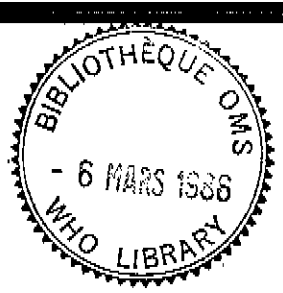
WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTE



PDP/85.3
ENGLISH ~~ONLY~~

PLANNING, IMPLEMENTATION, MONITORING AND EVALUATION OF THE CONTROL OF INTESTINAL PARASITIC INFECTIONS (IPI) PROGRAMMES[1]

CONTENTS

[1] This document is one in a series of papers (PDP/85.1, 85.2, 85.4, 85.5) which have been prepared by the WHO Parasitic Diseases Programme and which are intended to provide up-to-date information on technical aspects of intestinal parasitic infections control. According to the advances in technology and as experience accumulates in national control programmes, these documents will be revised. Inquiries and comments may be directed to Director, Parasitic Diseases Programme, World Health Organization, 1211 Geneva 27, Switzerland.

Outlines of this working paper have been prepared and discussed at the training course on diagnosis, prevention and treatment of intestinal parasitic infections at the community level organized by WPRO and PDP/HQ in the South Pacific, Nuku'alofa, Tonga, September 1984. It was agreed that in order to decide on the optimal IPI control programme for intestinal parasitic infections (IPI) it is necessary to:

(i) collect information about the local public health significance of IPI (section 1) and evaluate it against other health priorities;

(ii) evaluate the feasibility of the programme and its costs versus its benefits (section 2);

(iii) formulate the objectives of the IPI programme and establish optimal approaches and linkages with other priority health projects (section 3).

Sections 4 to 7 on community-oriented chemotherapy, health education, water supply, sanitation and personnel hygiene, and monitoring and evaluation may help to guide the implementation of the programme.

1. LOCAL PUBLIC HEALTH IMPORTANCE OF IPI

There are three sources of information which should be used for data collection on the local importance of IPI, namely information from the people, information from the health services, and information from epidemiological studies.

1.1 Information from the people.

1.1.1 Information from the people is usually restricted to reports of visible parasites in man (e.g. Ascaris) and in animals (cysticercosis, Echinococcus), their prevalence (common or rare), distribution (by age and areas e.g. rural, urban, suburban), and signs of infection (vomiting Ascaris, expelling Taenia proglottids). This information can be collected from schools, especially from teachers or older school children.

1.1.2 In addition it is useful to know:

(i) what are the major health priorities in the community;

(ii) whether the community feels a need to control IPI;

(iii) whether the community is ready to cooperate and support a IPI control programme;

(iv) whether the community sees the IPI control linkage with other activities, e.g. sanitation;

(v) what people's understanding is about "worms".

This information can be collected from local chiefs, teachers and members of social and religious organizations.

1.2 Data and information from health services.

Data on occurrence, morbidity and mortality due to IPI may be obtained from:

1.2.1 Hospitals, clinics and health centres:

(i) frequency of clinical cases being diagnosed;

(ii) frequency of abdominal complications due to ascariasis (intestinal obstruction, biliary ascariasis);

(iii) frequency of hookworm anaemia and other hypochromic anaemias;

(iv) frequency of amoebic liver abscesses or echinococcus liver cysts;

(v) frequency of dysentery (amoebic, bacterial);

(vi) frequency of diarrrhoeas related to parasites.

This information can be obtained from hospital/clinic documentation and by questioning the hospital/clinic doctors or nurses.

1.2.2 Laboratories:

(i) is coproscopic examination carried out routinely, e.g. in children, or in anaemic patients?

(i) number of coproscopical examinations per month and per patient hospitalized;

(iii) frequency of positive findings by species. Low detection rate may be caused by insufficient skill, or inadequate techniques used, or lack of motivation.

These data are available from laboratory documentation and by questioning medical and laboratory personnel.

1.2.3 Supply and use of anthelmintics:

(i) anthelmintics available on the market;

(ii) amount of each of these used in hospitals, health centres, and sold over the counter;

(iii) current price of anthelmintics which may be too high to be paid by infected individuals.

This information can be obtained from pharmacists or health authorities.

1.3 Data from epidemiological surveys.

The epidemiological survey is the best way to obtain objective information on the prevalence, intensity and distribution of the major intestinal parasitic infections. For methodology of a survey for intestinal parasitic infections see WHO document PDP/85.4(1).

Outlines of epidemiological national surveys that can be done for the major helminthiases are as follows:

1.3.1 Hookworm infection:

Data collection:

(i) species: Ancylostoma or Necator (speciate with 10% subsamples from cultures);

(ii) prevalence (by Kato-Katz technique);

(iii) distribution: place, age, sex, profession;

(iv) intensity of infection (by Kato-Katz technique);

(v) anaemias: frequency and distribution (age, place);

(vi) iron: iron in diet, iron store in individuals;

(vii) sanitation: status, ongoing activities;

(viii) education: status, ongoing activities.

Data analysis:

(i) transmission pattern: year-round or seasonal,
widely distributed or focal,

-stratification in population by

- age
- sex
- and profession,

hookworm reproduction rate,
hookworm reinfection rate;

(ii) relation to other hypochromic anaemias.

Response:

(i) standard management of anaemias:
for PHC or peripheral hospitals' use (e.g. iron supplementation, anthelmintic and antimalarial drugs in every case of hypochronic anaemia);

(ii) chemotherapy: population-based, seasonal, targeted;

(iii) prevention: improvement of sanitation and health education.

1.3.2 Ascariasis.

Data collection and analysis:

(i) prevalence and intensity of infection (by Kato-Katz technique);

(ii) distribution by place, age, sex, profession;

(iii) reproduction rate;

(iv) reinfection rate;

(v) relation to nutrition;

(vi) identification of the most heavily infected segment of the population and the most heavily affected segment of the population (small, undernourished children).

Response:

(i) standard case management of ascariasis at PHC,

(ii) population-oriented actions (sanitation, education, chemotherapy).

1.3.3 Taeniasis.

Taeniasis can easily spread in areas where pigs and/or cattle have access to human faeces and man is eating raw or semi-raw pork or beef. Taeniasis/cysticercosis can be introduced to a country by refugees or by infected animals (West Irian) and cause epidemics with high fatality rates. For prevention and control see WHO/VPH Guidelines for the Prevention and Control of Taeniasis/Cysticercosis, 1983 (VPH/83.49)[2].

1.3.4 Echinococcosis.

For prevention and control of echinococcosis, see WHO/VPH Guidelines on Prevention and Control of Echinococcosis/Hydatidosis (VPH 81.28) 1981[3].

1.4 Evaluation of data.

The public health importance of intestinal parasitic infections depends on many factors[4,5,6,7]. The most important are:

(i) prevalence rate (common, rare);

(ii) mortality rate (common, rare);

(iii) morbidity rate (high, low);

(iv) disability rate (high, low);

(v) cost to health services (high, low);

(vi) people's felt need to do something about the solution (high, low).

The two examples of such an evaluation are as follows:

	(i) prevalence	(ii) mortality	(iii) morbidity	(iv) disability	(v) cost	(vi) felt need
ascariasis[5]	common	low	low	low	high	high
taeniasis/cysticercosis[2]	rare	high	high	high	high	low

In the common intestinal parasitic infections, the absolute number of deaths and cases of disease are rather high despite the low mortality and morbidity rates[8]. In the event that control of IPI is not a high direct health priority in a country it may nevertheless be a useful indirect way to promote community cooperation in health matters and develop or strengthen WHO Health for All policy.

2. FEASIBILITY OF CONTROL MEASURES

The feasibility of IPI programmes depends much on community cooperation, manpower tools and funds available, cost-benefit evaluation, and cooperation with WHO and other agencies.

2.1 Community cooperation.

Depending on the expected community involvement, manpower and funds, the control programme may be organized in the following ways:

(i) PHC pilot project village(s); or

(ii) restricted to PHC model district(s); or

(iii) region or country-wide.

2.2 Manpower.

Evaluation of the existing manpower should be done by answering the following questions:

(i)	parasitological reference centre	available or unavailable?
(ii)	epidemiological skill	adequate or inadequate?
(iii)	laboratory diagnostic base	adequate or inadequate?
(iv)	health educational skill	adequate or inadequate?
(v)	sanitation programme	active or inactive?

There are many local possibilities for strengthening manpower by training activities, consultations, publications and meetings; WHO may also be of some help in training or consultations.

2.3 Tools.

(i) laboratory equipment - microscopes (some need only repairing);

(ii) laboratory kits (see Annex to WHO document PDP/85.2)[9];

(iii) anthelmintics (see WHO document PDP/85.5)[10];

(iv) educational materials (contact local health education units or WHO);

(v) designs and materials for sanitation (contact local WHO or UNDP sanitary teams).

Most of the tools are usually available and they are relatively cheap.

2.4 Cost of the control programme.

Prior to any decision to implement a control programme funding sources should be identified and all budgetary activities properly reviewed. There is no doubt that in the long run, the prevention of intestinal parasitic infections by improved sanitation and hygiene will be cheaper than any prolonged curative interventions. In addition to the costs related to IPI prevention and control programmes (cost of anthelmintics, sanitation, health education, etc.) and direct health benefits, there are indirect benefits such as:

(i) entry point for community cooperation;

(ii) satisfaction of the peoples needs;

(iii) improvement of sanitation;

(iv) easier and more effective health education;

(v) mobilization of voluntary activities in health and social matters.

2.5 Cooperation with agencies other than WHO.

(i) Some international organizations such as UNICEF, JOICFP (Japanese Organization for International Cooperation on Family Planning), JICA (Japanese International Cooperation Agency), South Pacific Commission, etc. could be of help in solving technical and financial problems related to the control activities.

(ii) Local agencies, institutions or associations should be approached for eventual help in carrying out the control activities. Examples of such are: Medical Association; Nurses Associations; Engineering Societies; Industrial and Commercial Groups; School officials; Mothers, Girls or Youth clubs; Religious Groups; Lion's or Rotary Clubs and other professional clubs; Red Cross and finally Sports associations and Scouts.

3. GOVERNMENTAL DECISIONS

In some cases the local public health significance of IPI or social priorities are obvious and the control programme feasible, however, in most cases the objective of the programme has to be defined and the best way to implement the programme has to be decided. The programme should be an important part of the whole programme of health and quality of life improvement and it should be coordinated with other major WHO or other UN agencies programmes, e.g. the Control of Diarrhoeal Diseases (giardiasis, amoebiasis), the Primary Health Care programme as well as the Water and Sanitation programmes, the Health Education programme, and Nutrition programme.

3.1 Objectives of the programme.

The general objective of an IPI control programme should be the gradual lowering of prevalence, intensity, mortality and morbidity related to IPI.

The specific objectives of control activities may be different for each infection. Some examples are:

(i)	ascariasis	- lowering of the prevalence and intensity of infection to low public health significance through the improvement of sanitation and community-oriented chemotherapy interventions;
(ii)	hookworm infections	- control of hookworm anaemia by organizing a regular treatment of patients with intensive infections;
(iii)	amoebiasis	- lowering of the mortality rate due to amoebic dysentery and liver abscesses through the improvement of sanitation and quality of water, as well as through proper diagnosis and treatment of invasive amoebiasis in individual cases;
(iv)	giardiasis	- lowering of the disability rate due to Giardia infection through the improvement of sanitation, quality of water and better personal hygiene;
(v)	T. solium taeniasis/cysticercosis	- lowering of the mortality and morbidity rates due to human cysticercosis through the improvement of general sanitation, meat inspection and early detection and treatment of human taeniasis;
(vi)	strongyloidiasis	- better understanding of the transmission pattern and pathogenetic mechanisms responsible for a high mortality rate of infants infected with S. fuelleborni and the inducement of proper control measures.

3.2 Optimal approaches.

The importance of individual case management and several community-oriented activities for prevention and control of intestinal parasitoses may differ for each infection. The following list provides some examples (ranks of importance from + to +++).

	Individual case management	Community-oriented activities: sanitation	chemotherapeutic interventions	education
ascariasis	++	+++	+++	++
hookworm infection	+++	++	+	++
trichuriasis	±	++	±	+
amoebiasis	++	+++	±	+
giardiasis	+	+++	±	+
taeniasis	+++	++	++	++
strongyloidiasis	++	+	±	±

The choice of the best approaches should consider both individual case management and wider community-oriented control measures.

Individual case management is most important in ascariasis, hookworm anaemia, taeniasis, amoebiasis and strongyloidiasis. Improvement of the diagnosis and treatment of individual cases may need:

(i) intensification of training in IPI for medical, paramedical and laboratory personnel;

(ii) preparation of standard management of the individual cases for peripheral health units.

(iii) strengthening of the laboratory base;

(iv) availability of inexpensive but effective drugs.

For wider control purposes the improvement of sanitation is most important, especially in ascariasis, amoebiasis, giardiasis and taeniasis. The role of community-oriented chemotherapeutic interventions varies widely and is highest in ascariasis and taeniasis. Health education is an important supporting element in the control of most IPI but its effect may vary. Community-oriented chemotherapy, health education and improvements in sanitation are discussed below.

4. COMMUNITY-ORIENTED CHEMOTHERAPY

The optimal schemes for chemotherapeutic intervention may differ from place to place but the basic principles remain the same[10].

4.1 Optimal chemotherapeutic approaches in different situations.

The choice of blanket, selective or targetted treatments has to be based on information on prevalence, reinfection rate, community cooperation and laboratory base.

Portion of population treated	Prevalence[1]	Reinfection rate[1]	Community cooperation[2]	Laboratory base[2]
whole population (blanket treatment)	+++	+++	++	±
infected people only (selective treatment)	++	++	+++	+++
people with heaviest infections (targetted treatment)	++	+	±	±

1: high (+++) to low (+); 2: good (+++) to inadequate (±).

Blanket treatment would be appropriate if the prevalence and reinfection rates are high, community cooperation is good and laboratory base is inadequate.

Both blanket and targetted treatments can be decided on the basis of one initial mass-examination and a few monitoring laboratory examinations.

Population may be targetted according to age (school children), profession (plantation workers), place (rural, urban, suburban), localities (some with higher prevalences than others), and social factors (poor families).

The control programme may be based on selective treatment only, e.g. South Korea, or on targeted treatment only, e.g. Indonesia, Thailand. It may start with blanket treatment but when the prevalence goes down after one or a few blanket treatments, targeted treatments may be considered as more appropriate.

4.2 Frequency and timing of treatment.

Effective community-oriented chemotherapy is dependent on at least five important variables. They are: (i) efficacy of drug; (ii) interval of drug treatment; (iii) compliance of community; (iv) reinfection rate, and (v) length of control programme. The measure of success of community-oriented chemotherapy is not just the prevalence of infection at the end of each treatment cycle, but also the prevalence of infection in the period after the termination of the programme. Theoretical models can provide a guide to a harmonious balance of the above-cited variables. There are few field models for community-oriented control of each of the intestinal parasitic infections. For example, it has been suggested that effective control of ascariasis needs community-oriented treatment every 3-4 months for at least 3 years. Hookworm infection may need treatment 2-3 times a year, and taeniasis may need two treatments 4-8 weeks apart, but the length of time for carrying these programmes has to be decided as the programme is evaluated.

Timing is important where transmission is seasonal. Treatment should be scheduled just after the most intensive period of transmission (at the end of the rainy season) in order to control new human reservoirs and, if possible, at the end of the dry season to minimize environmental contamination during the rainy season.

4.3 Drug selection

For details on anthelmintics see WHO/PDP document on Chemotherapy PDP/85. (10)

Selection of drugs is determined by:

(i) single or mixed infections (specific or a broad spectrum drug);

(ii) age and sex of people treated (mebendazole or albendazole should not be used in early pregnancy);

(iii) availability and cost of drugs (imported or locally produced or manufactured);

(iv) single or repeated dosage (single dose preferred);

(v) people's willingness to take the drug (syrups preferred for children; tablets for chewing preferred against tablets for swallowing);

4.4 Drug monitoring and evaluation.

Monitoring should be focused on the efficacy of the drugs (measured by faecal examination) and adverse reactions to the drug (including migration of Ascaris related to treatment).

Evaluation of the effectiveness of chemotherapeutic intervention should be performed regularly at 6 monthly intervals in randomly selected subsamples (up to 10%) of the population treated.

5. HEALTH EDUCATION

5.1 Planning an integrated health education programme.

The following activities are essential for planning education programmes on intestinal parasitic infections:

(i) set clear goals or objectives (request health educator's assistance, if necessary);

(ii) clearly define the target; the real needs may differ from the community's felt-needs and the needs assumed by administrators;

(iii) determine specific behavioural modifications desired;

(iv) identify the target group (location, age, sex, profession);

(v) evaluate conditions and constraints to be met in target groups through community diagnosis, as outlined in various guidebooks on community development and health education;

(vi) determine the methodology to be followed and tasks to be performed (survey, information campaign, sampling, testing, school or clinic programmes, projects, etc.);

(vii) determine available resources; manpower, money, facilities, available time;

(viii) chart and schedule the various events or actions to be taken and steps in implementation.

5.2 Principles of the planning process.

The following positive health practices are the foundation of all health promotional activities related to IPI control:

(i) nutrition, availability of food and food safety;

(ii) environment, (emphasis on personal hygiene, home cleanliness and sanitation);

(iii) water quality or purity, (concern on source, possible treatment and storage).

5.3 Checklist for health education programmes.

(i) The place within the target group best suited for the health education activities required: school, clinic, church, community meeting hall, fair or show ground, public centre, etc.;

(ii) The time to be involved, the most appropriate season, and whether this is to be a single event, a series of activities, or a repeated and developing programme at intervals;

(iii) Personnel to be used; who are best suited as programme coordinators or participants;

(iv) The health instruction media to be used; how they will be purchased, prepared, and utilized, with the appropriate equipment, methodology, and personnel competent in their use. Instructional media are as follows:

- Mass media (radio, TV, newspaper, billboards);

- Printed materials (including pamphlets, posters, handouts, booklets such as comics on health or lessons for school use);

- Audio-visual aids (slides, films, flip charts, tapes, movies, video, puppets, skits, music, T shirts, etc.).

Sources of the latter may be found through the health educator. Local businesses may fund some of these as advertisements.

5.4 Gaining community cooperation.

(i) Opinion leaders (village chiefs, politicians, teachers, church leaders, or others of influence) are usually the first and most influential point of contact;

(ii) Clearly and convincingly explain your programme purposes, with flexibility to work on a schedule and within a scope that is reasonable and convenient to the target group. Listen and learn of perceived interests before propounding your programme plans. Make no appointments or promises you cannot keep;

(iii) Involve as many people as possible in the planning process (women and youth groups, school teachers, churches, village council). Stress the need for an approach which will be as interesting, informative, and entertaining as possible;

(iv) Determine the best communication or media route to be followed. Give priority to the school, where you have a receptive audience under discipline who will follow the teacher's direction;

(v) Plan recognition or rewards by which the participants will gain a feeling of accomplishment and pride in what they have achieved in improving personal, family, and community health levels;

(vi) Plan, wherever possible, a model demonstration of proper toilet and water supply.

6. WATER SUPPLY, SANITATION AND PERSONAL HYGIENE

Water plays an important role in both transmission and prevention of intestinal parasitic infections especially amoebiasis and giardiasis.

The factors which act favourably for transmission of E. histolytica or G. lamblia cysts are the following: (1) cysts of both pathogens can survive for weeks in water; (2) they withstand chlorination at normal levels; (3) contamination of water is common as both infections are widely distributed and frequently asymptomatic, and (4) in addition to human sources of infection giardiasis may be of zoonotic origin (beavers, dogs).

Some epidemics of water-borne amoebiasis and giardiasis have been reported as caused by a cross connexion between sewer and water supply. Several epidemics of water-borne giardiasis were reported from the USA which followed the use of chlorinated water from surface sources for drinking purposes. Contaminated water used for "freshening" of new vegetables and fruits can increase local transmission of both protozoan and helminthic intestinal infections.

Washing, as a way of keeping personal hygiene, plays an important role in preventing intestinal infections; in dry countries where water is scarce the prevalences of directly transmitted faecal infections such as giardiasis and hymenolepiasis are usually high. The latter observation emphasizes the importance of having drinking water and in addition an adequate supply necessary to satisfy the local hygienic needs.

Sanitation is a major factor in controlling all faecally transmitted diseases including intestinal protozoan infection and soil-transmitted helminthiases. There are many cultural, behavioural, technical and economic reasons, which explain the slow progress in improving sanitation in many countries; they are known to local authorities as well as to professionals. However, there are three aspects, which deserve more attention in respect to intestinal parasitic infections.

(i) When sanitation using techniques most universal and optimal for a given area (water closets, ventilated latrines) is not available a compromise solution may be useful (e.g. sanitation without latrines may solve hookworm anaemia problems);

(ii) control of visible parasitoses such as ascariasis, well known to people, can be very helpful in promoting community cooperation not only for solving local sanitary needs but also other health problems;

(iii) high prevalences of some intestinal parasitoses, e.g. ascariasis may be used as an indicator for deficient sanitation; in other words there is no good sanitation wherever endemic ascariasis persists.

These three aspects should be discussed with those responsible for sanitation as they may help in improving local sanitary conditions. Improvement of personal hygiene measures is of the utmost importance for prevention and control of IPI and it can be achieved mainly by health education (see Section 5).

7. MONITORING AND EVALUATION OF IPI CONTROL ACTIVITIES

7.1 Principles of monitoring and evaluation

The progress of control programmes for most of the intestinal parasitic infections can be monitored objectively by:

- examining the prevalence (and intensity) rate and distribution pattern by coproscopical or serological examinations and surveys;
- analysing hospital data for causes of mortality and morbidity.

For example, data for neurocysticercosis, or hookworm anaemia, or complications due to ascariasis are appropriate for monitoring.

In principle the methodology of monitoring activities should be the same as those used for surveillance[1]. This refers to the selection of the population, sample design and size, parasitological variables, laboratory techniques used and accuracy of the evaluation process.

Monitoring activities are essential to evaluate the progress of the control measures being used and to improve or change the control measures and tactics.

7.2 Specific targets for control

There are no universal targets for intestinal parasite control programmes, because they may vary widely according to previous local epidemiological situations and planned control activities. The targets should be defined for each region of the country separately, before the control starts, and monitored during the process of control. Examples of specific targets for control are as follows:

7.2.1 in hyperendemic ascariasis

- lowering the transmission rate below 1.0, i.e. the reproduction rate break point; or
- lowering the prevalence below 5%; or
- lowering the prevalence and intensity of ascariasis to the point where 75% of positive cases will show unfertilized Ascaris eggs.

7.2.2 in hyperendemic hookworm infections

- lowering the prevalence below 10%,
- lowering the intensity of infection to the point where less than 1% of the population will have an evident hookworm anaemia.

7.2.3 in endemic amoebiasis

- lowering the active transmission and the occurrence of invasive amoebiasis to the level that less than 1% of the population have a serological test positive for specific antibodies;

7.2.4 in endemic giardiasis

- lowering the prevalence rate of giardiasis to below 2% in the general population.

7.3 Evaluation process

In principle, the subject to be evaluated is the actual progress and impact of a control programme, as a whole, however, the evaluation process also indirectly assesses the effectiveness of the surveillance system, efficacy of health services delivery, and the competence of specialized parasitological institutions or teams.

In the evaluation process special attention should be given to the activities which link IPI control with other major WHO programmes, their integration with the PHC system, and to the social and political impact of the IPI control activities.

Contrary to monitoring which is a continuous process, evaluation should be done periodically at certain times, e.g. once a year. The conclusions of the evaluation process should be used to improve in future actions. The improvements may deal with the strengthening of skills and manpower efforts, reallocation of finances, or better collaboration with other health or social institutions. In some cases the reformulation of the targets of control may be necessary.

8. REFERENCES

1. WORLD HEALTH ORGANIZATION. Surveillance and survey methodology for intestinal parasitic infections (IPI) (PDP/85.4)

2. WORLD HEALTH ORGANIZATION. Guidelines on surveillance, prevention and control of taeniasis/cysticercosis. (VPH/83.49) Geneva, 1983

3. WORLD HEALTH ORGANIZATION. Guidelines on surveillance, prevention and control of echinococcosis/hydatidosis. (VPH/81.28) Geneva, 1981

4. WORLD HEALTH ORGANIZATION. Intestinal protozoan and helminthic infections. Report of the WHO Scientific Group. Technical Report Series, 666, Geneva, 1981

5. WORLD HEALTH ORGANIZATION. Ascariasis and its Public Health Significance (Summary) Bulletin of the World Health Organization, 1985 (in print)

6. WORLD HEALTH ORGANIZATION. Informal meeting on strategies for control of amoebiasis (PDP/84.5, CDD/PAR/84.2) 1984

7. WORLD HEALTH ORGANIZATION. Guidelines for the prevention and control of giardiasis. (PDP/85 - in preparation)

8. WORLD HEALTH ORGANIZATION. General strategies for prevention and control of intestinal parasitic infections within primary health care (PHC) (PDP/85.1)

9. WORLD HEALTH ORGANIZATION. Diagnostic techniques for intestinal parasitic infections (IPI) applicable to primary health care (PHC) services (PDP/85.2)

10. WORLD HEALTH ORGANIZATION. Chemotherapy of intestinal parasitic infections (IPI) (PDP/85.5)