL GENETIC IN THE STUDY OF PATHOGENESIS IN
NEONATAL DIARRHOEA IN CENTRAL WOMEN HOSPITAL IN YANGON**

*Tin Aye, Thein Kyu, K. Wachsmuth, D.A. Sack, Khin Sann Aung &
Shin Min Thwe*

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Baby Special Care Unit, Central Women's Hospital
Magwe Division Hospital, Magwe
enteric Section, CDC, Atlanta, GA
Johns Hopkins University, Baltimore, MD*

A case/control study of pathogenesis of neonatal diarrhoea was carried out in Baby special Care Unit in Central Women's Hospital in 1985-1986. About 70 age/sex matched pairs of each sick babies and mothers and control babies and mothers were studied. Stool samples were collected and studied for enteric pathogens by standard procedures. Throat swabs were collected for study of carriage of pathogenic *Escherichia coli*. Assays of diarrhoeagenic *Escherichia coli* were performed by DNA hybridization methods using ³²P labelled DNA probes to detect the presence of virulent factors in 2600 *E. coli* isolates collected. The assay systems are : (i) enterotoxigenic *Esch. coli* for presence of heat labile and heat labile toxins. (ii) enteroadherent *Esch. coli* for localised and diffused adherent factors. (iii) enteroinvasive *Esch. coli* for presence of invasive virulent and toxin II producing factors. The causative agents identified as localised enteroadherent factor positive *Escherichia coli* serotype 0114: H2.

**DETECTION OF BACTERIAL PROTEIN TOXINS FROM STOOL SAMPLES
DIRECTLY BY BEAD ELISA METHOD**

*Mar Mar Nyein, Oku Y, Than Saw, Tin aye & Takeda T
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Bacterial protein toxins as *Escherichia coli* enterotoxigenic heat labile toxin II (VT2) and cholera toxin were detected directly from stool using Bead ELISA method. A total of 390 stools from adults with diarrhoea and dysentery from 2 Military Hospital, Workers Hospital and Yangon General Hospital and Infectious Diseases Hospital were included in this study. It was observed that 9.5 and 10 samples of stools showed to possess either LT or, VT1 or VT2 toxin alone respectively. Some of the samples showed to possess either 2 or 3 toxins in combination and they were 2 samples showed to possess LT and VT1 toxins; 3 samples showed to possess LT and VT2 toxins and 11 samples showed to possess VT1, VT2 toxins; and 14 samples showed to possess LT, VT1 and VT2 respectively. Thus a total of 54 samples (13.8 percent) showed to possess bacterial toxins. It was also observed that 28 samples out of 199 cases (14.1 per cent); 20 out of 109 cases (18.3 per cent) and 6 out of 82 case (7.3 per cent) showed to possess bacterial toxins in January, June and November 1988 respectively. Moreover Cholera toxin was detected from 5 out of 25 cases tested.

THE SERODIAGNOSIS OF AMOEBIASIS BY USING ENZYME-LINKED
IMMUNOSORBENT ASSAY

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An enzyme-linked immunosorbent assay was used to measure anti-*E. histolytica* antibody. The sera studied were from hospital patients with gastroenteritis, some of whom had amoebiasis, from patients with amoebic liver abscess and from persons in whom *E. histolytica* parasite (trophozoites and cysts) could not be found. Using PBS soluble trophozoite antigen of HK-9 strain of *E. histolytica*, serum antibodies against the parasite were detected in all individuals from whom trophozoites were isolated, but not from others. The results are discussed.

FIBREOPTIC GASTRODUODENOSCOPY; EXPERIENCE WITH 1372 CASES

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Fibre-endoscopy using Olympus GIF was performed in 1372 cases presenting with various abdominal complaints; for diagnostic purposes in 1240 and for therapeutic purposes in 132. The commonest indication was dyspepsia, 623 cases (45.04%). Abnormal findings were detected in 1204 cases (87.76%). The commonest diseases detected were 450 cases of peptic ulcer (32.9%), 345 cases of gastritis (25.15%) and 272 cases of oesophageal varices (19.83%). Gastric biopsy in 154 cases of gastric ulcer confirmed the benign nature of the lesion. Diagnostic accuracy rate in upper gastrointestinal malignancy is 66.19%. Therapeutic endoscopy (prophylactic injection sclerotherapy of oesophageal varices) was done in 132 cases of Cirrhosis who had at least one but of variceal haemorrhage. There was only minor morbidity (0.013%) in total 1372 cases of endoscopy. Discrepancy between radiological and endoscopic findings was found in 87 cases (17.12%). Fibre-endoscopy is advantageous in detecting mucosal lesions, tissue diagnosis and assessment of ulcer healing. Fibre-endoscopy complements and extends radiological findings.

INCREASED CAPILLARY PERMEABILITY ACTIVITY OF URSELL'S VIPER VENOM
AND NEUTRALISATION BY MONOSPECIFIC ANTIVENOM IN RABBITS

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Capillary permeability-increasing effect of Russell's viper venom was studied in rabbits by using I^{125} -labelled rabbit serum albumin tracer. The plasma disappearance of tracer was followed during the first 60 min

following intravenous administration into rabbits. The mean transcapillary escape rate (TER), plasma clearance and outflux of albumin for the envenomated group of rabbits were found to be grossly higher than those of the control group. Restricted pore area per unit path length (A_2/X) of the capillary membrane and the specific permeability coefficient (P) were also increased during envenomation, indicating increased leakage of plasma albumin from the circulation into the extravascular space due to the venom. This venom-induced effect was found to be dose-dependant and transient. Pretreatment with the monospecific antivenom 10 min prior to envenomation is effective in restoring the increased capillary permeability, but post-treatment with antivenom 10 min following envenomation fails to prevent the increase in capillary permeability.

USE OF REGRESSION ANALYSIS IN PREDICTING YIELD OF RUSSELL'S VIPER VENOM

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The amount of venom injected into the victims following bite is hard to estimate even with use of high precision sensitive technique. It has been shown that about half of the venom gland's content can be injected into the prey in defensive bites of large Russell's vipers. This finding sheds light on estimation of the venom gland's content through indirect measurement from biological parameters of the snakes brought by the victims. A total of 78 vipers (21 male and 57 female) of varying length, girth and sex were milked and venom dry weight is calculated from the wet weight. From these known measurements, regression analysis, a statistical estimation procedure was applied and venom yield estimated at a certain degree of confidence.

RUSSELL'S VIPER (VIPERA RUSSELLI) BITE: IMMUNODIAGNOSIS AND SIGNIFICANCE OF GUT STATUS AND LENGTH OF THE SNAKE

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Enzyme linked immunosorbent assay (ELISA) is used in immunodiagnosis of 311 Russell's viper bite victims. Of the total studied, 42% shows no systemic envenoming and diagnosis is confirmed in 35% of cases who failed to bring the dead snakes and excluded 24% of suspected bites. The mean initial venom level of systemic envenomed patients is 59 ng/ml (20-148 ng/ml). The gut status of the snake does not influence the degree of envenoming, the initial venom level, percentage circumference increase and the extent of local swelling of the bitten limb. The length of the snake had association with the degree of envenoming, admission onset time of incoagulable blood

in systemic cases, the extent of local swelling and percentage circumference increase of the bitten limb, but has no relationship with the initial venom level and development of acute renal failure. There is a significant difference in length distribution pattern of snake which causes oliguric and nonoliguric renal failure and majority of large viper bites may lead to oliguric renal failure. Late onset of incoagulable blood following bite depends on the rate of absorption of venom, balance between synthesis and consumption of clotting factors in addition to initial venom level.

AMOUNT OF VENOM INJECTED BY RUSSELL'S VIPER IN KILLING PREY

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The amount of venom injected into mice by Russell's viper in killing prey was studied using whole animal assays and quantitating venom antigen by enzyme linked immunosorbent assay. About 1.45 mg (0.8-2.4 mg) (less than 6% of the total available venom in the gland) was delivered in each successive bite irrespective of the gland's content. The amount of venom (40-230 mg) left in the gland even after bite would still be sufficient to cause systemic envenoming if the snake should bite a man.

INTRODUCTION TO MYANMAR ACUPUNCTURE

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A new method of curing and relieving some diseases with Myanmar needles has been introduced. The authors have invented filiform needles made from an alloy composing of gold, silver, iron, copper, mercury, arsenic, vermillion, sulphur and yellow orpiment of arsenic sulfide. The length of the needle is about 2 centimeters with the calibre between 26 and 28 gauge. The needle is superficially punctured in a horizontal-position with a depth of not more than half the length of the needle. The needles should be inserted into the points where pain is causing or to the area where the patient is not feeling well. The number of needles used depends on the condition of the disease and the number of pain causing points. The time required to retain the needle is generally from 10 to 30 minutes. No side effects have been observed yet. Kinds of diseases which can be cured or give relief by the needles are described. Illustrations and tables are included in accordance to the descriptions. The differences between chinese acupuncture and Myanmar acupuncture are comparatively discussed. Suggestions for future work have been outlined in the conclusion.

ANTIGENIC HETEROGENEITY OF PLASMODIUM FALCIPARUM GAMETOCYTES

Ye Htut

Parasitology Research Division, Department of Medical Research

The study aimed to establish the degree of variability in antigens that have been identified as involved in development of transmission blocking immunity in Plasmodium falciparum malaria and which are candidates as vaccine molecules. The gametocytes of NF 54 and Honduras strains of P. falciparum were grown in in vitro culture and used as antigens to test against ten monoclonal antibodies (MABs) by Indirect Immunofluorescent Antibody Test (IFAT) and Sodium dodecyl Sulphate-Polyacrylamide Gel Electrophoresis (SDS-PAGE) / (Western Blotting) IFAT showed positive reactions with both strains to eight of the MABs. By contrast IA 388, the MAB raised against 48/45 KD antigens of P. falciparum gametocytes gave positive reaction only with the Honduras gametocyte antigen. This confirmed a previous observation. Monoclonal 82D6A10 raised by immunization with affinity-purified 48 KD antigen of gametocytes of P. falciparum reacted only with NF54. SDS-PAGE and Western Blotting results corresponded well with the IFAT reactions in their specificities. The study thus produced some further evidence of antigenic heterogeneity although the results require confirmation by more extensive studies.

THE CHANGING INCIDENCE OF PLASMODIUM VIVAX INFECTION IN SUBJECTS WITH MALARIA

Myint Oo, Than Swe, Tin Shwe, Nyunt win, Aung Khin, Kyin Hla Aye
& Thi Thi Aye

Parasitology Research Division, & Clinical Research Unit for Malaria,
Department of Medical Research

This paper was based on (1) 1832 patients attending to Military Hospital in Lashio, Civil Hospital in Lashio and Civil General Hospital in Tharyarwaddy and (2) 1514 subjects with history of malaria living in villages and sectors in Lashio township. The data were collected between May and July during the years 1984 to 1989. The incidence rates of Plasmodium vivax were found to be increasing in hospitalized patients with malaria but P. falciparum still dominates in some villages of Lashio Township. The increasing trend of P. vivax was discussed.

IN VITRO AND IN VIVO ANTIMALARIAL ACTIVITIES OF ARTESUNATE

Myint Oo, Myint Lwin, Kyin Hla Aye, Aung Khin & Hual Zik
Parasitology Research Division, Department of Medical Research

Artesunate a derivative of Quinghaesu (Artemisinin) was tested for antimalarial activities against 4 isolates of Plasmodium falciparum in vitro and Plasmodium berghei-mouse model in vivo. The minimum inhibitory concentration of Artesunate in vitro was 4.0 p Mol per well whereas in vivo ED₉₀ was 1.4 mg/kg/day.

DEPOSITION KINETICS OF INFUSION QUINIDINE IN MYANMAR PATIENTS.
WITH FALCIPARUM MALARIA

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Institute of Medicine (2), Institute of Medicine (1) & DMR

To study the pharmacokinetics of infusion quinidine in Myanmar Patients, 14 adults with falciparum malaria, (half of them were highly parasitised i.e more than 5% of RBC parasitised with malaria parasites) were infused with quinidine dihydrochloride 15 mg/kg body weight, followed by 7.5 mg/kg 8 hourly for 2 doses. This was followed by oral administration of quinidine 7.5 mg/kg for 7 days. Plasma concentration of quinidine until 6 hours after the initial loading dose were analysed for pharmacokinetic parameters. The mean peak plasma concentration was 5.6 mg/kg. Systemic clearance was $4.3 \text{ ml Kg}^{-1} \text{ min}^{-1}$. V was 1.7 L/kg. Quinidine has a greater systemic clearance and a longer apparent volume of distribution when compare to quinine. Time to reach peak plasma concentration was 3.9 hours.

SEROLOGICAL SURVEILLANCE OF PLAGUE IN YANGON DIVISION, MYANMAR
1983 to 1988

Myint Zaw, Hla Naing & Wai Si Thauung
Rodent Control Demonstration Unit, Department of Health

Serological surveillance of Plague was carried out in an attempt to determine the factors underlying the existence and persistence of Plague and to explain the current status of endemicity in Yangon Division. This report covered the period from January 1983 to December 1988. Nabuto filter paper strips were used to collect blood samples from rodents, human cases, dog and rats. Positive Haemagglutination test Chan & Meyer was used employing the specific Fraction 1 antigen of Yersinia pestis. Results are stated according to species of rodents, calendar years, locations and positive titre ranges. Serological results of Yangon Division are compared with results from other states and divisions. The relationship between serological positive cases, human Plague and rat fall cases within the division are also shown. It is discussed that serological surveillance plays an important role in the surveillance and control of Plague by clarifying the mechanism responsible for quiescent Plague infection in rodents and mammals. In conclusion epidemiological features of Plague peculiar to Yangon Division are mentioned.

DDT RESISTANCE IN FLEAS IN MYANMAR

Maung Maung Tun, Wai Wah Khet & Wai Si Thauung
Rodent Control Demonstration Unit

DDT has been widely used in Myanmar for the interruption of malaria since 1953. The residual action of toxicity of DDT has induced the fleas to show cross resistance to chlorinated hydrocarbons. The fleas from Hlegu area showed a mortality of 68% at 4% DDT for one hour exposure, and the fleas

from Sanchaung, Thein zayat (Mon State) and Tamwe showed a mortality of 80% whereas in Maymyo only 29%. In case of emergency, DDT could still be used to suppress the flea population in the outbreak of plague but at a very high dosage of 10% emulsion spray. A new economical, highly effective insecticide of low mammalian toxicity should be substituted.

PLASMA NEUROLEPTIC LEVELS IN SCHIZOPHRENICS

Win Maw

Department of Pharmacology, Institute of Medicine (1)

Neuroleptic therapy is remarkably successful in the treatment of schizophrenia. In a preliminary study dosage of neuroleptic administered was calculated as the equivalent of chlorpromazine in mg per day and was found to be vastly different between the highest and lowest doses administered. Requirement of different doses to achieve adequate control of psychotic symptoms may be due to a number of reasons. In searching for possible answers plasma neuroleptic level was estimated in 61 patients suffering from chronic schizophrenia whose symptoms were adequately controlled by neuroleptic therapy. Radioreceptor assay was employed for estimation. The assay was based on the premise that anti-schizophrenic effect of neuroleptics is due to their anti-dopamine (anti-D2) action. Results showed among others, that plasma neuroleptic level was different in different patients but related to the dosage of neuroleptic administered. These findings indicate that requirement of neuroleptics was indeed different among schizophrenic patients. The possible reason may be difference in the disease conditions.

RODENT CONTROL FIELD TRIALS AT A LARGE OFFICE COMPLEX IN YANGON

Aung Zin, Hla Naing & Pe Than Htun
Rodent Control Demonstration Unit

Rodent control field trials were conducted at a large office complex of Burma Socialist Program Party Central Committee head-quarters in Mayangon township, Yangon, during the period of 1984 to 1986 by the Rodent Control Demonstration Unit (RCDU). The control programmes consist of three phases i. e. initial, follow-up and maintenance. The initial phase was started in the late months of 1984. The follow-up phase was commenced in August 1985. The third phase the maintenance (1) and maintenance (2) were carried out in the months of January to April and October to November of 1986 consecutively. Anticoagulant rodenticides Bromadiolone 0.005% and Brodifacoum 0.005% ready made wax baits locally formulated and produced to RCDU were introduced in controlling the incriminated rodents. Method of application was based on pulsed baiting technique. Successful results in reducing small mammals in the field as well as laboratory tests with these rodenticides were discussed. Practices in getting rid of rodents with new rodenticides provide further incite in gaining experience for future urban rodent control programmes.

COMMUNITY HEALTH EDUCATION STUDIES ON MALARIA IN
THANTHARYI DIVISION

Aung Htun & Khin Maung Lwin
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Malaria is a focal endemic disease in Myanmar. The present study was aimed at elucidating behavioural factors and their determinants that are essential in providing health education. Based on the principles of the PRECEDE model, a base-line survey was conducted on a samples of 277 community members from 6 project sites and communities in 4 townships of the Tanintharyi Division. Pretested interview schedule, open-ended questionnaire, observations and discussions and directed conversations were employed in gathering data. Analysis was focused on malaria-related non-behavioural and behavioural factors and their determinants which were presented as predisposing, enabling and reinforcing factors. Factors which were antecedent to behaviour were high-lighted. Feedback results which encourage or discourage malaria prevention and treatment were presented. Some barriers created mainly by the societal forces or symptoms were discussed. A possible health education intervention programme is suggested.

A COMMUNITY-BASED YOUNG CHILD CLUSTER RAPID SURVEY

Htay Htay Aye, Khin Tar Tar, Tin Tin win, Thein Swe, Khin Swe Min,
Myint Htwe, Than Tun Sein, Ohn Kyaw, Soe Tint & Roma Hein
Department of Health

A survey of (429) births born during the prior three years were selected as a scientifically valid sample of all children born in the accessible areas of Hmawbi township in May 28-29 1988. This study presents the findings of a community-based, ad hoc retrospective survey using the 'Rapid Survey Methodology' to shorten the time gap between when a survey is conducted and when their results are presented. Within three weeks, the survey results wer available to the Township Medical Officer and local authorities for use and a central level presentation was made. The information available are infant mortality rate (52 per 1000 live births), deliveries by trained health personnel (96.3%), immunization status onFDPT, OPV, BCQ (reported history and physical examination) and measles, nutritional status with regard to breast feeding, weaning practices, anthropometric measurements on growth (weight-for-age) and knowledge, attitude and practice for use of ORS. Using this methodology, health personnel can quickly gather population-based data for determining the distributions of diseases or conditions of interest and for evaluating intervention measures against them in the community.

CONTAMINATION OF FOOD AND WATER CONSUMED BY MYANMAR CHILDREN

Khin Nwe Oo, Aung Myo Han & Tin Aye
Bacteriology and Epidemiology Research Divisions
Department of Medical Research

To isolate some selected bacterial pathogens from children's food and drinking water, a 3 month study was conducted in a suburban community in Yangon, Myanmar. Food and water samples were collected (from 208 randomly selected children) from their morning meals and drinking water storage pots in the mornings. Escherichia coli, non-01 V. cholerae, Salmonella and Shigella spp. were isolated using the standard methods. E. coli, non-01 V. cholerae and Salmonella spp. were isolated from food samples. 5 E. coli and 6 non-01 V. cholerae isolates produced stable toxin (ST) and Cholera-toxin (CT) like toxin respectively. No shigella spp. was isolated from food samples. From the drinking water sample, 3 were positive for ST producing E. coli and no samples were positive for Salmonella and Shigella spp. This study underscores the importance of child foods and drinking water contamination and stress the need for prevention of such contamination.

EFFECT OF ALUM ON BACTERIA IN WATER

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A disinfecting property of alum on bacteria in different water types was studied. Alum concentration of 0.025%, 0.05% and 0.1% were added to natural waters (shallow well, pond and tube well) with and without seeded pathogens (Vibrio cholerae 01, Shigella dysenteriae type 1, enterotoxigenic Escherichia coli and Salmonella typhi) as well as to pathogens added distilled water. Total bacterial and faecal coliform counts as well as counts for the 4 specific pathogens were made at 0, 1, 2 and 4 hours after adding alum. The effects of different concentrations of alum on bacteria were compared. We found that the best decontamination power of alum was at 0.05%. It is most effective against V. cholerae 01 and S. dysenteriae 1, removing them within 1-2 hours. Potash alum is probably a potentially useful cost-effective intervention measures for decontaminating household water in future community interventions.

SEVERE PRE-ECLAMPSIA AT THE CENTRAL WOMEN'S HOSPITAL

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Divisional Hospital, Patheingyi

A study on hypertensive diseases in pregnancy at the Central Women's Hospital included 119 cases of Severe Pre-eclampsia, 58 cases of preeclampsia, 25 cases of severe hypertension, 36 cases of hypertension and 21 cases of eclampsia. Among the 119 cases of severe Pre-eclampsia, the majority

(48 patients- 40.3%) were in the 25-34 age group. 46(38.6%) were primigravidae, 3 cases (27.7%) gravida 2 to 5 and 40 (33.6%) were grand multiparae. Most 74-(62.2%) of them were housewives. The majority were of low educational status, 23(19.3%) being illiterate and 43 (36.1%) educated up to the primary school level. Regarding the economic status, 19 patients (15.9%) had an income of less than Kyats 200/- and 66(55.4%) earned between Kyats 201/- and Kyats 500/- per month. The risk of associations between maternal complications (eclampsia and abruptio placenta) and fetal complications (intra-uterine fetal death and "small for dates" babies) and maternal age, gravidity education and income were analysed.

ACUTE SPORADIC NON-A NON-B HEPATITIS IN YANGON

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Ninety six acute Viral Hepatitis cases were detected at the Primary Health Centres of three townships in Yangon during a period of ten months. Out of that 17 cases were Non-A-Non-B, 33 were B and 39 were A type of Viral Hepatitis. Clinical features of Non-A Non-B Hepatitis were the same as other acute viral hepatitis cases. Nine households of NANB hepatitis with a total of 109 family members were followed up for eight weeks and no secondary cases were detected.

ENTERICALLY TRANSMITTED NON-A NON-B HEPATITIS IMMUNITY IN RHESUS MONKEYS

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An experimental model of enterically transmitted non-A, non-B, hepatitis (ET-NANBH) was established in Rhesus monkeys (*Macaca mulatta*). Two monkeys previously infected with 10% of pooled stool suspensions of Myanmar patients with well-defined ET-NANBH and three virgin control monkeys were infected simultaneously with pools of stool suspensions from the first-passage. None of the two previously infected monkeys developed signs of hepatitis. All of three control virgin monkeys exhibited hepatitis as evident by sharp rise in serum aminotransferases, pathological changes of acute hepatitis in liver biopsies and identification of virus-like particles (VLPs) in the biles. these findings document the establishment of immunity after infection with EY-NANBH virus in Rhesus monkeys.

AN OUTBREAK OF ACUTE VIRAL HEPATITIS IN BUTHITAUNG TOWNSHIP

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DMR & Nihon University School of Medicine, Tokyo

An outbreak of acute viral hepatitis developed in Buthitaung township, Rakhine State in April 1988 and it was investigated by a combined team from DMR and Department of Health. 95 blood samples were collected from acute viral hepatitis patients. 46(48.42%) cases were NANB, 38(40%), 2(2.11%) were A type of hepatitis. In 9(9.47%) cases, type of Hepatitis could not be clearly determined. Therefore it was a mixed NANB and B type of epidemic. Epidemiological data were also presented.

PRELIMINARY REPORT ON THE CONTRACEPTIVE PREVALENCE SURVEY IN MANDALAY (PHASE I, URBAN)

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A study of the K A P (knowledge, attitude and practice) on contra-ception in Myanmar Females was undertaken in Mandalay. Two thousand and five hundred ever married females between the age of 15 and 49 years were interviewed. The data compiled were stratified according to age group, educational level, marital status, parity, socio-economic status and the prevalence of contraceptive use for each type of stratum. More than 90% of these women possess knowledge regarding contraceptives, but 79% of these are not practising contraception at the time of the study. The reasons for not using the fertility regulation methods were - (i) being afraid of side effects (ii) because of desire to have more children (iii) ignorance regarding contraception (iv) not wanting to interfere with nature (v) due to financial problems and (vi) because of religious beliefs. Oral contraception is the most popular method of fertility regulation followed by the injectable type. Sterilisation and vasectomy methods is the third recognised method. Although 94.76% of women are aware of the oral pills, only 26.2% used this method. Injection methods are known to 91.76% of respondents but only 18.14% used them. Understandably 91.08% of interviewers are aware about sterilisation but only 4.68% of subjects had undergone sterilisation.

SERUM URIC ACID IN NORMAL PREGNANCY IN MYANMAR WOMEN

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The serum uric acid levels of 25 apparently healthy pregnant Myanmar women between the ages of 20-40 years were measured. Eleven of them were primigravidae and the remaining 14 were multigravidae. Their serum uric acid levels were measured every 4 weeks from 20 weeks till 36 weeks of gestation. The mean serum uric acid levels were 3.476 ± 0.538 mg/dl at 20

weeks, 3.89 ± 0.673 mg/dl at 24 weeks, 4.07 ± 0.749 mg/dl at 28 weeks, 4.71 ± 0.622 mg/dl at 32 weeks, and 5.06 ± 0.727 mg/dl at 36 weeks. There was a gradual rise in the mean serum uric acid level as pregnancy progressed. A significant positive correlation was noted between serum uric acid level and period of gestation. Subjects with a higher serum uric acid level in the early months of pregnancy had a tendency to remain in the upper range throughout pregnancy and subjects with a lower serum uric level remained in the lower range throughout pregnancy. Parity had no effect on serum uric acid.

MANAGEMENT AND OUTCOME OF PROMIGRAVID LABOURS IN INSEIN GENERAL HOSPITAL, 1988

Khin Me Me Lwin

Institute of Medicine, Mandalay

A prospective study of management and outcome of 270 consecutive primigravid patients in labour was carried out in Insein General Hospital in 1988. Partogram was used to monitor progress of labour and the method of "Active Management of Labour" (O' Driscoll) was followed. Erect lateral X ray was never taken antenatally and no elective Caesarean section was performed for alleged "Cephalopelvic disproportion" diagnosed from the stature or the clinical finding of non engaged at term. Proper trial of labour was given to each patient; Artificial rupture of membranes in active labour was performed and augmentation with syntocinon was instituted whenever indicated. Of the 270 cases, 230 has spontaneous deliveries, 36 were assisted by Low Forceps, 2 are delivered by lower segment caesarean section. 39 cases needed augmentation with syntocinon. There was one case of maternal pelvic haematoma following forceps delivery, (the baby was normal). There was one still birth, two babies were transferred to neonatal unit for further care and the final outcome was good. The introduction of the use of partogram and the application of the method of "Active Management of Labour" (O' Driscoll) has reduced the incidence of the diagnosis of "Cephalopelvic disproportion" and the Caesarean Section rate, avoiding further problems of Caesarean Section scar in subsequent pregnancies. Maternal morbidity and fetal mortality and morbidity were low.

RELATIONSHIP OF SYMPHYRIO-FUNDAL HEIGHT AND ABDOMINAL CIRCUMFERENCE TO FETAL MATURITY

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Mandalay General Hospital & Institute of Medicine (1)

Symphysio-fundal height, abdominal circumference and anterior abdominal wall skinfold thickness were measured serially in 507 women with uncomplicated pregnancies in Mandalay General Hospital. A total of 2522 readings were made. Standard graphs of symphysio-fundal height, abdominal girth, symphysio-fundal height plus engaged portion of head and abdominal girth minus skin-fold thickness were drawn. The correlation between symphysio-fundal height (in centimeter) and weeks of gestation is good ($r=0.99$). The correlation of symphysio-fundal height with Maturity when the length of

fundal height (in centimeter) and weeks of gestation is good ($r=0.99$). The correlation of symphysio-fundal height with Maturity when the length of engaged portion of head is taken into account is 0.95 which is slightly less than that with symphysio-fundal height alone. The correlation coefficient for abdominal circumference (in inches) and weeks of gestation is 0.95 and when skin-fold thickness is subtracted, the value is slightly raised to 0.96. It is concluded that standard graphs of symphysio-fundal height (in cms) and abdominal girth (in inches) can be used to assess maturity of fetus.

MATERNAL NUTRITION: ENERGY INTAKE AND EXPENDITURE

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Nutrition Research Division & Physiology Research Division
Department of Medical Research

Dietary intake and energy expenditure were studied in 200 randomly selected rural (villages near Taikkyi) and 135 periurban Thaketa women who were either pregnant, lactating or non-pregnant, non-lactating. Three day dietary intake was measured by weighment method in all subjects and energy expenditure was estimated in 42-76 percent of the women. Mean energy and protein intakes of pregnant women did not vary between trimesters of pregnancy, and was no significant differences between intakes of pregnant women and those of non-pregnant, non-lactating women. However, mean energy, protein and total food intakes increased appreciably during lactation. Mean energy expenditure values of women showed a pattern similar to that of energy intakes. There was a not positive energy balance ranging from 224 to 296 Kcal/day during pregnancy in both rural and periurban women. Mean weight gain between trimester I and III in 24 rural cohort women was 7.45 ± 3.08 SD Kg while that of periurban women was 6.75 ± 2.22 SD Kg ($n=5$) with a wide individual variation. Energy balance during lactation might probably be negative especially in women from Thaketa. The implications of finding were discussed.

LIVER STORES OF VITAMIN A AMONG MYANMAR DYING OF VARIOUS CAUSES

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Nutrition Research Division, Department of Medical Research

A total fo 134 liver samples obtained from subjects who died of accidents or of various diseases in Yangon were analysed for vitamin A. Children who died of protein-energy malnutrition (P.E.M) and neonates had significantly lower liver vitamin A reserves compared to children who died of accidents ($p<0.001$). However, liver stores of vitamin A among children who died of acute respiratory infections (A.R.I) and those of the children who died of diseases other than P.E.M and A.R.I were not significantly lower when compared to children who died of accidents. Children 1-6 years who died of accidents hd significantly lower concentration of liver vitamin A than older children and tenage (6-9 years) and Adults who died of the same cause ($p<0.05$). It was found that socio-economic status also has an influence on

lower stores of vitamin A among Myanmar. The present study indicates the existence of a significant public health problem of vitamin A nutrition among Myanmar children of 1-6 years belonging to low socio-economic group in Yangon area.

LACK OF EFFECT OF DIETARY POTASSIUM ON RENAL LITHIUM CHANGES IN MAN

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M.G. Buckley, A.L. Sugden, M.A. Miller & G.A. MacGregor

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Charing Cross & Westminster Medical School, London, U.K &
Blood Pressure Unit, Department of Medicine, Charing Cross &
Westminster Medical School, London, U.K

The effects of alterations in dietary potassium (40, 80 and 160 mmol/day) on endocrine status and on renal lithium clearance were assessed in 10 healthy subjects on a fixed sodium intake; measurements were made on the fifth day of each dietary regimen. Plasma aldosterone concentration was found to increase with potassium intake, whereas plasma renin activity and the plasma concentration of atrial natriuretic peptide did not change significantly. Hence absolute lithium clearance nor fractional lithium excretion was affected measurably by changes in dietary potassium, suggested that provided the potassium intake remains within the normal range it is unnecessary to control this factor during lithium clearance studies in man.

ORAL GLUCOSE TOLERANCE IN MYANMAR ADULT

Than Oo, Htay Htay & Lilian Po
Institute of Medicine (1) & Institute of Medicine (2)

The oral glucose tolerance test (OGTT) was carried out on 66 apparently normal persons (male-31, female-35) of 20+3 years group and 68 apparently normal persons (male-33, female-35) of 50+3 years group. Capillary blood samples of fasting and $\frac{1}{2}$ hourly samples after the glucose load were determined for 2 hours by O-toluidine method. Urine sugar was tested at fasting state, after 1 hour and 2 hours of OGTT. Fasting glucose levels of both groups were found to be within the normal range (3.3-5.5 mmol/L). Sixty eight percent of the subjects in 20+3 years group and 67% of the subjects in 50+3 years group attained the peak blood sugar level at $\frac{1}{2}$ hour of OGTT. At 2 hour of OGTT, the blood glucose levels returned to fasting state. The mean blood glucose level at all points of OGTT in older group were significantly higher than that of the younger ($p < 0.01$), although both groups showed a normal response to oral glucose load. This clearly demonstrated the decreased glucose tolerance in old age. However, the blood glucose levels during OGTT of both groups were not influenced by the sex of the subjects ($p > 0.05$). In both groups, a very weak positive correlation between body weight and blood glucose was found.

PROSPECTIVE CLINICAL STUDY OF CARDIAC BERI-BERI IN ADULTS

Rai Mra, Pe Than Myint & Kyi Soe
Yangon General Hospital & Institute of Medicine (1)

Although thiamine status of the general population and studies on infantile beri-beri have been well documented, as yet no definite clinical information on cardiac beri-beri among adults in the Myanmar is available. In this prospective study, clinical features of 15 cases of cardiac beri-beri are presented. They were diagnosed clinically by the presence of all of the following criteria: (1) oedema and features of cardiac failure (2) no detectable cause for underlying heart diseases (3) absent ankle jerks and (4) rapid clinical recovery with complete disappearance of oedema with thiamine replacement therapy alone. Ten were males and 5 were females, aged 15 to 48 years (mean 27 years). Three groups of patients were seen: previously healthy adults (7), alcoholics (4) and women in that post-partum period (4). In addition to routine laboratory investigations echocardiograms were obtained in 7 patients four patients presented with hypotension and one with shock. All had cardiomegaly and features of right sided heart failure. Although paraesthesia were common, calf tenderness was seen in only 3 patients; 3 had foot drop and 2 had dysphonia. Electrocardiograms showed T wave inversions which became more pronounced after thiamine replacement. We recognized massive disproportionate oedema of the external genitalia to be important physical sign which has not been emphasized before. All recovered rapidly except one who died of concurrent disease.

THE INFLUENCE OF POSTURE ON RENAL TUBULAR FUNCTION IN MAN

Hla Yee Yee & D.G. Shirley
Department of Physiology, I.M (1), Yangon &
Department of Physiology, Charing Cross & Westminster Medical School,
London, U.K

The acute effects of changes in posture on renal function were investigated in healthy volunteers. Proximal tubular function was assessed using two methods simultaneously; lithium clearance and urine flow rate during maximal water diuresis. Changing from the standing to the supine posture was associated with significant increases in urine flow rate and in the clearances of sodium, potassium, creatinine and lithium ($p < 0.01$ in each case). Increases in fractional water excretion and fraction and fractional lithium excretion (using creatinine clearance as an estimate of glomerular filtration rate) were also observed ($p < 0.01$). The increases in lithium clearance and urine flow rate, both absolute and fractional, were significantly correlated. These findings suggest that the acute increase in sodium excretion following assumption of the supine posture results largely from an increase in endproximal fluid delivery, due partly to an increase in glomerular filtration and partly to a decrease in fractional reabsorption in the proximal tubule. The results also provide circumstantial support for the use of lithium clearance as a marker of end-proximal delivery in man.

THE IMPACT OF 6-MONTHLY AGE-TARGETTED CHEMOTHERAPEUTIC REGIMENS ON
PREVALENCE, INTENSITY AND MORBIDITY OF ASCARIASIS IN RURAL COMMUNITIES

Thein Hlang, Than Saw & Myat LayKyin
Epidemiology & Parasitology Research Division
Department of Medical Research

Three 6-monthly chemotherapeutic regimens targetted to 1-19, 1-14 and 5-19 age groups were implemented in three villages in Lepadon township, to observe the effects on prevalence, intensity and morbidity of ascariasis over a one-year period. After two rounds of chemotherapeutic treatment, the prevalence and intensity of *Ascaris* infection in age-targetted and non-age-targetted groups were markedly reduced in all the study areas, and the extent of reduction was according to the descending order of the above mentioned three regimens. In addition, marked reductions were observed in the rates of vomiting of worms, passing of worms per anus, cough, abdominal pain and treatment of bowel complaints especially in the targetted age groups. The findings are compared with those of other studies, and the public health significance of this study is discussed.

A MORPHOLOGICAL STUDY OF PALMAR APONEUROSES AND PALMAR SPACES

Tin Tin Myint, Ko Lay & Aye Cho
Department of Anatomy, Institute of Medicine (2), Yangon

The morphology of the palmar aponeurosis and the variable formation of the palmar spaces were studied by gross dissection, serial transverse sections of hands by band saw machine, dissection and radiological study after injecting the coloured gelatin and radio-opaque material in twenty seven adult human hands and seven aborted foetal hands. The palmar aponeurosis was the superficial layer of the deep fascia of the palm. It gave deep attachments to underlying structures by nine fibrous septa, which divided the distal part of the palm into eight small compartments for long flexor tendons and lumbrical muscles. Two marginal septa divided the proximal part of the palm into hypothenar, central and thenar compartment. One or two intermediate septa formed the middle palm septum, dividing the central compartment into middle palmar and anterior adductor spaces. Three variations of this septum's location were found. Due to various location of this septum, the boundaries and extent of the fascial spaces were different from one hand to another. The histology of the palm aponeurosis and the septa was studied by connective tissue stain and Elastic stain. It was found to consist of dense layer of collagenous and elastic fibres. The importance of the palmar aponeurosis and fascial spaces was discussed in Dupuytren's contracture and anterior adductor space infection of the hand.

**SERUM LIPIDS AND LIPOPROTEIN IN MYANMAR DIABETIC PATIENTS
WITH CARDIOVASCULAR MANIFESTATIONS**

Ye Thwe, Win Win Myint, Zay Soe, Maung Maung Oo & Tin Tin Htwe

No. (2) Military Hospital & Department of Medical Research

From June 1988 to June 1989, fasting serum lipids and lipoproteins were studied among 54 Myanmar diabetic patients (27 males and 27 females with mean ages 52.9 & 50.96 years) and 10 normal controls. Serum cholesterol was raised in 82.69% and triglycerides in 36.53% of diabetic cases. Serum cholesterol was raised significantly ($p < 0.005$) among diabetes while it was not for triglycerides ($p > 0.5$) if compared with normal controls. Patients with and without cardiovascular complications had similar rate of raised serum lipid levels and there was no significant change detected in serum lipoproteins in this study. No relationship of serum lipids to age, sex and duration of diabetes was detected in this study. Cardiovascular complications secondary to atherosclerosis in diabetes is thus concluded as related to raised serum lipids.

DYSRHYTHMIAS IN ACUTE MYOCARDIAL INFARCTION

Hnin Yee, Khin Ye Myint, Aung Chein, Khin Mar Oo,

Kywe Kywe Thein & Khin Mar Yee

Medical Ward, New Yangon General Hospital

One hundred and thirty cases of Acute Myocardial Infarction admitted to the coronary care Unit of the New Yangon General Hospital from January 1, 1987 to June 30 1989 were studied. Out of these 68 cases (52%) had various types of dysrhythmias. Types of dysrhythmias were studied. Total mortality of Acute Myocardial Infarction cases was 25%. Mortality of dysrhythmia cases in this group was 16%.

PERICARDIAL EFFUSION IN RENAL FAILURE

U Aung, Hla Mon, May Mya Win & Ba Aye

Department of Health & Department of Medical Research

It has been shown that excessive collection of transudate can occur in patients with Chronic Renal Failure. This study attempts to find out the incidence of pericardial effusion in patients with chronic renal failure, in the Yangon General Hospital. Case selection: 30 patients with chronic Renal Failure were selected from the Renal Unit, Yangon General Hospital on the basis of (1). High blood urea and acidosis for more than 8 months duration.

(2). Bilateral small kidneys on KUB. (3). Bilateral flat renograms. Pericardial effusion was detected by using an Aloka Model SSD 720 Echocardiogram. The amount of fluid was estimated by using the Martin et al method. Serum albumin was estimated in the Yangon General Hospital Laboratory by the Biuret and the Bromocresol green methods. Blood urea was estimated by the Automation method in the same Laboratory. Findings

Pericardial effusion was detected in 76% of patients which showed pericardial effusion was common in chronic renal failure.

**CEREBRAL AMYLOID ANGIOPATHY AND INTRACEREBRAL HAEMORRHAGE
(A CLINICO-PATHOLOGICAL STUDY)**

*Nyunt Win
Yangon General Hospital*

Cerebral amyloid angiopathy was been increasingly recognised in association with primary intracerebral haemorrhage in non-hypertensive patients over the age of 60 years. In this clinico-pathological study of seven patients with cerebral amyloid angiopathy diagnosed by biopsy or at autopsy, a detailed clinical account, Neuroradiological features, Neuropathologic findings (both Macroscopic and microscopic) and its relationship to dementia are presented. The role of surgery in cerebral amyloid angiopathy is also evaluated.

**EVALUATION OF FOUR COMMERCIAL TEST KITS FOR DETECTION OF ANTIBODY
TO HUMAN IMMUNODEFICIENCY VIRUS INFECTION**

*Khin Yi Qo Soe Lwin, Khin Mya Lwin, Myint Myint Lwin,
Khin Pyone Kyi, Sein maung & Saw Dale Pe Kyar
Virology Department, National Health Laboratory*

Two hundred blood specimens were tested for antibody to human immunodeficiency virus infection by the Competitive ELISA Test (WE11cozyme), the anti-globulin ELISA Test Kit (Orthodianostic), the Latex Agglutination Kit (Recombigen) and the Western Blot Immunoassay. Sensitivity and specificity of these test kits were evaluated.

**CLINICAL, ULTRASONIC AND PATHOLOGIC ANALYSIS OF OVARIAN TUMOURS
AT THE CENTRAL WOMEN HOSPITAL**

*Kathrine Ba Thaïke, Khin Nyunt, Nan Oo, Saw Lwin & Khin San Tint
Institute of Medicine (1), Institute of Medicine (2) &
Cerebral Women Hospital, Yangon*

During an 18 month period from 1st. January 1988 to 30th June 1989, 90 cases diagnosed as ovarian tumours were admitted to Unit II, Central Women Hospital. Pre-operative data collection on clinical features and ultrasonic findings were made. Following, operative findings and histopathologic diagnosis were noted. 87 cases had a laparotomy. Out of 82 cases of ovarian tumours 21 were malignant (25.6 per cent) and 61 (74.4 per cent) benign. The clinical and ultrasonic diagnostic accuracy of ovarian tumours were 87.35 per cent and 91.18 per cent respectively. The sensitivity, specificity, predictive values for positive and negative tests were calculated in differentiating benign from malignant ovarian tumours. It was found that clinical diagnosis had the highest sensitivity rate (73.68 per cent) whereas operative findings had the highest specificity rate. (96.72 per cent)

**DEVELOPMENT OF IMMUNOLOGICAL REAGENTS FOR HEPATITIS B SURFACE
ANTIGEN DETECTION BY REVERSE PASSIVE HAEMAGGLUTINATION METHOD**

*Khin Pyone Kyi, Than Aung, Myint Myint Lwin & Than Swe
National Health Laboratory*

Immunological Reagents for the detection of Hepatitis B surface antigen were produced locally at National Health Laboratory by using available resources. The technique included sensitisation of glutaraldehyde preserved sheep erythrocytes with goat anti HBs antibody. These reagents have been tested on 552 blood donors by the reverse passive haemagglutination (RPHA) method in parallel with Green Cross Antihebscell RPHA Commercial kit and Enzyme Linked Immunosobent Assay (ELISA) method. The results of these three methods were comparable.

ELECTROCARDIOGRAPHIC PATTERNS OF MYANMAR ATHLETES

*Tin Aung, Tin May Than, Mar Mar Nyein & M. Mya Tu
Physiology Research Division,
Department of Medical Research*

Standard twelve leads resting electrocardiograms of Myanmar athletes were reported. The study consist of 106 male and 34 female athletes participating in different sport events. The various components of the electrocardiogram (ECG) were measured and analysed. The ECG anomalies were observed which might lead to false diagnosis as heart disease. True diagnosis could have been achieved in those doubtful athletes by performing the ECG while exercising. Different types of exercise showed specific haemodynamic responses, - a fact needs consideration for future planning of the exercise therapy and rehabilitation programme for cardiac patients.



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KOM + SWM / 41289 Publications Division, DMR

Papers to be published

(JICA will be acknowledged)

1. Khin Maung Win, Khin Maung Tin, Ohn Kyi and Tin Maung Win. An outbreak of hepatitis E (enterically transmitted Non-A, Non-B Hepatitis) in Downtown Yangon.
2. Khin Maung Win, Tun Khin, San Shwe, May Mya Nwe and Fusae Iida. An outbreak of acute viral hepatitis in Buthidaung Township.
3. Khin Maung Win, Ohn Kyi, Hla Myint, San Shwe and Tin Maung Win. Acute sporadic Non-A, Non-B Hepatitis in Yangon.
4. Tin Aung, Thida Aung, Khin Maung Win, Hla Myint and Myo Thein. A study of glucose and insulin profiles in acute viral hepatitis patients.
5. Khin Maung Win, San San Do, Wynn Wynn Kyaw, Soe Soe and Fusae Iida. Significance of viraemia during acute Non-A, Non-B infection.
6. Soe Soe, Khin Maung Win, Fusae Iida, Than Than, Maung Maung Do, San San Oo, Wynn Wynn Kyaw, Toshikazu Uchida, Koyu Suzuki, Toshio Shikata and Than Swe. Enterically transmitted Non-A, Non-B hepatitis immunity in rhesus and cynomolgus monkeys (*Macaca mullatta* and *Macaca fascicularis*).
7. Than Than and Khin Ei Han. Coagulation profiles in viral hepatitis.
8. Myint Oo, Maw Maw Khine Than Hlaing, Ye Htut, Myint Lwin and Kyin Hla Aye. Inhibition of *Plasmodium falciparum* merozoites invasion by immune sera collected from subjects with malaria.
9. Myint Oo, Pe Than Myint and Tin Shwe. The relationship between clinical severity of malaria infection and some genetically determined red cell abnormalities in Myanmar.
10. Myint Oo, Myat Phone Kyaw and Thein Than. *In vitro* susceptibility of *Plasmodium falciparum* merozoites to genetically abnormal erythrocytes in relation to their membrane protein variations.
11. Myint Oo, Thein Aung, Myo Nyunt, Win Win Kyaw, Thein Thein Myint, Than Na Swe and Su Su Khin. The occurrence of *Pneumocystis carinii* in autopsied lungs of children from Yangon.
12. Myint Oo, Myat Phone Kyaw and Thein Than. Some variations in membrane proteins of erythrocytes obtained from subjects with

Thalassaemia trait and G-6-PD deficient genes.

13. Myint Oo, Myint Lwin, Kyin Hla Aye, Aung Khin and Hual Zik. *In vitro* and *in vivo* antimalarial activities of artesunate.

14. Myint Oo, Hual Zik, Hla Pe, Myint Lwin and Kyin Hla Aye. Blood glucose and blood lactate levels in *Plasmodium berghei* infection.

15. Soe Thein, Than Aung and Htay Nwe. First laboratory documentation of human Japanese encephalitis infection in Myanmar.

16. Soe Thein, Myo Min Aung, and Htay Aung. Risk factors in dengue shock syndrome - preliminary report.

17. Soe Thein, May La Linn and J.A. Aaskov. A study to develop rapid diagnostic technique for chikungunya virus.

18. Soe Thein, Myo Minn Aung and Htay Aung. Dengue shock syndrome in Indians residing in a Yangon community.

19. Kyaw Moe, Hla Sein Wai and Khin Khin Oo. Evaluation of RNA polyacrylamide gel electrophoresis for the detection of rotavirus in stools.

20. Thein Than, Tin Tun, Hla Pe, D.A. Warrell, R.E. Phillips, Myint Lwin and Tin Nu Swe. Development of renal function abnormalities following Russell's viper (*Vipera russelli siamensis*) in Burma.

21. Tin Tun, Tin Nu Swe, Myint Lwin, D.A. Warrell, R.E. Phillips and Thein Than. Clinical significance of quantitative albuminuria following Russell's viper bites in Burma: The value of chemical reagent strips detection of albuminuria for impending oliguric acute renal failure.

22. Mar Mar Nyein, Y. Oku, Than Saw, Tin Aye and T. Takeda. Detection of bacterial protein toxins from stool samples directly by Bead ELISA.

23. Mar Mar Nyein, B. Rowe, Tsukamoto, Tin Aye and H. Hayashi. Relationship of serotype and enterotoxigenic *Escherichia coli* from acute diarrhoea in children.

24. Mar Mar Nyein, Tin Aye, Khin Maung Oo, Aung Myo Han, Myo Khin and Thane Toe. Distribution of enterotoxigenic *Escherichia coli* in children and its seasonal pattern.

25. Mar Mar Nyein, Kyu Kyu Mar and H. Hayashi. Vero cell

- cytotoxic *Escherichia coli* isolated from children with diarrhoea.
26. Mar Mar Nyein, Than Saw and H. Hayashi. Importance of enteropathogenic *Escherichia coli* isolated from dysentery cases in adults.
27. Than Saw, Mar Mar Nyein and H. Hayashi. Association of bacterial pathogens and amoebiasis from diarrhoea and dysentery cases.
28. Mar Mar Nyein and H. Hayashi. Enteroadhesive pattern of *Escherichia coli* isolated from diarrhoea cases.
29. Khin Nwe Oo, Aung Myo Han, Thein Hlaing and Tin Aye. Contamination of food and water consumed by Myanmar children.
30. Aung Myo Han, Khin Nwe Oo, Tin Aye and Thein Hlaing. Food and water contamination and diarrhoea risk.
31. Aung Myo Han and Khin Nwe Oo. Toilet paper and paper towel use after defaecation and hand contamination.

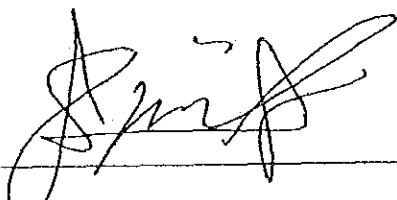
MINUTES OF DISCUSSIONS
BETWEEN THE JAPAN INTERNATIONAL COOPERATION AGENCY
AND
THE AUTHORITIES CONCERNED OF THE UNION OF MYANMAR
CONCERNING THE EXTENSION OF THE TECHNICAL COOPERATION
FOR THE RESEARCH PROJECT ON TREATMENT OF INFECTIOUS DISEASES
OF THE ALIMENTARY SYSTEM

The Japan International Cooperation Agency (hereinafter referred to as "JICA") represented by Mr. Tatsuo Fujimura, Head of the Technical Cooperation Section, Embassy of Japan, held a series of discussions with the authorities concerned of the Government of the Union of Myanmar concerning the extension of the technical cooperation on the Research Project on the Treatment of Infectious Diseases of the Alimentary System (hereinafter referred to as "the Project") proposed by the Myanmar side to the Japanese Evaluation Team which visited the Union of Myanmar in January 1990.

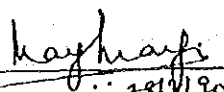
JICA had studied the possibilities of extension of the technical cooperation with the authorities concerned of the Government of Japan and concluded that the extension is vital for the success of the Project.

Based on this conclusion, both parties hereby agreed to recommend to their respective Governments that the technical cooperation be extended from March 1, 1990 to February 28, 1991 and that measures referred to in the Attachement be taken.

Myanmar, February 28, 1990.



Tatsuo Fujimura
Japan International
Cooperation Agency.



Dr. May May Yi
Director General,
Department of Medical Research,
Ministry of Health,
The Union of Myanmar.

ATTACHEMENT

1. The major objective of the technical cooperation during the extended period is to attain the technology transfer on the items (a),(b),(c) and (d) of the Master Plan of the Record of Discussions signed on December 26, 1985.

2. Responsibilities to be assumed by both sides are as follows:

Myanmar side

- (1) To secure budgetary allocation required for smooth implementation of the Project.
- (2) To provide adequate Myanmar counterpart personnel in order to ensure successful implementation of the Project.

Japanese side

- (1) To dispatch Japanese experts to the Project in the following fields:
 - a. (Short term experts)
Experimental Medicine
Bacteriology
Virology
Pathology
Immunology
Parasitology
 - b. (Long term expert)
Experimental Medicine
 - (2) To accept Myanmar counterpart personnel in Japan
4 persons will be accepted for training in Japan
 - (3) To provide supplementary equipment
Necessary equipment will be supplied within the limit of budgetary allocation of the Japanese Government
3. Activities of the extension program and tentative schedule of implementation are shown in the ANNEX I &II.
4. Regarding all matters other than above mentioned will be treated, during the period of the extension, in the same manner prescribed in the Record of Discussions signed on December 26, 1985.

ANNEX I ACTIVITIES OF THE EXTENSION PROGRAM

Activities of the extension program are as follows:

1. Experimental Medicine

- (1) Establishment of parameters necessary to be diagnosis of NANB hepatitis.
- (2) Propagation and detection of NANB hepatitis virus in cell culture.
- (3) IEM of the NANB infection liver and other tissues.

2. Bacteriology

- (1) Cytotoxins of Shigella and E. coli strains.
- (2) Pathogenesis of E. coli.
- (3) Continuation of type specific antiserum precreation.

3. Virology

- (1) Avidin biotin enzyme immunoassay for the diagnosis of rotavirus infection.

4. Pathology

- (1) Continuation of morphological characterization of NANB infection livers from patients.
- (2) In site hybridization of liver and other tissues.

5. Immunology

- (1) Development of hybridoma technology to prepare monoclonal antibodies against NANB hepatitis virus on arrival of necessary supplies and reagents.

6. Parasitology

- (1) Establishment of amoebic diagnosis.
- (2) Differentiation between the invasive and non-invasive strains of E. histolytica by using DNA technology.

ANNEX II

TENTATIVE SCHEDULE OF IMPLEMENTATION OF THE EXTENSION PROGRAM

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
DISPATCH OF EXPERT												
1. Experimental medicine												
Dr. toshio SHIKATA												
Dr. toshikazu UCHIDA												
Dr. kouyu SUZUKI												
Dr. michitani YANO												
Dr. mariko ESUMI												
2. Bacteriology												
Dr. hideo HAYASHI												
Dr. touru SHIMIZU												
Dr. Yoshi Fumi TAKEDA												
Dr. takeshi HONDA												
3. Virology												
Dr. takehiko KOUJI												
4. Pathology												
Dr. Yoshihiro HAMASHIMA												
Mr. makio FUJIOKA												
Dr. shigeru OKADA												
5. Immunology												
Dr. kazuo NAKANE												
Dr. keiko MORIKAWA												
6. Parasitology												
Dr. yoshio KANEDA												
Dr. tomoo TANAKA												
COUNTERPART TRAINING IN JAPAN												
EQUIPMENT												

JICA