ONCHOCERCIASIS CONTROL PROGRAMME 
IN WEST AFRICA (OCP)

MANAGING A NATIONAL 
ONCHOCERCIASIS CONTROL 
PROGRAMME

Manual for the co-ordinators of 
national onchocerciasis control programmes

WORLD HEALTH ORGANISATION
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Abbreviations and acronyms

CDD   community directed distributor
CDTI  community directed treatment with ivermectin
CMFL  community mean microfilarial load
DEC   diethyl carbamazine
IEC   information, education, communication
OCP   Onchocerciasis Control Programme in West Africa
WHO   World Health Organisation

Glossary

Central Medical Stores
the agency that is responsible for ordering pharmaceutical supplies for the whole State health service of the country

Molecular Biology Laboratory
a laboratory run by WHO, serving the West African sub-region, and based at Ouagadougou in Burkina Faso

Organisational levels in the health service

<table>
<thead>
<tr>
<th>Term used in the text</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headquarters</td>
<td>The level of the Ministry of Health, in the capital city.</td>
</tr>
<tr>
<td>Region</td>
<td>The organisational level just below Headquarters. A region is made up of several health districts.</td>
</tr>
<tr>
<td>District</td>
<td>The basic unit of organisation of the health services. It usually has doctors working in it, and contains a small referral hospital, as well as a wide variety of other health services.</td>
</tr>
<tr>
<td>Sub-district/first line health facility</td>
<td>The level just below that of ‘district’. Each sub-district usually contains one health centre, and serves a number of villages</td>
</tr>
</tbody>
</table>
HOW TO USE THIS MANUAL

This manual is intended for you, if you have the responsibility at national level for managing onchocerciasis control within your country. It aims to provide you with the knowledge you need to do the job of ‘National Onchocerciasis Coordinator.’

- To use this manual, start with this page. It will guide you through the whole process of managing onchocerciasis control in your country.
- Perhaps onchocerciasis control is your only job, or perhaps you are responsible for control programmes for other diseases as well (for example schistosomiasis, trypanosomiasis and Guinea worm). In either case you need this manual.
- Your job in onchocerciasis has four main components:

1. Surveillance: epidemiological and entomological

   - You monitor the infection by means of this activity.

   - To learn more about how epidemiological surveillance works, go to Section 2.1.
   - To learn more about your role in epidemiological surveillance, go to Section 2.2.
   - To learn more about how entomological surveillance works, go to Section 3.1.
   - To learn more about your role in entomological surveillance, go to Section 3.2.
2. Community Directed Treatment with Ivermectin (CDTI)

You control the severity of the infection by means of this activity.

- To learn more about how CDTI works, go to *Section 4.1.*
- To learn more about your role in CDTI go to *Section 4.2.*

3. Using surveillance data to monitor transmission

You identify instances of recrudescence of the infection, and control them.

- To learn how to act on the findings of surveillance data, go to *Section 5.2.*

4. General management

You manage these activities.

- To learn how to make a yearly plan, go to *Section 6.1.*

It must be stressed that this manual only provides suggestions, examples and guidelines. Since your country is unique, and has its own structures and traditions, you have to develop your own way of handling onchocerciasis control. You do this by adapting the ideas in this manual to suit your conditions. Use what you need!
ONCHOCERCIASIS AND ITS MANAGEMENT

Onchocerciasis is a disease caused by the macrofilaria *Onchocerca volvulus*, which invades the subcutaneous tissues of the body.

*The life cycle of Onchocerca volvulus*

Within a year the female worm starts producing millions of microfilariae, which migrate to the skin of the infected person. The adult worms live for about 15 years.

When the blackfly bites a human again, the larvae are introduced into the skin of this individual. The larvae grow into adulthood in the subcutaneous tissues of the new victim.

The female blackfly *Simulium* needs blood meals before she can lay her eggs. When she bites an infected person she ingests some of the microfilariae together with the blood.

The microfilariae go through three larval stages in the blackfly. The last one migrates to the head and mouthpiece of the fly.

*The life cycle of the blackfly Simulium*

After taking a blood meal the female backfly lays her eggs at the edge of fast flowing streams and rivers.

After going through a few larval stages and a pupal stage, the adult flies emerge from the water 7-10 days after the eggs were laid.

The eggs hatch and the larvae live in the water, attached to objects like leaves, sticks and stones. They need oxygen rich water to thrive, which is why the fly lays her eggs next to fast flowing water.
The adult female fly lays a large number of eggs every 4 to 5 days of her short life. Between every egg laying she has to take a blood meal. She will therefore bite several humans, at an interval of a week or so. This makes her an ideal vector for the parasite.

The blackflies clearly prefer living close to rivers, and that is where most cases of onchocerciasis are found (hence the old name ‘river blindness’). However a single fly can migrate a hundred kilometres or more, especially if assisted by strong winds.
Symptoms and signs of onchocerciasis
Almost all the symptoms and signs are caused by the microfilariae, and not by the adult worm.

- The **most common** symptom is **itching**, which is caused by body’s reaction to microfilariae dying in the skin. It is severe and continues day and night. This leads to the following clinical signs:
  - An onchoceral **dermatitis** - small papules.
  - ‘Lizard skin’ - areas of roughening.
  - ‘Leopard skin’ - areas of depigmentation (especially on the lower limbs).

- As the number of microfilariae in the body increases, increasing numbers find their way to the eyes. Every part of the eye is eventually affected by inflammation, tissue damage and scarring. This leads to a gradual **loss of vision**, and eventually to irreversible blindness - often by as early as the age of thirty-five.

- The adult worms may cause **painless nodules** under the skin. These are especially noticeable over bony parts like the skull and pelvis.

- The constant itch (leading to lack of sleep), the slow loss of vision, and the effect of the high parasite load together have a profound effect on the **quality of life** of the sufferers. They become weak, debilitated and depressed. In small children the heavy parasite load can interfere with growth and development, leading to a clinical syndrome referred to as ‘onchocercal cretinism’.

As a result of the disease many fertile river basins were abandoned by their populations, with profound economic consequences for the countries concerned.
Symptoms and signs of onchocerciasis

Itching
Onchocercal dermatitis
‘Lizard skin’

‘Leopard skin’
Nodule on the face
Loss of vision

Diagnosis of onchocerciasis

The diagnosis can be made in either of two ways:

- By taking two small skin biopsies (over the left and right iliac crests respectively) and examining them microscopically. The living microfilariae are easily observed emerging from the biopsies.
Taking skin biopsies

Applying DEC patches
By applying DEC (diethyl-carbamazine) to the skin over each of the two iliac crests, and examining the skin under the patches after 24 hours, to see if there is an inflammatory reaction (but note: Mansonella streptocerca also gives a positive reaction).

**Treatment of onchocerciasis**

Until about 10 years ago there was no effective treatment known. A drug called diethyl-carbamazine (DEC) was tried, but it had many serious side-effects.

The only drug we now have available is ivermectin. This is a non-toxic, well tolerated compound:

- It is highly effective as a *microfilaricide*. For this reason it immediately relieves the itching, and also causes early eye lesions to be reversed. It achieves these effects by being administered once a year.
- It does not however kill the adult parasite, although it appears to lower the fertility of the female worm.

More detailed information about ivermectin and its use is given in a separate handout.
CONTROL OF ONCHOCERCIASIS

In order to control the disease we have to break its cycle of transmission (man → blackfly → man). There are two ways of achieving this:

1. Larviciding

The goal here is to eliminate the vector *Simulium* by killing its larvae:

- Each river where it breeds has to be identified, and an insecticide administered to each breeding site in those rivers once a week.
- This has mostly been done by helicopter, but also on the ground and with boats.
- The process has to be continued for at least 15 years, until all the adult worms have died out and there are no microfilariae left in skins of the population.
Ground larviciding

Larviciding by boat
2. Community directed treatment with ivermectin (CDTI)

Ivermectin is administered to the whole population of the affected areas once a year (sometimes twice):

- Such infrequent administration is sufficient since all microfilariae are killed, and the fertility of the female worm is diminished for a substantial period.
- As a result transmission of the parasite is cut down by 75% (but not halted completely).
- The administration is achieved done by enlisting the help of the villagers themselves.
- Even those who feel well must be treated. Although their parasite load may be low they can still be sources of infection for others.
- It is best if the ivermectin is administered just before the time of maximum transmission in the year - normally the rainy season, when the blackfly population increases rapidly.
Larviciding is the most reliable and effective way of eliminating the disease. CDTI helps the larviciding to take effect more quickly, but is not sufficient in itself to achieve control where there is a high prevalence of the disease. In situations where the parasite load is low CDTI will probably be sufficient to control the disease, but it will have to continue yearly for many years.

Since 1974 the Onchocerciasis Control Programme (OCP) has been using these strategies to control the disease in West Africa - first only larviciding, then later CDTI as well. We now have a situation where the disease is no longer a public health threat. In addition, many thousands of hectares of fertile land in river basins have been resettled.

After 2002 larviciding will cease, and CDTI will be the only control measure used.
2.1 HOW ACTIVE EPIDEMIOLOGICAL SURVEILLANCE OF ONCHOCERCIASIS WORKS

It is very important to know whether the control measures are working. There are two ways in which this is done: by epidemiological and by entomological surveillance. The two complement each other - we need both to give us a full picture of what is happening. This section deals with active epidemiological surveillance:

- By epidemiological surveillance we mean observing what is happening to the infection in human populations.
- By active surveillance we mean, going out specifically to look for the infection in the population, to see how much of it is still there. (In ‘passive’ surveillance we wait for patients with the infection to come to us, and then report it.)

OCP has selected specific villages in each river basin that was affected by the infection. These are called sentinel villages because, like a sentinel or guard, they give us warning if something is going wrong. The population in them is followed up at regular intervals:

- In river basins which were once treated with larviciding, to eliminate the blackfly: every three years.
- In river basins where there was never any larviciding, only ivermectin treatment: every five years.

The aim of this follow-up is to see what is happening to the population’s parasite load. This may be done in two different ways:

- By performing skin biopsies or ‘snips’ on every person over the age of one in the village, and examining them microscopically (one biopsy is performed on the skin of each iliac crest).
- By performing the DEC (diethyl carbamazine) patch skin test on all persons form 5 to 20 years of age in the village (a patch is applied to the skin over one iliac crest, and read 24 hours later).

In both cases this is done to see how many people are still carrying the parasite, or have been re-infected with it.
At present the skin biopsy is still the method of choice. You will be informed as soon as the DEC skin patch test may be used in stead.

It is essential to use the same village every time. For example:

- In 1998 Village A has 12 people with positive tests, and Village B has only 5. So it looks as if the situation is worse in Village A.
- However we know that in 1995 Village A had 23 positives, while Village B had only 2. This means in fact that Village A is improving nicely, but Village B is having a problem! There may be a problem in that river basin. *We only know this because we examined both of the villages before.*

Up to now OCP has been organising the examination of these ‘sentinel villages’. However OCP is coming to an end in the year 2002, and the health services of the 11 countries where it operates will have to take over this activity of ‘epidemiological surveillance’. Only then can we be sure the infection is detected early if it returns, which makes it possible to control it with CDTI.

**Some important statistics**

Here are a couple of definitions that are used in presenting the information arising from epidemiological surveillance, and which you need to know:

<table>
<thead>
<tr>
<th><strong>Prevalence</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td><strong>Unit</strong></td>
</tr>
<tr>
<td><strong>Meaning</strong></td>
</tr>
</tbody>
</table>
### Incidence

**Definition**
The proportion of persons in a community who have become infected within a year (as proved by two negative ‘skin snips’ or ‘patch tests’ beforehand, which have now become positive; or in the case of a child born after control measures started, who has now become positive).

<table>
<thead>
<tr>
<th>Unit</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning</td>
<td>It shows whether the level of infection is decreasing (which is what we want) or increasing (a danger sign).</td>
</tr>
</tbody>
</table>

### CMFL (community mean microfilarial load)

**Definition**
The average number of microfilariae seen per skin snip for that community.

<table>
<thead>
<tr>
<th>Unit</th>
<th>mf/s (microfilariae per snip)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning</td>
<td>This gives a definite indication of the strength of infection in infected persons - it is therefore a refinement of ‘prevalence’.</td>
</tr>
</tbody>
</table>

### Criteria for selecting villages for epidemiological surveillance

Through the years OCP has developed strict criteria for selecting villages which are suitable as ‘sentinel villages’:

- They must have had a high level of onchocercal infection in the past.
- They must be near a major blackfly breeding site.
- They must be ‘in the first line’ - that is, there may not be any other villages between them and the breeding site on the river.
- They must not be too big - the population should be between 200 and 300.
- They must have a stable population - there must not be a lot of migration in and out of the village.
It is important to know about these criteria. Although the 11 countries will continue to use the sentinel villages that OCP identified, you may have to select more as time goes on. This may happen when:

- Villagers refuse to continue participating (‘snip fatigue’ - remember the biopsy is painful).
- A village no longer satisfies the criteria (for instance when a lot of migration starts taking place, or a new village is built between the old one and the river).

*In such cases you will have to replace that village with another one,* close to the original one, in the same river basin, which fulfils the criteria set out above.

**The effect of ivermectin on the biopsies and DEC patch tests**

- As we know ivermectin effectively removes microfilariae from the skin of a person who carries the adult worm. If there has been a round of treatment in the village shortly before the epidemiological surveillance takes place, all the results will be negative (because they work by detecting microfilariae in the skin). This might be a ‘false negative’, because there might still be living adult worms present in many of the inhabitants of the village.

> If a village is to undergo epidemiological surveillance, it is therefore essential to STOP the administration of ivermectin for at least twelve months beforehand.

- As soon as the surveillance has been completed, the next round of CDTI can take place immediately in the village concerned.
- In areas where there is no CDTI this is clearly not a problem.

**The effect of migration on epidemiological surveillance**

In many areas of West Africa there is a tradition of migration. This means that people may move from a village where onchocerciasis is still present, to one which has been free of the infection. The longer such infected persons stay in the area, the greater the chances that they can become the sources of new transmission. If however it is a fleeting visit, the chances of renewed transmission are very small.
Whenever a skin test is found to be positive, it is essential therefore to conduct a ‘migration enquiry’ on such a person. S/he is interviewed for the following information:

- The person’s name (all possible names).
- The person’s ‘Individual number’ on the surveillance record sheet.
- Where the person was born.
- Any other places where s/he has lived:
  - Since the last examination (if s/he had one).
  - OR for the past 10 years (if this is her/ his first examination).
- In recording a previous place of residence be sure to specify:
  - Name of village.
  - Sub-district, district, region, country.
  This is so that the village can be located.

If s/he recently came in from another area, the chances are that s/he got the infection there. In such a case:

- S/he must be treated immediately with ivermectin, so that s/he is no longer infectious.
- The officer responsible for onchocerciasis control in the country s/he comes from must be informed immediately. A full record (as above) is sent to her/ him.

What happens if you are the officer in charge who gets the notification?

- **It may be that the person comes from a sentinel village**, where you have recently conducted surveillance and know the situation (this is very unlikely). In such a case you note her/ his status in your records.

- **It may be that the person comes from a river basin where control is still not good**, and new cases are known to be occurring. In such a situation one new case will not make any difference to the control methods being used.

- **It may be that the person comes from a river basin which was believed to be free of the infection**. In such a situation you need to conduct epidemiological surveillance in the village and surrounding area.
The epidemiological surveillance team

When surveillance activities are planned at the beginning of each year, it is essential that there should be a team of persons available who are able to perform the surveillance competently.

Who are the members of such a team?

It depends on what method you use: the ‘skin snip’, or the ‘patch test’.

- Each ‘skin snip’ team consists of a three members:
  - A snipper (who does the biopsy).
  - A microscopist (who examines the biopsy).
  - A census taker (who does the recording and administration).

- Each ‘DEC patch test’ team consists of two members:
  - An applier (who prepares and applies the patch)
  - A census taker (who does the recording and administration).

Note that team members can learn to alternate these functions in the field (except the microscopy, which is rather specialised).

Where does one find such people?

- During the years OCP trained several teams to do both ‘DEC patch test’ and ‘skin snip’ surveillance in each country. *You need to compile a list of such persons in your country: their names and contact details.*

- If you can no longer locate trained people, or if their new positions make it impossible for them to leave their work, you will have to *arrange for new ones to be trained*. There are training manuals available for this purpose. The training will have to be done by persons with previous experience of either ‘skin snipping’ or ‘DEC patch testing’.

- In order to maintain a pool of people with the necessary skills, it is suggested that you send along one or two new members with the surveillance team each year, to learn on the job.

What do they need for their work?

They need equipment and a budget:

- The *equipment* is given in Section 2.3. Its use is fully explained in the training manuals for ‘skin snipping’ and ‘DEC patch testing’.
You have to work out a **budget** for their work at the beginning of each year. It is easy to calculate:

- To calculate the distances to be travelled (for the petrol): consult past records, or an up-to-date map of the country.
- To calculate *per diem* allowances: work on three to four villages being covered per week (depending on their size, and distance from each other).
2.2 YOUR RESPONSIBILITIES IN EPIDEMIOLOGICAL SURVEILLANCE

Your primary responsibility is to ensure that epidemiological surveillance for onchocerciasis control is carried out systematically every year, at at least one site in every river basin in your country. This responsibility is dealt with below.

Your secondary responsibility is interpret the results of the epidemiological surveillance, and to take the appropriate steps. This responsibility is dealt with fully in Section 5.2.

As overall manager of the primary responsibility (i.e. making sure that epidemiological surveillance takes place) you have to:

1. Plan the surveillance.
2. Manage the surveillance.
3. Monitor the surveillance.

1. You plan the surveillance like this:

- At the beginning of each year you have to plan the surveillance for the year in detail. This means that you need to prepare a list with all the necessary details. Here is an example, for two river basins:

<table>
<thead>
<tr>
<th>river basin</th>
<th>village to be surveyed</th>
<th>proposed date of surveillance</th>
<th>date of previous surveillance</th>
<th>date of last ivermectin distribution*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oumé</td>
<td>Aguigadjí</td>
<td>second week in March 2000</td>
<td>March 1997</td>
<td>March 1999</td>
</tr>
<tr>
<td>Alibori</td>
<td>Pétankou</td>
<td>second week in March 2000</td>
<td>September 1996</td>
<td>none</td>
</tr>
</tbody>
</table>

* Note that if the villages are in an area where the CDTI programme is operating, the planning has to be done a year in advance - because ivermectin may not be given for at least a year before the surveillance.
To see an example of a yearly time frame for your epidemiological surveillance work, go to Section 6.1.

You use this list to guide whoever takes responsibility for actually organising and sending out the surveillance teams (see below).

- You need to **budget** for the epidemiological surveillance yearly.

To see an example of a budget for your epidemiological surveillance work, go to Section 6.2.

2. **You manage the surveillance like this:**

- You need to **appoint the team** that is going to do the surveillance for that year:
  
  - According to the situation in your country you may decide to do this yourself, or you may delegate it to the person in charge of onchocerciasis control at regional level (provided you are sure s/he has the necessary experience and know-how).
  
  - You should have inherited a list of people who have done this before, who have the necessary training and experience. If the country is very large you may have to appoint more than one team.

  The characteristics of the team members are given in Section 2.1.

- They work according to the timetable you have made for the year - a few weeks at most. Since they may have been transferred to other sections of the health service you may have to negotiate for their secondment to you (or the region) for the period of the surveillance.

- Regarding **transport, equipment and materials**, you need to make sure that the epidemiological surveillance team has what it needs to do the job:
  
  - Transport has to be booked well in advance.
  
  - The equipment and materials needed for surveillance are listed in X. You will find that they are being stored somewhere (there may be one or more stores, depending on the size of your country). Make sure that the stores are being well run:
* There must be a person who is responsible for the store.
* There must be a stock register for the store.
* Any movement of equipment or material in or out of the store must be recorded.
* The store must be kept locked.

- Note that for the time being you are going to be using the ‘skin snip’ method of surveillance.

For more information about the equipment needed for epidemiological surveillance, go to **Section 2.3**.

- You may need to arrange for a small amount of *training* yearly. You are probably going to inherit a situation where there are a number of persons who know how to do epidemiological surveillance well. However due to normal turnover and transfer a need for new training may arise. The necessary training manuals are available, for both the ‘skin snip’ and ‘DEC patch test’ methods. If you decide that training is needed you will have to budget for it.

For more information about training, go to **Section 6.3**.

- You already have a list (and a map) of the sentinel villages in your country. Every two years you should *revise your list* (and map) of *sentinel villages* where surveillance has to take place. It may well happen that one or two villages refuse to cooperate any more, due to the inconvenience and pain of the ‘skin snip’ method; such villages have to be replaced by others.

  The criteria for selecting new villages are given in **Section 2.1**.

- You include a short section on epidemiological surveillance in your *annual report* to the Ministry.

3. **You monitor the surveillance like this:**

- The principal way in which you monitor the surveillance is by *receiving and analysing the data* from the teams, after they come back from the field. You scrutinise all the reports (see Section 2.4) for completeness. In this way you identify:
• Team members who seem to have problems with the work.
• Villages where there are problems with the programme (low compliance with the 'snips', high levels of migration etc.).

You also enter the findings into your computer, to determine the prevalence, CMFL and incidence (see Section 2.1). This helps you find out whether the situation is stable in each river basin, or whether there are new developments which need further investigation (Section 5.2).

For examples of all the forms used in epidemiological surveillance, go to Section 2.4.

Another way of monitoring the epidemiological surveillance is to supervise the teams while they are in the field. If you have full confidence in them you may decide that it is not necessary; if however they are new, and you are in doubt, you will have to budget for such visits. If you are responsible for more than one programme, you may decide to link this supervision to a supervisory visit for another programme. Here is a checklist of what you should do on such a visit:

• A discussion with the regional officer responsible for onchocerciasis control:
  * Is s/he fully aware of the team’s activities?
  * Does s/he have any suggestions about their functioning?

• A similar discussion with the district level officer responsible for onchocerciasis control.

• A discussion with the epidemiological surveillance team leader:
  * Is s/he satisfied with her/his team’s performance?
  * What problems are they experiencing, and how are they overcoming those?

• Observation of the team members while at work:
  * Spend some time with each of the three members: the ‘census taker’, the ‘snipper’, the ‘microscopist’.
  * Use the information in their training manual to see if they are doing the work correctly.
  * Discuss any problems they have with them, and work out solutions.
2.3 EQUIPMENT NEEDED FOR EPIDEMIOLOGICAL SURVEILLANCE

The following equipment needs to be taken on a field trip:

1. **General equipment**

   * **For the census**
     - One folding table and chair.
     - A pencil.
     - Enough census forms N602 (pre-prepared, in the case of repeat visits).
     - Copies of all the past records for that village, in their box.
   
   * **For where the snipping/ applying of patches is done, in privacy**
     - One folding table and chair.
   
   * **For the ivermectin treatment point**
     - One folding table and chair.
     - A supply of bottle of ivermectin tablets (3 mg).

   * **For personal needs**
     - For each team member:
       - A stretcher or foam mattress.
       - Bedding.
       - A mosquito net and/ or tents for sleeping.
       - A set of eating utensils.
       - Personal bag with clothes, toiletries etc.
     - For the team:
       - A 50 litre water container, full.
       - A paraffin stove (two burners).
       - Three paraffin lamps.
       - Ten litres of paraffin.
       - Cooking pots, pans, knives, spoons.
       - Bowls for washing up.
       - Washing up liquid.
For the vehicle
- An extra spare tyre.
- A jack and wheel spanner.
- Basic tools for the vehicle.
- 25 litres of petrol/diesel oil.
- One litre of engine oil.

A basic pharmacy/first aid kit
Every team will have to see what it can get together by way of medical supplies. In countries where cost recovery is in operation it may not be possible to get any medicines at all. Here is a list of what would be useful - but anything is better than nothing:
- Aspirin (tablets).
- Paracetamol (tablets and syrup).
- Chloroquin (tablets).
- Penicillin VK (tablets and syrup).
- A broad spectrum antibiotic like co-trimoxazole or ampicillin (capsules and syrup).
- Metronidazole (tablets).
- Tetracycline (capsules).
- A bottle of antiseptic solution (e.g. chlorhexidine).
- Antiseptic cream (e.g. povidone iodine).
- A fungicide cream (e.g. Whitfield’s ointment).
- A thiazide diuretic (tablets).
- Aminophylline (suppositories and tablets).
- Bandages.
- Gauze and cotton wool swabs.
- Sticking plaster.

2. Specific equipment if the ‘skin snip’ method is to be used
For the microscopic examination
- One folding large table and chair.
- One beach umbrella.
- A binocular microscope.
- Curved tweezers.
- A watch or chronometer (set to exactly the same time as the snip-taker's watch).
- A number of plastic microtitration trays each containing 96 round bottomed wells arranged in 8 rows of twelve serially numbered A1 - A12, B1 - B12, etc.
- Saline solution.
- A hypodermic syringe and needle size 1.
- A roll of adhesive tape (as wide as possible).
  - Microscopic examination forms:
  - Census form N602.
  - Census result form.
  - Microscopic examination form (OCP/D3).
  - Parasitological examination results form: Parts 1 and 2.
  - Summary of new cases form.
- A black ball-point pen.
- Water and detergent.
- For microscopy after 24 hours the following additional equipment is needed:
  - An Eppendorf pipette (50) with at least 40 disposable tips.
  - Six clean ringed slides.
  - Two slide trays.
  - A felt-tip pen.
  - A red ball-point pen (so that the results are easily distinguishable from those of the 30 minute test, which are marked in black).

For the snipping
- At least 15 Holth type sclerocorneal punches, diameter 2.5 cm.
- A lancet.
- At least 15 curved tweezers.
- A felt-tip pen.
- A watch or chronometer
- A dropper bottle of distilled water.
- Cotton-wool swabs.
- At least ten glass slides with shallow wells formed by 12 raised ceramic rings, arranged in 3 rows of four.
- At least four slide trays each holding 3 slides.
A sterilisation kit is also needed, containing the following:
- A butane burning stove.
- An aluminium pressure steriliser.
- Three instrument trays.
- Sterilizer forceps and tweezers.
- Enough fuel for the stove.

3. Specific equipment if the 'DEC patch test' method is to be used

Preparing the 20% DEC solution
- Nivea milk.
- Diethyl carbamazine (DEC) in powder form.
- A chemical balance.
- A measuring cylinder.
- A one litre plastic or glass storage bottle (with a tight fitting lid).

Preparing the DEC patch
- The 20% DEC solution.
- A few sheets of Wattman no. 1 filter paper.
- Pencil and ruler.
- Scissors (suitable for paper and cloth).
- Forceps
- Several rolls of zinc oxide sticking plaster, width 50 mm, with perforations (the perforations are essential in hot climates, to allow the skin to breathe and remain dry).
- A small bowl.

Applying the DEC patches
- The prepared DEC patches.
- Cotton wool swabs.
- 80% alcohol solution.
### 2.4 EXAMPLES OF EPIDEMIOLOGICAL SURVEILLANCE FORMS

The following forms are routinely used:

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* Note that this form was designed for use with the ‘skin snip’ method. The headings on two of the columns need to be changed to make it suitable for the ‘patch test’ method.

Copies are shown below.
## CENSUS RESULT

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Number of village: 105  
Date: 21/2/83

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**M: 13/61**  
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**F: 14/54**
# Parasitological Examination Results (Part 2)

**Name of village:** Naga  
**Number of village:** 105  
**Date:** 21/2/2001

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3.1 HOW ENTOMOLOGICAL SURVEILLANCE OF ONCHOCERCIASIS WORKS

It is very important to know whether the control measures are working. There are two ways in which this is done: by epidemiological and by entomological surveillance. The two complement each other - we need both to give us a full picture of what is happening. This section deals with entomological surveillance.

- By entomological surveillance we mean observing what is happening to the infection in insect populations - in this case, in the blackflies which transmit the infection.

Why do we need entomological surveillance?

- The female blackfly is very good at finding the parasite in the skin of an infected person. There is good evidence that the flies can find microfilariae at lower levels of infection than the ‘skin snip’ or ‘patch test’ can. This means that, generally speaking, entomological surveillance is more sensitive than epidemiological surveillance.

- On the other hand we know that the flies are highly mobile - they migrate over long distances. This means that an infected fly found at one site may represent an infected population in another site, far away.

- That is why the final diagnosis must always be made on epidemiological findings in then local population. If the entomological findings show a problem, epidemiological studies must follow.

- Up to now OCP has been organising the entomological surveillance. However OCP is coming to an end in the year 2002, and the health services of the 11 countries where it operates will have to take over this activity. Only then can we be sure the infection is detected early if it returns, which makes it possible to control it with CDTI.

In summary, the objectives of entomological surveillance are:

- To compare the present infectivity level of blackflies with hat it was before (for example, at the moment when larviciding stopped).
- To serve as a warning, so that more intensive epidemiological investigations can be set in motion.
How do we find the parasite in the blackflies?

- When a female blackfly bites an infected person, microfilariae are ingested with the blood. The microfilariae develop through several larval stages within the blackfly, until the so-called ‘infective Stage 3 larvae’ present themselves in the head of the fly. This is where we find them.
  - Previously they were found by microscopic examination of the heads of the flies. This was done on site, next to the points where the flies were being captured.
  - Now however we use analysis of DNA in the larvae which are found in the heads of the flies. This is done at the Molecular Biology Laboratory at Ouagadougou in Burkina Faso:
    * The whole flies are sent in large batches to the laboratory.
    * In the laboratory the heads are separated from the bodies, and then analysed.
    * This technique requires a minimum of 8,000 flies to be sent from each ‘capture point’ (see below).

An important statistic

There is one important statistic that you need to know, which is used in presenting the information about entomological surveillance:

<table>
<thead>
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<th><strong>Infectivity rate</strong></th>
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<td><strong>Unit</strong></td>
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<td><strong>Meaning</strong></td>
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The infectivity rate for each site will be sent to you from Ouagadougou, so you do not need to calculate it yourself.
The entomological surveillance team

When surveillance activities are planned at the beginning of each year, it is essential that there should be a team of persons available who are able to perform the surveillance competently.

Who are the usual members of such a team?

NOTE: The team as described below is the usual one. It may vary slightly from country to country, but its overall duties stay the same.

1. The national medical entomologist
   - This person is usually based at the Ministry Headquarters, and should be responsible for all aspects of entomological surveillance in your country.

2. Members of the district health team
   - The nurse in the health centre closest to the capture site supervises and encourages the capturers (see below) during routine visits; receives and packs bottles of flies; sends the flies to the District.
   - The district disease control officer mobilises villages to select capturers; supervises the nurse and capturers during routine visits; receives and packs bottles of flies; send the flies to Ministry Headquarters.

3. The capturers
   - The flies have to be captured. The best way to do this is to use people, who fulfil two roles at the same time:
     * They are the bait - they expose part of their bodies (usually the lower legs) to the flies, which alight on them in preparation to biting them.
     * They are the capturers - they quickly catch the flies which alight on them, and put them into small bottles.

• The technique is not difficult to learn. The national medical entomologist of your country is able to do the training on request.
• Because the flies have to be captured at sites in isolated rural areas, the most suitable capturers are people from villages near the site. This becomes even more important because the capturing is spread over several months.
In the past people OCP employed people as capturers. Each country will now have to have to decide what it wants to do:

* **There is no way that the villagers can be asked to volunteer their services.** To collect the required minimum 8,000 flies at one site will take 2-4 days' work a month, for 6 months - to cover the time of maximum transmission, which is also a time of high agricultural activity. In many cases the sites are several kilometres away from the villages, as well. Experience with CDTI shows that this is too much to ask anyone to do for no pay.

* **The villagers will therefore have to be paid for the job.** It is probably best to pay the collectors upon completion of the job each year; however each country will have to decide how much to pay, what to pay and when. The money kind has to be budgeted for yearly, for each site to be surveyed.

**Where does one find such people?**

- During the past few years OCP has trained teams in your country to do the mass blackfly collections. You need to compile a list of such persons in your country: their names and contact details.

- In some districts there will be people who know how to do the work, but in others the staff will need training:
  - The training should be done by the people mentioned above, who already know how to do the job (like the national medical entomologist).
  - The training will have to be budgeted for.

**What do they need for their work?**

They need equipment and a budget:

- The **equipment** is simple:
  - Bottles with lids (smaller bottles are used for capturing, larger ones for storing and sending the flies).
  - 70% alcohol solution.
  - Paper, pencils and forms to record captures (see Section 3.3).
  - Packaging material.

- You have to work out a **budget** for their work at the beginning of each year. It is easy to calculate:
  - The yearly cost of sending the flies to Ouagadougou.
• To calculate capturers’ allowances (if any): work on 20 days per capturing site per year.

Where and when do we obtain the blackflies?

Where?

- In the same way that epidemiological surveillance covers each river basin in the country, entomological surveillance does as well. Through the years OCP has identified sites which give good results, and they have developed the following criteria for selecting these so-called ‘capture points’:
  - It must be situated in a zone where there is potentially a high risk of transmission of the infection.
  - It must be at an important and productive breeding site.
  - It must be easily accessible to those who will capture the flies, and those who will collect the captured flies from the capturers.
  - It must be accessible throughout the period of maximum transmission.
  - It should be near a sentinel village (or at least near an area of substantial human activity).

- For each country a set of capturing points has already been identified. These can continue to be used, unless there are good reasons to change.

We know that we always use the same villages for epidemiological studies, so that valid comparisons can be made between one year and the next. In the same way we use the same capture points for entomological surveillance, year after year.
When?

At what time of the year is the capturing done?

- The population of blackflies in an area varies greatly throughout the year. The danger of transmission of the infection is clearly greatest when the blackfly population is highest (normally during the rainy season, when the breeding conditions for the fly are optimal):
  - It makes sense to collect flies at regular intervals during the period of their highest population - that way we have the greatest chance of finding infected ones.
  - This ‘period of maximal transmission’ varies from country to country, but usually lasts about 6 months. Your national medical entomologist will tell you what this period is. Note that it may be different in different parts of the country.

- In practice this means that, at each ‘capture point’, flies have to be collected once a week or once a fortnight, throughout the 6 months’ period of maximal transmission, to make up a total of not less than 8,000 flies. *It is probably wise to provide each capturer with a list of dates on which capturing has to be done.*

How frequently is the capturing done?

- If the situation is stable (infectivity rate under 0.5 %): each site is examined *every three years*.

- If the situation shows increased levels of blackfly infection (infectivity rate over 0.5 %): the site is examined *yearly*.

It is important to note at this stage that the arrangements and structures or entomological surveillance may vary from country to country. The information and structures described in this section are meant to be used as guidelines only.
How do we get the flies from the capture point to Ouagadougou?

| At the capture site by the river | All the flies captured at one sitting are anaesthetised by pouring 70% alcohol into the bottle which contains them (the alcohol also preserves them for the long journey to Ouagadougou). A small piece of paper is also put into the bottle, with the following information written in pencil:
|   | - Name of capture point.
|   | - Code number of capture point (if known).
|   | - Name of river basin.
|   | - Number of flies in the bottle.
|   | - Date of the capture. |
| At the village | A separate bottle is used to store the flies caught in each day’s capture. At the end of the day the capturer takes it home, and enters the day’s catch on form ‘Annex 2’ (See Section 3.3).
|   | - The bottles of flies have to be kept at an agreed place, where they will be safe and cool, until the time of transmission is over, and the 8,000 or more flies are ready to be sent. One of the capturers takes the flies to the local health centre. |
| At the sub-district and district | The nurse in charge informs the district disease control officer that the flies have arrived. The bottles are carefully packed and transported to the district headquarters, and from there to the national onchocerciasis coordinator at national headquarters. |
| At Ministry Headquarters | The national onchocerciasis coordinator re-packs the bottles very carefully to avoid breakage in transit S/he uses commercial transport (road, air) to transport them to the Molecular Biology Laboratory in Ouagadougou. It will save money if a number of lots are sent together. |
| At Ouagadougou | The analysis is done and the results are sent back to the national coordinator. |
3.2 YOUR RESPONSIBILITIES IN ENTOMOLOGICAL SURVEILLANCE

You have an important colleague in this activity - your national medical entomologist. This person should in fact take full responsibility for entomological surveillance for onchocerciasis, and you cooperate with her/him in fulfilling this responsibility. Details of the work involved are given below.

Your primary responsibility is to interpret the results of the entomological surveillance, and to take the appropriate steps. This responsibility is dealt with fully in Section 5.2.

However as overall manager of onchocerciasis control you have to make sure that the national medical entomologist does the following:

1. S/he plans the surveillance.
2. S/he manages the surveillance.
3. S/he monitors the surveillance.

The surveillance should be planned like this:

- At the beginning of each year the surveillance for the year has to be planned in detail. This means you have to prepare a programme, which guides whoever is responsible for arranging the collection of blackflies at each site. Here is an example, for two river basins:

<table>
<thead>
<tr>
<th>River basin</th>
<th>Capturing point/nearest village</th>
<th>Nearest health centre</th>
<th>Health district</th>
<th>Proposed dates for surveillance</th>
<th>Year of previous surveillance</th>
</tr>
</thead>
</table>
To see an example of a yearly time frame for your entomological surveillance work, go to Section 6.1.

- There needs to be a budget for the entomological surveillance yearly.

To see an example of a budget for your entomological surveillance work, go to Section 6.2.

The surveillance should be managed like this:

- The actual collection of the blackflies must be arranged, for each site on the list for that year:
  - Each site has to be visited the month before the collection is due to start, so that the necessary arrangements can be made with the villager who will collect; with the health centre nurse who will support; and with the district manager who will supervise.
  - Here is a checklist of what needs to be arranged at each site:
    * The person/ persons in the village who is going to capture the flies must be appointed.
    * A detailed timetable for the collection is worked out with this person, to cover the entire collection period.
    * Enough equipment (bottles, alcohol, pencil and paper) must be left with this person.
    * The payment for the capturing must be arranged: how much, to whom, and when.
    * If a capturer needs training it must be given.
    * The place must be decided upon where the bottles with each day’s flies are going to be stored (at the capturer’s home, or at the local health centre).
    * The sending of the samples to the capital city must be arranged: who will do it, and how, and how frequently.

- These yearly arrangements should be controlled by your national medical entomologist. S/he may do the visits her/ himself, or s/he may delegate it to the person in charge of onchocerciasis control at regional level (provided that person has the necessary experience and know-how). You may have to arrange it yourself if the entomologist cannot.

- Regarding transport and materials, you need to make sure that all those involved have what they need to do the job:
• Transport has to be booked well in advance with the Health Department.

• The materials needed for surveillance are listed in Section 3.1. You will find that they are being stored somewhere (there may be one or more stores, depending on the size of your country). Make sure that the stores are being well run:
  * There must be a person who is responsible for the store.
  * There must be a stock register for the store.
  * Any movement of equipment or material in or out of the store must be recorded.
  * The store must be kept locked.

- The samples of flies have to be sent for examination, to the Molecular Biology Laboratory at Ouagadougou, in Burkina Faso. This can be done:
  • All together, at the end of the collecting season.
  • Bit by bit, as the collecting season progresses.
In either case the bottles have to be very carefully packed, and very good arrangements made for the sending (by road or by air). The form ‘Inventory of entomological material dispatched (see Section 3.3)’ has to accompany each batch that is sent.

- Regarding training, you are probably going to inherit a situation where there are a number of village capturers who already know how to do the job. If new ones are needed, the skill is very easy to learn; so new village capturers can quickly be taught when the first visit of the year is made to the village. No extra budgeting is needed for this.

  For more information about training, go to Section 6.3.

- You should already have a list (and a map) of the capturing points in your country. Every two years you should revise your list (and map) of capturing points where surveillance has to take place. It may happen that a site is no longer suitable, according to the criteria (see Section 3.1), and a new one has to be selected in its place.

- You include a short section on entomological surveillance in your annual report to the Ministry.
The surveillance should be monitored like this:

- The principal way in which we monitor the surveillance is by receiving the samples of blackflies from the teams, as they are sent in from the field. The ‘Capturer’s daily record sheet’ is scrutinised to make sure that enough flies have been captured at each site. In this way one can easily identify villages where there are problems with the capturing.

For examples of all the forms used in entomological surveillance, go to Section 3.3.

- Another way of monitoring the entomological surveillance is to supervise the villagers on site, during the course of the capturing season. This may be done by:
  - The medical entomologist (say once per season).
  - By the person responsible for onchocerciasis control to the district level (whenever s/he visits the health centre for routine supervision).
  - By the local health centre nurse (whenever s/he visits the village of the capturer).

Here is a checklist of what should be checked on such visits:

<table>
<thead>
<tr>
<th>At village level:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>* Is the capturer following the timetable?</td>
<td></td>
</tr>
<tr>
<td>* Are the flies being correctly stored?</td>
<td></td>
</tr>
<tr>
<td>* What problems does the capturer have? How can these be solved?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>At health centre/ sub-district level:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>* Is the nurse supervising the capturer regularly?</td>
<td></td>
</tr>
<tr>
<td>* Is the nurse satisfied with the capturer’s performance?</td>
<td></td>
</tr>
<tr>
<td>* Are the samples being properly stored and dispatched?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>At district level:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>* Is supervision of entomological surveillance included in routine, integrated supervision of the health centres?</td>
<td></td>
</tr>
<tr>
<td>* What problems has the district supervisor noted? How can these be solved?</td>
<td></td>
</tr>
<tr>
<td>* Are the samples being properly stored and dispatched?</td>
<td></td>
</tr>
</tbody>
</table>

The costs of transport for such supervision need to be budgeted for.
Since you are finally responsible for this activity, you need to meet regularly with your national medical entomologist, to make sure that the whole process is on track.
3.3 EXAMPLES OF ENTOMOLOGICAL SURVEILLANCE FORMS

Capturer’s daily record sheet

<table>
<thead>
<tr>
<th>Date of capture</th>
<th>No. of females caught</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Inventory to accompany entomological material

<table>
<thead>
<tr>
<th>Description</th>
<th>No. of samples</th>
<th>Observations</th>
</tr>
</thead>
</table>

Sender: ________________________________

Destination: __________________________

Copies to:
4.1 HOW THE CDTI PROGRAMME WORKS

The CDTI programme is not very complicated. However for it to work well:

- 100% of the villages in those areas have to participate.
- At least 65% of the inhabitants of each village have to take the treatment.
- The treatment has to be taken once (in some cases twice or three times) a year.

If these targets are not reached the onchocerciasis may come back.

Some history: how the CDTI programme was started up in communities

- The officer responsible for onchocerciasis in the district got a list of the villages where CDTI was needed. S/he then had to arrange with the national onchocerciasis coordinator for training courses to be conducted, for the nurses from all the health centres in the sub-districts which served those villages.

- Once the trained persons were in place they could move on to the villages. In the course of her/his training each nurse got a list of the villages and hamlets s/he was going to be responsible for. They then made two visits to each village:
  1. A first visit to explain the programme, and to request the cooperation of the villagers in ‘community directed treatment’. The approach was polite and respectful, realising that village authority structures are different in different societies. With the consent of the village authorities a village meeting was held where the programme was thoroughly explained. If the villagers agreed to participate, they were asked to select two distributors from among their members. An appointment was made for the next visit.
  2. At the second visit the distributors were trained, and in the process a dose of ivermectin was given to all eligible villagers.

If for some reason the village distributors stop working, the same two visits would have to be made again, to identify and train a new group.
The normal running of the CDTI programme

There are three levels of worker responsible for CDTI in the district:

<table>
<thead>
<tr>
<th>The district</th>
<th>At district headquarters</th>
<th>At the sub-district</th>
<th>At the village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>John Doe</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mary Smith</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bob Green</td>
</tr>
<tr>
<td>The officer responsible for onchocerciasis control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurses in the health centres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The village distributors</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Once the distributors are trained and in place, each has the following responsibilities:

1. *The village distributors (CDDs - community directed distributors)*
   - Fetch the ivermectin from the health centre a few weeks before it is going to be administered.
   - Inform the community when the date has come.
   - Perform the yearly census of the families.
   - Hand out the right amount of pills to everyone.
   - Follow up those who weren’t there.
   - Deal with side effects.
   - Fill in the report forms and take them to the health centre.
   - Order the right number of pills for the next time.

   To find out more about how to motivate CDDs, go to *Section 4.3*.

2. *The nurse at the health centre*
   - Undertakes all aspects of ordering the ivermectin (receiving village estimates, checking them, putting them together in an order).
   - Receives the reports from the villages for each distribution round, and puts them together in her/ his own yearly report to send to the district.
   - Visits each village near distribution time to check that all is well.
   - Visits villages which appear to have problems.
   - Supports and encourages the distributors.
• Where distributors have stopped work, motivates village anew and trains new distributors.

3. The district onchocerciasis officer
• Undertakes all aspects of ordering the ivermectin (receiving sub-district estimates, checking them, putting them together in an order for the next round).
• Receives the reports from the sub-districts for each distribution round, and puts them together in her/ his own report for that round, to send to the Ministry.
• Visits sub-districts for routine supervision of cdti, and especially those which appear (from poor coverage) to have problems,
• Supports and encourages the health centre staff.
• Helps with training of new health centre staff in the area; arranges logistics for village and health centre/ sub-district level training.

Once or twice a year?

• The way in which ivermectin is used in onchocerciasis control is determined by the predictions of a computer simulation of the infection, developed by OCP in Ouagadougou. It is this programme (called ONCHOSIM) that tells us that if we want to limit transmission of the infection with ivermectin, 65% of the population has to take the drug.

• However ONCHOSIM also tells us that in some cases the ivermectin has to be taken twice a year in some circumstances:

Once a year
Areas where the infection was never controlled with larviciding (to eliminate the blackflies) because the level of the infection was not so high. In such cases you want to give the ivermectin just before the time of maximum transmission in the year - normally the rainy season, when the blackfly population explodes.

Twice a year
Areas which were controlled with larviciding for many years, but which still have some of the infection remaining; or where the infection returns again, having been absent for a while (a so-called ‘recrudescence’ of the infection). Usually two rounds per year are needed, six months apart. In some very specific circumstances ONCHOSIM may instruct that three rounds per year are needed.
At what time of the year should the distribution take place?

- This is a very important question, and you need to make the decision very carefully. Ideally we would like the distribution to take place just before the rainy season (i.e. the time of maximum transmission of the infection by the blackflies). This is because the level of microfilariae in the skin decreases to zero immediately after taking the ivermectin, so transmission is cut down to the minimum.

- On the other hand we have to take into account the realities of village life. The vast majority of CDDs are subsistence farmers. For them the ideal time of distribution is in the interval between the harvest and the new planting season. This helps them in two ways:
  1. They do not lose time from their work in the fields - at planting time and harvest their time is economically valuable to them and their families.
  2. During the dry season most people are at home during the day, which makes the work easier for the CDDs. During seasons of planting and harvest many members of families in the village are not at home during the day. This means that the CDDs have to go around after hours, in the dark even. Some families even move home completely, to go and live nearer to their fields.

- The following is therefore suggested:

<table>
<thead>
<tr>
<th>For one distribution per year:</th>
<th>For two distributions per year:</th>
</tr>
</thead>
</table>
| • It should take place during the time between harvest and planting. | • One of them takes place between the harvest and planting.  
| | • The other takes place exactly six months later. |

The times of planting and harvest may be different for different parts of the country. You have to ask your colleagues at the district level to help you decide on the best times for each district.
4.2 YOUR RESPONSIBILITIES IN THE CDTI PROGRAMME

Your overall responsibility is to ensure that there is a coverage rate of at least 65% of the total population, in areas that should be under treatment with ivermectin.

As you are aware this is a very large job, involving hundreds of health workers and villages, and thousands (even millions) of doses of ivermectin yearly. You know how the programme works. As overall manager of the process you have to:

1. Plan the programme.
2. Manage the programme.
3. Monitor the programme.

You plan the programme like this:

- At the beginning of each year you have to plan the distributions for the year in detail. This means that you need to prepare a list with all the necessary details, that you can send to each region. Here is an example, for two health districts:

<table>
<thead>
<tr>
<th>Health district</th>
<th>Timing of distributions per year</th>
<th>Health centres doing CDTI</th>
<th>Number of villages doing CDTI</th>
<th>Approximate population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kétou</td>
<td>March</td>
<td>Adakplamé</td>
<td>8</td>
<td>6 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Idigny</td>
<td>6</td>
<td>5 000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illikinou</td>
<td>9</td>
<td>7 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kpankou</td>
<td>14</td>
<td>9 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Odométa</td>
<td>9</td>
<td>12 000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Okpométa</td>
<td>5</td>
<td>3 000</td>
</tr>
<tr>
<td>Nikki</td>
<td>March September</td>
<td>Biro</td>
<td>5</td>
<td>3 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gnanhoun</td>
<td>12</td>
<td>9 000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kassakpéré</td>
<td>7</td>
<td>7 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nikki Centre</td>
<td>5</td>
<td>4 000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ouénon</td>
<td>16</td>
<td>13 500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sérékalli</td>
<td>14</td>
<td>11 500</td>
</tr>
</tbody>
</table>
- In your country you may inherit a situation where there are some health districts with one distribution per year, and others with two or even three distributions per year.

To see an example of a yearly time frame for your CDTI work, go to Section 6.1.

- You need to **budget** for the CDTI programme yearly.

To see an example of a yearly budget for your CDTI work, go to Section 6.2.

- You have to supervise the **yearly ivermectin order** which is made to Merck for your country. The way in which this order is done varies from country to country:
  - It will usually be done as part of the routine ordering within the State system. The needs of the villages are passed on to the health centres, who pass them on to the districts etc. Your job is to work with the Central Medical Stores of your country, to ensure that:
    * The quantities are realistic (check them against the data you get from the district report forms).
    * The order is sufficient for all the yearly treatment rounds (if there are more than one in your country).
    * The order is made in good time. The drug has a limited shelf life, so it should only reach the country 2-3 months before the distributions start.
  
- It may be that in your country you inherit a situation where you do the ordering yourself, because the State system is not efficient. In such a case:
  * You receive the quantities from the regions/districts. You have to make sure that you have received all of them, and that the quantities are realistic.
  * Then you make the order through the Central Medical Stores, to the supplier (the Mectizan Donation Programme) in the United States.

- You also plan with the Central Medical Stores to take over the ordering as soon as possible.
You manage the programme like this:

- You need to arrange for a small amount of training yearly. You are probably going to inherit the following situation:
  - Most (if not all) villages already have trained distributors.
  - Most (if not all) health centres in those areas have nurses on them who know how to train community distributors.

Due to normal turnover and transfer there will however be a constant small need for new training, for both distributors and their trainers (the health centre nurses). Your budget will have to cover both the training of the health centre nurses at a central district venue, and the training of village distributors at their villages. The necessary training manuals for the two levels are available.

For more information about training, go to Section 6.3.

- Regarding information, education and communication (IEC), your task is to meet once or twice a year with the IEC division of the Ministry, to discuss the distribution of IEC messages through their network. The CDTI programme does a lot of its own IEC (through the village distributors), so you are likely to need them only if there is a new development, such as a recrudescence in a particular area. They can also help by including messages about onchocerciasis in routine education programmes, for instance in schools, so that correct information about the infection enters the common culture.

- You may need to work with non-governmental organisations which are helping (or want to help) with CDTI. They help in especially three ways:
  - They provide funding for the training and follow-up of village distributors (and sometimes insist on doing the training themselves).
  - They undertake to distribute the ivermectin that has been ordered.
  - They provide materials and expertise for information, education and communication about the infection.

Your job is to meet regularly with them, to ensure that they adhere to the requirements of the CDTI programme; to ensure that there is no duplication with the State programme; to ensure that they use the same information system as the districts when they report to you; and to
ensure that when they withdraw, the State system takes over those areas in good time.

- It is your job to handle reports from the districts on documented cases of side-effects with ivermectin (the districts are instructed to forward them all to you). You make copies and forward them directly to Merck in France, at the following address:

Dr Philippe Gaxotte
Laboratoires Merck Sharp and Dohme-Chibret
106, Avenue Jean Moulin
78170 La Celle Saint Cloud
France
Tel: **33-1-30-82-1037 ; Fax: **33-1-30-3087-0635

You will find that you rarely get such reports, and it is necessary to remind district level staff of the need to look out for side-effects. A copy of such a report is given in Section 4.6.

For more information about the side-effects of ivermectin, go to Section 4.4.

- Every two years you should revise your list of villages where CDTI has to take place. You forward copies of relevant sections of your master list to the health districts, where your deputy there will check them against the names on the current sub-district report forms, before returning them to you.

- You include a short section on CDTI in your annual report to the Ministry.

You monitor the programme like this:

- You receive and analyse reports on CDTI from the districts - they send these to you after every round of treatment (once or twice a year - or even three times). You use the information in them for the following:
  - Compiling annual statistics for the country.
  - Identifying districts where there are problems with the programme (low or decreasing coverage rates).

You will of course conduct enquiries in districts with coverage problems, in order to identify the causes of the problem, and to take remedial action.
During your routine *supervisory visits* to the districts, you include specific supervision activities to monitor the quality of the CDTI programme. The following is a suggested checklist for your visit (a minimum one, considering that you will probably have several other programmes to supervise as well):

- A discussion with the officer charged with onchocerciasis control at district level:
  
  * Check the latest sub-district report forms through with him - where are the villages that are not being covered, and why not?
  * Ask him about problems he is experiencing and discuss concrete steps to resolve them.
  * Most importantly, find out if he and his team are also supervising CDTI activities when they visit the health centres for integrated supervision.

- A visit to the medical stores, and a discussion with the officer in charge about the ordering and delivery of ivermectin for his district.

- A visit to one or two sub-districts which are experiencing problems, and a discussion with the staff charged with implementing CDTI there:
  
  * Focus on villages that are not being covered, the reasons why not, and possible solutions.
  * Discuss ivermectin supplies and village supervision.
  * Find out how often the district level staff come for supervision, and whether they do CDTI supervision then as well.

Naturally you have to budget annually for the expenses incurred in the supervisory visits.
4.3 MOTIVATING VILLAGE DISTRIBUTORS

Research has shown that the majority of CDDs are happy to do the job of distribution as volunteers. In some cases however their motivation is affected:

- When the villages are large and the homes are widely distributed, so that CDDs have to walk far and it takes a week or more to complete the distribution.
- When there is more than one distribution per year, so that distributors (who are mostly farmers) need to do the distribution during the planting season or the harvest.
- Where there are other programmes around which provide real incentives for their workers at the village level.

In such cases the CDDs’ motivation needs to be supported and sustained. The following are ways in which this can be done:

- Regular in-service training - bringing CDDs together once a year to share their experiences and to learn some more about their work.
- Regular support and supervision - the health centre nurse makes a point of visiting and encouraging the CDDs during routine visits. S/he also visits them during the distribution, to encourage and give advice.
- Gifts of T-shirts and caps - this identifies the CDDs within the community do, and also shows them that the work they do is appreciated.
- A national ‘Roll of honour’ - this is kept at Head Office, and contains the names of those who do voluntary work against river blindness. The CDDs know their name is written on that roll, and held in honour.
Help with transport - in some situations, for those who have to visit several isolated hamlets, encampments or farms within their communities. This may take the form of a bicycle (kept at the health centre, for all CDDs in that area to use), or petrol money so they can hire a motorcycle. Village organisations should always be asked to supply the money for this, but if they cannot (or will not) the health service may have to cough up.

Each country has to decide how to motivate its own CDDs. The decision has to be taken in the light of:

- The particular circumstances of each region.
- The kind of incentives that other programmes are offering.
- Budgetary constraints.
4.4 SIDE-EFFECTS OF IVERMECTIN

These are usually mild, and are mostly caused by the reaction of the body to millions of dead microfilariae - a sign therefore that the treatment has worked. Interestingly community members spontaneously have this perception too. In the vast majority of cases the side-effects appear within 24 hours of the ivermectin being given, and clear up spontaneously, without further treatment, within a day or two. The most common side-effects are:

**Itching**
- This can be very harsh but only lasts for a few days.
- It is considered severe *if it stops the person from working or sleeping.* It should then be treated with an antihistamine.

**Oedema**
- This is sometimes generalised but is usually localised in some part of the body - often the face, often like a nodule. It disappears a few days later.
- It is considered severe *if it interferes with normal movement of the affected part.* Aspirin should be given.

**Fever**
- This is usually mild and of short duration.
- It is considered severe *if it lasts longer than a day.* In that case the patient should be investigated further, and the real cause (e.g. malaria) should be treated.

**Pain**
- This can be located in any part on the body, may be localised in the swollen parts, may involve the joints, or take the form of a headache.
- If it is severe it should be treated with aspirin.

**Dizziness or syncope**
- This comes on fairly quickly after taking the ivermectin. The patient should be encouraged to rest, and to take extra fluids.
Diarrhoea

- This is a very rare complaint.
- If it is severe it should be treated with the usual rehydration solution.

All severe reactions must, if possible, be seen by a doctor or nurse at a health centre. There is a specific form that has to be completed in such a case. This form will be passed on to the manufacturers of Mectizan® for their records.

There are also positive ‘side-effects’ of the drug. Intestinal worms are purged; people sleep better (less itching); and there is often a feeling of increased wellbeing (perhaps due to fewer parasites and more sleep). As a result ivermectin has in some places developed a reputation as an enhancer of sexual performance!
4.5 EVALUATING CDTI

When we think of surveillance (epidemiological and entomological) we think in terms of the situation within river basins - what is happening to the parasite there?

For CDTI we have to think of coverage in health districts - what proportion of the population that should be getting ivermectin there is actually getting it?

**The magic figure is 65%**: a minimum of 65% of the total population in an area must get ivermectin yearly, if transmission of the parasite is to be kept down (by ‘total population’ we mean everybody, and not just those who qualify for getting ivermectin) If you have achieved that figure, you are succeeding in our task. Of course higher figures would be better - up to 85% is possible.

**Your information system for CDTI**

For the time being you are going to run a parallel information system for CDTI, outside the normal Department of Health information system. This information system is your responsibility. It works like this:

<table>
<thead>
<tr>
<th>At the village</th>
<th>The village distributors give out ivermectin 1-2 times a year. They do a census every time. A month after each distribution they give their recording booklets to the health centre nurse in the sub-district.</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the sub-district</td>
<td>The nurse at the health centre summarises the village data in a ‘Sub-district report for each round of ivermectin treatment’ (<em>Section 4.6</em>). This form should also contain the names and estimated total populations of villages that should be getting ivermectin, but for some reason did not get it. This is very important, otherwise one cannot calculate the coverage.</td>
</tr>
</tbody>
</table>

| S/he sends the completed form to your deputy at the district level - the person charged with onchocerciasis control there. |
### At the sub-district
- This district level person summarises the sub-district level data in a ‘District report for each round of ivermectin treatment’ *(Section 4.6).*
  - This form also must contain population details of non-compliant villages, for the same reason.
- S/he sends the completed form to you, for each round of treatment.

### At Ministry Headquarters
At national level, you use the district level forms to calculate the national coverage rate, using a ‘National report on a treatment round’ *(Section 4.6).*

### Making decisions with the data
- Once you receive the data from the districts you check it, to see that:
  - Data from non-compliant villages are included.
  - The calculations have been done correctly.
- You can now easily see in which districts the problems are:
  - Those where the percentage of the population covered is less than 65%
  - Those where coverage is deteriorating, compared to previous rounds.
Calculating national statistics

You now make your national report, for each round of treatment, by simply summarising the district data and calculating the percentages:

1. Firstly, and most importantly, you calculate the *percentage of the population covered*:

   \[
   \frac{\text{number of persons actually treated in all villages that should be on CDTI}}{\text{total population for all villages that should be on CDTI}} \times 100
   \]

2. Secondly, you can calculate the *percentage of villages covered*:

   \[
   \frac{\text{number of villages where CDTI actually took place}}{\text{total number of villages that should be on CDTI}} \times 100
   \]

3. Thirdly you can calculate the *total number of ivermectin tablets (3 mg) received, used, wasted and in still in stock*.

It may happen that in your country you have areas with different numbers of treatment rounds per year. Then you have the following options:

1. Reporting the ‘% coverage’ for each round separately. Of course in each of these calculations you will use as denominator ‘the total population that is supposed to get treatment for that round’.

2. If you want to have one annual figure for the country (e.g. for your report to the Ministry) you have to do the following:

<table>
<thead>
<tr>
<th>Round</th>
<th>Number of persons actually treated in all villages that should be on CDTI for that treatment round</th>
<th>Total population for all villages that should be on CDTI for that treatment round</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>a</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>b</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>c</td>
<td>C</td>
</tr>
</tbody>
</table>

Annual national coverage = \[
\frac{a+b+c}{A+B+C} \times 100
\]
The importance of the ‘village list’

For this evaluation to be meaningful, it is clearly essential for everyone in the programme to know which villages are to be included in CDTI, and how frequently.

- You inherit from OCP detailed lists of sub-districts, and the villages in them, that need to be treated. OCP also tells you for how long these villages must continue to be treated.
- The nurses in the health centres will have their lists of villages to be treated, that was decided upon at the time that they were trained. It is important to note that these lists have been found to be incomplete - it often happens that villages are left out by mistake. This question therefore has to be raised at every supervisory visit to the health centres.
- If there is a recrudescence in your country, you add the villages in the recrudescence areas to your list. The health centres in the area concerned get their new lists from you.
- It is important to realise that populations change and move - sometimes surprisingly quickly.

Your list needs to be updated constantly. You cannot go to every sub-district yourself, so you will have to ask your deputy at the regional or district level to do it for you, every 1-2 years. S/he will use the yearly sub-district report forms (see Section 4.6) for that purpose. At the same time s/he will check that the village lists at the sub-district level are up to date, and include every village that should be under CDTI.
Common problems experienced with CDTI

Why do we get low coverage rates? From its experience over the years, OCP has found the following common problems:

- Problems related to the supply of ivermectin:
  - No ivermectin arrived: the chain of ordering and/or delivery broke down, somewhere between the health centre and the Central Medical Stores.
  - Too little ivermectin arrived: the village distributors did the census wrong, or made a mistake in working out the total they needed.
  - The ivermectin arrived late.
- Choosing the wrong time of the year for treatment:
  - When people are ploughing or harvesting.
  - When people are migrating/moving.
- People who refuse to take the ivermectin.
- Distributors who have not been properly trained.
4.6 EXAMPLES OF CDTI REPORT FORMS

1. Example of a sub-district level stock register for ivermectin

**Kérou Health Centre**

*Ivermectin stock register*

<table>
<thead>
<tr>
<th>Date</th>
<th>tablets received</th>
<th>tablets issued</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>received from</td>
<td>issued to</td>
</tr>
<tr>
<td></td>
<td>delivery note number</td>
<td>receipt number</td>
</tr>
<tr>
<td></td>
<td>amount</td>
<td>amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>balance</td>
</tr>
</tbody>
</table>

---

63
2. Sub-district ivermectin order for each treatment round

NOTE:
- This is a home-made form, to use it there is no routine health service form that can be used for this purpose.
- The same form, slightly adapted, can be used for the district.

<table>
<thead>
<tr>
<th>IVERMECTIN ORDER FOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR</td>
</tr>
<tr>
<td>MONTH</td>
</tr>
<tr>
<td>Sub-district:</td>
</tr>
<tr>
<td>District:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quantity of ivermectin received the previous time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity distributed to villages</td>
</tr>
<tr>
<td>Quantity left in stock</td>
</tr>
</tbody>
</table>

To carry out our present activities we need ______ additional tablets.

Name of health centre nurse making order:

Signature:

Date:
3. Example of a receipt form for issuing ivermectin to a village

NOTE: This is a home-made form.

KÉROU HEALTH CENTRE

Receipt number:

Number of ivermectin tablets received:

Name of nurse issuing:

Signature of nurse issuing:

Name of receiver:

Address of receiver:

Signature of receiver:

Date:
4. Report on serious side effects due to ivermectin

- One report is written by the health centre nurses for every case of serious side effects that they see, or that the village distributors report to them.
- This form has to be forwarded to the district, then to Head Office, who will send the information to the manufacturers Merck in the USA.

NOTE: This form is handwritten.

REPORT ON SERIOUS SIDE-EFFECTS DUE TO IVERMECTIN

1. Information about the patient

Name: Age: Sex:
Name of home village:
Sub-district: District:
What was his/ her health like before?
good [ ] fair [ ] poor [ ]
Which other illnesses does s/he have?
Which other medicines has s/he been taking?

2. Information about the treatment with ivermectin

Date s/he took the ivermectin:
Patient’s height:
Number of tablets given:
Was this the first time s/he got ivermectin? yes [ ] no [ ]

3. Description of the side-effects

Date the side effects started:
Describe the side-effects:
Treatment given for the side-effects:

4. What happened to the patient

Did s/he go to hospital? yes [ ] no [ ]
If s/he did, what happened there?
 Did s/he die? yes [ ] no [ ]

Name of nurse making report:
Signature: Health Centre:
District: Date:
5. Village report form for each treatment round

NOTE:
This is normally compiled by the nurse at sub-district level. If the village distributors are literate they learn to produce this report themselves, thus saving the health centre nurse a lot of trouble.

**CDTI PROGRAMME:**
**VILLAGE REPORT FOR EACH ROUND OF TREATMENT**

**Year and month:**
**Village: District:**
**Sub-district/ Health centre:**
**Name(s) of village distributor(s):**
**Number of inhabitants:**

<table>
<thead>
<tr>
<th>Number of people treated:</th>
<th>Number of people not treated:</th>
</tr>
</thead>
<tbody>
<tr>
<td>with 1 tablet</td>
<td>children under 5 years</td>
</tr>
<tr>
<td>with 2 tablets</td>
<td>pregnant women</td>
</tr>
<tr>
<td>with 3 tablets</td>
<td>very sick</td>
</tr>
<tr>
<td>with 4 tablets</td>
<td>refusing</td>
</tr>
<tr>
<td>TOTAL TREATED</td>
<td>absent</td>
</tr>
<tr>
<td></td>
<td>TOTAL NOT TREATED</td>
</tr>
</tbody>
</table>

Ivermectin used:

- number of tablets left at start of round
- number of tablets given to village
- number of tablets used
- number of tablets lost/ spoilt
- number of remaining tablets

**Name of health centre nurse making report:**
**Signature:**
**Date:**
6. Sub-district report form for each treatment round

NOTE: In your country you may be given a slightly different form. It should contain the same information though.

SUB-DISTRICT REPORT FOR EACH ROUND OF IVERMECTIN TREATMENT

Year and month of treatment round:
Sub-district: District:

<table>
<thead>
<tr>
<th>Name of village</th>
<th>population counted</th>
<th>population treated</th>
<th>coverage: % of population treated</th>
<th>quantity of ivermectin received</th>
<th>quantity of ivermectin used</th>
<th>quantity of ivermectin lost/ spoilt</th>
<th>quantity of ivermectin left</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

NOTE: If a village did not participate in the programme, fill in its name and population, and as many of the other spaces as you can.

Name of health centre nurse making report:
Signature: Date:
7. District CDTI report form for each treatment round

NOTE: In your country you may be given a slightly different form. It should contain the same information though.

CDTI PROGRAMME: DISTRICT REPORT FOR EACH ROUND OF IVERMECTIN TREATMENT

Month and year of treatment round:
District: Region:

<table>
<thead>
<tr>
<th>sub-district</th>
<th>total no. of villages that should be on CDTI</th>
<th>no. of villages where CDTI actually took place</th>
<th>% of villages where CDTI took place</th>
<th>for all villages that should be on CDTI (those treated and those not treated):</th>
<th>quantity of ivermectin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>total pop.</td>
<td>pop. treated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Name of district officer making report:
Signature:
Date:
8. National CDTI report form for each treatment round

**NOTE:** In your country you may be given a slightly different form. It should contain the same information though.

CDTI PROGRAMME: NATIONAL REPORT FOR EACH ROUND OF IVERMECTIN TREATMENT

Month and year of treatment round:

<table>
<thead>
<tr>
<th>Health district</th>
<th>total number of villages that should be on CDTI</th>
<th>number of villages where CDTI actually took place</th>
<th>% of villages where CDTI took place</th>
<th>for all villages that should be on CDTI (those treated and those not treated):</th>
<th>quantity of ivermectin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>total population</td>
<td>population treated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Name of district officer making report:

Signature:

Date:
5.1 ENTERING AND ANALYSING SURVEILLANCE DATA

- Once the yearly epidemiological surveillance has been done, the information that has been collected in the sentinel villages has to be analysed. This means we have to work with it, so that will give us the statistics we need to answer questions and make decisions:
  - Is the infection under control?
  - If it is not under control, what needs to be done, and where?

- Within your office you will find a computer that was installed with the help of OCP:
  - This computer contains the necessary software (a computer programme) that you need, to analyse the information that is collected during the epidemiological surveillance.
  - There should also be in the office a person who has been trained to do this work (perhaps you yourself have undergone this training). There is a training manual available for this purpose. This person will enter the new surveillance information into your computer.

  For more information about training, go to Section 6.3.

- The computer contains all the information that has been collected during epidemiological surveillance in your country, since the start of the control programme. Every time you do epidemiological surveillance from now on, you add the new information to that which is already there. It will then provide you with the following information:
  - The prevalence of the infection in each of the villages where the survey has just been completed.
  - The CMFL (community microfilarial load) in each of these villages.
  - The prevalence and CMFL for all the previous dates when epidemiological surveillance was done in these villages.
  - Finally, the incidence of the infection in each of the villages (i.e. the rate of new infections). If the incidence is more than 1.0% per year, it means there is a recrudescence of the infection.
The computer presents this information for you:

- on a map (showing exactly where each village is situated)
- and in the form of a graph (showing how prevalence and CMFL have changed over the years).

**Your responsibilities are:**

- To check that the information is entered into the computer *correctly*.
- To *read and note* the results of the analysis, and to take the necessary action (see *Section 5.2*).
5.2 ACTING ON THE FINDINGS OF SURVEILLANCE DATA

‘Unsatisfactory residual situations’ and ‘recrudescence’

It is important to understand the difference between these two concepts:

- At the end of 2002 there will be some areas where the infection is still present, and where the danger of transmission is still real - an unsatisfactory residual situation. These places needed to be carefully monitored, and CDTI has to continue in them for the time being.
- Other areas will appear free of the infection by the end of 2002, but a few years later the surveillance shows that transmission has started up again. This is a recrudescence. CDTI has to start up in them again.

**Formal definition of ‘recrudescence’**

- The presence of new infections in the residents since the cessation of larviciding, at an incidence rate* of 1.0-1.5%, determined at a survey interval of 3 to 4 years.

**Definition of ‘new infections’**

- Infections in children born after the control programme began.
- Infections in adults, previously found to be negative on two consecutive surveys separated by at least two years.

* This calculation is automatically made for you if you process your surveillance data using the software that OCP has provided (see Section 5.1).
Continuing with CDTI

- At the final handing over of responsibility for onchocerciasis control (in December 2002) there will be an agreement between OCP and each country about the capturing points and sentinel villages that are going to be used, for entomological and epidemiological surveillance respectively.

- At the same time there will be an agreement between OCP and each country, about the areas where CDTI has to take place, and for how long. The villages in these areas were included because they satisfied one or more of the following CDTI inclusion criteria:
  - CMFL equal to, or more than, 5 mf/s.
  - Nodular rate of 20% in 50 ‘stable’ males of the village (‘stable’ meaning those who have been living there more or less full time for twenty years).
  - Prevalence of microfilariae in skin snips (or on DEC patch testing) of 40% or more.

- Each country then continues with surveillance and CDTI. However as time goes by changes will need to be made with regard to CDTI - some areas may cease to need it, and others may start needing it. The flowchart on the following page will guide you to make these decisions.
Making decisions about onchocerciasis control

An area with CDTI

Do yearly entomological and epidemiological surveillance of each basin:
- Yearly in each basin, but three yearly at each site.
- This is done to follow what is happening, while the CDTI continues unchanged

Re-assess CDTI at date indicated:
- Date set by OCP in 2003 OR
- 15 years after a recrudescence.

\[\text{Poor results:}\]
- Prevalence increasing.
- Incidence rate 1.0% or more.
- Infectivity rate 1.0% or more.

Continue CDTI for 15 years.

\[\text{Good results:}\]
- Prevalence decreasing.
- Incidence rate under 1.0%.
- Infectivity rate under 0.5%.

Stop CDTI.

from next page... to next page...
An area with no CDTI

- Do yearly entomological and epidemiological surveillance of each basin:
  - Do both exercises yearly in each basin, but 3 yearly at specific villages/capturing sites.
  - But if infectivity rate is between 0.5 and 1.0%, do entomological surveillance at that site *yearly* until it is ‘normal’ again.

<table>
<thead>
<tr>
<th>Entomological result:</th>
<th>Epidemiological result:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal infectivity rate</td>
<td>Abnormal infectivity rate</td>
</tr>
<tr>
<td>&lt;0.5%</td>
<td>≥0.5%, &lt;1.0%</td>
</tr>
</tbody>
</table>

- Detailed concentric epidemiological investigation/mapping of the area (this activity is described below).

- Poor results in some villages:
  - Prevalence increasing.
  - Incidence ≥1.0%.

- Good epidemiological result in all villages:
  - No villages with poor results.
  - So no CDTI needed.
Detailed concentric epidemiological investigation/ mapping of the area being investigated

This kind of investigation is done if surveillance results show that there is a danger of renewed transmission of onchocerciasis in an area:

- **Entomological** results from a capturing point: infectivity rate 1.0% or more.
- **Epidemiological** results from a sentinel village: incidence of 1.0% or more.

Following on these results you have to do a **thorough epidemiological survey** of the area:

- You may use the ‘skin snip’ or ‘patch test’ methods.
- You start by investigating the first line or ring of villages around the point where the bad result was found. If all of those have a good result (low prevalence, CMFL under 5 mf/s OR patch test grading 0-1) you need go no further.
- If any of these villages have a bad result, you continue investigating the first line or ring of villages around that one.
- You continue in this way until all the villages in the new ‘first line’ have good results.
- The following villages are then **started on CDTI for 15 years**:

1. All those with ‘bad’ results:
   - A CMFL of 5 mf/s or more.
   - A prevalence of 40% or more.
2. Those with ‘good’ results, situated in the midst of those with ‘bad’ ones.
3. The first line of ‘healthy’ villages – i.e. those which do not meet the above criteria.
Help with these decisions

The decision to start CDTI (and therefore control) in new areas, or to stop it in existing ones, is as difficult as it is important. You are therefore advised to consult colleagues and experts when making these decisions. In particular, the staff at the planned ‘Sub-Regional Centre for Multi-Disease Surveillance and Control’ will be able to help. This Centre is based in Ouagadougou in Burkina Faso, as from the end of 2002.
### 6.1 A SUGGESTED YEARLY TIMETABLE

Here is an example of a timetable that you as manager can use to guide your year’s work in onchocerciasis control:

<table>
<thead>
<tr>
<th>epidemiological surveillance</th>
<th>J</th>
<th>F</th>
<th>M</th>
<th>A</th>
<th>M</th>
<th>J</th>
<th>J</th>
<th>A</th>
<th>S</th>
<th>O</th>
<th>N</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>• make programme for next year</td>
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<td></td>
<td></td>
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<td></td>
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<td>*</td>
</tr>
<tr>
<td>• appoint and inform teams</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>• check transport, equipment, materials</td>
<td></td>
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<tr>
<td>• select sentinel villages for the year after next</td>
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<td>*</td>
</tr>
<tr>
<td>• warn districts not to give sentinel villages ivermectin next year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>*</td>
</tr>
<tr>
<td>• receive and analyse reports</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>• revise list of sentinel villages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>entomological surveillance</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>• meet national medical entomologist</td>
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<tr>
<td>• select capture sites for next year</td>
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</tr>
</tbody>
</table>
| • visit sites at start of collecting season       |   |   |   |   |   |   |   |   |   |   |   | * *
| • receive final samples                          |   |   |   |   |   |   |   |   |   |   |   | * *
<p>| • send samples to Molecular Biol. Lab.            |   |   |   |   |   |   |   |   |   |   |   | * |
| • revise list of capture points                  |   |   |   |   |   |   |   |   |   |   |   | * |</p>
<table>
<thead>
<tr>
<th>CDTI</th>
<th>J</th>
<th>F</th>
<th>M</th>
<th>A</th>
<th>M</th>
<th>J</th>
<th>A</th>
<th>S</th>
<th>O</th>
<th>N</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>make detailed plan for next year’s CDTI distributions</td>
<td></td>
<td>*</td>
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<tr>
<td>quarterly meeting with NGOs</td>
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<tr>
<td>prepare/ check ivermectin order</td>
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<tr>
<td>meet the national IEC coordinator to plan for the next year</td>
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<tr>
<td>analyse district CDTI reports, take appropriate action</td>
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</tr>
</tbody>
</table>

using surveillance data

| interpret surveillance data to identify recrudescence (if any)      |   | * | * |   |   |   |   |   |   |   |   |
| plan intensive epidemiological surveillance (if needed)             |   | * | * |   |   |   |   |   |   |   |   |
| interpret surveillance data to adapt CDTI (decide to stop/continue)|   |   |   | * |   |   |   |   |   |   |   |

Other

| make annual report                                                  |   |   |   |   |   |   |   |   |   | * |   |
| prepare budget for next year                                       |   |   |   |   |   |   |   |   | * |   |   |
| plan for the year’s training                                       |   |   |   |   |   |   |   | * |   |   |   |
| conduct training                                                   |   |   |   |   |   |   |   |   | * |   |   |
| conduct supervisory visits to regions                              |   | * | * | * | * | * |   |   |   |   |   |

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6.2 BUDGETING FOR ONCHOCERCIASIS CONTROL

Of course the exact needs of the programme will be different in each country. However your yearly budget will look something like this:

<table>
<thead>
<tr>
<th>Budget for onchocerciasis control for 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. CDTI</strong></td>
</tr>
<tr>
<td>1.1 Training of nurses/district level staff</td>
</tr>
<tr>
<td>• transport/ fuel</td>
</tr>
<tr>
<td>• materials</td>
</tr>
<tr>
<td>• per diems</td>
</tr>
<tr>
<td>1.2 training/ refresher of CDDs</td>
</tr>
<tr>
<td>• transport/ fuel</td>
</tr>
<tr>
<td>• per diems</td>
</tr>
<tr>
<td>1.3 supervision of CDDs</td>
</tr>
<tr>
<td>1.4 supervision of nurses</td>
</tr>
<tr>
<td>1.5 motivation of CDDs</td>
</tr>
<tr>
<td><strong>2. Epidemiological surveillance</strong></td>
</tr>
<tr>
<td>2.1 Field trips (surveillance and supervision)</td>
</tr>
<tr>
<td>• transport/ fuel</td>
</tr>
<tr>
<td>• per diems</td>
</tr>
<tr>
<td>2.2 training</td>
</tr>
<tr>
<td>• transport/ fuel</td>
</tr>
<tr>
<td>• materials</td>
</tr>
<tr>
<td>• per diems</td>
</tr>
<tr>
<td>2.3 materials</td>
</tr>
<tr>
<td>2.4 equipment</td>
</tr>
<tr>
<td><strong>3. Entomological surveillance</strong></td>
</tr>
<tr>
<td>3.1 materials</td>
</tr>
<tr>
<td>3.2 payments for village collectors</td>
</tr>
<tr>
<td>3.3 visits to supervise and collect :</td>
</tr>
<tr>
<td>• transport/ fuel</td>
</tr>
<tr>
<td>• per diems</td>
</tr>
<tr>
<td>3.4 dispatching samples to the Molecular Biology Lab.</td>
</tr>
<tr>
<td><strong>4. Miscellaneous items</strong></td>
</tr>
<tr>
<td>4.1 Office materials and stationery</td>
</tr>
<tr>
<td>4.2 IEC materials and activities</td>
</tr>
<tr>
<td>4.3 Symposia and workshops</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
</tr>
</tbody>
</table>
Here are the details of such a budget:

1. **For CDTI**

<table>
<thead>
<tr>
<th>Budget item</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| training/ refresher training of nurses and district level staff | DETAILS:  
  * training materials  
  * transport/ fuel  
  * per diems  
  • In each region there are regular transfers of staff, which means that new nurses, without training in CDTI, are appointed at the health centres.  
  • In addition there are nurses who were trained long ago, and who need refresher training. The district level staff (who are responsible for supervising onchocerciasis control) also change.  
  • *You have to budget for one yearly training event per region*, to cater for these people. |
| training/ refresher training of CDDs | DETAILS:  
  * training materials  
  * transport/ fuel  
  * per diems  
  • Although the turnover of CDDs is low, yearly refresher training is a powerful motivator (especially if done at a central place).  
  • If your country decides to do this, *you need to budget for each health centre to run a yearly refresher course for its CDDs.* |
| supervision of CDDs                | DETAILS:  
  * transport/ fuel  
  • Each cycle of delivery requires 3 visits to villages:  
    • for delivering ivermectin;  
    • for checking delivery while it is in progress;  
    • for collecting reports.  
  • Health centre nurses can use other visits to villages (e.g. for EPI) to supervise CDTI, but experience has shown that they need to make at least one special CDTI visit per distribution to... |
| supervision of nurses in the health centres | DETAILS:  
- transport/ fuel  
- It is agreed that the supervision of CDTI will be integrated into the normal supervision that district level staff do, when they visit the health centres. Experience has shown however that one or more special visits per year are needed for CDTI - for instance to deliver the ivermectin, or to collect reports, or to follow up problems.  
- You need to budget for fuel for these visits. |
| motivation of CDDs | DETAILS:  
- training, visits,  
- transport/ fuel,  
- gifts etc.  
- It depends on what your country decides to do to motivate the CDDs. Whether it is training, or bicycles, or T-shirts, it will cost some money.  
- You need to budget for the cost of the motivation activity you decide to use. |

For more information about motivating CDDs, go to Section 4.3.

2. For epidemiological surveillance

<table>
<thead>
<tr>
<th>Budget item</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| field trips for surveillance | DETAILS:  
- transport/ fuel  
- per diems  
- When you plan the surveillance you work out exactly which villages you are going to survey that year.  
- To calculate the distances to be travelled (for the petrol): consult past records, or an up-to-date map of the country.  
- To calculate per diem allowances: work on three |
| Field trips for supervision | DETAILS:  
* transport/ fuel  
* per diems  
* The field teams may need to be supervised, especially if they are inexperienced.  
* If you think they need to this, you have to work out when and for how long, and then **you need to budget for the fuel and per diems for these trips**. |
| --- | --- |
| Training | DETAILS:  
* transport/ fuel  
* materials  
* per diems  
* There are numbers of persons in your country who have been trained for epidemiological surveillance. However it may happen that you run short, or that you feel in-service training is needed.  
* If you decide that training is needed, **you need to budget for one or more yearly training events for your country**. |
| Materials | DETAILS:  
* For both methods: ‘skin snip’ and ‘patch test’.  
* The materials needed are given in **Section 2.3**. New supplies may be needed.  
* **You need to budget for the cost of the materials that will be used**. |
| Equipment | DETAILS:  
* For both methods: ‘skin snip’ and ‘patch test’.  
* The equipment needed is given in **Section 2.3**. If some of it is old or broken you may need to replace it.  
* **You need to budget for the cost of whatever you decide to replace**. |
3. *For entomological surveillance*

<table>
<thead>
<tr>
<th>Budget item</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| wages for capturers                  | DETAILS:                                                                läss paid upon successful completion  
• You know how many sites you are going to survey that year.  
• You know how many capturers there are going to be per site.  
• You need to budget for the wages for each capturer. |
| field trips to supervise, train, collect | DETAILS:  
• transport/ fuel  
• per diems  
• When you plan the surveillance you work out exactly which breeding sites you are going to survey that year. Each will require a number of visits: to set the capturers to work; to follow them up and collect what they have collected to date; to do the final collection and payment.  
• To calculate the distances to be travelled (for the petrol): consult past records, or an up-to-date map of the country.  
• To calculate per diem allowances: work on five sites being covered per week (depending on their size, and distance from each other).  
• You need to budget for the fuel and per diems for these trips. |
| dispatching samples                  | DETAILS:  
• materials  
• postage/freight  
• You are going to use wrapping materials, and money to pay for the postage or freight for the samples when you send them to Ouagadougou.  
• You need to budget for packing materials and postage. |
4. **Miscellaneous items**

This may include the following:

<table>
<thead>
<tr>
<th>Budget item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>office services and stationery</td>
<td>▪ You will need the usual stationery and services (photocopying, postage etc.).</td>
</tr>
<tr>
<td></td>
<td>▪ <strong>Budget for what you need.</strong></td>
</tr>
<tr>
<td>IEC materials and activities</td>
<td>▪ You may decide that you need to print and distribute IEC materials for a particular group in the country.</td>
</tr>
<tr>
<td></td>
<td>▪ <strong>Budget for what you plan to do.</strong></td>
</tr>
<tr>
<td>symposia and workshops</td>
<td>▪ You may want to get regional or district staff together to plan and evaluate.</td>
</tr>
<tr>
<td></td>
<td>▪ <strong>Budget for what you plan to do</strong> (transport/ fuel and per diems).</td>
</tr>
</tbody>
</table>

**Help with funding from NGOs and bilateral programmes**

At present NGOs and other funders are helping to pay for onchocerciasis control activities, especially CDTI and IEC, in many countries. Examples are Helen Keller International (HKI), the Christoffel-Blindenmission (CBM) and Sight Savers (SS). The budget may be presented to potential funders, to discuss activities for which they would like to provide funds.
6.3 NOTES ABOUT TRAINING

A few important points about training

- **Two things** are needed for a job to be done properly:
  1. The persons doing the job must have the *skills* to do it properly.
  2. They also need *resources*, such as transport, equipment and materials.

  It is a common mistake to think that everything will be fine as long as people have been trained, while neglecting to supply the necessary resources for the job.

- During training those who are learning need to learn **two things**:
  1. They need to learn the *skills* they need for the job.
  2. They need to learn some *facts or knowledge*, so that they can understand why they need to apply the skills.

  It is a common mistake to teach only the knowledge, and to hope that the skills will somehow follow.

- To learn a skill properly **two steps** are needed:
  1. **Demonstration** - someone who already has the skill does it, for all to see.
  2. **Practising** the skill, under supervision, with feedback, so that the learner can learn from his mistakes and so improve.

  It is a common mistake to think that people will learn to perform a skill, if I talk to them about it for long enough.
Training materials

A number of training manuals have been written, and are available for you to use. If you do not have them you can ask the Sub-Regional Centre for Multi-Disease Surveillance and Control (in Ouagadougou, Burkina Faso) to send them.

<table>
<thead>
<tr>
<th>Subject of manual</th>
<th>Target group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Directed Treatment with Ivermectin</td>
<td>village level distributors</td>
</tr>
<tr>
<td>Community Directed Treatment with Ivermectin</td>
<td>health professionals at district level - trainers of village level distributors</td>
</tr>
<tr>
<td>Epidemiological surveillance of a village (DEC patch method)</td>
<td>health professionals at district level</td>
</tr>
<tr>
<td>Epidemiological surveillance of a village (skin snip method)</td>
<td>health professionals at district level</td>
</tr>
<tr>
<td>Entomological surveillance for national onchocerciasis</td>
<td>health professionals at district and national level</td>
</tr>
<tr>
<td>programmes</td>
<td></td>
</tr>
<tr>
<td>Processing field data</td>
<td>health information workers at national level</td>
</tr>
</tbody>
</table>