



STATISTICAL METHODS APPLICABLE TO SCHISTOSOMIASIS CONTROL PROGRAMMES¹

by

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1. INTRODUCTION

A schistosomiasis control programme is a far-reaching undertaking whose preparation and execution, in all its phases, requires the knowledge of different quantitative information. Existing documentation must be used rationally by the personnel in each phase of the operations. In addition, the technical and administrative needs demand the collection and analysis of appropriate supplementary data.

A single index used to characterize the status of schistosomiasis within a defined population, such as prevalence (i.e. the proportion of infected persons), is not adequate to monitor or modify the operations of a control programme. Other indices are needed especially those relating to the reduction of morbidity due to schistosomiasis in a treated population. The statistical analysis should allow the evaluation of the effectiveness of the campaign during its different phases and make it possible to verify whether the epidemiological evolution of the disease is as anticipated.

2. THE NEED FOR STATISTICS

The planning, execution and monitoring of schistosomiasis control programmes should depend on objective judgements and not on personal expectations. The data from these programmes are derived from the interactions between three living groups: human beings, snails (intermediate host) and worms (schistosomes). Each of these groups may affect, and may be affected by, environmental factors known or unknown. The selection of operational approaches and their modification during the course of the programme therefore relies on the correct interpretation of interrelated data which are not only highly variable within themselves but may also be influenced by a multitude of other uncontrollable factors.

Modern statistical methods facilitate, to a large extent and on a purely objective basis, the interpretation of numerical data in which variations may be due to the simultaneous action of many factors. In particular, the correct interpretation of the data implies the use of appropriate statistical techniques. For this reason, statistical methods are required in all phases of a schistosomiasis control programme, in the establishment of the operational plans as well as in the monitoring of the operations and the final evaluation of the results.

2.1 Analysis of schistosomiasis in a community

In contrast to the clinician whose major concern is the health of his patient on an individual basis, the epidemiologist in a control programme is responsible for the state of health of the community at large. In both cases, the actions to be taken will depend on the number of persons to be cared for and the measures of intervention available. However the situation takes on a statistical nature because the epidemiologist may have to base his conclusions on the relevant observations from a selected number of individuals rather than from the whole population. He must establish to what degree the community is at risk with respect to schistosomiasis, determine the type, prevalence and intensity of infection, and decide on the intervention schemes and how best to reduce the risk of the disease within the community. Although the data will be collected on an individual basis, the analysis will be focused more on the community as a whole rather than on the individual. Appropriate statistical methods should then be applied in the analysis of the collected information.

2.2 The role of statistics in schistosomiasis control

Statistics are derived from data recorded for each event or individual. Only with great difficulty is it possible to grasp all the information that can be obtained on an individual basis. The capacity of a control programme to accumulate data usually outstrips its ability to analyse them correctly and to use them in an informed manner. Statistical methodology is an indispensable tool for the correct interpretation of the collected data. In fact it comes directly into play in the various problems faced by a schistosomiasis control programme of which some of the principal ones are indicated below.

2.2.1 Rational planning

This implies the following:

- plans which are flexible and suited to local conditions;
- plans which are practicable within the limitations of available funds and trained personnel - data processing should be catered for;
- choosing the geographical area to be covered, the frequency of the observations, and the methods and frequency of intervention;
- establishing reasonable targets for achievement.

2.2.2 Collection and processing of data

The correct collection and processing of data include:

- the establishment of definitions and the use of standardized classifications;
- the preparation of questionnaires and appropriate record forms with the provision of pre-testing the data collecting procedures;
- the training of staff in data collection, their supervision and the establishment of quality control procedures;
- the establishment of appropriate sampling schemes where total population coverage is not feasible;
- the verification of data with regard to their accuracy, correctness and validity.

Annex 1 further discusses the reasons for collecting information for a schistosomiasis control programme and suggests some simple record forms which may be used to collect the information.

2.2.3 Analysis and interpretation of data

The analysis and interpretation of the collected data consist in:

- the sorting and classification of data into the required groups for tabular presentation;
- the estimation and comparison of the appropriate statistical indices and their standard errors;
- the evaluation of the campaign results, the statistical significance of the conclusions;
- the timely preparation of reports on the progress of the campaign and their dissemination to those concerned including the workers in the field.

It may be necessary to use advanced statistical methods for certain types of analysis and significance testing, and to have access to computer facilities for a more efficient processing of the data. Annex 2 gives examples of tabulations which can be generated during a control programme.

3. THE NEED FOR A CENTRAL STATISTICAL SERVICE

Although the operational approach to be followed during a control programme should be clearly established, it will continually need to be adapted to the particular conditions which are met. Various changes may be necessary during the course of the operations, and

sufficient knowledge of the situation is needed at all times. The data to be used are of a varied nature, coming from different sources (demographic survey teams, mollusciciding teams, diagnostic teams, observers, doctors, epidemiologists, administrators responsible for material and equipment, etc.). It is therefore indispensable that all the information collected should be sent to a centralized service responsible for their collation. The responsibility for the analysis and interpretation of the data however should not rest solely with the central statistical service. The capability should be built in at each operational level of the programme to make specific judgements concerning the effectiveness and efficiency of the operations within its sector.

Among the functions of such a centralized service are the following:

- (a) Keep a permanent control of the statistical documentation coming from the different sectors of the operation. Centralization may eventually be limited to the data necessary for the calculation of relevant fundamental indices:
 - the prevalence of schistosomiasis, i.e., the results of the parasitological examination;
 - the actual activities of the control programme (number of potential transmission sites treated with molluscicide, efficiency of the diagnostic teams, etc.).
- (b) Design surveys appropriate to the local conditions in order to estimate indices which cannot be calculated from available data.
- (c) Have a centralized file for the classification of data by locality.
- (d) Establish plans for registering the data on standardized forms so that they can be stored, retrieved and analysed, preferably by computer.
- (e) Liaise and collaborate with national health statistical services in order to avoid any duplication of effort and to correct any eventual differences in the relative numbers of known schistosomiasis cases.
- (f) Verify the accuracy of the information received and study, in collaboration with the administrative and technical personnel, the possibility of simplifying the registration of the data or making it more economical.
- (g) Establish effective lines of communication so that the data from the operational units are not only transmitted to the service but are also fed back in an aggregated form to all sectors.

4. STATISTICS NECESSARY FOR SCHISTOSOMIASIS CONTROL PROGRAMMES

The need for statistical information becomes apparent during the preparation of the preliminary investigations that precede the actual control campaign, and is even more imperative during the phases which follow. A detailed study of schistosomiasis in each community is based on knowledge of the demographic, health, economic and social characteristics of the population itself: i.e., its size, composition by sex and age, general health status, work conditions, habits, understanding and awareness of the disease, etc.

4.1 Demographic data

Detailed reports on the status of the population are published periodically in most countries, usually at the time of the census. Statistics relating to demographic events such as births, deaths, marriages, etc., are also published annually by many national governments in publications on "vital statistics". Furthermore in certain countries statistics on causes of death are also compiled and published.

While these statistics may not be of great value in the implementation of control schemes, they will serve as an indicator of the population size. In general the population census should be established at the outset of the operations. Each locality should be defined by careful mapping and the population size determined by a household census. In instances where a census is not feasible, the best estimate which may be obtained through discussions with local officials or community leaders may be used. This estimate should also give some indication of the distribution of the population by age.

4.2 Statistics based on parasitological findings

The proper monitoring and evaluation of a schistosomiasis control programme demands that certain indices be calculated both before and during the life of the programme. The most appropriate indices are based on quantitative measurements made on the human population.

Indices based on egg counts

- (a) Prevalence of infection: the proportion of the population infected with schistosomiasis, i.e. the proportion of individuals with schistosome eggs in their urine or faeces.
- (b) Prevalence of heavy infections: the proportion of individuals with at least 50 eggs/10 ml of urine for Schistosoma haematobium infections or with at least 100 eggs/gram of faeces for S. mansoni infections.
- (c) Intensity of infection: this is estimated by the number of eggs per unit volume of urine or weight of faeces.
- (d) Incidence: the rate at which uninfected persons who were never treated become infected during a given period of time.

All of these measurements are directly affected by the sensitivity of the diagnostic technique. In the analysis, these indices should be presented not only for the total population, but also by groups according to age and sex.

In most control programmes it will be sufficient to calculate only the first two of the above indices. The last two are more appropriate for special studies within the programme. For the intensity of infection, it is recommended that the geometric mean egg output among the infected individuals be calculated.

4.3 Statistics on morbidity due to schistosomiasis

In most countries the public health services have established a system for the obligatory declaration of certain infectious diseases, in particular those considered to be highly contagious and dangerous. Unfortunately, the majority of schistosomiasis cases are neither treated in a hospital nor seen by a doctor and therefore are never registered.

However, in some areas, statistics related to the treatment of cases in hospitals and health centres are often the only sources of information on the prevalence of schistosomiasis. The interpretation of these data must be made with great care, because the patients who are treated are not necessarily representative of the general population, nor even of the population at risk with respect to schistosomiasis. Hospital statistics may nevertheless be used to investigate certain aspects of the disease, as for example the study of seasonal or annual variations in the number of cases.

Since the aims of control programmes are now directed towards a reduction in morbidity due to schistosomiasis, it is necessary that more up-to-date and reliable information be obtained in this area both at the beginning and during the programme.

Indices related to morbidity

- (a) Within a stated time interval, the number of hospital beds occupied by patients with schistosomiasis.

(b) The number of outpatient visits related to schistosomal infections at dispensaries, health units and hospitals.

(i) For S. haematobium infections

- proportion of persons with recent history of haematuria and/or dysuria;
- prevalence of gross haematuria at time of examination;
- prevalence of haematuria as detected by chemical reagent strips.

(ii) For S. mansoni infections

- proportion of persons with recent history of haematemesis;
- prevalence of hepatic and/or splenic enlargement in schoolchildren (the presence or absence of meso- or hyperendemic malaria should be stated).

4.4 Statistics on chemotherapy

Chemotherapy is a tool for both primary and secondary control of schistosomiasis. The aim of primary control of schistosomiasis is the reduction in the excretion of eggs, particularly in those persons who are most likely to pollute the transmission sites, and it is therefore beneficial for the entire community. The aim of the secondary control of schistosomiasis is to reduce the risk of morbidity and mortality among the treated individuals.

Highly effective and well tolerated drugs now exist for the control of schistosomiasis. The choice of any drug for use in a control programme is dependent on several factors of which some of the main ones are:

- the characteristics of transmission of infection,
- the cost of the drug and the mode of the delivery,
- the cost of examination of the population,
- the systems available for providing health care,
- the estimated degree of acceptance and tolerance of the drug by the population.

Before carrying out a control programme, therefore, an assessment must be made of the proposed dosage regime, the mode of delivery and the cost of identifying and treating the infected individuals.

During the control programme, other indices based on the treatment of the population may be calculated. Programmes dealing with individuals on a community basis rather than in a clinical situation require some new terminology or redefinition of terms. For example, "cure" is a term which is used in clinical trials and is applied to a patient who does not excrete eggs on three successive days at some specified time after treatment (Davis & Bailey, 1969). For control programmes, it is proposed that the word "cure" be replaced by the term "egg negative" where "egg negative" is defined as the absence of Schistosoma eggs in a treated individual at the subsequent follow-up.

Indices related to chemotherapy

- (a) Participation rate: the proportion of infected persons who have received treatment. A distinction should be made for individuals who are only partially treated in schemes using a drug regime requiring more than one dose.

- (b) Egg negative rate: the proportion of infected persons who were treated and who now show an absence of Schistosoma eggs. The diagnostic technique used and the time after treatment should be stated.
- (c) Reinfection rate: the proportion of persons who had no Schistosoma eggs at the first examination at least three months after treatment and who were again found to be infected six months or later at a subsequent examination. The length of time between examinations should be stated. Usually reinfections are observed at about four to six months after treatment.

5. OTHER ASSESSMENT INDICES

Although examination of the human population is essential for the evaluation of the programme, other indicators may also be taken into consideration, e.g.:

- reduction in the snail population;
- reduced human/water contact;
- reduced cercarial levels in the water contact sites;
- introduction/increase of sanitation and water supply.

In order to establish these indicators, information relating to the environment and to the relationship of human beings to the environment needs to be ascertained.

5.1 Statistics on the snail hosts

It is neither possible nor necessary to estimate the total number of snails in a given area. Useful information may be obtained by calculating certain indices. Studies should first be carried out to determine the ecological and temporal aspects of the transmission patterns in the areas concerned. One important index for determining transmission is the water temperature.

From a practical point of view, it is important to obtain and analyse data on the proportion of infected snails. Furthermore, it is essential to relate the snail habits to sites where humans come into contact with the water and which are contaminated by them.

For snail sampling, the sites and conditions of capture should be chosen carefully so that the observed differences of snail density reflect the variations in the environment. Each site within the area where the snails may be found should be identified by a code number. The list of sites should be checked regularly and carefully. Periodic surveys should be made to determine the number of new sites, the sites which may have been destroyed and the proportion of sites to be treated, etc.

5.2 Statistics on mollusciciding

Snail control by means of molluscicides is a rapid and effective method of reducing transmission. Its efficiency is increased when it is joined with other methods of control. Data show that area-wide mollusciciding is most cost-effective where the volume of water to be treated per individual at risk is small, as for example in irrigation schemes where population density is high and where controlled water management is practised. Focal mollusciciding, however, is better adapted to zones where there are seasonal variations in transmission and where the foci are identifiable. This last method will depend on effective surveillance procedures.

Mollusciciding should be sufficient and regular. "Sufficient" mollusciciding refers to the amount of molluscicide needed to be effective in a given volume of water or for a certain length of canal. Mollusciciding is "regular" if it is repeated at the prescribed intervals. The control operation will be facilitated if the dates and the quantity of molluscicide are duly recorded for each site separately so that the mollusciciding programme may be easily adjusted.

The efficacy of the mollusciciding programme will also depend on the ecological situation within the water bodies, the turbidity of the water, the presence of plants, wave action, water flow, etc. All this information must be noted with care so that the operations can be planned to meet the situation.

5.3 Statistics on human behaviour with regard to water contact sites

Since human behaviour plays such an important role in the transmission of schistosomiasis, any control programme must take into account the human element. It is essential therefore to determine what knowledge the people have of the disease and what their attitudes are towards it.

In order to complete the transmission picture, it is necessary to know the location of the sites where humans come into contact with water, the human activities in these sites, the presence or the absence of the snail intermediate host, and the possibilities for human beings to pollute the water in these sites.

The data may be collected through observations, questionnaires and interviews. Some of the items on which information may be collected are:

- location of water contact sites;
- presence of vegetation and snail hosts;
- source of water supply and sanitary facilities;
- identification of the persons having contact with water at the site;
- type, duration and frequency of contact;
- perception of water and its relationship with the disease.

In certain instances it may be possible to relate the prevalence and intensity of infection in a population with the behaviour and activities of individual members of the community at defined water contact sites.

If the data are collected during the pre-intervention phase, they can be utilized in developing the control strategies and in formulating effective health education programmes.

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ANNEX 1

DATA COLLECTION

A significant part of all schistosomiasis control programmes involves the generation of data. These data fall into two main categories: (a) data dealing with people and (b) data dealing with the environment. The data concerning people may be further subdivided into those relating to:

- demography,
- parasitology,
- clinical aspects, and
- administration of chemotherapy.

For the environment there are data relating to:

- water bodies,
- snail hosts,
- human activities with respect to the water bodies, and
- intervention measures aimed at obtaining some degree of transmission control, i.e. mollusciciding, installation of water supplies, sanitation and health education.

The purposes for generating these data will determine the manner in which they are collected, stored, analysed and presented. The generation of data in control schemes is intended to answer certain questions which may be grouped under three broad headings:

(1) To establish baseline data

- Who are the persons at risk?
- Where are the areas of priority?
- How many persons are infected?
- Where are the potential transmission sites?
- What sanitary facilities are available?
- What does the population know about the disease?
- What are their attitudes towards the disease?

(2) To plan the intervention

- Is intervention needed?
- What measures should be undertaken?
- Where, when and how should these measures be applied?
- What are the priorities for applying these measures?

(3) To monitor the intervention

- What percentage of the infected people and of the transmission sites is being treated?
- How effective are the measures of control?
- Is retreatment necessary?
- When should retreatment take place?
- Which areas or groups of people remain a problem?
- Have sanitary facilities and water supply been provided?
- Are these facilities functioning?
- Are these facilities being used?

Having stated the purposes for which the data will be used and taking into due consideration the constraints such as money, personnel and time so that the resources can be optimally utilized, the control programme should then proceed to:

- (a) design record forms and questionnaires to collect the needed information;

Annex 1

- (b) train the personnel in the data collection procedures and in correctly and legibly recording the data;
- (c) establish systems for supervising the collection so as to reduce recording errors and keep intra- and inter-observer variations down to a minimum.
- (d) establish systems for processing the data, i.e. checking the collected data, coding the information wherever necessary, especially when machine processing is envisaged, and editing the collected data.
- (e) establish systems for storing the data.
- (f) establish systems for analysing the data.

Sketch maps

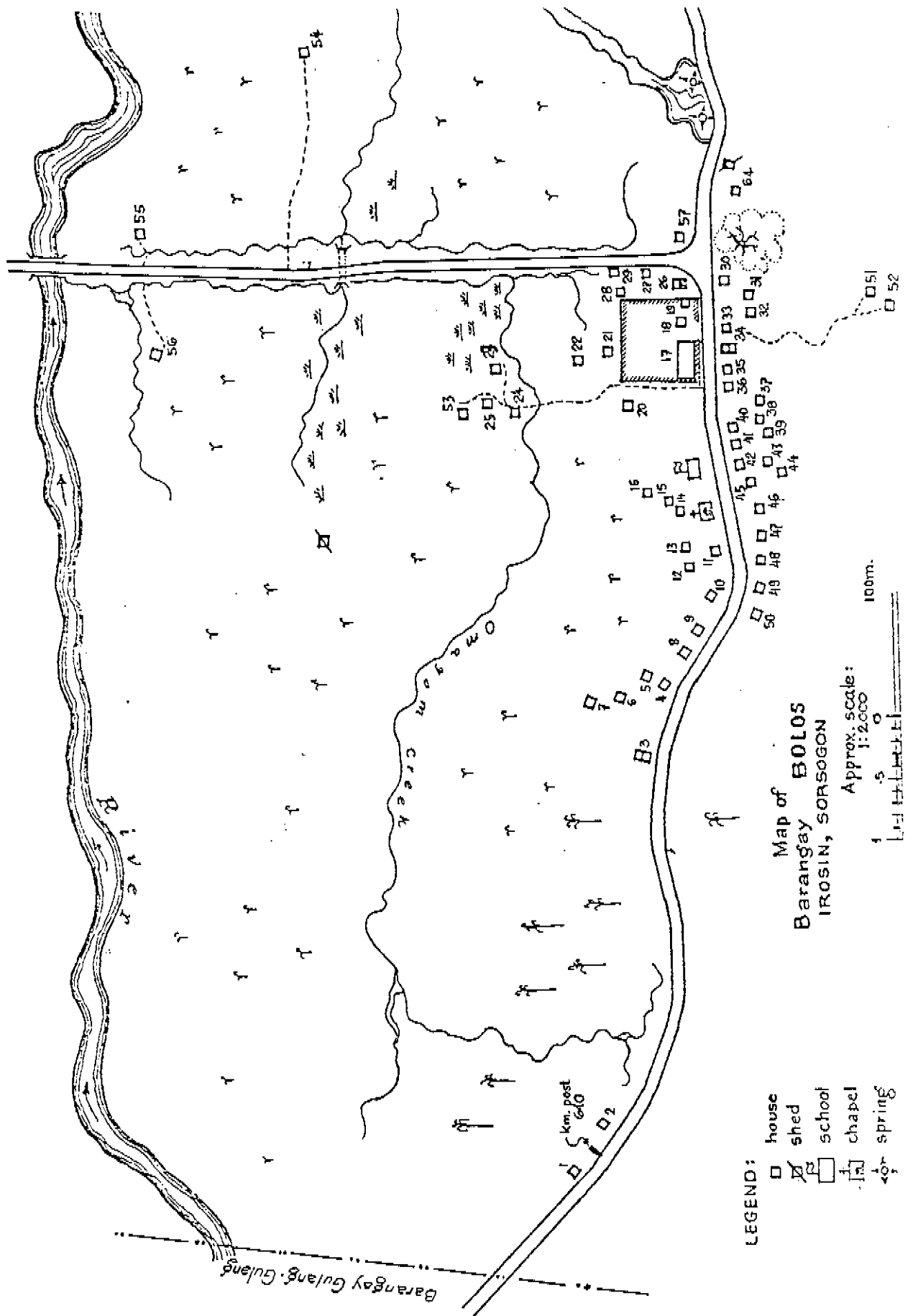
Before the start of the operations a sketch map should be made of every village or locale in which it is intended to carry out control measures. This sketch map should include the major features of the locality (roads, footpaths, water bodies, dwellings, schools, sources of communal water supply, etc.). All dwelling units and potential transmission sites should be numbered and these numbers should be used in the identification process when recording information related to these places. An example of a sketch map, which covers two sheets of paper and which was used in the Philippines, is attached.

Record forms

Form 01 is an example of a form which may be used for recording data during the survey and treatment of a population in an area with both Schistosoma mansoni and S. haematobium infections. The information gathered by this form would reflect the situation at the time of the survey and should be used in monitoring and evaluating the effects of the control programme. The microscopist record forms, Form 02 and Form 03, would be used in conjunction with the survey record form to inscribe the results of the parasitological examinations. These forms which offer suggestions of items to be recorded, should be adapted to meet the conditions and needs of each control programme. For example, an in-depth evaluation of the programme would make it necessary to follow people over time and would therefore require a more detailed identification system whereby individuals could be easily identified.

Form 04 shows the kind of information which may be collected to determine the importance of water contact sites. This information should aid in planning the control measures to be used at each site. Form 05 is used to record information concerning one of these control measures.

Annex 1

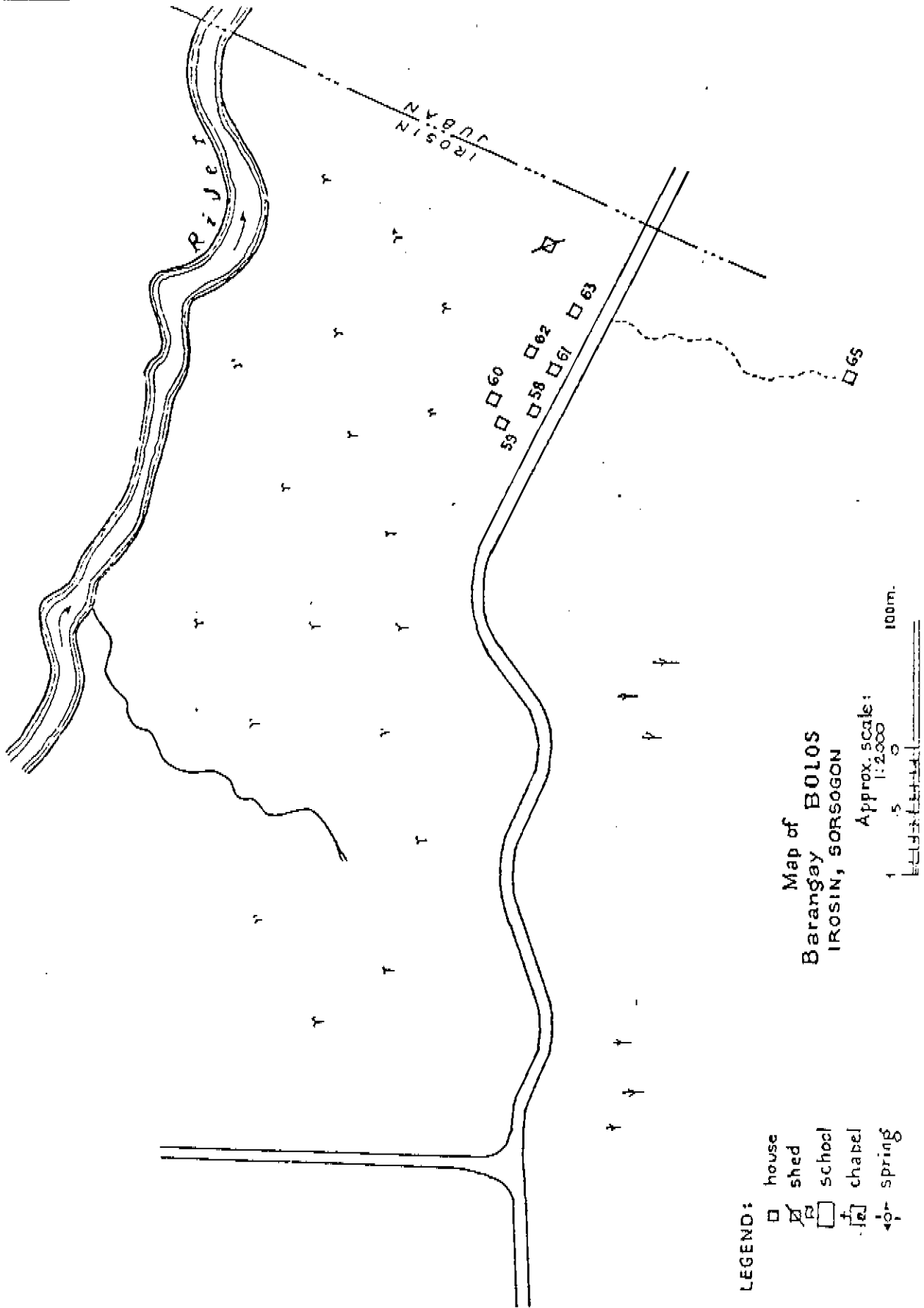


LEGEND:
 □ house
 □ X shed
 □ school
 □ ⊕ chapel
 ⊙ spring

Map of **BOLOS**
 Barangay **BOLOS**
 IROSIN, SORSOGON

Approx. scale:
 1 : 5000
 1 : 10000
 100m.

Annex 1



Annex 1EXPLANATION FOR SURVEY AND TREATMENT RECORD

Form 01 (continued)

SPECIMEN NO.: All specimens submitted each day will be marked beginning with the number 1 consecutively.

NAME: The full name of the person will be recorded. The teacher or parent should be requested to help with the recording of the correct name.

SEX: Male = 1 Female = 2

AGE: Record the age at the last birthday. Children under 10 years of age will be recorded with a zero "0" in the first column, i.e. 08 = 8 years old.

HISTORY: The person who is registering the specimen will ask the person:
 (1) If he/she has ever urinated blood in his/her entire life.
 (2) If he/she has urinated blood within the last six months.
 The responses will be recorded as 0 = No and 1 = Yes.

VISUAL:

Liver size: The liver edge palpated below the right costal margin in the resting supine position is measured with a centimetre ruler. If the liver edge is not palpable an "0" is recorded. Otherwise liver size is recorded to the nearest whole centimetre.

Spleen size: The spleen edge palpated below the left anterior axillary line is measured according to the Hackett scale.

0 = normal spleen, not palpable on deep inspiration.

1 = spleen palpable only on deep or at least more than normal inspiration.

2 = spleen palpable on normal breathing but not projected below a horizontal line half-way below the costal margin and the umbilicus measured along a line dropped vertically from the left nipple.

3 = spleen with the lowest palpable point projected more than half-way to the umbilicus but not below a line drawn horizontally through it.

4 = spleen with the lowest palpable point below the umbilical level but not projected more than half-way towards a horizontal line through the symphysis pubis.

5 = spleen with lowest palpable point below the lower limit of class 4.

Urine: The person registering the specimen will look at the specimen and record if the specimen is bloody or muddy brown.

The result will be recorded as:

0 = normal; 1 = bloody or muddy brown.

Clear brown or dark yellow urine is to be considered normal.

URINE EGGCOUNT:

The microscopist will record all the results on a separate form which indicates specimen number and the number of eggs up to 50 eggs per 10 ml of urine.

On this form only the code number for the number of eggs will be recorded.

0 = no eggs; 1 = 1-9 eggs; 2 = 10-19 eggs; 3 = 20-29 eggs;

4 = 30-39 eggs; 5 = 40-49 eggs; 6 = 50+ eggs.

STOOL EGGCOUNT:

The microscopist will record all results on a separate form which indicates the specimen number and the number of Schistosoma mansoni eggs up to 34 eggs per slide. The presence of eggs belonging to other parasites will also be recorded. On this form only the code numbers for the number of S. mansoni eggs and/or the presence of other eggs will be recorded.

S. mansoni: 0 = no eggs; 1 = 1-4 eggs; 2 = 5-16 eggs; 3 = 17-33 eggs

4 = 34+ eggs.

Other parasites: 0 = none, 1 = Ascaris, 2 = Trichuris, 3 = 1 + 2,

4 = hookworm, 5 = 1+4, 6 = 2 + 4, 7 = 1 + 2 + 4.

WEIGHT:

If the person is infected, he/she will be weighed and the weight recorded.

TREATMENT:

If the person is treated with praziquantel, this column will be marked P. If the person was treated with metrifonate then each dose taken will be marked "1". A complete treatment will be "111" - 3 doses given 2 weeks apart. If a dose was missed "0" should be recorded.

Form 04
(from WHO document PDP/83.6)

POTENTIAL TRANSMISSION SITE SURVEY RECORD

Annex 1

GOVERNORATE	ACTIVITIES					DISTRICT			VILLAGE		DATE		RANK	Transmission Rank (Total)
	1	2	3	4	5	1	2	3	1	2	1	2		
Site number	1	2	3	4	5	1	2	3	1	2	1	2		
	Fording, collecting	Washing cattle	clothes-dishes	Fishing	Abution	bathing	Swimming	No access	paths	Access paths	Fast flow	Slow flow	Stagnant	Snail hosts not found
											Contamination absent	Contamination present	Users not infected	Users infected
											Community aid - No	Community aid - Yes		

Annex 1

EXPLANATION FOR POTENTIAL TRANSMISSION
SITE SURVEY RECORD

Form 04 (continued)

1. Activities:

The main activity taking place at the site is recorded. If more than one activity is of major importance, then both activities may be recorded.

2. Access:

The presence of a well defined access path indicates that the site is frequently used. The absence of access paths, or a little used one, indicates that the site is rarely or not used and that transmission is low or nil.

3. Water:

The rate and constancy of water-flow is related to the risk of transmission. Constant fast-flowing water, in general, is associated with a low risk of transmission. Similarly, most snail hosts can seldom survive in sites which dry up for five or more months each year.

4. Snails:

The presence or absence of snail hosts should be recorded. A 15 minutes search, per person, of the places preferred by the snail hosts, in or near the site, is considered minimal.

5. Contamination:

The presence or absence of signs of human waste is to be recorded. Swimming, for example, can be accepted to mean that urination takes place at that site.

6. User:

The team should try to determine if the persons using the site have or have had signs or symptoms related to schistosomiasis. If infected persons use a site which is suitable for snail hosts, this is highly significant.

7. Community aid:

Note is made on whether the community is willing or not to help in cleaning up the contact site, in changing human behaviour by local legislation, or in doing the mollusciciding.

8. Rank:

The rank number will be the total of the coded numbers given to each category for each site. This number will ultimately determine the mollusciciding/snail control procedures.

Annex 1

EXPLANATION FOR MOLLUSCICIDING RECORD

Form 05 (continued)

1. Site number:

This number is taken from the potential transmission site survey form (Form 04).

2. Rank:

The rank number must be taken from the potential transmission site survey form (Form 04). It may, however, be altered if the transmission status (e.g. human activities) has changed radically.

3. Community aid:

This column indicates whether community collaboration is given or not.

4. Number of snails alive before control:

Just before applying the molluscicide, a 15 minute search (per person) of the places preferred by the snail hosts in the transmission site is carried out. All snails, of any species, are collected and the number found alive is recorded.

5. Quantity of molluscicide applied (kg):

The amount of niclosamide (Bayluscide) applied in each transmission site is recorded. The calculation of the amount required must be kept in a notebook and checked by the programme supervisor.

6. Number of snails alive after control:

The same method of searching for the snails (all species), and recording the number found alive in the transmission site after (i.e., within 1 week) mollusciciding, is carried out.

7. Signature of Team Leader:

The mollusciciding form is considered complete only when signed by the person in charge of the snail control operations and by the Supervisor.

8. Next molluscicide application (proposed date):

The date (month) of application of the next mollusciciding operations in the transmission site is recorded. It will depend on such factors as rainfall pattern, rank of transmission site, suitability for snail host reproduction, chemotherapy schedule, etc. In any event, mollusciciding operations should usually just precede population chemotherapy.

9. Recording of last and next chemotherapy programme:

The dates (month) of the last and next chemotherapy programme are recorded on the mollusciciding form. This is to ensure the closest linkage possible between snail control operations, community involvement and population-based chemotherapy.

ANNEX 2

DATA PRESENTATION¹

The data collected are of no use until they have been processed and analysed. The analysis includes the summarizing of the information by appropriate frequency distributions, computation of rates, averages and measures of dispersion, and determination of relationships or correlations.

The information summarized is usually presented in the form of tables by different classifications. It must be emphasized that the classifications should be adopted on the basis of their epidemiological and operational importance, their comparability with other areas in the same country and in other countries, and their comparability over time (i.e. it should be possible to compare observations made at different periods of time).

A set of six tables and the outline of two others are given as examples of how data collected during a control programme may be presented. These tables can be prepared with the aid of simple calculating machines, but the use of electronic equipment would greatly enhance the efficiency of the operations.

¹ In this annex, Tables 1-6 are based on the WHO document PDP/83.11 and Tables 7 and 8 are based on the WHO documents PDP/83.8 and PDP/83.9 respectively.

TABLE 1. SCHISTOSOMIASIS CONTROL PROGRAMME - ZANZIBAR

Sex	Age	No. of persons	No. examined	Result of examination - pre-treatment, July 1981							% prevalence	
				No. of eggs per 10 ml								
				0	1-9	10-19	20-29	30-39	40-49	50+	50+	Total
Male	0-4	229	185	146	26	1	1	2	2	7	3.8	21.1
	5-9	444	316	110	45	15	13	11	5	117	37.0	65.2
	10-14	351	295	76	59	18	13	10	6	113	38.3	74.2
	15-24	252	185	90	40	6	8	5	2	34	18.4	51.4
	25-44	280	190	108	50	7	4	4	1	16	8.4	43.2
	45+	228	172	94	38	10	6	6	0	18	10.5	45.4
	Total	1 784	1 343	624	258	57	45	38	16	305	22.7	53.5
Female	0-4	225	180	150	14	2	5	0	1	8	4.4	16.7
	5-9	468	347	144	76	14	16	10	3	84	24.2	58.5
	10-14	266	237	80	49	17	18	5	4	64	27.0	66.2
	15-24	245	192	93	49	13	3	1	2	31	16.2	51.6
	25-44	268	211	148	40	7	3	0	0	13	6.2	29.9
	45+	194	158	112	24	9	2	0	1	10	6.3	29.1
	Total	1 666	1 325	727	252	62	47	16	11	210	15.8	45.1
Total	0-4	454	365	296	40	3	6	2	3	15	4.1	18.9
	5-9	912	663	254	121	29	29	21	8	201	30.3	61.7
	10-14	617	532	156	108	35	31	15	10	177	33.3	70.7
	15-24	497	377	183	89	19	11	6	4	65	17.2	51.5
	25-44	548	401	256	90	14	7	4	1	29	7.2	36.2
	45+	422	330	206	62	19	8	6	1	28	8.5	37.6
	Total	3 450	2 668	1 351	510	119	92	54	27	515	19.3	49.4

Annex 2

TABLE 1. SCHISTOSOMIASIS CONTROL PROGRAMME - ZANZIBAR (continued)

Sex	Age	No. of persons	No. examined	Result of examination - post-treatment, August 1982							% prevalence	
				No. of eggs per 10 ml							50+	Total
				0	1-9	10-19	20-29	30-39	40-49	50+		
Male	0-4	274	184	158	6	3	1	1	0	15	8.2	14.1
	5-9	258	172	63	29	14	10	4	5	47	27.3	63.4
	10-14	221	155	54	23	19	7	6	0	46	29.7	65.2
	15-24	246	121	60	31	10	3	3	0	14	11.6	50.4
	25-44	318	155	93	32	9	4	4	1	12	7.7	40.0
	45+	251	134	85	37	1	2	2	0	7	5.2	36.6
	Total	1 568	921	513	158	56	27	20	6	141	15.3	44.3
Female	0-4	259	146	116	10	7	3	1	1	8	5.5	20.6
	5-9	307	200	97	28	14	2	4	5	50	25.0	51.5
	10-14	181	135	66	31	5	5	2	1	25	18.5	51.1
	15-24	291	158	94	31	11	4	4	3	11	7.0	40.5
	25-44	312	188	137	30	5	1	0	1	14	7.4	27.1
	45+	214	128	100	15	6	1	0	1	5	3.9	21.9
	Total	1 564	955	610	145	48	16	11	12	113	11.8	36.1
Total	0-4	533	330	274	16	10	4	2	1	23	7.0	17.0
	5-9	565	372	160	57	28	12	8	10	97	26.1	57.0
	10-14	402	290	120	54	24	12	8	1	71	24.5	58.6
	15-24	537	279	154	62	21	7	7	3	25	9.0	44.8
	25-44	630	343	230	62	14	5	4	2	26	7.6	32.9
	45+	465	262	185	52	7	3	2	1	12	4.6	29.4
	Total	3 132	1 876	1 123	303	104	43	31	18	254	13.5	40.1

TABLE 2. STATUS OF POPULATION BEFORE AND AFTER CHEMOTHERAPY

(After first survey positives are treated and population is surveyed one year later. Some persons seen at first survey are not seen at second survey and vice-versa. No effort is made to know the persons who are surveyed twice.)

(a) by prevalence of infection

Status	Before	After
Negative	1 351	1 123
Positive	1 317	1 753
Total	2 668	1 876

Prevalence before chemotherapy: $1317/2668 = 49\%$

Prevalence after chemotherapy: $753/1876 = 40\%$

Reduction in prevalence: $(40-49)/49 = 18\%$

(b) by egg load: eggs per 10 ml urine

Eggs per 10 ml	Before	After
0	1 351	1 123
1 - 49	802	499
50+	515	254
Total	2 668	1 876

Prevalence of heavily infected before chemotherapy: $515/2668 = 19\%$

Prevalence of heavily infected after chemotherapy: $254/1876 = 14\%$

Reduction in prevalence of heavily infected: $(14-19)/19 = 26\%$

Annex 2

TABLE 3. EGG LOAD IN A POPULATION AT TWO SURVEYS

(No intervention is carried out between surveys.
 Some persons seen at first survey are not seen at
 second survey and vice-versa).

Eggs per gram - Survey 2	Eggs per gram - Survey 1				800+	Unknown*	Total
	0	1-99	100-399	400-799			
0	195	5	9	0	0	5	214
1 - 99	4	3	3	0	0	1	11
100 - 399	6	7	6	0	0	0	19
400 - 799	1	1	6	1	0	1	10
800+	0	0	1	0	2	0	3
Unknown**	19	5	6	1	0	0	31
Total	225	21	31	2	2	7	288

* Newcomers - not seen at Survey 1.

** Absentees - not seen at Survey 2.

Annex 2

TABLE 4. STATUS OF THE POPULATION BEFORE AND AFTER CHEMOTHERAPY

(Each person tested at two surveys; second survey is 6 months after first)

After chemotherapy	Before chemotherapy		Total
	Negative	Positive	
Negative	217	270	487
Positive	55	293	348
Total	272	563	835

Prevalence before chemotherapy: $563/835 = 67\%$

Prevalence after chemotherapy: $348/835 = 42\%$

Reduction in prevalence: $(42-67)/67 = 37\%$

Conversion rate (- \rightarrow +): $55/272 = 20\%$

Egg negative rate (+ \rightarrow -): $270/563 = 48\%$

Annex 2

TABLE 5. STATUS OF THE POPULATION BEFORE AND AFTER CHEMOTHERAPY BY TREATMENT

(Each person tested at two surveys; second survey is 6 months after first)

(a) Persons treated

After chemotherapy	Before chemotherapy Positive
Negative	248
Positive	275
Total	523

Egg negative rate (+ → -): $248/523 = 47\%$ (b) Persons not treated

After chemotherapy	Before chemotherapy		
	Negative	Positive	Total
Negative	217	22	239
Positive	55	18	73
Total	272	40	312

Reversion rate (+ → -): $22/40 = 55\%$

Annex 2

TABLE 6. EGG LOAD DISTRIBUTION IN THE POPULATION BEFORE AND AFTER CHEMOTHERAPY
 (Each person tested at two surveys; second survey is 6 months after first)

Eggs per 10 ml urine after chemotherapy	Eggs per 10 ml urine before chemotherapy							Total
	0	1-9	10-19	20-29	30-39	40-49	50+	
0	217	100	30	25	10	2	103	487
1-9	24	24	12	11	2	3	56	132
10-19	7	11	1	1	3	2	31	56
20-29	6	8	1	3	0	0	11	29
30-39	6	5	0	1	0	1	7	20
40-49	2	1	1	0	0	0	7	11
50+	10	10	0	8	6	5	61	100
Total	272	159	45	49	21	13	276	835

TABLE 7. PREVALENCE OF INFECTION AND NUMBERS TREATED BY AGE AND SEX

		GOVERNORATE	DISTRICT	VILLAGE	DATE								
Sex	Age (in years)	No. in census exam.	No. exam. neg.	Positives			50+ eggs in urine <800 epg in stool		800+ epg in urine <50 eggs in urine		50+ eggs in urine 800+ epg in stool		No. treated
				S.h. only	S.m. only	Mixed	No.	%	No.	%	No.	%	
				No.	%	No.	%	No.	%	No.	%		
Male	0-4												
	5-14												
	15-24												
	25-44												
	45+												
	Total												
Female	0-4												
	5-14												
	15-24												
	25-44												
	45+												
	Total												
Total	0-4												
	5-14												
	15-24												
	25-44												
	45+												
	Total												

S.h. = Schistosoma haematobium
 S.m. = Schistosoma mansoni
 epg = eggs per gram

Annex 2

TABLE 8. SYMPTOMS IN RELATION TO EGG COUNTS

GOVERNORATE	DISTRICT	AGE	VILLAGE		DATE	SEX		TOTAL
			<50 eggs in urine <800 epg in stool	50+ eggs in urine <800 epg in stool		<50 eggs in urine 800+ epg in stool	50+ eggs in urine 800+ epg in stool	
			No.	%	No.	%	No.	%
History of haematuria								
	Yes							
	No							
Total								
Bloody urine								
	Yes							
	No							
Total								
Liver: 5 + cm								
	Yes							
	No							
Total								
Spleen: 3 + Hackett								
	Yes							
	No							
Total								

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