REPORT

SEAR/WPR BIREGIONAL MEETING ON PREVENTION AND CONTROL OF SELECTED PARASITIC DISEASES

Manila, Philippines
13-15 April 1998
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SEAR/WPR BIREGIONAL MEETING ON PREVENTION AND CONTROL OF SELECTED PARASITIC DISEASES

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NOTE

The views expressed in this report are those of the participants in the SEAR/WPR Biregional Meeting on Prevention and Control of Selected Parasitic Diseases and do not necessarily reflect the policies of the Organization.

This report has been prepared by the World Health Organization Regional Office for the Western Pacific for governments of Member States in the Region and for those who participated in the SEAR/WPR Biregional Meeting on Prevention and Control of Selected Parasitic Diseases, which was held in Manila, Philippines from 13 to 15 April 1998.
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Countries of the Western Pacific and South-East Asian Regions share similar problems with regard to soil-transmitted helminths and foodborne trematodes. Schistosomiasis is a public health problem in several countries of the Western Pacific Region. The meeting reviewed the epidemiological situation, present control activities and the action required to strengthen prevention and control activities.

There is overwhelming evidence that roundworms, pinworms and hookworms are leading causes of morbidity in pre-school and school-age children and women of childbearing age in the two regions. These infections represent a major obstacle for the improvement of health and nutritional status of girls and women. The prevention and control of intestinal helminths should represent a major goal for all countries of the two regions where these infections represent a public health problem and where control activities have not yet started.

Foodborne trematode infections are important health problems in several countries. Transmission of clonorchiasis, opisthorchiasis and paragonimiasis are associated with eating raw or insufficiently cooked fish and crabs. Significant health education efforts will be needed to control these foodborne trematode infections.

Considerable progress has been made in controlling schistosomiasis. However, there is a risk of reintroducing infection in areas where transmission has ceased. There is also need to reinforce control activities in areas where morbidity and transmission have been reduced without interruption of transmission.

The tools and methods used to control schistosomiasis and the other helminthic infections mentioned above are already available. Health education programmes should be strengthened to emphasize the hazards of poor sanitary practices and improper disposal of faeces, and to stress the importance of safe food preparation and water supply.

Excellent drugs are available to treat these helminthic infections. Mebendazole and abendazole are effective in the treatment of roundworms, pinworms and hookworms. Praziquantel has made a significant impact on the treatment of schistosomiasis, paragonimiasis, opisthorchiasis and clonorchiasis. Furthermore, when combination therapy is used, filarial as well as the intestinal parasitic worms can be dramatically reduced, especially in mass treatment programmes.

Since available drugs are safe, effective and easy to administer, a strategy of mass treatment could target school-age children through schools. In addition, such treatment could be extended to other community members. The WHO Model List of Essential Drugs can be utilized. The Model List includes levamisole and pyrental and the drugs mentioned above for the treatment of intestinal nematodes. These drugs provide an opportunity for periodic de-worming of school children. Chemotherapy targeted at population groups with the heaviest worm burdens may also be beneficial to other non-treated populations by clearing the source of infection, reducing faecal contamination of the environment and eventually diminishing transmission.

Hookworm infections can cause iron-deficiency anaemia especially in areas of high prevalence (20%-30%). The essential drugs should be used in strategies designed to improve the health and nutritional status of girls and women in general. Single-dose anthelminthics may also be
given to pregnant and lactating women but not during the first trimester. Pre-school children over two years of age can be given a single dose of mebendazole or albendazole every six months.

There is a continuing need to maintain and reinforce control activities in endemic areas. Control should be community based and programmes can be integrated with concomitant use of anthelminthics against soil-transmitted nematodes, food-borne trematodes and schistosomiasis. Ensuring continuous financial support in future years will be critical for the long-term success of control of infections.
1. INTRODUCTION

1.1 Objectives

The specific objectives of the meeting were:

- to review the epidemiological situation regarding helminthiasis, foodborne trematode infections and schistosomiasis;
- to discuss progress made and operational problems encountered in implementing control measures;

1.2 Organization

The meeting was held at the World Health Organization Regional Office for the Western Pacific (WPRO) in Manila, the Philippines, from 13 to 15 April 1998. It was partly funded by the Sasakawa Memorial Health Foundation. The detailed programme is given in Annex 1.

The Chairman of the meeting was Dr Feng Zeng, China, the Vice-Chairperson Dr Praphasri Jongsuksuntigul, Thailand, and the Rapporteurs Dr Nor Filzatun Borhan, Malaysia and Dr Takeshi Kasai, Japan.

1.3 Participants and resource persons

The list of participants and resource persons is given in Annex 2.

1.4 Opening ceremony

The meeting was opened by Dr S.T. Han, Regional Director of the Western Pacific Region of the World Health Organization. Dr Han emphasized that intestinal helminthiasis, foodborne trematodes and schistosomiasis represent a public health problem in both regions. Many millions are infected by *Ascaris*, *Trichuris* and hookworms in the two regions, and children harbour the most intense infections. His message stressed that it is time to apply what we have learned to carry out effective public health interventions that will reduce the parasite burden, especially in children during their crucial developing years. The text of the Regional Director's opening address is contained in Annex 3. Dr A. G. Andjaparidze, Regional Adviser on Communicable Diseases, SEARO, also delivered a message on behalf of Dr Uton Muchtar Rafei, Regional Director of the WHO South-East Asia Region, which is contained in Annex 4.
2. PROCEEDINGS

2.1 Summary of country reports

Cambodia

Schistosomiasis transmission is focused along the Mekong River and its tributaries.

An integrated and decentralized helminthic disease control programme is being developed in Cambodia. Since 1996 the Ministry of Health, in collaboration with the international humanitarian organization Médecins Sans Frontières (MSF), has been carrying out a national programme. In 1995 a pilot control programme was set up in the area of highest transmission (Kratie Province). A new approach for the identification of endemic areas was tested. The approach was based on a questionnaire addressed to school children. One aim of the questionnaire was to identify the partially flooded rocky areas in the river near villages along the banks. Other questions related to schistosomiasis symptomatology and presence of "big bellies" in the village population. The approach was validated by parasitological investigation. The results of this approach allowed the Ministry of Health to classify villages potentially endemic for \textit{S. mekongi}, and to reduce survey costs and time, thereby increasing the efficiency of the control programme.

Three annual mass treatment campaigns were implemented before 1997. There was a reduction in prevalence from an average of 60\% in high transmission areas to less than 20\%. The programme has also been able to reduce dramatically the number of in-patients and out-patients in the Hospital of Sambok in the main endemic area.

Control of morbidity due to \textit{S. mekongi} has also been successfully associated with the control of soil-transmitted helminths, with the concomitant administration of praziquantel and a single dose of 500 mg of mebendazole. The epidemiological situation of soil-transmitted helminths has been assessed in representative samples of school children at the national level. Soil-transmitted helminths constitute a major high public health problem and periodic mass chemotherapy was started in several pilot districts. The schistosomiasis and helminth control programme has been integrated with the successful malaria control programme. Within helminth control a multisectoral approach has been evaluated in the suburb of Phnom Penh. This approach requires a sanitation component associated with a strong health education campaign.

However, several areas of concern may jeopardize the long term sustainability of the programme. Financial support is presently ensured only by the significant efforts of a single NGO (MSF). Further financial support is needed to extend programme coverage as schistosomiasis and intestinal helminth control is a long-term commitment.

Several cases of \textit{Opistorchis spp} and \textit{Fasciola spp} were reported during the \textit{S. mekongi} control survey.

China

A nationwide survey on the distribution of parasites, especially intestinal helminths and protozoa, was carried out in between 1988 and 1992. About 726 counties from all provinces/autonomous regions/municipalities were sampled at random and 1.48 million individuals were examined.
The estimated number (and average prevalence) of *Ascaris, Trichuris* and hookworm infections are 531 million (47.0%), 212 million (18.8%) and 194 million (17.2%), respectively. The investigation also assessed the prevalence of foodborne parasitic infections, in particular: clonorchiasis, paragonimiasis, cysticercosis and trichinellosis, and hydatidosis.

Based on the results of the national survey, a control programme for these parasites has been developed by the Ministry of Health. Control/surveillance of schistosomiasis and lymphatic filariasis are being sustained. Helminth control as a whole remains an important public health issue and needs a firm commitment from both the government and the community.

**Fiji**

Hookworm and *A. lumbricoides* are the most common intestinal helminths diagnosed in hospitals. A few cases of foodborne trematodes have been reported. Schistosomiasis is not transmitted in the archipelago. Control of intestinal helminths is incorporated into the primary health care system. A 10-year national lymphatic filariasis control programme was launched in 1997. The first round of the annual combined treatment with DEC and ivermectin produced a 60% reduction in *A. lumbricoides* infection.

There is a need to improve laboratories and diagnostic facilities. More emphasis needs to be placed on development of primary health facilities and processing of rural water supplies. These developments, together with regular chemotherapy for the elimination of lymphatic filariasis, will have a major impact on intestinal helminths.

**India**

Intestinal parasitic infections are very prevalent. It is difficult to estimate the exact magnitude of the problem as no survey at national level has been conducted. However, several sample surveys have been undertaken in various parts of the country.

Prevalence of various intestinal helminths varies from 0.1% to 55.6%. Roundworm, hookworm and whipworm are the major intestinal helminths. Generally speaking, rural areas report higher prevalences. Many studies have shown the prevalence to be higher in children, while others have shown it to be higher in females.

Although a few sporadic cases of fascioliasis and paragonimiasis have been documented, foodborne trematode infections are, in general, uncommon in India. *Schistosoma haematobium* has been reported but knowledge about the extent of endemic areas, the distribution of the snail intermediate host and the epidemiology of the disease is lacking.

In India, there is no specific control programme aimed at intestinal helminthic infections. Activities for the prevention and control of intestinal parasitic infections have generally been implemented through other major health programmes. These programmes include water supply and sanitation, diarrhoeal diseases control, maternal and child health, nutrition supplementary programmes, food safety, health education, and school health schemes. By and large, these programmes are integrated with primary health care. Repeat surveys in a few areas have shown that, over a period of time, prevalence of helminthic infections has markedly declined.

**Indonesia**

Intestinal helminthiasis remains a major health problem with intense transmission in most rural areas. Prevalence rates for *A. lumbricoides, T. trichiura* and hookworm (mainly *N. americanus*) are typically 40%-60%, higher in children and young adults. Control activities
include mass drug administration, health education and sanitation. They are carried out by the Government through its National Soil-transmitted Helminthiasis Control Programme and several school health programmes, the education sector, and other entities, for example pharmaceutical companies. Funding is still far from sufficient, but it is hoped that it will be possible to expand the programme to cover all the populations at risk: school-age children, populations in plantation areas, transmigration areas, tourism areas, and remote and less developed areas.

Foodborne trematode infections are not of great importance in Indonesia, as raw fish and crabs are not popular.

Schistosomiasis caused by *Schistosoma japonicum* is endemic in two valleys in Central Sulawesi Province with a total population of about 18 000. Before systematic control activities started in 1982, severe manifestations of the disease were common in the affected communities, especially among young children. The control programme has gradually advanced from mass drug administration to a comprehensive multisectoral programme including appropriate agricultural and environmental practices, education and special attention to transmigrants. Prevalence rates have been reduced from around 17% to 1%-3%, and it is expected that elimination of the disease will be attained within a few years.

**Japan**

Parasitic disease were once endemic in Japan. Today, Japan has successfully eliminated most parasitic diseases. Today, no cases of malaria and filariasis can be found, except for imported cases and the infection rate for soil-transmitted nematodes has fallen to near zero (around 0.01%). Similarly, no schistosomiasis cases have been reported in the last 15 years.

In Japan, parasite control measures were treated as part of public hygiene activities. Mass screening and anthelmintic agent treatment were undertaken together with community-oriented activities such as health education. As well as the community, public institutions, including the national government and local governments, parasitologists, and private organizations were involved in a coordinated campaign.

**Lao People’s Democratic Republic**

Although intestinal parasitic infections have never been considered as life threatening for the Lao people, they still remain prevalent throughout the entire population. Many of them cause high morbidity and mortality in addition to contributing to malnutrition among the poorest people in the country. Unlike malaria, which can cause illness and death in the untreated population within a short period of time, intestinal parasitic infections can be responsible for stunted growth in young children (ascariasis, taeniasis, etc.) and slowly developing chronic diseases leading to carcinoma and finally to death of the victim (opisthorchiasis, fascioliasis).

According to surveys carried out between 1990 and 1994 by the Institute of Malariology, Parasitology and Entomology (IMPE) in different regions of the country, the prevalence of intestinal parasitic infections ranged from 77% to 83%. These parasites included hookworm (18% - 42%), whipworm (15% - 20%), roundworm (24% - 45%), and taeniasis (8%). The most prevalent foodborne parasitic infection is liver fluke (31% - 54%). However, the prevalence of these parasitic diseases in Vientiane is much lower than reported by IMPE, e.g., ascariasis (12%), ancylostomiasis (20%), trichuriasis (7%), strongyloidiasis (6%) and opisthorchiasis (12%). According to the annual report on hospitalized cases published by the Department of Curative Medicine, there were 15 trichinosis cases throughout the country during 1994. The pattern of intestinal parasitic infections has remained unchanged during the
last 20 years, although there has been an alarming increase in ancylostomiasis as well as strongyloidiasis in some districts of the municipality.

WHO actively supported control activities to control *Schistosoma mekongi* from 1989 to 1994. The programme consisted of an epidemiological-malacological survey and treatment of human schistosomiasis with 40 mg/kg body weight praziquantel. However, this was not sufficient to effectively treat opisthorchiasis. The programme has drastically reduced the prevalence of schistosomiasis in Khong island (from 30% to 0.4% in school children). However the 1994 prevalence of *O. viverrini* was 27%, indicating that this liver fluke could not be suppressed by this drug regime.

**Malaysia**

Intestinal helminths are a major health problem among the aboriginal population and in certain areas throughout the country. There are small foci of schistosomiasis in the deep jungle where small aborigine populations are at risk. Control activities are integrated in the general health service, including an active programme of environmental sanitation and development of rural water supplies.

**Myanmar**

Myanmar has several endemic intestinal helminthic infections including *Ascaris lumbricoides*, *Trichuris trichiura*, *Enterobius vermicularis*, hookworms, *Hymenolepis nana* and *Strongyloides stercoralis*. Of these, *Ascaris lumbricoides* is the most common helminthic infection followed by *Trichuris trichiura*. The overall prevalence of intestinal helminth infection is approximately as follows: ascariasis (60% - 80%); trichiuriasis (24% - 28%); enterobiasis (10% - 20%); strongyloidiasis (2.5% - 2.9%); hookworm infection (0.4% - 0.6%).

The prevalence is variable from region to region. It is relatively high in the wet, humid and plain areas of the country and lower in hot, dry regions and the highlands. Helminthic infections are common in children. Some acute abdominal cases requiring surgery have been due to ascariasis.

**Papua New Guinea**

Schistosomiasis and foodborne trematodes are not found in Papua New Guinea. Intestinal helminths are a major health problem and have a major impact on children. There are no specific central helminth control programmes but there is an active programme of water supply and sanitation supported by health promotion.

**The Philippines**

A review of data on intestinal parasitism in the Philippines from the Department of Health Intelligence Service (1990-1993) shows a high incidence of intestinal helminthiasis among children ages one to nine years with more males (58%) affected than females. Common intestinal parasites are also reported by the Schistosomiasis Control Service from 24 schistosomiasis endemic areas. In 1994, out of 508 859 stool specimens examined, 36% had *A. lumbricoides*, 31% had *T. trichiura* and 12% had hookworms. In 1995, out of 73 351 stool examinations, 26% had *A. lumbricoides*, 16% had *T. trichiura* and 14% had hookworms. The Urban Health and Nutrition Project (1995) reported a prevalence of intestinal helminthiasis of 57% in four urban study sites.

The Department of Health implements control measures through the environmental health service; promotion of environmental sanitation and personal hygiene; the schistosomiasis
control service, diagnosis and treatment of cases; and occasional deworming carried out by the feeding/malnutrition programme of the nutritional service. The Department of Education, Culture and Sports has a limited annual deworming programme as part of its school health programme.

Paragonimiasis was reported in Cateel, Davao Oriental in 1997 among 35 out of 60 people (58%) not responding to short course anti-tuberculous chemotherapy.

**Republic of Korea**

Various helminthiasis infections have long been recognized as important endemic diseases in the Republic of Korea. In the past, the parasite infection rate was high and heavy infections were common. Through continuous parasite control and national surveillance activities by the government and parasitologists, together with rapid socioeconomic development, parasite infections, especially soil-transmitted helminthiasis, have decreased remarkably during the last three decades. However, foodborne trematode infections such as clonorchiasis are still prevalent. It is estimated that 1 million people are still infected with foodborne trematodes. In the future, the parasite control programme should be directed at the control of foodborne trematodes, especially *Clonorchis sinensis*.

**Samoa**

Although communicable and parasitic diseases remain one of the major public health problems in Samoa, the number of admissions due to infections has been progressively falling. The overall decline was 26% between 1991 to 1996.

As part of the Healthy Island concept, the Department of Health became active in educating the population on the transmission of the common parasitic diseases, as well as on environmental cleanliness and personnel health development, including hygienic practices.

The lymphatic filariasis control programme has included mass annual drug administration with a single dose of DEC and ivermectin carried out in 1996 and 1997. The prevalence of microfilariae was 4.3% in 1993 and 1.7% in 1997. More detailed observations and evaluations will be made in 1998.

**Singapore**

Intestinal helminths, foodborne trematodes and schistosomiasis are not endemic in Singapore. Cases are infrequently reported from immigrant workers.

**Solomon Islands**

Intestinal helminths are a major health problem throughout the country but there are no central programmes in place. Schistosomiasis and foodborne trematodes are not found in Solomon Islands.

**Thailand**

Intestinal helminthiasis is considered an important public health problem in rural areas, especially in the south. A national control programme began in 1980 with mass chemotherapy targeted at schoolchildren. It now includes sanitation, education and surveillance, with mass treatment being limited to areas with hookworm prevalence above 50%. Over the years, a gradual decline in prevalence of hookworm has been observed in all regions. Thus, in the south, prevalence was reduced from 76% in 1981 to 34% in 1996.
The most important foodborne trematode infection is opisthorchiasis, which is found in all parts of the country. In 1996, surveys revealed prevalence rates from 12% to 43%. The liver fluke control programme includes detection and treatment as well as health education for avoiding raw fish and hygienic disposal of excreta. However in spite of efforts in most areas, prevalence has increased in recent years, except in the north-east, where the control programme has had the most complete coverage and there has been a decline from 35% in 1981 to 15% in 1996.

Schistosomiasis is not transmitted in Thailand. However cases are reported from neighbouring countries. Intensive surveillance (of humans, snails and potential animal reservoir hosts) and a campaign to minimize high-risk behaviour is presently being carried out at a hydro-electric power plant project in Ubonratchathani Province in north-eastern Thailand to avoid the introduction of transmission.

Tonga

It was reported that parasitic diseases are not a major health problem among the people of the Kingdom of Tonga.

Vanuatu

It was reported that parasitic diseases are not a major cause of morbidity in Vanuatu. Based on medical statistics from 1997, some 2.4% of patients are diagnosed as having parasitic infections, with the major parasite being *A. lumbricoides*.

Viet Nam

Intestinal helminthiasis (*A. lumbricoides*, *T. trichiura* and hookworms, mainly *N. americanus*) are found countrywide, especially in the densely populated plain areas. Prevalence rates, especially of *Ascaris* and *Trichuris* tend to be higher in the north, where night-soil is generally used as fertilizer. Some pilot control projects, including mass drug administration for schoolchildren, health education and sanitation, have been carried out in limited areas. More systematic intervention on a larger scale is presently being planned. The epidemiological overlap between intestinal helminthiasis and lymphatic filariasis, for example in parts of the Red River Delta, may provide an opportunity to integrate both disease control activities with the concomitant administration of anthelminthic drugs active against filariasis and intestinal nematodes.

Among the foodborne trematode infections, clonorchiasis is the most important. It occurs focally, mainly in northern provinces. Opisthorchiasis has been found focally in central Viet Nam and paragonimiasis in north-western mountain provinces. Control activities, carried out as pilot projects, include case detection and treatment and health education. *Taeniasis* (*T. saginata* and *T. solium*) is important in certain areas and is related to traditions of eating raw beef and pork.

2.2 Technical reports

2.2.1 Recent developments in the integrated control of tropical diseases

Despite the remarkable success of smallpox eradication and the imminent interruption of transmission of dracunculiasis, it has long been recognized that a "vertical" approach to other individual tropical diseases was neither affordable nor sustainable in the long run.

Progress in efforts to control tropical diseases was slow, at least in the early years. The methods in use for the control of individual diseases were generally specific to those diseases.
making practical integration and the formulation of suitable policies difficult. However, in the past decade, the situation has begun to change dramatically. Among other factors, the following have been of particular significance:

- new drugs became available, which were highly effective against several prevalent but unrelated diseases;
- drugs already used against certain diseases were found also to be active against others of public health importance;
- certain drugs were found to be safe when administered together, permitting several different infections (e.g. schistosomiasis, hookworm, roundworm, lymphatic filariasis) to be treated orally at the same time;
- schools and school health programmes were recognized as the best entry point for disease control in children, with teachers, whose health promotion role has been long neglected, being given an active role (long neglected);
- insecticide-impregnated mosquito nets were introduced against malaria;
- the major drug companies undertook to provide certain drugs (ivermectin and albendazole) free of charge for onchocerciasis and lymphatic filariasis control programmes.

For control of morbidity due to schistosomiasis and intestinal nematodes, the opportunity to administer anthelminthic drugs simultaneously has increased the cost-effectiveness of programmes, especially in school children. Clinical trials supported by WHO on the absorption, pharmacokinetics and safety of praziquantel and albendazole, when jointly administered, have shown that the combination is safe and effective. Both schistosomes and soil-transmitted nematodes can be treated with single dose orally administered drugs: praziquantel is highly effective against all the three species of schistosomes, while the benzimidazole derivatives, such as mebendazole or albendazole, are effective against soil-transmitted helminths.

A resolution (WHA.50.29) by the World Health Assembly in 1997 to eliminate lymphatic filariasis as a public health problem from all endemic countries, was followed by the recent drug donation of albendazole in support of this goal. The simultaneous administration of albendazole and either ivermectin or DEC for the elimination of filariasis will have public health benefits that extend beyond the elimination of one of the oldest debilitating diseases of mankind. Albendazole is one of the most effective anthelminthics against soil-transmitted intestinal nematodes, and these drug combinations are expected to have a major effect in reducing morbidity due to these parasites.

At this time, the challenge for integrated tropical disease control is more operational than medical. Safe, effective and affordable drugs and control tools are available. The challenge is to be able to deliver them sustainably, with a low per-capita cost, to those who need them most: children and women in the least-developed countries, where there is little money available for health interventions. Hence, the ability to define the infection status and the disease burden of the population, and the competence to predict the impact and the cost of intervention, are very important in designing operationally realistic control programmes.

2.2.2 School-based interventions for helminth control

It is estimated that globally over 2 billion people are infected with parasitic helminths, mostly in developing countries. It is believed that the proportions of the world population infected with roundworm, whipworm and hookworms have remained virtually unchanged over
the past 50 years since Norman Stoll published his seminal paper "This Wormy World" in 1947. In areas where these worms occur, children become exposed to infections at an early age. By the time they reach school age, they are more likely than any other group of the community to harbour moderate to heavy infections, often with several kinds of worms. It is these moderate to heavy infections which cause disease. However, the significant socio-economic and technological developments of the past decades mean that this wide-ranging burden can be tackled through settings such as schools, using effective and inexpensive tools.

Experience indicates that school aged children should be the main focus for helminth control and that the school system provides an excellent channel for implementing interventions:

- The highest prevalence and heaviest intensity of infections with intestinal worms or schistosomes typically occur among children between 5 and 14 years of age. The adverse effects of infections on growth, nutrition and cognitive functions are particularly evident in children.

- We have the knowledge and tools to control and prevent the infections: (1) existing drugs are effective, safe, affordable, easy to administer and have a broad spectrum of action, and (2) when screening is necessary, simple screening methods are available. Furthermore, successful experience in controlling worms is available in some countries, particularly in the Western Pacific Region.

- Schools where children assemble daily provide an existing infrastructure for delivering mass treatments and messages about prevention of worm infections. The practical experience of large-scale, school-based programmes has shown that teachers can be of great help in drug administration without adding much more to their existing duties. In addition, studies have shown that children out-of-school can receive deworming interventions through schools.

- Studies have also shown that treating children can reduce the prevalence of infection in untreated members of the community, resulting in a decrease of overall transmission.

The following components will be addressed through deworming interventions:

- **School health education.** The success of helminth reduction interventions substantially depends on whether individuals are willing and able to practise behaviour that reduces the chance of infection. Education informs students and helps to change their unhealthy behaviour.

- **Healthy school environment.** Essential sanitary facilities in schools, such as latrines and water supply, not only contribute to the prevention of worm infection but to the overall improvement of school hygiene.

- **School health services.** Screening and drug administration provide an entry for the delivery of health services in schools and strengthen the collaboration between schools and the local health centre/institution.

- **School/community relationship.** The success of efforts to improve sanitation and reduce helminths in schools is closely linked to communal behaviours and decisions, and requires community involvement. As an educational experience, the results of deworming are immediate and visible and can be easily understood by students, parents and others in the community.
School food and nutrition programme. Helminth reduction can help decrease malnutrition and iron deficiency anaemia caused by the infections. At the same time, food hygiene and food safety are important for the prevention of parasitic infections. Nutrition education and micronutrient supplementation may be integrated into deworming efforts.

Health promotion for school personnel. Teachers’ preparation for health education and relevant activities in the programme can help improve the health of school personnel.

School policy and practices. School systems in a country may already have established policies on a range of issues. If the existing policies do not refer to health issues, they could be extended to incorporate issues such as policies/practices on food safety, smoke-free schools, routine screening, sustainable environment, parent-teacher associations, etc.

2.2.3 Schistosomiasis control programme in the Philippines

The schistosomiasis endemic areas do not have a distinct dry season. At present, it is estimated that there are 209 000 schistosomiasis cases out of a total risk population of 5.1 million in 183 municipalities of the 24 endemic provinces. A total of 1.6 million individuals are directly exposed to infection in the 1182 endemic barangays of each of the endemic municipalities. The endemic areas are distributed in 10 regions. Distribution is mostly concentrated in the Visayas and Mindanao islands.

Prevention and control consists of case finding and chemotherapy using praziquantel, given orally with a total dose of 40 mg to 60 mg/kg body weight. Environmental sanitation involves construction and use of sanitary toilets, provision of safe sources of water supply, building of footbridges, and control of stray animals. Snail control consists of agro-engineering measures such as clearing of vegetation, drainage of water logged areas, earth filling, ponding and improved rice culture. Chemical control using niclosamide is best applied after clearing and/or drainage. Health education is given high priority, bearing in mind that the successful implementation of any control measure requires the informed cooperation of the human population. The prevalence in the endemic areas was reduced from 10.4% in 1985 to 4.1% in 1996.

2.2.4 Schistosomiasis control in China

After more than 40 years of control activities, remarkable progress has been made in the control of schistosomiasis. By the end of 1997, the criteria of transmission interruption had been achieved in the municipality of Shanghai, in the provinces of Guangdong, Fujian and Zhejiang, and in 12 formerly endemic provinces and municipalities in the autonomous region of Guangxi.

Among the 400 counties (cities) formerly endemic for schistosomiasis, by the end of 1997, 227 had achieved the criteria for transmission interruption, 55 had achieved the criteria for transmission control and 118 were still endemic.

Despite this considerable progress, the task for schistosomiasis control in China is still arduous. In 1950, about 12 million people were infected. According to a nationwide survey on schistosomiasis conducted in 1995, the snail habitats totalled 3.6 billion m², with practically no reduction during the past several years. Infected persons amounted to 865,084, and among these, 55,961 were advanced cases. Furthermore, the estimated number of infected cattle and buffaloes (which serve as important reservoirs in the transmission of S. japonicum infection) was 100,251 in 1995. The population at risk of the infection is still 40 million.

Most of the 118 counties (cities) endemic for schistosomiasis are distributed in the swamp, lake and mountainous regions. In the swamp and lake regions, water levels are
unstable and snail elimination is very difficult. Irrigation and other factors cause snail colonies to expand and new snail habitats have frequently been found in areas where the snails had been eliminated. Many people live in the lake region, and they and their cattle frequently contact infested water. As a result, there is frequent infection and reinfection, and prevalence rates are usually maintained at high levels. Population movement is another factor contributing to the spread of the sources of the infection. Thus, prevalences in some places are increasing.

The mountainous region is another problem area for the control programme. The population density in this area is low, and the environment is quite complicated in terms of snail elimination. The region is socio-economically underdeveloped and it is not easy to reach. Schistosomiasis control in this region will be very difficult. The control strategy which is now being used in the swamp and lake regions and in the mountainous region is far from ideal. The government is aware that, to consolidate the success achieved, more efforts will be needed in the still endemic marshland, lake and mountainous regions.

2.2.5 Control of paragonimiasis

There are over 40 species of Paragonimus that infect humans. The important ones are Paragonimus westermani, P. heterotremus, P. skrjabini and P. miyazakii. Their distribution is highly focal and usually associated with populations that eat raw crabs or crayfish. There are 20 million people with paragonimiasis in China, 153 000 in Lao People's Democratic Republic and 1000 in the Republic of Korea. The population at risk in those countries is over 194 million. The disease has also been documented in Bangladesh, Cambodia, India, Indonesia, Japan, Lao People's Democratic Republic, Myanmar, Nepal, Papua New Guinea, the Philippines, Thailand, and Viet Nam.

Infections are acquired by eating raw or incompletely cooked, pickled or salted crustaceans. In China, crabs are soaked in rice wine (drunken crabs) before they are eaten and crayfish curd is popular in some areas. In Thailand, raw crab salad is favoured and in the Republic of Korea, crabs are soaked in soy sauce before eating. In the Philippines crab juice is used to season salads and roasted crab is popular. In some cultures crabs and crayfish are used for medicinal purpose. Contaminated utensils and even water containing metacercariae may be a source of infection.

Health education and chemotherapy have been two important control measures for paragonimiasis in China. People's eating habits have changed as a result of health education. Regional cooperation could become a reality for foodborne trematode infections if each country were to establish recognized effective control measures. Education to change eating habits is a priority, followed by the use of praziquantel to treat all existing cases. Knowledge of paragonimiasis in the Philippines is sufficiently advanced to permit a rational basis for targeting control efforts at high-risk groups.

2.2.6 Prevalence of helminth infections in Viet Nam

Ascaris lumbricoides

According to survey results of the Institute of Malariology, Parasitology and Entomology (IMPE) in Hanoi, among 437 235 people surveyed in over 30 provinces, the prevalence rates ranged from 45% to 95%. In general, the distribution of infection is highly focal. In the plains region prevalence is higher than in the mountainous regions. This can probably be explained by the fact that in the mountainous regions untreated night-soil is not used as fertilizer and the population density is much lower than that in the plains region. The infection rate in the north is higher than that in the south because southern farmers do not use untreated night-soil for manure. Moreover, helminth eggs are easily destroyed by year-round sunshine. The prevalence of infection is highest in the 5-9 years age group (99% in some areas). It should be emphasized
that children under one year have already a prevalence of *Ascaris lumbricoides* infection of 21%-43% in some areas.

There is no significant difference in infection rate between males (70%) and females (72%) in the same occupational groups. However farmers have a higher incidence of infection than other workers. Those who work in vegetable fields (93%) have a higher incidence of infection than farmers working in rice field (78%). In cities, workers (78%) have a higher incidence of hookworm infection than students and housewives (65%). Transmission of infection is extremely intense, as demonstrated by the fact that six months after anthelminthic treatment 90% of cases are reinfected. Transmission is more intense in April, May and September.

**Hookworms**

Hookworm infection is mainly caused by *Necator americanus*. The prevalence of *N. americanus* was 95% compared with 5% for *Ancylostoma duodenale*. In the north, the distribution of infection in plains region ranged from 30% to 60% whereas in water flooded plains it was between 3% and 18%. Prevalences for the different regions are coastal (67%), midlands (64%) and mountainous (61%). In the south, the incidence of infection was plains (52%), coast (68%), midlands (61%), and plateau (47%).

**Trichuris trichiura**

This infection is highly endemic. Distribution is similar to that for *A. lumbricoides* with which it is often associated. In the north, the infection rate ranged from 58%-89% whereas in the south, it was much lower (about 1%). In the north of Viet Nam, about 30%-40% of the infected people harbour all three infections: *A. lumbricoides*, *T. trichiura* and hookworms, with 50% harbouring mixed *A. lumbricoides* and *T. trichiura* infections.

**Liver fluke**

Infection was found mainly in south-east provinces of the Red River delta and some other areas where people have the habit of feeding fish with faeces and then eating raw fish. The prevalence ranged from 1.3% to 60%. Working adults had a higher prevalence than other adults. Males had a higher incidence of infection than females. The common liver fluke species in the north are *Clonorchis sinensis* and in the south, *Opisthorchis viverrini*. The first intermediate host is the snail *Melanoides tuberculatus* and the second is the fish *Hypophtalminthic multirix* (in the north of Viet Nam) and *carassius* (in the south). Animal reservoir hosts are domestic cats and dogs (in endemic area their infection rates are 64% and 29% respectively).

**3. WORKING GROUPS**

All participants, temporary advisers, observers and the secretariat were assigned to three working groups to identify priority actions for regional collaboration to strengthen parasitic diseases prevention and control activities for 1998 - 2000.

3.1 Intestinal helminth infections

The group recognized that there is overwhelming evidence that *A. lumbricoides*, *T. trichiura* and the two hookworms *N. americanus* and *A. duodenale* represent leading causes
of morbidity in pre-school and school-age children and in women of childbearing age in the two regions. These infections represent a major obstacle for the improvement of health and nutritional status of girls and women. Several countries have implemented effective disease control strategies. However, in others, in spite of their public health importance, these infections have not yet received adequate attention from policy-makers and health authorities. Prevention and control of intestinal helminths should represent a major goal for countries where these infections represent a public health priority and control activities have not yet started.

The group identified several activities as priority actions for the assessment of the public health relevance of soil-transmitted helminths and their prevention and control. The preparation of national plans of action should be the first step and activities should be included in accordance with the following scheme:

(1) Preparatory activities:

(a) Assessment of the epidemiological situation: The results of the parasitological survey will enable the classification of the community into categories for intervention, following recent WHO recommendations (WHO/CTD/SIP/98.1). The group stressed the need to acquire data on both prevalence and intensity to be able to classify the community in terms of intensity of transmission and morbidity (WHO Bench Aids for the Diagnosis of Intestinal Parasites, 1994).

(b) Identification of high-risk groups: In general, experience from endemic countries in the two regions has shown that children of pre-school and school-age and women of childbearing age represent the major high-risk groups (see WHO/HPR/HEP/96.10 and WHO/CTD/SIP/96.1). In specific epidemiological settings other groups (miners, plantation workers, etc.) may be exposed to intense transmission of soil-transmitted helminths.

(c) Assessment of operational feasibility: the availability of facilities and trained staff should be assessed.

(d) Advocacy: health authorities, political leadership and community leaders.

(e) Mobilization of funds: adequate financial resources have to be tapped from governments, international agencies, the private sector and NGOs.

(2) Specific activities:

(a) Training health managers in epidemiological assessment of the infections and programme evaluation and monitoring. Training of health staff on diagnosis and treatment. Training of teachers on control strategies. There are several documents published by WHO that can be used for this training (see WHO/CTD/SIP/98.2 and WHO/CTD/SIP/98.1).

(b) Monitoring of the impact of interventions on intensity of infection. This will enable the frequency of treatment to be defined according to intensity of transmission, which may vary from area to area. This will also enable appropriate utilization of human and financial resources to achieve maximum control of morbidity.

(c) Mass drug administration with one of the four anthelmintics on the WHO Essential Drug List (albendazole, levamisole, mebendazole and pyrantel) should be utilized for mass administration, depending on the experience of the country, drug
availability and cost (see WHO/CTD/SIP/96.2). Drug administration may be combined with micronutrient supplementation (iron, vitamin A, iodine, etc.) as needed.

Three strategies were identified for the use of anthelminthic chemotherapy:

(i) Universal treatment in which the whole community is treated irrespective of age, sex, infection status or other social characteristics.

(ii) Targeted treatment in which drugs are delivered to high-risk groups.

(iii) Selective treatment in which drugs are administered to individuals found infected after parasitological screening.

As school age children bear the greatest parasite burden, control programmes should give first priority to this age group. School children are also easily accessible and school-based intervention is a rational and sustainable approach for intervention. Teachers should be trained and should fully utilize control activities (see WHO/HPR/HEP/96.10).

(d) Health education messages should focus on risks associated with the use of nightsoil, open air defecation, the need for personal and food hygiene, and use of footwear.

(3) Supportive activities:

(a) Interaction with other community-oriented health programmes such as maternal and child health (specifically to control hookworm morbidity in women and soil-transmitted helminths in pre-school children), school health, sanitation, control of other communicable and parasitic diseases, and nutrition and micronutrient supplementation programmes. Strategies have included:

(b) primary health care where needed,

(c) involving NGOs and communities.

Programme evaluation and monitoring. Regular monitoring of the impact of intervention should be oriented to morbidity control through the reduction of the proportion of highly infected individuals.

3.2 Foodborne trematode infections

The strategy for the control of foodborne trematode infections requires collaboration between the sectors of public health, agriculture, fisheries and aquaculture, food industry, food safety and education as well as marketing, consumer and political sectors. The problem continues to be a high priority in several countries that have been able to control other helminthic infections such as the Republic of Korea. Transmission is associated with food habits that are particularly difficult to change. Within the two regions, these infections constitute a high priority in China, Lao People’s Democratic Republic, Philippines, Republic of Korea, Thailand, and Viet Nam. They also occur in other countries of the two regions.

Different sectors, including health, agriculture and education, can integrate their activities to reduce the prevalence of infection, morbidity and transmission. The objectives should range from reduction of morbidity in highly endemic areas to prevention of transmission and, in all countries, elimination of the risk of infection through food safety measures.
The group noted that, in spite of the public health importance of foodborne trematode infections, financial support for control measures is rare, even in the most affected countries. National control activities could be initiated or strengthened by allocation of new funds or reallocation of resources within the budgets of individual sectors. Participants stressed the usefulness of a body to coordinate funding to countries in need.

Laboratory staff adequately trained in parasitology are essential for public health programmes and clinical services. It was noted that the lowest rates of correct identification of parasite eggs and highest rates of missed diagnosis have occurred with the trematode eggs. As an example the differentiation of *Opistorchis* spp. eggs and other minute intestinal trematode eggs is problematic. The laboratory diagnosis of these infections requires continuous education programmes for laboratory technicians (see WHO, TRS. 849 and WHO/CTD/SIP/98.2).

3.3 Schistosomiasis

In the last 10 years significant reductions in prevalence and transmission of *S. japonicum* have been achieved in China, Indonesia and Philippines. Control of *S. mekongi* was implemented in Lao People’s Democratic Republic approximately 10 years ago and in Cambodia in 1995. In Malaysia, transmission is limited and focal, and schistosomiasis does not represent a public health problem. In Japan transmission has stopped.

Various problems have been encountered in the control of schistosomiasis in China and the Philippines. In China control measures are difficult to implement in large water bodies and swammy areas where snail control is problematic. In the Philippines control measures are particularly complex in several isolated areas of the archipelago.

The epidemiology of *S. mekongi* is now well established along the Mekong River in Cambodia and Lao People’s Democratic Republic and also along its tributaries in Cambodia. In these areas the control measures should mainly rely on regular mass drug administration to endemic communities and health education. Due to the particular transmission pattern of this infection at present, snail control does not seem to be a feasible approach for transmission control. Control measures should be targeted at the school age population with the aim of progressively integrating the control measures with those for other parasitic infections, mainly foodborne trematodes and soil-transmitted helminths. In Lao People’s Democratic Republic, control measures are continuing progressively. These includes the control of soil-transmitted helminths and foodborne trematodes. Since implementation, control activities in Cambodia have been integrated with control of soil-transmitted helminths.

In Lao People’s Democratic Republic, *S. mekongi* is transmitted only in the southern part of the Mekong River mainly around Khong island. Ten years of control have significantly reduced morbidity, prevalence and transmission of the infection. In Cambodia, three consecutive mass treatments, together with health education campaigns have reduced the prevalence in high transmission areas from an average of 60% to less than 20%.

Cambodia represents the highest transmission area for schistosomiasis in the two regions and reinforcement of the present control activities is essential. These should be aimed at covering areas without sufficient control activities and at strengthening implementation of existing control measures.

In China and the Philippines, there has been a long term political and financial commitment to control of schistosomiasis and the group felt that this commitment should be consolidated and maintained. In those provinces where transmission has ceased, surveillance should be included as part of the basic health service. Surveillance needs to be reinforced to avoid re-emergence of transmission (see WHO, TRS. 830; WHO/CTD/SIP/98.1; WHO/CTD/SIP/98.2).
4. EXAMPLES OF PRIORITY ACTIONS

Several countries have implemented effective disease control strategies. However, in others, in spite of their public health relevance, these infections have not yet received adequate attention by policy-makers and health authorities. The prevention and control of intestinal helminths should represent a major goal for those countries where these infections represent a public health problem and control activities have not yet started.

The meeting stressed the need for immediate action, especially in areas and countries where intervention has not started. What follows is a series of examples of actions that could be immediately undertaken, provided there is the necessary political commitment and funding. It will be evident that the list is not intended to be exhaustive.

There is evidence that in Lao People’s Democratic Republic and Cambodia the control of schistosomiasis, foodborne trematode and soil-transmitted nematode infections can be carried out at the same time. These infections can be treated with single dose orally administered drugs: praziquantel is highly effective against all the three species of schistosomes and Clonorchis and Opistorchis while mebendazole or albendazole is effective against soil-transmitted helminths. It is safe to administer praziquantel and mebendazole or albendazole at the same time to school age children and other infected individuals. Experience in Cambodia has also shown that this approach is feasible. The approach could be expanded to other endemic areas in the Lao People’s Democratic Republic.

In Viet Nam schistosomiasis is not transmitted but both foodborne trematodes and soil-transmitted nematodes are endemic, with high transmission areas. The soil-transmitted nematodes in Viet Nam represent a major public health problem and severe malnutrition in children and hookworm-associated iron deficiency in pregnant women can be observed. In Viet Nam control of helminthic infections could take place in conjunction with measures to eliminate filariasis. This would involve the use of praziquantel (for foodborne trematodes) and albendazole and ivermectin (for both filariasis and soil-transmitted nematodes).

In Fiji and the Philippines, intestinal helminths and filariasis are public health problems. In Fiji, the concomitant administration of ivermectin and DEC aimed at eliminating filariasis has helped to reduce the prevalence of A. lumbricoides. The regular yearly administration of DEC with ivermectin or albendazole could also be used for combined intestinal helminth and filariasis control in the Philippines.

In Thailand, foodborne trematode control in high-risk locations deserves more attention from health services. In India, filariasis elimination could be combined with soil-transmitted nematode control.

In Papua New Guinea and Myanmar soil-transmitted helminths represent a major public health problem. A strong association has been found between such helminths and malnutrition and stunting in children. Efforts should be directed at controlling morbidity due to soil-transmitted nematodes in children in both countries.
5. CONCLUSIONS

1. Millions of people in the South-East Asia and Western Pacific Regions of WHO are infected with human helminthic parasites, many with multiple infections. Poor sanitary practices, inadequate water supplies and eating uncooked fish or crabs perpetuate the problem. Methods to control helminthic infections are available and specific programmes can be implemented.

2. Excellent drugs are available to treat helminthic infections. They are safe, effective and easy to administer. A strategy of mass treatment could be targeted at school-age children through school settings. Treatments should also be extended to other affected community members, such as pre-school children and pregnant women, especially in areas where hookworms are a public health problem.

3. Combined drug therapy can be used to control two or more infections as follows:

(a) Two drugs can be jointly administered to control schistosomiasis, roundworms, pinworms, and hookworms. This safe drug combination consists of praziquantel for schistosomiasis and albendazole or mebendazole for these soil-transmitted nematodes. These drugs can be administered in single oral dosages.

(b) The combination of praziquantel and albendazole or mebendazole can be jointly administered to control schistosomiasis, soil-transmitted nematodes and also opisthorchiasis and clonorchiasis. Effective treatment of paragonimiasis may require retreatment with praziquantel spaced over two days.

(c) The combined administration of ivermectin with albendazole is effective in eliminating microfilariae of lymphatic filariasis up to 15 months and in treating soil-transmitted nematodes. DEC can be administered with albendazole or ivermectin for combined control of filariasis and soil-transmitted nematodes.

(d) The drugs for the soil-transmitted nematodes are inexpensive. Mebendazole, for example, can be purchased for about 3 US cents for each single 500mg dose. Albendazole and ivermectin, when used in the context of mass treatment for filariasis elimination programmes, are provided free of charge by pharmaceutical companies in joint collaboration with WHO and governments. Praziquantel to treat schistosomiasis at 40 mg/kg body weight costs about 30 US cents.

4. Reductions in the number of cases and in the worm load will inevitably lead to reductions in the rate of transmission. Chemotherapy targeted at the population groups harbouring the heaviest worm burden is also beneficial to the non-treated populations by clearing the sources of infection, reducing the faecal contamination of the environment and eventually diminishing transmission. The WHO Model List of Essential Drugs can be utilized. It includes levamisole and pyrantel in addition to the drugs already mentioned for the treatment of intestinal nematodes.

5. These four highly effective and safe single-dose anthelminthics (mebendazole, albendazole, levamisole and pyrantel) offer the opportunity of periodic de-worming of school children at affordable prices. School children harbour some of the most intense helminthic infections which produce adverse effects on health, growth and school performance. Treatment of this group achieves the maximum return in terms of reduction of morbidity.
School children are also one of the most accessible groups for treatment, and health care can be efficiently integrated with education programmes. Anthelminthic therapy is an essential component of anaemia control in areas where hookworms are endemic, and should be complemented with school-based iron supplementation.

6. Hookworm infections can cause iron-deficiency anaemia, especially in areas of high prevalence (20%-30%). The essential drugs should be used in strategies designed to improve health, development and nutritional status of girls and women in general. Single-dose anthelminthics may also be given to pregnant and lactating women but not during the first trimester. Pre-school children over two years of age can be given a single dose of mebendazole (500 mg) or albendazole (400 mg). The WHO Integrated Management of Childhood Illness (IMCI) programme recommends that all anaemic children over two years of age in endemic areas be treated with a single-dose anthelminthic every six months.

7. Before intervention a qualitative and quantitative epidemiological assessment should be made. This would enable programme managers to identify geographical areas and communities containing high-priority, high-risk groups, and to classify the communities into three epidemiological patterns. Intensity is of considerable importance and is related to heavy infections and causes of morbidity.

(a) High-prevalence, high-intensity (cumulative prevalence ≥ 50%, heavy intensity ≥ 10%) communities in which the whole community is treated once a year. High-risk groups of children and women are treated two or three times a year. Low standards of sanitation usually exist.

(b) High-prevalence, low-intensity (cumulative prevalence ≥ 50%, heavy intensity < 10%) communities in which treatment is organized at least once a year in high-risk groups. Health education strategies support the improvement of sanitation.

(c) Low-prevalence, low-intensity (cumulative prevalence < 50%, heavy intensity < 10%) communities in which diagnosed cases are treated. Health education strategies support passive case detection and improved sanitation.

8. Significant changes in food habits through health education are necessary to control food-borne trematode infections.

9. There is a risk of reintroducing schistosomiasis infection in areas where transmission has ceased. There is also a need to maintain and reinforce control activities in areas where morbidity and transmission have been reduced without interruption of transmission. It is essential that adequate funding sources be maintained to carry out comprehensive diagnosis and treatment activities in populations at high risk. Schistosomiasis can now be integrated with the simultaneous administration of anthelminthics against soil-transmitted helminths and foodborne trematodes. Ensuring continuous financial support in the years to come will be critical for the successful long-term control of these infections.

10. WHO should consider establishing a task force to identify sources of funding to support national parasitic disease control programmes and bringing this subject to the attention of the Regional Committees in 1999.
PROGRAMME OF ACTIVITIES

Monday, 13 April 1998

0800 - Registration

0830 - Opening ceremony
  Opening address - Regional Director, WPRO
  - Regional Director, SEARO
  Short remarks by Dr K. Kiikuni, Executive Managing Director
  Sasakawa Memorial Health Foundation
  Self introductions
  Designation of Chairman, Co-chairman and Rapporteurs
  Administrative announcements
  Group photograph

0900 - Coffee

0930 - Objectives and content of meeting – Dr Lee Self

0945 - Country presentations (Bangladesh, Cambodia, China, Fiji, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia)

1200 - Lunch break

1330 - Country presentations (continued)
  (Myanmar, Papua New Guinea, Philippines, Republic of Korea, Samoa)

1445 - Coffee break

1500 - Country presentations (continued)
  (Singapore, Solomon Islands, Thailand, Tonga)

1600 - Informal get-together
Tuesday, 14 April 1998

0800  -  Country presentations (continued)
       (Vanuatu, Viet Nam)

0830  -  Control of parasitic diseases
       • Recent developments in the integrated control of tropical
diseases
         (Dr L. Savioli)
       • School-based interventions for helminth control
         (Dr Yu Sen-Hai)
       • Schistosomiasis and soil-transmitted helminths infections:
         A sustainable integrated control for improving health in
         disadvantaged populations
         (Dr C. Urbani)

0930  -  Coffee break

1000  -  Schistosomiasis
       • Schistosomiasis control programme in the Philippines
         (Dr B. Ducusin)
       • Schistosomiasis control in the People's Republic of China
         (Dr Chen Minggang)
       • Snail control in Cambodia and the Philippines
         (Dr K. Yasuraoka)

1030  -  Other parasitic diseases
       • Foodborne trematodes and intestinal capillariasis
         (Dr J. Cross)
       • Paragonimiasis in the Philippines
         (Dr V. Belizario)
       • Characteristics of intestinal helminthiasis in Viet Nam
         (Dr Hoang Thi Kim)
       • Recent epidemiological situation regarding soil-transmitted
         helminthiases and foodborne trematode infections in the
         Republic of Korea
         (Dr Tai Soon Yong)

1200  -  Lunch break
1400  Group discussions: I. Intestinal helminthiasis, II. Foodborne trematodes; III. Schistosomiasis
1530  Coffee break

Wednesday, 15 April 1998

0800  -  Group discussions (continued)
       Drafting of conclusions
0930  -  Coffee break
1000  -  Presentation of group conclusions
1200  -  Lunch break
1330  -  Presentation of group conclusions (continued)
       Finalization of conclusions
1500  -  Closure of meeting
BACKGROUND

SEAR/WPR BIREGIONAL MEETING ON
PREVENTION AND CONTROL OF
SELECTED PARASITIC DISEASES

Manila, Philippines
13-15 April 1998

WPR/CTD/MAL/(1)98/IB.2
6 April 1998

ENGLISH ONLY

INFORMATION BULLETIN NO. 2

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REGIONAL DIRECTOR'S OPENING SPEECH FOR THE SEAR/WPR BIREGIONAL MEETING ON PREVENTION AND CONTROL OF SELECTED PARASITIC DISEASES
13-15 April 1998, Manila

DISTINGUISHED GUESTS, LADIES AND GENTLEMEN,

I am very pleased to welcome you all to the biregional meeting on the prevention and control of selected parasitic diseases. I welcome the opportunity to collaborate with the South-East Asia Region of WHO in tackling health problems common to our two regions.

In addition to well-known diseases such as malaria and lymphatic filariasis, important parasitic diseases in the South-East Asia and Western Pacific include intestinal helminthiasis, foodborne trematodes and schistosomiasis. Intestinal helminthiasis is a universal problem in tropical countries and more than 1 billion persons worldwide are estimated to be infected with Ascaris, Trichuris and hookworms. Many millions are infected in the two regions. High rates of infection occur in rural and semi-urban areas where personal and environmental hygiene and sanitation are inadequate. Children harbour some of the most intense helminth infections. Such infections have adverse effects on health, growth and school performance. Strategies based on mass drug administration to schoolchildren, combined with sanitation and educational measures, are gaining acceptance.

Foodborne trematodes affect more than 40 million people throughout the world, and are particularly prevalent in the two regions. Clonorchiasis, opisthorchiasis and paragonimiasis are contracted by eating raw or insufficiently cooked freshwater fish and crabs. The severity of clinical manifestations of infection is variable, but the disease can be severe and even fatal. One or more of these infections are public health problems in China, Japan, the Lao People's Democratic Republic, Republic of Korea, Thailand, and Viet Nam. Endemic foci and/or sporadic cases of paragonimus have been reported from Cambodia, India, Indonesia, Myanmar, Nepal and the Philippines. The epidemiological data are limited, but surveys have been conducted in specific localities.

More than 1 million people are infected with schistosomiasis in the two regions. The disease can be a cause of severe morbidity and is a particular public health problem in parts of Cambodia, China, and the Philippines. The disease also occurs in localized areas of Indonesia and Malaysia. The successful control approach that has been employed in Khong District, the Lao People’s Democratic Republic, is being expanded to other areas of the country. Water resources development projects require health and environmental health safeguards to minimize the transmission of schistosomiasis and foodborne trematodes.

WHO's activities in parasitic disease control have involved collaboration with governments in conducting national workshops and training courses; promoting national control programmes within the context of improved water supply and environmental sanitation; providing research and training grants to upgrade the skills of doctors, scientists and other health workers; and supporting collaborating centres to carry out research and training activities on the epidemiology and behavioural aspects of parasitic diseases. We also fully support and indeed
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encourage the linkage of parasitic disease control with other priority health programmes, such as diarrhoeal diseases control, essential drugs and environmental health.

Volumes of research have been produced over the past 50 years on parasitic diseases. I am very sad that very little of that research has been put into use by disease control programmes.

My message to you today is that it is time that we apply what we have learned towards effective public health interventions that will reduce the parasite burden, especially in children during their crucial developing years.

One example that clearly illustrates this point is Khong Island in Laos. For more than twenty years experts studied schistosomiasis on Khong Island. Nothing happened. The population continued to suffer from extremely high rates of disease. After deciding that we had studied the situation on Khong Island enough and that it was time to do something, a series of annual mass drug administration campaigns using praziquantel were carried out between 1989 and 1994. For the first time the prevalence of schistosomiasis was reduced from 30% to less than 1%.

It is time this same public health approach is applied in other countries against other parasitic diseases.

I would like to acknowledge the support of the Sasakawa Memorial Health Foundation in helping to make this meeting possible. I thank you for your participation and wish you a productive meeting.
MESSAGE FROM DR UTON MUCHTAR RAFEI
REGIONAL DIRECTOR, WHO SOUTH-EAST ASIA REGION
AT THE SEAR/WPR BIREGIONAL MEETING ON PREVENTION AND
CONTROL OF SELECTED PARASITIC DISEASES
MANILA, 13-15 APRIL 1998

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DR HAN, REGIONAL DIRECTOR, WHO WESTERN PACIFIC REGION, DISTINGUISHED PARTICIPANTS, DEAR COLLEAGUES, LADIES AND GENTLEMEN,

I am very grateful to my dear friend and colleague, Dr S.T. Han, who has always been very supportive of collaborative activities between the Western Pacific and the South-East Asia Regions of WHO.

Since 1996, our two Regions have organized a series of biregional meetings on the control of communicable diseases in border areas. These meetings contributed significantly in promoting cooperation among the countries of our Regions on communicable diseases control, particularly polio, diphtheria, malaria, cholera and STD/AIDS.

In addition to biregional meetings where major focus was on synchronization of preventive and control activities in border areas, our two Regions had also organized biregional consultative meeting on prevention and control of dengue/dengue haemorrhagic fever. This meeting revised the existing dengue/DHF situation and developed practical recommendations for the establishment of more effective national and regional preventive and control programmes. These activities are underway in dengue endemic countries in both Regions.

Intestinal Parasitic Infections (IPI) continues to be a large public health problem in SEAR countries. These are closely associated with under-nutrition, poor personal hygiene and environmental sanitation.

Intestinal parasitic infections are not accepted by health administrators as a serious public health problem for several reasons. First, the easily spreading acute bacterial or viral infections always took priority, since they had a more direct and visible impact on human life or health and created a certain epidemiological threat. Secondly, intestinal infections usually take an insidious or a chronic course and tend to be constantly present. And finally, many of IPI are deeply entrenched in an inadequate sanitation and poverty - factors which seem difficult to change.

WHO provided technical cooperation to countries of South-East Asia in the control of IPI. Many countries are engaged in control of these parasitic diseases through incorporation in ongoing projects such as those family planning, school health. As a result of the studies carried out in Nepal, Sri Lanka and Thailand, mass treatment of children and women of child-bearing age have been established in highly infected areas.
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WHO supported IPI control activities in India, Maldives, Indonesia and IPI demonstration project in Bangladesh. The experience gained from these activities clearly demonstrated that mass dehelminthization are effective when it is combined with improved sanitation, involvement of community and proper health education.

At the present moment, the preliminary research has demonstrated that there is a possibility that intestinal helminths can be treated with filariasis eliminating drug regimens. However, before initiating mass treatment, it is necessary to undertake well designed field trials.

Distinguished participants, during the next few days you will be discussing and reviewing the progress made in controlling and preventing IPI. This exchange of information and experiences should prove to be most useful to strengthen the prevention and control activities in your respective countries.

While wishing you all success in your deliberations, I look forward to closer cooperation between our Regions in controlling intestinal parasitic infections.
CLOSING REMARKS BY  
DR S.T. HAN, REGIONAL DIRECTOR  
FOR THE SEAR/WPR BIREGIONAL MEETING ON THE PREVENTION AND CONTROL OF SELECTED PARASITIC DISEASES  
13-15 APRIL 1998, MANILA  

DISTINGUISHED GUESTS, LADIES AND GENTLEMEN,

I know that you have worked very hard during the past few days to identify priority actions to prevent and control selected parasitic diseases. I am also glad to know that you have focused your working group discussions on the practical aspects of control. Hopefully, this information will be used to implement sustainable control interventions, which will have a direct impact on reducing the parasite burden in affected communities, especially children.

Parasitic diseases have the characteristics of a zoological garden. Each parasite has its own morphology, habits and life cycle and its own preferences in terms of the host organisms it likes to live with. Medical parasitologists often become fascinated with the biology of the parasites and the immunology of the host-parasite interaction, and forget that their work is supposed to lead to reduction of the disease burden caused by these parasites, if not their eradication. So, to be frank with you, I have sometimes become frustrated with the people dealing with parasitic diseases.

The messages I am receiving from this meeting are, however, changing my perception somewhat. From each country we have heard about practical experiences in controlling parasitic diseases. Activities have been planned on the basis of rational assessment, so that interventions have been targeted to the populations with the highest burden. The common intestinal helminths, such as roundworm, hookworm and pinworm are the easiest to tackle. For these diseases, properly targeted mass drug administration has been shown to be cost-effective, acceptable and easy to administer. The group most in need of this intervention is schoolchildren. Similar experiences and successful interventions have been reported in schistosomiasis control. We have heard from the country reports that it is possible to start a programme with mass drug administration combined with education, and then gradually mobilize the intersectoral and community action which is required for sustainable results. In other words, you could say that we in the health sector must show that we care and are ready to do our part of the job before we can expect others to do theirs.

In some cases we can combine drug interventions to cover several parasitic diseases at the same time. This is a favourable advantage which should be exploited.

The term “integrated” sounds very nice, but let us be a little careful about it. Integration between specialized disease control programmes is obviously useful, if it can lead to greater cost-effectiveness. Integration with general health services is something else. As you all know, the idea of integration into primary health care became a slogan nearly 20 years ago, and the consequences for malaria control were disastrous. Why? In some countries, malaria control
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services were abolished leaving a void, because primary health care services had simply not been developed. In other places, where primary health care services existed, the staff was not prepared to take over the complex responsibilities of malaria control.

Disease control programmes require ongoing interaction between specialized staff and general health service staff. We can learn this lesson from the country presentations. To ensure long-term sustainability and efficiency, disease control programmes require the full participation and involvement of local health services for interventions which are quite simple. But guidance and evaluation by specialists is still needed to prevent the programmes from going astray.

Within the field of food-borne trematode infections, we have to admit that really effective control strategies are somewhat more demanding. The most important intervention is to change people’s eating habits and sometimes their sanitary habits. The experiences of the most industrialized countries show that in the long run, the availability of non-contaminated food can go a long way towards eliminating these diseases. Again, we cannot sit back and wait for general economic development. In the foci where they occur, these diseases exert a considerable toll and we have seen that in the short term they may become more common, as the consumption of raw foods becomes a fashion in some population groups. The results from north-east Thailand and the Republic of Korea show that if serious efforts are made to change people’s habits, combined with medical intervention, good results can be achieved. With the growth of mass media, there are new possibilities for educational interventions. What we need is professionalism in our health promotion work. In public health we have now learnt how to reduce tobacco consumption by a combination of advocacy, health education, regulation and international mobilization. If we can tackle smoking, which is, after all, an addiction, there is no reason that we should not be successful in changing people’s eating habits towards healthy foods which are tasty and interesting without being dangerous.

I wish to thank all of you for your active participation and your valuable contributions to the teamwork and the discussions. I wish to give my special thanks to the Chairman, Dr Feng Zheng, the Vice-Chairperson, Dr Praphasri Jongsuksuntigul, the rapporteurs, the temporary advisers and my WHO colleagues from Geneva and New Delhi. Without their concerted efforts, this meeting would not have achieved its objectives.

I wish you all a pleasant journey back home.

Thank you.