Trachoma control

A guide for programme managers

World Health Organization

LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE

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Includes 30 slides on the assessment of trachoma and a CD-ROM which contains electronic versions of forms, an antibiotic requirement estimator, a template budget and a generic evaluation manual.

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Preface

Trachoma is an infectious eye disease that causes blindness; it is prevalent in many poor rural communities. The World Health Organization has set the year 2020 as the target for global elimination of trachoma as a public health problem. To reach this target, the SAFE strategy (Surgery for trichiasis, Antibiotics to treat *Chlamydia trachomatis* infection, and Facial cleanliness and Environmental improvement to reduce transmission of *C. trachomatis* from one person to another) is recommended for districts and communities with endemic disease.

This guide has been written for managers of national and district trachoma control programmes. It sets out, step-by-step, what is needed to assess the magnitude and extent of the trachoma problem in the area and how to plan, implement, monitor and evaluate a programme to control, and ultimately eliminate, trachoma.

Throughout this guide, the term 'community' is used to refer to the minimum number of persons for whom mass trachoma control is to be implemented (for example, a defined group of households, one village or a group of neighbouring villages). The term 'district' is defined as the usual administrative unit for health care management, and the term 'region' is used to indicate the administrative unit one level higher than the district. These definitions and definitions of other terms used are found in the glossary.

Templates for a number of forms recommended for use in a programme can be found in the annex. To allow adaptation of the forms for use in a specific programme, electronic versions are available on the CD-ROM that accompanies this guide. The CD-ROM also contains an antibiotic requirement estimator (section 3.2.4), a template budget (section 4.5) and a generic evaluation manual (section 5.3).

We hope you find these materials useful.

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1. Background

Trachoma is a major cause of blindness. It affects very poor people living in rural areas, where access to water and sanitation is limited. It is caused by a bacterium called *Chlamydia trachomatis*, which is passed from the eyes of one person to those of another by flies, fingers or shared cloths or towels. Repeated infection with these bacteria over many years produces scarring of the inner part of the upper eyelid, which turns the lashes inwards so that they scratch the eyeball. Eyelid scarring also causes poor tear secretion and drying of the eye. These conditions increase the risk of corneal ulceration and scarring. Scarring of the cornea impairs vision.

C. trachomatis infections of the eye are commonest in young children. They are associated with a group of clinical signs known as 'active trachoma'. The condition in which the eyelashes are turned inwards is called 'trichiasis'. A person's risk of trichiasis probably increases in relation to the total number, duration and intensity of *C. trachomatis* infections during his or her lifetime. As a result, trichiasis tends to occur more commonly in women, because they tend to spend more time than men do with children, who are most frequently infected. It also becomes more and more common with increasing age. Implementation of trachoma control activities is prioritized in communities where the prevalence of active trachoma in children aged 1–9 years is 10% or higher or where the prevalence of trichiasis in people aged 15 years and over is 1% or higher. Places in which trachoma is known to be endemic are shown in Figure 1. Within many of these areas, however, the distribution of trachoma is focal, affecting certain communities, and within these communities only some households. In some areas, trachoma is a problem in nearly all rural communities.

Blindness due to trachoma is irreversible once it has occurred, but it can be prevented. The SAFE strategy (Surgery for trichiasis, Antibiotics to treat *C. trachomatis* infection, and Facial cleanliness and Environmental improvement to reduce transmission of *C. trachomatis* from one person to another) is recommended for the control of trachoma. With the SAFE strategy, the World Health Organization (WHO) and its partners are targeting the Global Elimination of Trachoma as a cause of blindness by the year 2020 (GET2020). GET2020 is one element of a broader strategy known as 'VISION 2020: The Right to Sight', which has as its goal the elimination of all avoidable blindness by the same year.

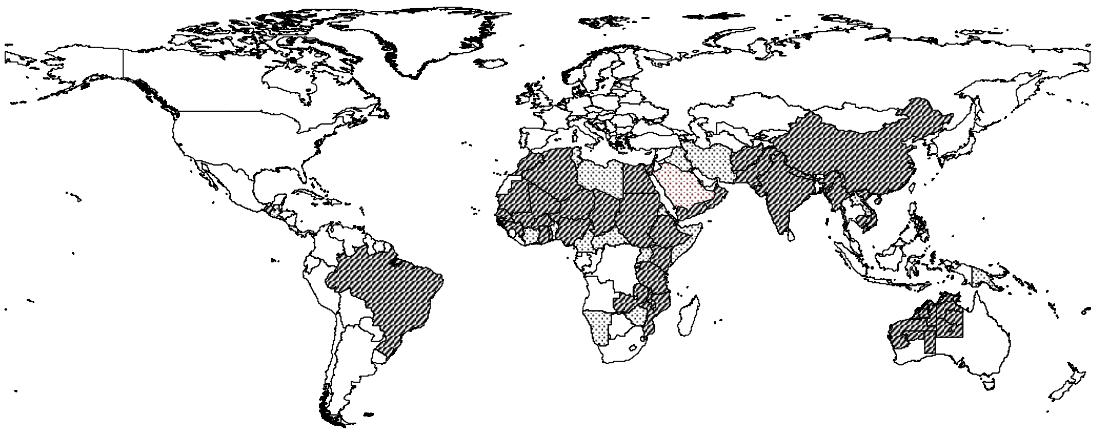


Figure 1. Global distribution of trachoma. Administrative areas in which trachoma is known to be a public health problem are shaded dark grey. Areas in which trachoma is believed to be a problem, but for which no data are available, are shaded light grey.

2. Assessment

People are examined for clinical signs of trachoma for one of two reasons:
(1) to determine whether they have trichiasis and therefore require surgery; or
(2) to measure the prevalence of clinical signs of trachoma.

The latter allows determination of whether trachoma is a public health problem, assists in selection of locations in which interventions are a priority and provides baseline or follow-up data for monitoring and evaluation of the control programme.

In this section, we explain how examinations and assessments are carried out. Even if you do not examine people for trachoma yourself, it is important to understand how it should be done and what your examiners are looking for. Pictures of a normal conjunctiva and the signs of the WHO simplified grading scheme are shown on the enclosed **trachoma grading card**; if you are unfamiliar with these signs, it is recommended that you examine the card as you read.

2.1 How to grade trachoma

2.1.1 Know the appearance of the normal eye

In a normal eye, none of the eyelashes touches the eyeball. The cornea is smooth and clear. The tarsal conjunctiva is pink, smooth, thin and transparent; there are normally large, deep-lying blood vessels that run vertically over its entire area.

2.1.2 Know the appearance of TT, CO and TF

The WHO simplified grading scheme [1] comprises five signs. For programme planning, monitoring and evaluation, three of these five signs are particularly important: trachomatous inflammation – follicular (TF), trachomatous trichiasis (TT), and corneal opacity (CO). The prevalence of TF in children aged 1–9 years is the key index for determining whether an area needs intervention with the A, F and E components of SAFE. The prevalence of TT determines the probable need for surgical services. The prevalence of CO is a (rough) measure of the burden of blindness and visual impairment due to trachoma.

At an individual level, the presence of TT means that that person needs surgery to reduce the risk that he or she will develop CO. The presence (and area) or absence of CO in a person who is about to have surgery for TT is important for determining how much the surgery will benefit that person; assessing CO at follow-up helps to determine how much benefit was obtained.

An eye can have more than one sign. When a person is examined, the presence or absence of TT is assessed first, then CO, then TF. The signs are therefore described below in that order.

Trachomatous trichiasis (TT)

TT is defined as “at least one eyelash rubs on the eyeball, or evidence of recent removal of in-turned eyelashes”.

Corneal opacity (CO)
CO is defined as “easily visible corneal opacity over the pupil, so dense that at least part of the pupil margin is blurred when viewed through the opacity”. Such opacities tend to cause significant visual impairment (visual acuity less than 6/18, or 0.3 vision).

Trachomatous inflammation – follicular (TF)
TF is defined as “the presence of five or more follicles at least 0.5 mm in diameter in the central part of the upper tarsal conjunctiva”.

Follicles are round swellings up to 3.0 mm in diameter. They are grey or creamy and are therefore paler than the surrounding conjunctiva. Peripheral follicles (lying outside the area enclosed by the dotted line in the picture of the normal tarsal conjunctiva on the **trachoma grading card**) and follicles smaller than 0.5 mm in diameter do not contribute to a diagnosis of TF, since they may be normal.

TF is one of two signs of ‘active trachoma’. The other sign in the WHO simplified grading scheme is trachomatous inflammation – intense (TI), which is defined as “pronounced inflammatory thickening of the upper tarsal conjunctiva obscuring more than half the normal deep tarsal vessels”. (A person is said to have active trachoma if he or she has TF and/or TI in either eye.) The clinical appearance of TI is similar to that produced by several other eye infections. TF is therefore the sign used in preference to TI for assessing the need for a trachoma control programme and in monitoring its results.

The final sign in the WHO simplified grading scheme is trachomatous conjunctival scarring (TS), which is defined as “the presence of easily visible scars in the tarsal conjunctiva”. TS is not useful for programme purposes, as no intervention is indicated by its presence.

2.1.3 Prepare the person who is to be examined
First, explain to the person who is to be examined, or their parent, the reason for the examination and what the examination will involve.

To examine an adult or an older child, you and the subject of the examination should sit or stand so that your heads are at approximately the same level. If the person is a lot shorter than you, you should sit while the subject stands. If you are both sitting, your chairs should be close enough that the subject’s knees nearly touch your chair; your knees will need to pass on either side of the subject’s.

To examine a young child, obtain the help of an assistant. This may be the child’s parent. When many children are to be examined, however, it is usually easier to have a dedicated assistant who understands your requirements and is skilled at handling children. Instruct your assistant that, if necessary, the child should be held very firmly: if the child is unable to move his or her head, arms or legs, the examination can be completed quickly and painlessly. The child should sit on the assistant’s lap facing you, with his or her back against the assistant’s front (Figure 2a). The assistant should hold the child’s head against his or her

chest with one hand and hold the child's body and arms with the other arm. If the child is uncooperative, his or her legs should be placed between the assistant's legs to prevent kicking. Alternatively, to prevent kicking, the child can be wrapped in a large cloth.

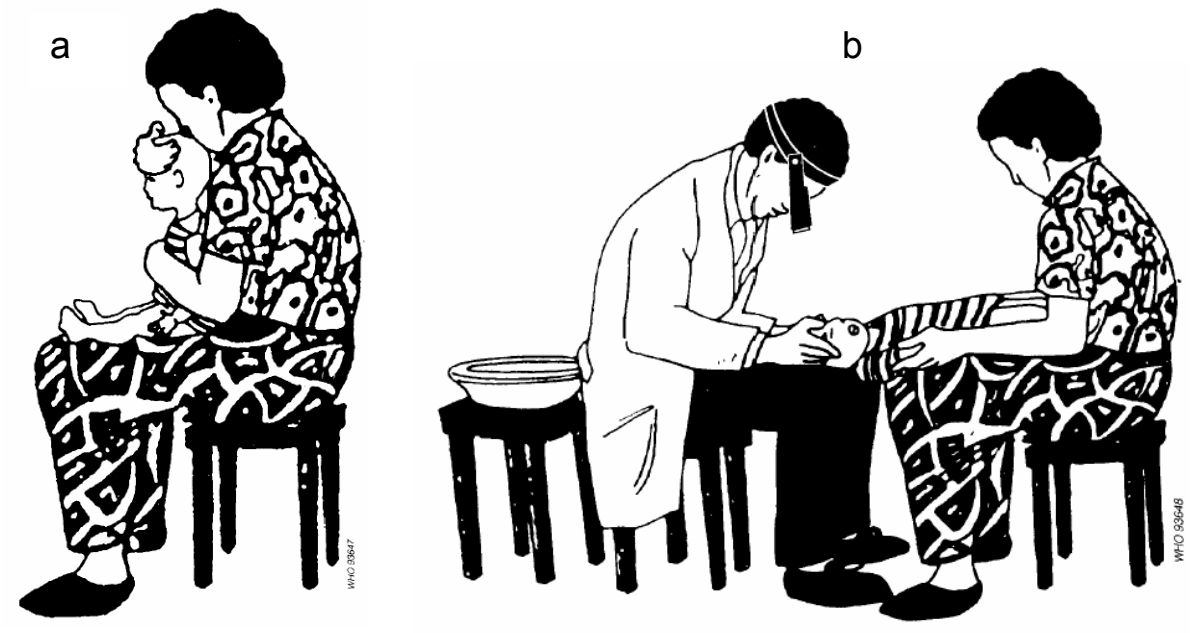


Figure 2. Two recommended ways for an assistant to hold children for examination. © World Health Organization. Reproduced with permission.

To examine an infant, lie him or her on the assistant's lap with the head towards you (Figure 2b). Steady the head between your knees. The infant's knees might need to be held by another helper. Alternatively, to prevent kicking, the infant can be wrapped in a large cloth.

2.1.4 Examine the eyes

Examine each eye separately, using binocular loupes (× 2.5 magnification) and adequate lighting (either daylight or a torch; daylight is preferable). Examine the right eye first, then the left eye. If you always do this, it helps to ensure that you do not forget in which eye you saw an abnormality.

Push the upper eyelid of the right eye slightly upwards to expose the lid margin, and look carefully to see if there is TT. Then look carefully at the cornea to see if there is CO. If either of these signs is present, visual acuity must also be measured. You should do this after you have finished examining both eyes.

The right upper eyelid is then turned over (everted). To do this, instruct the subject to look down and not to close his or her eyes. Use the thumb and first or second finger of your right hand to gently pull downwards on the subject's lashes, and place the little finger of your left hand (or a small, blunt, smooth tool, such as a matchstick) at the upper edge of the tarsal plate. Fold the lid backwards over the tool or your finger, and keep the lid everted by holding the

lashes against the orbital margin with your thumb. It can be difficult to evert the badly scarred, inflexible lids of some older patients. If you are unable to evert the lid, you should record that you were unable to assess that eye for TF.

Examine the central part of the tarsal conjunctiva and determine whether TF is present. Return the eyelid to its normal position. This completes the examination of the right eye.

Repeat this procedure for the left eye.

At the end of the examination, check the record to ensure that the findings have been correctly recorded. If the subject has conjunctival inflammation or eye discharge, wash your hands or change your gloves.

2.2 How to train people to grade trachoma

The number of trachoma graders a programme will need will depend on the number of people to be examined (see section 2.4), the size of the trachoma-endemic area, the number of vehicles available for surveys and the existing workload of the staff that are to be trained as survey graders.

People selected for training as survey graders should ideally be ophthalmic nurses or ophthalmic medical assistants. If this is not possible, general nurses or medical assistants should be trained. The trainers should be ophthalmologists or ophthalmic nurses with experience of trachoma grading in the community. If experienced people are not available nationally, WHO can provide the names of international experts who might be able to assist.

For persons with no previous experience in eye examination, a training programme of up to 5 days may be necessary. For persons with previous experience in eye examination, 2 days are usually adequate. Initial experience in training various levels of staff will indicate the necessary duration and content of subsequent training.

At the end of the training programme, trachoma graders should be able to:

- safely examine the eyes of adults, children and infants for TT, CO and TF;
- reliably recognize these three conditions;
- discuss the potential risk of an examiner's fingers transmitting eye infections from one person to the next and outline practical steps to prevent this; and
- recognize the clinical signs of other diseases designated as national priorities and describe how to refer or treat patients who have these conditions.

On the final day of the training programme, inter-observer agreement exercises should be conducted in a trachoma-endemic community to ensure that trainees can reliably grade trachoma in the field (see section 2.3).

Once training has been completed, each trainee should be asked to (anonymously) evaluate the training programme by completing a questionnaire.

Valuable information for improving the training protocol can be gathered in this way.

2.3 How to validate trachoma grading

At the end of the training period and before each survey [2], an inter-observer agreement exercise involving a reference ('gold standard') grader of proven accuracy should be conducted. Although such exercises are time-consuming and logistically difficult, they are the best way to maintain (and prove) the quality of assessments.

Inter-observer agreement exercises should be undertaken in a trachoma-endemic community. The reference grader should select 50 1–9-year-old children, at least 15 (but no more than 35) of whom should have TF. Each child should be given an identification number (between 01 and 50), which should be written on a card that the child shows to each examiner. Each of the 50 children should be seen independently by each of the examiners, who should determine whether the child has TF and should not discuss his or her opinion with any other examiner [2]. All examiners should record their findings on an **inter-observer agreement form** (Annex).

The reference grader should then compare the diagnoses of each candidate grader with their own. Agreement on the diagnosis of at least 45 of the 50 children is acceptable; candidate graders who do not achieve this score should be given formal re-training. Even if the agreement is acceptable, it is useful (as a learning exercise) for each candidate grader and reference grader to re-examine together any child for whom the candidate's diagnosis was incorrect.

Because the diagnoses of TT and CO are more straightforward, formal validation of diagnostic reliability for these signs is usually not undertaken.

2.4 How to determine the burden of disease

To plan services effectively, you need to estimate the probable need for those services. The need for services is predicted by the burden of disease.

For both logistical and epidemiological reasons, WHO recommends that the unit of implementation for trachoma control activities be the district. A district generally corresponds to an average population size of about 100 000. To facilitate planning, the burden of disease should therefore be estimated (in the first instance) at the district level.

2.4.1 Classify districts as likely or unlikely to be endemic for trachoma

You should first identify districts in which trachoma is likely to be endemic [3]. To do this, obtain information from previous surveys, written reports and hospital eye surgery records and by interviewing persons with local experience, such as regional or district eye coordinators and the staff of nongovernmental organizations. Use this information to classify each district as likely or unlikely to be endemic. Districts should be classified in this way by an ophthalmologist with experience in trachoma or by a trachoma expert.

2.4.2 Conduct a comprehensive assessment of trachoma

In districts classified as likely to be endemic for trachoma, the burden of disease must be determined. It is not practical to examine each person in the district, as this would take too long and be too expensive. Instead, a sample is selected and the trachoma status of each person in the sample determined. This is called a survey. The prevalence in the sample approximates the prevalence in the population if the sample is sufficiently large and has been selected appropriately to be representative of the population as a whole.

To conduct the survey, a sampling protocol must be designed. This should be done in consultation with an epidemiologist from the ministry of health. If no epidemiologist is available locally, WHO can provide the names of international experts who might be able to assist.

Sample size

The size of the sample is usually chosen to allow determination of the prevalence of TF in 1–9-year-old children with an acceptable degree of certainty. Children aged 1–9 years are used as the standard because the prevalence of TF is highest in this age group. The prevalence of TT is also measured, but, because the prevalence of this sign is generally less than 5% in most endemic areas, the certainty of the estimate will be much lower. In other words, the confidence interval for the estimated prevalence of TT will be much wider than that for TF. Very large surveys would be needed for accurate determination of the prevalence of TT.

The information necessary to determine the required sample size is:

a) the size of the population (i.e. the number of 1–9-year-old children in the district);*
b) the expected prevalence of TF in 1–9-year-old children (i.e. an estimate of the result of the survey);
c) the desired precision of the estimate (usually the expected prevalence ± 20%);
d) the required alpha risk (risk of the true prevalence being outside the confidence interval; usually 5%), expressed as the z score for the alpha risk: for an alpha risk of 5%, the z score is 1.96; and
e) the expected design effect (if you are not familiar with this term, use 4).

For example:

a) number of 1–9-year-old children in the district = 32 058
b) expected prevalence of TF = 0.20
c) absolute precision = 0.04 (20% of prevalence)
d) alpha risk expressed as z score = 1.96
e) design effect = 4

$$\text{Sample size required} = e \times \frac{d^2 \times b \times (1-b)}{c^2} = 4 \times \frac{(1.96)^2 \times 0.20 \times 0.80}{(0.04)^2} = 1537.$$

* If the number of 1–9-year-old children in the population is less than 5000, the sample size formula on this page may result in an overestimate of your required sample size. Consult an epidemiologist if you are planning such a survey.

Alternatively, once parameters a)–e) have been specified, the required sample size can be calculated with a statistical package such as Epi Info. An epidemiologist should be asked to help with this.

Divide the calculated sample size by the cluster size (usually 100–300 persons) to determine the required number of clusters. In this example, if the cluster size was 100 children, 16 clusters would be required.

Sample selection

Draw up a list of all communities in the district. Next to each community's name, record its population size, taken (if possible) from census data. Include a column showing the cumulative population size. Divide the total population by the required number of clusters to derive the sampling interval. Select the first cluster by multiplying the sampling interval by a random number between 0 and 1[*]. In the cumulative population column, trace the number that is the product of this multiplication; take the first cluster from the corresponding community. Select each subsequent cluster by adding the sampling interval to the previous number.

Example:

Village	Total population	No. of 1–9-year-old children	Cumulative no. of 1–9-year-old children
A	17 700	5664	5 664
B	2 400	768	(= 5664 + 768) 6 432
C	3 500	1120	(= 6432 + 1120) 7 552
D	4 300	1376	(= 7552 + 1376) 8 928
E	8 800	2816	(= 8928 + 2816) 11 744
F	2 200	704	and so on 12 448
G	13 300	4256	16 704
H	2 200	704	17 408
I	17 700	5664	23 072
J	27 900	8986	32 058

Total population (all ages) = 100 000; total 1–9-year-old children = 32 058

$$\text{Sampling interval} = \frac{\text{Total population}}{\text{Required number of clusters}} = \frac{32\,058}{16} = 2004.$$

As a starting point, 2004 is multiplied by a random number between 0 and 1. In this example, the random number obtained with Microsoft Excel is 0.327, so the starting point is 655.

First, a cluster is drawn from the village that includes 655. In this example, it would be village A. Next, the sampling interval is added to the starting point: 655 + 2004 = 2659. A cluster is chosen from the village that includes that number, which, in this case, would again be village A. This procedure is continued until the required number of clusters (in this example, 16) has been selected.

[*] To generate a random number between 0 and 1, open a blank Microsoft Excel spreadsheet and type "=RAND()" into any cell, then press enter.

Village	No. of 1–9-year-old children	Cumulative no. of 1–9-year-old children	No. of clusters selected
A	5664	5 664	3
B	768	6 432	0
C	1120	7 552	1
D	1376	8 928	1
E	2816	11 744	1
F	704	12 448	0
G	4256	16 704	3
H	704	17 408	0
I	5664	23 072	3
J	8986	32 058	4

With this method, more clusters are taken from larger villages than from smaller villages. This is because the method is designed to choose clusters with a probability proportionate to size.

Field work

The sampled clusters should be visited by an advance team, which should talk with community opinion leaders about trachoma and blindness, the services that the trachoma control programme wishes to provide and the need for and logistic requirements of the survey. The team should also ask that a list of the names of household heads be prepared and request the assistance of a few residents (selected by community leaders) to guide and if necessary translate for the survey team.

To undertake the examinations, the following personnel will be needed in each survey team:

- one validated trachoma grader;
- three field assistants (to enumerate household residents and record clinical findings); and
- one or more community residents to guide and, if necessary, translate.

Persons who have completed secondary school can be trained as field assistants in 2 days, 1 day of which should be spent in a classroom and 1 in the field.

In addition, you will need vehicles and drivers to transport the teams, as well as (later) data entry clerks and a data entry supervisor.

Each survey team will require:

- two binocular examination loupes (×2.5);
- a torch with spare batteries and a spare bulb;
- tetracycline eye ointment;
- referral forms (for people with conditions requiring hospital review);
- forms for comprehensive assessment of trachoma;
- a clipboard and pens for each data recorder; and
- a spray bottle containing alcohol to clean the examiner's hands after examining a person with conjunctivitis. Frequent use of alcohol dries the skin, so the examiner may prefer to use disposable latex gloves (if this is acceptable to the community) to examine each subject rather than spraying their hands with alcohol.

To maximize participation in the assessment, survey teams should go from house to house. In each cluster, select a household randomly from the list of households, and include in the survey all 1–9-year-old children and persons aged 15 years or more who are resident in the household. Continue random sampling until the required cluster size of 1–9-year-old children is obtained. If a list of households cannot be obtained, random sampling is not feasible, and households should be selected by a random walk. To do this, spin a bottle at a central point in the cluster to determine the direction in which the walk will start. Visit the first household, and list 1–9-year-old children and persons aged 15 years or more who are resident in the house. Then spin the bottle outside this house to choose the next house, and continue the procedure until the required cluster size (of 1-9 year-old children) has been reached.

Field assistants should go to each house in the sample and record the name, sex and date of birth of each individual living there. Demographic information and examination findings can be recorded for all residents of one household on a single sheet, or, if there are many residents, on several sheets) (**form for comprehensive assessment of trachoma**). When each examiner has many field assistants, the examiner only spends time examining, which is the most specialized task of the team. The purpose of the study and examination procedures should be explained before the examination and verbal consent for examination obtained.

All children aged 1–9 should be examined for TF and all persons aged 15 years or more for TT and CO.

In each household sampled, the field assistant should determine whether there is a latrine and ask how long it takes in the dry season to walk from the house to the place where water is collected. Enumerated persons who are not present at the time of the initial visit should be visited at two further scheduled times on the same day. People who refuse to participate or who are not available at any of the visits should be listed as ‘non-responders’.

The disadvantage of conducting a comprehensive assessment of trachoma is the large sample size required. It therefore takes a long time and is expensive. For this reason more rapid methods, such as the Trachoma Rapid Assessment (TRA), are sometimes used.

2.4.3 Understand the principles of Trachoma Rapid Assessment (TRA)

TRA is a method for rapid assessment of trachoma that has been endorsed by WHO [3]. It is a simple, fast, cheap way for setting priorities for trachoma control. Districts and communities in which trachoma is likely to be endemic are selected as described above (section 2.4.1), and the communities are visited. During the visit, persons who may have TT are identified by consultation with village informants. The total number of persons who have or who are suspected to have TT is divided by the total population of the village to obtain a crude estimate of the prevalence of TT in the community. In addition, the eyes of 50 1–9-year-old children are examined. These children are chosen from 20 households that appear to have the lowest socioeconomic status in the

community. The percentage of the 50 children who have active trachoma is then calculated.

The TRA protocol does not provide a good estimate of the prevalence of TT in a community, because persons suspected of having this condition (but not examined) are assumed to have it. The protocol is also specifically designed to overestimate the percentage of children with active trachoma. TRA indicates only whether trachoma is likely to be a problem in a given community and therefore whether further assessment and intervention are needed.

Information about the TRA is provided here to indicate why it cannot give prevalence data and therefore why a comprehensive assessment of trachoma (or some other population-based survey) is necessary.

3. Intervention

Before starting interventions against trachoma, it is important to plan (see section 4); however, a programme cannot be planned without understanding of the nature of the services that it will provide. This section gives information on how to implement the 'S', 'A', 'F' and 'E' components of the SAFE strategy.

3.1 How to provide surgical services for trichiasis ('S')

3.1.1 Choose a surgical technique and set guidelines for offering it

For treatment of TT, WHO recommends the bilamellar tarsal rotation procedure. Full details of this technique are provided in a separate WHO manual [4]. Other surgical techniques have been used for many years in some trachoma-endemic countries. Because re-training of surgeons is expensive and time-consuming, it is not recommended that established programmes change their technique, unless the incidences of surgical failure, complications or recurrence of TT are high. Areas (in any country) where new programmes are being set up should, however, use bilamellar tarsal rotation.

Following up unoperated patients is difficult, and TT becomes progressively more severe (and more likely to cause CO) with time. WHO therefore recommends that you offer surgery without delay to anyone with TT, regardless of the number or position of lashes touching the globe.

3.1.2 Determine the structure of the service

To maximize the uptake of surgical services for TT, it is useful to use two strategies simultaneously: regular surgical sessions held at fixed sites, such as district hospitals, and periodic outreach sessions held in trachoma-endemic communities.

Each fixed surgical site should offer surgery at least once a week, on the same day (or days) of the week. The day(s) that surgery is available should be advertised to the target population.

Outreach teams should be organized at national or regional level, led by an experienced TT surgeon. Outreach should include education of the community about trachoma and its prevention (see section 3.3). The team structure should reflect local needs and resources. Each team may spend one or more days providing TT surgery to any given community. Scheduling of outreach activities should involve opinion leaders of the communities visited, the district programme manager and national programme personnel.

The presence of an experienced TT surgeon represents an opportunity for supervision and in-service training of surgeons at district level. In addition, outreach visits for TT surgery provide opportunities for integration of trachoma control into community-based treatment and prevention of other ophthalmic and non-ophthalmic conditions. Ministries of health should consider how best to use these opportunities.

3.1.3 Calculate the number of surgeons you will need

Ideally you need at least two resident trichiasis surgeons at each fixed surgical site, to ensure continuous service. Thus, if one surgeon is working with the outreach team or is otherwise unavailable, the other surgeon will be there to operate. This avoids the problem of patients being turned away because there are no surgeons available. There should be at least 1 facility providing TT surgery in each district in which TT is a public health problem.

If the estimated backlog of patients (see section 4.3.2) in the district is between 2000 and 3000, you will need three surgeons for the district. If the estimated backlog is between 3000 and 4000, you will need four surgeons, perhaps with two surgeons at each of two facilities, and so on. If this rule is followed and each surgeon performs at least 200 operations per year, the backlog of TT can be cleared in less than 5 years.

At the national (or regional) level you will need at least one surgical trainer to train new TT surgeons.

3.1.4 Train and supervise trichiasis surgeons

In nearly all trachoma-endemic countries, there are too few ophthalmologists and a large backlog of TT patients. As a result, most programmes train non-ophthalmologists as TT surgeons. Choose nurses or medical assistants who have good surgical skills. To assess this, ask potential trainees to sew a hem on a piece of cloth, and observe how much care they take and how exact their stitches are. If possible, trainees should have some previous general surgical experience and should be able to suture wounds competently. Experience in examining eyes is a distinct advantage.

The trainers should be ophthalmologists or very experienced TT surgeons.

No more than six persons should be trained in any one group. At the end of the training programme, each trainee should be able to:

- describe and discuss the normal anatomy of the eyelid;
- safely examine the eyes of adults, children and infants for TT and CO;
- reliably recognize these conditions;

- recognize the clinical signs of other diseases designated as national priorities and describe how to refer or treat patients who have these conditions;
- discuss the potential benefits and risks of surgery with any person who has TT;
- measure and record visual acuity;
- set up an appropriate temporary operating theatre;
- create and maintain a sterile operating field;
- perform TT surgery independently;
- effectively sterilize instruments and discuss why it is critical to do so between cases;
- demonstrate appropriate handling of sharps (needles, blades) and discuss why this is important;
- describe appropriate post-operative care for TT surgery patients; and
- accurately complete a surgical log.

Depending on the experience and aptitude of the trainees and the number of patients available as training cases, training will require 2–4 weeks. Each trainee should perform at least their first 10 operations under close supervision of the trainer. They should then perform at least another 20 operations under the supervision of two peers, with review of the lid position and wound by the trainer at conclusion of the procedure. The trainer should have the power to suspend the training of any trainee who proves unable to master the requisite skills. Trainees should log each operation they perform.

3.1.5 Equip trichiasis surgeons

Each surgeon will require:

- Snellen and illiterate 'E' chart for measuring visual acuity;
- water reservoir (with tap) for pre-operative hand-washing;
- two complete TT surgery kits;
- consumables (sterile gloves, antiseptic solution, gauze, needles, syringes, blades, sutures, eye patches, tape);
- a portable sterilizer;
- tetracycline eye ointment
- a **surgical log;**
- **referral forms** (for persons with conditions requiring hospital review); and
- health promotion materials.

At the completion of training, surgeons should be given all this equipment, including sufficient consumables to perform at least their first 100 operations. It is then the responsibility of the national programme manager to ensure a continuous supply of consumables to district-based surgeons and outreach teams. TT surgery kits will probably need to be replaced every 2 years.

3.1.6 Identify cases and encourage surgery

Effective case finding is essential to the success of the 'S' component of SAFE. At least one trusted resident of each trachoma-endemic community should be trained to identify persons with TT. If there is an existing network of community

health volunteers, they should be asked whether they would be willing to take on the additional work of identifying TT patients, recording their names, referring them, encouraging them to present for surgery and liaising with the outreach team. As TT is often commoner in women than in men, it is important that at least some women are trained as case finders: they are often more effective than men at passing information to women. Persons who have previously undergone successful TT surgery are also effective at encouraging others to accept it. You should consider different methods to appropriately motivate your case-finding cadre. Offering awards to volunteers according to the number of cases operated upon has been successful in some programmes.

Because people with TT are typically the poorest members of the poorest communities, surgery should, if possible, be provided at no cost. National programme managers should advocate this as national policy.

3.1.7 Operate

For each case, the surgeon must record the patient's name, date of birth, sex and address. The address should be sufficiently detailed to allow the surgeon to find the patient again. He or she should record the number of lashes touching the globe and the presence (and area) or absence of corneal opacity for each eye. Additionally, before surgery, visual acuity should be measured in each eye separately. A template **surgical log** is included in the Annex; such forms must be kept securely for follow-up after surgery.

Trachomatous trichiasis surgery should then be performed, using the bilamellar tarsal rotation procedure [4] or an alternative recommended locally. The date and place of surgery should be recorded with the details of the operation(s) performed.

To maintain proficiency, each surgeon should perform at least 10 operations per month. If they fail to do so for 6 successive months, their technique should be supervised by an experienced TT surgeon before they begin again. To ensure that programme targets for surgical output can be achieved, a higher output per surgeon than this will probably be needed.

3.1.8 Follow up

Visual acuity should be measured again and sutures removed 7–10 days after surgery. At this time, the wound should be inspected for excessive redness or purulent exudate, which indicate the presence of wound infection. If infection is suspected, a course of antibiotics should be provided free of charge. Fortunately, infection of wounds after bilamellar tarsal rotation is rare. Occasionally, a granuloma occurs around a stitch or in the wound; this can be removed under local anaesthetic.

At 1 year, the patient should be seen again. Visual acuity should be measured and both eyes examined for recurrent or (in an unoperated eye) new TT.

3.1.9 Supervise district surgeons

To ensure good TT surgery with a low incidence of recurrence, surgeons' technique and results should be checked regularly. A senior, experienced

surgeon or surgical trainer can visit and watch surgeons operate and help them to improve their technique and results. If this is not possible, refresher training courses should be organized at national or regional level every 1–2 years and TT surgeons asked to attend. Such workshops can be used to supervise and improve techniques and to motivate staff.

3.2 How to give antibiotics ('A')

WHO currently recommends two antibiotics for the control of trachoma: 1% tetracycline eye ointment and azithromycin. Tetracycline eye ointment can clear ocular *C. trachomatis* infection if administered to both eyes twice daily for 6 weeks, and is almost universally available. It is, however, difficult and unpleasant to apply, so compliance is often poor. Azithromycin clears ocular *C. trachomatis* infection with one oral dose (20 mg/kg body weight) and is well tolerated by both children and adults, but is relatively expensive. If azithromycin is available, trachoma control programmes are encouraged to choose it as their first-line antibiotic, with small quantities of tetracycline eye ointment for children under 6 months of age. If azithromycin is not available to the programme, tetracycline eye ointment should be offered to all persons who need antibiotics.

3.2.1 Register antibiotics

Both tetracycline eye ointment and azithromycin are on WHO's essential drug list and are part of the model formulary. Reference to this fact might be useful if applications must be made to the national pharmacy board (or equivalent) to register drugs for use in trachoma control.

3.2.2 Set guidelines for starting and stopping antibiotic treatment

If the baseline district prevalence of TF in 1–9-year-old children is 10% or greater, antibiotic treatment of all residents should be undertaken annually for 3 years. After these three treatments, a repeat district survey should be carried out. If the district prevalence of TF in 1–9-year-old children is still 10% or greater, annual mass treatment should be continued. If the prevalence is less than 10%, surveys should be conducted to determine the prevalence at community level. Then, in communities in which the prevalence is less than 5%, treatment can be stopped; and in communities in which the prevalence is 5% or greater, annual treatment should continue until such time as it falls below 5%.

If the baseline district prevalence of TF in 1–9-year-old children is less than 10%, the prevalence should be determined at community level.

- In communities in which the baseline prevalence is 10% or greater, mass treatment should be undertaken annually for 3 years. A repeat survey should be carried out after 3 years. Then, in communities in which the prevalence has fallen below 5%, treatment can be stopped. In communities in which the prevalence is 5% or above, annual treatment should continue until such time as it falls below 5%.
- In communities in which the baseline prevalence is 5% or greater but less than 10%, F and E interventions should be implemented (without antibiotic treatment) for 3 years. A repeat survey should be carried out after 3 years. If the community-level prevalence has fallen below 5%, active trachoma control interventions can be discontinued. If the

community-level prevalence is 5–10%, F and E interventions should be continued for another 3 years.
- In communities in which the baseline prevalence is less than 5%, implementation of the A, F and E components of SAFE is not a priority.

After antibiotic treatment is stopped, the prevalence of TF in children should be measured twice, at two 3-yearly intervals.

3.2.3 Undertake a pilot treatment round

If mass treatment with antibiotics has not previously been undertaken in the country, the first treatment round should commence with a small-scale trial. This will allow testing of systems for storage, transport, stock control, training of treatment personnel and community distribution, and help in estimating staffing requirements. The pilot treatment round should be planned as the preparatory phase of a larger first annual treatment round in a district. Plan a pilot round that can easily be completed by four dispensers over 5 days. This will cover a target population of about 5000.

Involve leaders of the recipient communities in all stages of planning for the pilot round. You should do the pilot round at least 1 month, if possible, before the main treatment round.

National programme personnel should closely supervise the pilot round. Their observations should be discussed after the pilot round and improvements made in drug handling, training and treatment protocols.

3.2.4 Determine requirements for and order antibiotics

Having sufficient antibiotics available at the planned time of treatment is critical. To ensure that drugs can be produced and delivered in time, ensure your order is placed well in advance.

For azithromycin, allow at least 6 months for drug manufacture, packaging, sea freight and customs clearance. You should request that copies of all paperwork relating to the shipment be sent as soon as they are prepared, so that the documents can be lodged with appropriate government agencies well in advance of the antibiotics' arrival. This will shorten delays at the port of entry.

For tetracycline eye ointment, small quantities can usually be obtained locally. If your order exceeds the available stock of the supplier, however, manufacture and delivery may take 3–6 months.

To determine the quantities of antibiotics you will need, first determine the annual treatment objective (ATO) for antibiotics in each district (see section 4.4). Sum the ATOs of all districts to determine the provisional national ATO. If you are using azithromycin, you can then use the antibiotic requirement estimator on the enclosed CD-ROM to determine how much azithromycin and how much tetracycline eye ointment you need. If you are only distributing tetracycline eye ointment, the total number of tubes you will need for the national programme is twice the provisional national ATO.

If the government, manufacturer or drug donor can provide these quantities of drugs, the order should be placed. If not, you will need to decide which areas deserve priority intervention (see section 4.8).

3.2.5 Make sure that appropriate storage is available

Antibiotics must be stored in secure, dry facilities in which the temperature remains below 30 °C. At national level, it is likely that the ministry of health will have appropriate drug stores. In districts endemic for trachoma, the pharmacy of the designated district hospital might have an appropriate store. However, national and district stores might be unable to accommodate a large delivery of antibiotics; it is important to establish this well in advance. The quantities of azithromycin and tetracycline eye ointment needed to treat 100 000 people will require 9.5 m^3 of storage space. If tetracycline eye ointment is used alone, the amount needed to treat 100 000 people will require 9.8–13.2 m^3 of storage space.

3.2.6 Import antibiotics and deliver to districts

In most countries, duty and taxes are levied on imported drugs. The national programme manager should approach the relevant government ministries to seek exemption from these charges for antibiotics destined for use in trachoma control. In some countries, this is easier if a nongovernmental organization or multilateral agency is the consignee. The consignee should be asked to be responsible for ensuring that imported drugs arrive intact at the national store.

Antibiotics will have to be transported from the national store to the districts where they will be used. Every effort should be made to do this within the essential drug distribution network. Transfer into and out of storage facilities at each level should be carefully controlled and monitored with the existing drug tracking system.

3.2.7 Select and train treatment personnel

The treatment team structure (and therefore the personnel requirements) depends on whether antibiotics are to be offered centrally in each community or delivered by treatment teams moving from house to house. The decision will depend on the population size and density and local logistics [5].

If central sites are to be used, each treatment team should consist of two registration clerks, two persons who determine drug dosage (not required if tetracycline eye ointment is used alone), two persons to dispense antibiotics and a recording clerk. At least one of the registration clerks and one of the persons who determine dosage should be from the community being treated, as this improves acceptance of antibiotics. If house-to-house treatment is used, a larger number of smaller teams will be needed, each composed of a clerk, a person who dispenses antibiotics and a guide from the community, who should also assist with dosing.

In either case, if azithromycin is being offered, the personnel dispensing it should be nurses, medical assistants or pharmacy assistants, who are experienced in dispensing oral medication.

Training to dispense azithromycin will require 1–2 days. Training of other treatment personnel will require 1 day. Depending on the population size (and therefore the required number of team personnel), training of trainers may be required, in which central personnel train district-level personnel, who, in turn, train front-line workers.

One supervisor will have to be trained for every 5–10 teams. If antibiotic treatment is new in the district or country, it might be helpful to invite someone from another district or another national programme to assist with the first round of training and to contribute to supervision of the pilot treatment round.

3.2.8 Plan the treatment calendar

Even when antibiotics are offered to entire populations of whole districts, actual treatment rounds are best undertaken one community at a time. Scheduling should involve opinion leaders of communities endemic for trachoma, district programme managers and national programme personnel. Do not schedule treatment rounds during important religious or cultural festivals, on market days or during the harvest season, as residents are likely to be unavailable to receive antibiotics at these times. It is also better not to schedule treatment during the rainy season, when access is difficult.

In any given district, you should complete treatment of all communities scheduled to receive antibiotics within a 1 month period.

3.2.9 Prepare a census of the community

Achieving high antibiotic coverage is critical to the effectiveness of the 'A' component of SAFE. To help achieve high coverage (and to show that it has been achieved), an accurate census of the population to be treated is required. Leaders of communities endemic for trachoma should be consulted about the best way to prepare the census. Literate community members should be involved, with supervision by programme staff, local health workers or teachers. The information collected from each household should include the name of the head of the household and the name, date of birth and sex of each person normally resident there.

A record of census data should be kept on cards, in books or in some other durable format, so that the census need only be updated for the next 2 rounds of antibiotic treatment, rather than being conducted anew. The **census and treatment card** in the Annex provides a template. Census records should be held by district programme managers and provided to treatment teams.

3.2.10 Sensitize the community

If the time between census-taking and treatment is less than 1 month, community sensitization should be combined with collection of census data. If not, a separate visit should be made to the community to educate residents about trachoma, and inform them of the reason for antibiotic treatment, the dates and methods of treatment and the inclusion and exclusion criteria for receiving antibiotics.

3.2.11 Treat

Whether a central or a house-to-house approach is used, the number of people who can be treated each day is heavily dependent on how well the treatment teams are organized. If central treatment is used, two respected members of the community (such as the village chief or watchman) should be asked to help organize community members at the site.

If azithromycin is available, the suspension should be reconstituted as directed and as required: a new bottle should be reconstituted only as the previous one is being finished. The powder should be shaken before any water is added, and the water used must be drinkable. The date of reconstitution should be written on the label of any bottle of suspension not finished on the day it is made up, and such bottles must be used before new ones are prepared the next day. Any suspension that has not been dispensed within 7 days of reconstitution should be discarded.

With few exceptions (see below), all residents of the targeted communities should be offered an antibiotic. The names of persons arriving at the central site or found by house-to-house teams should be checked against the community census record. The names of persons who have immigrated (and who intend to live in the community for the following month) or who were born after the census should be added to the census. Persons who are not resident in the community should be asked to receive treatment in their own community, or, if they are resident in a community that is not to be treated, advised that they do not need antibiotics for trachoma control. Persons who have died or emigrated since the census should be identified by a note in the census record.

Parents of children under 6 months of age should be given 2 tubes of tetracycline eye ointment, shown how to apply it and instructed to do so to both the child's eyes twice daily for 6 weeks. All older persons should be offered a single oral dose of azithromycin (if available) at a dose determined by their height. Height dosage scales should be painted on pieces of light-weight wood about 180 cm long, 4 cm wide and 1 cm thick. Because the relationship between height and weight varies for different ethnic groups, programme managers should ensure that the height dosage scale(s) used in their programme are appropriate for the population(s) being offered azithromycin. To use the scale, the person is asked to stand erect, without shoes on a flat floor. The scale is placed vertically against their back, with the 'ground' end touching the floor. The horizontal level at the top of the individual's head indicates the number of azithromycin tablets to be dispensed. Adults or children with biomechanical disorders that prevent full extension should be given the same dose as someone of similar age and build.

If azithromycin is not available to the programme, each person eligible to receive antibiotics should be given 2 tubes of tetracycline eye ointment, shown how to apply it, and instructed to do so to both eyes twice daily for 6 weeks.

The only contraindications to the use of azithromycin are being too ill to be measured or a history of previous serious adverse reaction (see section 3.2.12) to azithromycin. Recent or intended intake of alcohol, food or traditional medicine; blindness; pregnancy and breastfeeding are *not* contraindications to the use of azithromycin. The only contraindication to the use of tetracycline eye ointment is a history of a previous adverse reaction to the drug.

The drug stock with the earliest expiration date must be used first.

Antibiotic treatment should always be accompanied by health promotion (see section 3.3).

3.2.12 Obtain high coverage

In each community, treatment teams should aim to achieve at least 80% coverage, which is defined as the number of people treated (with either azithromycin or tetracycline eye ointment) divided by the number of residents. The number of residents used for this calculation should be determined at the end of the treatment round and will therefore include people who were born or who immigrated and exclude those who died or emigrated since the census.

3.2.13 Manage adverse reactions and collect information about their incidence

Experience from a number of countries in which azithromycin has been used for trachoma control indicates that mild, transient adverse reactions (such as nausea, vomiting and diarrhoea) occur in about 10% of recipients. These should be managed by increasing the intake of fluids such as water, soup and milk and very rarely require medical intervention. Communities should be forewarned that a proportion of people will have these reactions, informed that this does not indicate that the drug is harmful and told about the recommended management. These reactions are not serious adverse reactions and are not contraindications to azithromycin in subsequent treatment rounds. More serious adverse reactions to azithromycin are extremely uncommon. If any occur, treatment supervisors should ensure that the patients are seen and treated at the district hospital. They should also pass on the details of the case to the national programme manager, who will bring them to the attention of the drug manufacturer.

Adverse reactions associated with the use of tetracycline eye ointment are extremely uncommon. If any occur, the patient should be advised to stop using the ointment and not to use tetracycline (either orally or topically) in the future.

3.2.14 Report

At the conclusion of the annual treatment round in a district, the district programme manager should prepare a report for the national programme manager, showing the total quantities of azithromycin and tetracycline eye ointment used, the quantities of each drug not used but discarded, the quantities of each drug returned to the national store, and the quantities of each drug retained at district level. Data to assist with monitoring treatment coverage are collected as part of routine monthly district reporting (see section 5.2.1).

3.3 How to promote facial cleanliness ('F') and trachoma control in general

Health promotion plays many roles in implementation of the SAFE strategy. It is essential for:

- educating people about trachoma and how it is spread;
- encouraging acceptance of surgery;
- increasing acceptance of antibiotics;
- encouraging facial cleanliness;
- promoting a clean environment; and
- creating demand for household latrines.

Advice on how to deliver health promotion so that it can contribute in all these ways is presented in this section. To be effective, health promotion should be planned in partnership with the community and delivered continuously or repetitively to the target population.

3.3.1 Choose multiple channels of health promotion

To ensure that everybody in the community receives health promotion messages, a variety of channels should be used. Effective settings for health promotion include places of worship, women's groups, community meetings, health centres, schools and homes. Health promotion should always be conducted during TT surgery outreach and antibiotic treatment.

Person-to-person communication is useful for discussing sensitive issues, such as explaining the need for behavioural changes or encouraging acceptance of surgery. Small group discussions and school lessons can be used to convey detailed information about trachoma and its control. The mass media (such as radio) are effective for raising general awareness and for conveying discrete pieces of information, such as the dates of mass antibiotic treatment. Ideally, a combination of person-to-person communication in homes, small group discussions, school lessons and mass media should be used. It may be useful to include practical demonstrations (of face washing, in particular), drama groups, competitions and 'trachoma days'.

3.3.2 Choose topics for health promotion

Important health promotion messages are outlined in the table below. Each health promotion session should be tailored to the audience; for example, the most important message for older adults might be information about trachomatous trichiasis surgery, while the priority for mothers might be the importance of keeping their children's faces clean. The best results will be obtained if everyone in the community learns about each topic shown.

Topic	Include information about:
Trachoma	• what causes trachoma • how trachoma is transmitted • how trachoma causes blindness
Surgery	• why people with TT need surgery • when and where surgery is available • what surgery involves for the patient
Antibiotics	• why the community needs antibiotics • when and where antibiotics will be distributed

Facial cleanliness	• the potential benefits and side-effects of the antibiotics • how keeping faces clean prevents trachoma transmission • how faces can be washed with small amounts of water (include practical demonstrations!)
Environmental change	• how improving the environment can prevent transmission of trachoma and other infections • why latrines are viewed as socially desirable • how latrines can be constructed • how latrines are used and maintained

3.3.3 Develop materials that can be used in health promotion

A variety of materials can be used in health promotion.

- Posters are effective for conveying simple messages; they should be displayed in health centres and schools.
- Radio messages, including songs and jingles, can also convey simple pieces of information. The trachoma control programme should negotiate with national and local radio stations, which might provide discounted or free air time for trachoma control messages and assist in the production of recordings.
- Flipcharts can be used to provide detailed information but are effective only if supported by explanations from competent health promotion personnel.
- Billboards, playing cards, stickers, leaflets and booklets can also be used.

All health promotion materials should contain suitable language and appropriate images. They might need to be adapted, e.g. written in a local language or depict the ethnic group of the target audience. If this is not done, they might be seen by community members as having no relevance to their own families. Materials should be pre-tested with the target group to make sure that they are understandable and effective.

3.3.4 Identify personnel to deliver health promotion

Because a variety of activities will be performed in different settings, a range of front-line workers in health promotion will be needed. Teachers, women's groups, community and religious leaders, health workers and volunteers can all be effective health promoters if they receive appropriate training and are motivated.

3.3.5 Train, motivate and supervise health promotion personnel

Training should include information about trachoma, trachoma control and methods of transmitting this information to persons living in endemic communities. It should incorporate specific hands-on practice with health promotion materials. Because of the large number of personnel who will need to be trained, training of trainers will almost certainly be required. Central personnel can train district-level personnel, who, in turn, can train front-line workers. Both central and district-level training will take 3–5 days. Training should be standardized and supervised by programme managers.

Health promotion personnel often work in remote areas for little reward. Recognition by the trachoma control programme of their contribution to its success will almost certainly increase their efforts. Motivation does not

necessarily have to be in the form of financial rewards. Certificates or material incentives that actually help them do their jobs (such as bicycles, uniforms and household latrines) can be of great value.

After training, health promoters should receive supervisory visits from their district programme manager at least annually, to ensure that they remain motivated and to monitor the quality of their work.

3.4 How to improve water and sanitation ('E')

The 'E' component of SAFE aims to reduce transmission of *C. trachomatis* by promoting better personal and environmental hygiene. To do this, the access of large populations to latrines (or other methods of safe disposal of faeces) and water must be improved. These require specialist expertise and more money than is usually available to trachoma control programmes. The role of the programme might therefore be to find out which organizations are already working to improve water and sanitation, learn what they are doing, encourage them to give priority to communities endemic for trachoma in allocating resources, assist those communities in creating demand for water and sanitation and monitor implementation. If little is being done, the trachoma control programme might seek new partnerships to improve water and sanitation.

3.4.1 Determine what is already being done in the water and sanitation sector

First, government agencies and other organizations already working to improve water and sanitation in areas endemic for trachoma should be identified and contacted and their activities and plans discussed. These agencies and organizations are strategic partners in your trachoma control programme.

It is important to find out what types of latrines are being built, what kinds of water sources are being installed, how long it takes for each latrine and water source to be constructed and how much each costs. A sense should be obtained of how strong demand for these interventions is on the part of recipient communities.

3.4.2 Determine strategies for improving water availability

The role of the trachoma control programme in improving the availability of water should be determined locally. Collaboration and advocacy are an important part of the programme and should include strengthening links between stakeholders involved in providing water.

The availability of water can be improved by the construction of new sources or by repair of failed sources. If repairing and rehabilitating old water points is part of the strategy, the repairs should be accompanied by efforts to determine why the water source failed in the first place.

As a priority, water must be readily available to primary schools throughout the area. If water is available in schools, schoolchildren can be taught face washing habits that they will both transmit to their families and retain themselves for the rest of their lives.

3.4.3 Determine strategies for sanitation

Latrines will improve environmental cleanliness only if they are used consistently by a large proportion of the community. Consultation with representatives of the communities and organizations working in the sanitation sector should be undertaken to determine what methods of faeces disposal are being used and what methods are acceptable to the local population.

The use, as far as possible, of locally available construction materials is important for the long-term sustainability of a latrine programme.

As a priority, latrines should be constructed and appropriately maintained in primary schools throughout the trachoma-endemic area.

3.4.4 Establish community water and sanitation committees

Water and sanitation committees should be established in each community endemic for trachoma. These committees can determine the needs of their communities, ask for the necessary work, direct the installation of water points and latrines, assist installation (by providing labour and, in some cases, funds), monitor and control water collection and take responsibility for ensuring that water points and latrines remain functional. In many communities, funds for water point maintenance are assured by collecting a small fee for each unit of water collected. In some communities, the funds collected in this way are sufficient to generate money for installation of additional water sources. The committee might also identify a person who can be trained to undertake routine maintenance.

3.4.5 Increase latrine use

Demand for latrines and use of those that have been built can be increased by building demonstration facilities and by health promotion. Health promotion should include information about the health and social benefits of latrine use and discussion of the methods and costs of latrine construction and maintenance (see section 3.3).

Demonstration latrines should be built in health posts and schools and in the households of community health volunteers. These persons are likely to recognize the need for and desirability of latrines, use them themselves, strongly to encourage their families to use them and maintain them appropriately. In addition, as volunteers already view latrines as desirable, installation of a latrine will be seen as a reward for their continuing contribution to the work of the trachoma control programme.

4. Planning

4.1 How to gain support for the programme

Effective trachoma control requires the expertise and energy of many individuals in a broad spectrum of disciplines. These persons need to be fully involved from the beginning of the planning process.

4.1.1 Identify the stakeholders

Groups and persons who should be involved in the programme include:

- endemic communities;
- civil society;
- local nongovernmental organizations;
- hospital directors;
- government at all levels (ministries of health, education, women's and children's affairs, water and sanitation);
- academic institutions;
- ophthalmologists and professional groups;
- radio, television and print media;
- international nongovernmental organizations; and
- bilateral and multilateral organizations.

It is particularly important to contact and involve political leaders at community, district, regional and national levels, at an early stage.

4.1.2 Create a shared sense of ownership of the programme

A 3–5-day planning workshop should be arranged to which representatives of each group listed above are invited. At this workshop, participants will be helped to develop their understanding of the challenge presented by trachoma, by discussing:

- existing data on the prevalence of trachoma in the country;
- the public health implications of trachoma;
- the global initiative to eliminate trachoma by the year 2020; and
- the place of trachoma control in 'VISION 2020: The Right to Sight'.

Participants should assess whether trachoma is a problem of public health significance in the country and agree on the priority areas for control or further assessment.

Participants should bring to the workshop any data to which they have access (see section 4.2). Analysis of the available data (section 4.2), calculation of ultimate intervention goals (section 4.3), preliminary programme planning (section 4.4) and preparation of a draft budget (section 4.5) should all be undertaken as part of the workshop. The participation of a wide variety of stakeholders is necessary to make the drafts useful and to ensure that all groups become involved in the programme. A smaller group can finalize the drafts after the workshop.

4.1.3 Maintain a shared sense of ownership of the programme

A national trachoma task force that includes representatives of as many groups as possible should be formed to oversee the work of the programme. The task force should meet at least twice a year. A district trachoma task force should be constituted in each programme district and meet at least quarterly.

4.1.4 Engage with political leaders and advocate to gain support for trachoma control

The chairperson of the national trachoma task force should ensure that the minister of health and regional political leaders are kept informed of the activities and progress of the national programme. The chairperson of each district trachoma task force should ensure that political leaders at district and community level are kept informed of the activities and progress of the district programme. Support from all of these people is critical to the programme's success.

4.2 How to analyse the available data

4.2.1 Summarize relevant data for each district

Data useful for planning purposes include: census data; results of prevalence surveys; TRAs; information about water and latrine coverage; outputs for 'S', 'A', 'F' and 'E' in the previous year; and information about the human and material resources available for health, water and sanitation at district level. As mentioned above, participants should be asked to bring such data to the planning workshop. If possible, they should also make available information about the methods that were used for data collection and analysis. This information will be needed for the analyses described below.

In small groups or in plenary, workshop participants should list (on a **district summary form**) all the available information on the prevalence of TT, the prevalence of TF, the prevalence of clean faces and latrine and water coverage, for each district. If no data are available for the district on one of these 5 parameters, 'no data' should be written in the corresponding space in the table.

4.2.2 Analyse data on TT for each district

The data summarized on the **district summary form** is used to estimate the approximate prevalence of TT in the district among persons aged 15 years or more. If there is more than one source of data, the most reliable source(s) should be used for the estimate, according to the following hierarchy (from most reliable to least reliable):

1. a district-level population-based survey, such as a comprehensive assessment of trachoma (see section 2.4)
2. a population-based survey of selected communities
3. a population-based survey of one community
4. a TRA (see section 2.4.3)

If there is no district-level population-based survey but other population-based survey data are available, the district prevalence of TT in persons aged 15 years or more can be estimated. The age range and sex of the people

examined in the survey, the method of selection of communities and individuals and the proportion of the district population that lives in areas thought to be endemic for trachoma should be taken into account. It should be noted that the 'rough prevalence estimate' of trichiasis derived from a TRA [3] is *not* reliable and should be used only if no better data are available. Service-based data (such as the number of people with TT presenting for bilamellar tarsal rotation at outreach or a fixed site) are not useful.

If data are available from several surveys of similar reliability, the most recent should be used. If available datasets cover different geographical areas within the district, all can be taken into account in the estimate of district prevalence.

In deriving the estimate, it is useful to record the methods used for calculation on the **district summary form** to help with revision of the estimates when new data become available.

4.2.3 Analyse data on TF for each district

The data recorded on the **district summary form** are used to estimate the approximate district prevalence of TF in 1–9-year-old children. If there is more than one source of data, the most reliable should be used for the estimate, according to the following hierarchy (from most reliable to least reliable):

1. a district-level population-based survey, such as a comprehensive assessment of trachoma (see section 2.4)
2. a population-based survey of selected communities
3. a population-based survey of one community

The 'percentage of active trachoma in children', generated from a TRA [3], is *not* a prevalence figure and is not useful in this analysis, although it can be used to identify districts or communities that require a comprehensive assessment of trachoma. If the only data available are from a TRA, TF can be recorded as 'present' but its prevalence cannot be estimated. Service-based data (such as the number or proportion of children who present to a clinic and are shown to have TF) are also not useful.

4.2.4 Analyse data on the availability of latrines for each district

The data recorded on the **district summary form** are used to estimate the approximate proportion of households in the district that have access to a latrine or some other safe method of disposal of faeces.

4.2.5 Analyse data on the availability of water for each district

The data recorded on the **district summary form** are used to estimate the approximate proportion of households in the district that are within 1 km (a 15-min walk one way) of the nearest point from which water is available during the dry season. In addition, the water department should be asked for an estimate of the number of public access water points (including rivers, lakes, dams and storage tanks, wells, bore holes and stand-pipes) in the district. As the water used for face-washing does not need to be drinkable, surface water points should be included in this analysis.

4.2.6 Understand the limits of these analyses

Unless district-level population-based surveys are used, the estimates from the protocol described in section 4.2 will be useful for planning services but will not be sufficiently reliable baseline data for later assessment of the success of the programme. Before beginning full-scale trachoma control in a district, a comprehensive assessment of trachoma (see section 2.4) should be completed.

4.3 How to calculate your ultimate intervention goals

Ultimate intervention goals (UIGs) indicate the total number of interventions in each component of SAFE that must be completed to eliminate blinding trachoma. They are dynamic figures based on current estimates of disease burden, which can be modified and updated as newer, more reliable data become available. The calculations should be recorded on the **district summary form**.

4.3.1 Understand what is meant by 'elimination'

WHO defines elimination of trachoma as a cause of blindness as being:

- a reduction in the prevalence of TT to less than one case per 1000 total population; and
- a reduction in the prevalence of TF in 1–9-year-old children to less than 5%.

4.3.2 Calculate your ultimate intervention goal for 'S'

This is the backlog of unoperated trichiasis.

(1) Define the population at risk – (a)
(the district population) e.g. 100 000 people

(2) Estimate the prevalence of TT in persons aged 15 years and more in that population – (b)
(see section 4.2.2) e.g. 2%

(3) Estimate the prevalence of TT in the total population – (c)
(= b × 50%) e.g. 2% × 50/100 = 1% (where 50% of the population are 15 years and more)

(4) Calculate the number of cases of trachomatous trichiasis in the population – (the UIG-S)
(= a × c) e.g. 100 000 × 1/100 = 1000.

In all calculations for TT (e.g. the number of cases and the number of operations performed), the number of persons, not the number of eyes, should be stated. Even though a prevalence of up to one case per 1000 total population is consistent with WHO's definition of trachoma elimination (see section 4.3.1), WHO recommends that the UIG-S be calculated to include all prevalent cases, in order to emphasize provision of surgical services to all persons with TT.

4.3.3 Calculate your ultimate intervention goal for 'A'

(1) If the best estimate of the district prevalence of TF in 1–9-year-old children is 10% or more, the UIG-A is the estimated total district population.

(2) If the best estimate of the prevalence of TF in 1–9-year-old children is < 10%, the community prevalence must be considered. Two kinds of communities qualify for mass antibiotic treatment:
- communities with a prevalence of 10% or more; and
- communities in which there have been one or more rounds of mass antibiotic treatment and which now have a prevalence of 5% or more but less than 10%.

The estimated total population of these types of communities is the UIG-A.

(3) If the estimated district prevalence of TF in 1–9-year-old children is < 10% and there are no communities that meet the criteria in (2), mass treatment is not indicated and UIG-A for the district is 0.

4.3.4 Calculate your ultimate intervention goal for 'F'

Health promotion to encourage facial cleanliness should be provided to:
- communities that require 'S' or 'A';
- communities that have received one or more rounds of mass antibiotic treatment and now have a prevalence of TF in 1–9-year-old children of less than 5% (*); and
- communities that have never received mass antibiotic treatment and in which the prevalence of TF in 1–9-year-old children is 5% or more but less than 10% (*).

As delivery of health promotion is most easily monitored at group rather than individual level, the UIG-F is expressed as the number of communities rather than the number of persons who require education.

For the types of communities marked with (*) above, 'F' and 'E' should be provided, but not 'A'. These are communities that have previously received mass antibiotic treatment and in which the prevalence of TF has fallen to a level at which antibiotic treatment is no longer recommended, or communities that have a low but measurable prevalence of TF and have never received mass antibiotic treatment. The purpose is to ensure that transmission of trachoma remains low, so that antibiotics are not required in these communities in the future.

4.3.5 Calculate your ultimate intervention goals for 'E'

Latrines

(1) Define adequate coverage for household latrines – (a)
(nationally defined) e.g. adequate coverage is 80% of households either having a latrine or using other methods of safe disposal of faeces

(2) Estimate the number of households in the area – (b)
(number of households in the district) e.g. 15 000

(3) Estimate current latrine coverage in that area – (c)
(see section 4.2.4) e.g. 10%

(4) Calculate approximate number of latrines in the area – (d)
(= b × c) e.g. 15 000 × 10/100 = 1500

(5) Calculate the number of latrines in the area when adequate coverage is achieved – (e)
(= a × b) e.g. 80/100 × 15 000 = 12 000

(6) Calculate the number of latrines to be constructed for adequate coverage (UIG-L)
(= e – d) e.g. 12 000 – 1500 = 10 500

Water

(1) Define adequate coverage for water – (a)
(nationally defined) e.g. when 80% of households are within 1 km (a 15-min walk one way) of the nearest point from which water is available during the dry season

(2) Estimate the number of households in the area – (b)
(number of households in the district) e.g. 15 000

(3) Estimate water coverage in that area – (c)
(see section 4.2.5) e.g. 20%

(4) Determine approximate number of water sources in the area – (d)
(see section 4.2.5) e.g. 80

(5) Calculate the number of water sources in the area when adequate coverage achieved – (e)
(= d × (a/c) e.g. 80 × (0.80/0.20) = 360

(6) Calculate the number of water sources to be installed for adequate coverage (UIG-W)
(= e – d) e.g. 360 – 80 = 280

4.3.6 Understand the nature of ultimate intervention goals

It is important to recognize that the ultimate intervention goals for 'S' and 'E' are fundamentally different from those for 'A' and 'F'.

Once a person with TT has undergone an operation to correct a lid deformity, the intervention for that person is recorded as having been completed, even though follow-up is still required to monitor surgical quality. In other words, part of the UIG-S has been achieved. Similarly, once a household latrine or a new water point has been installed in a trachoma-endemic community, part of the UIG-L or UIG-W has been achieved, even though follow-up is still required to ensure that the latrines are used or that the water point is satisfactorily maintained. Every intervention in 'S' or 'E' completed within the programme moves it towards attaining the ultimate intervention goals for those components.

In contrast, one round of antibiotic treatment, even to an entire district, does not represent completion of an intervention for the recipient communities because

the end-point is defined on the basis of disease prevalence. Mass antibiotic treatment must be continued throughout the district until the community prevalence of TF in children has fallen below 10%. Similarly, health promotion to encourage facial cleanliness should be continued until the prevalence of TF in children has remained at less than 5%, without mass antibiotic treatment, for 3 years.

Note that the calculations for the UIG-S assume that there is no recurrence of operated trichiasis and no incident (new) trichiasis, and the calculations for the UIG-L and UIG-W assume that no latrines or water points fail or become unusable. Partly for this reason, ultimate intervention goals should be reassessed periodically, as explained in section 4.3.7.

4.3.7 Recalculate your ultimate intervention goals

Although UIGs are estimates of the total number of interventions that will be required to achieve trachoma elimination, they should be recalculated every 3 years to take into account new or more recent data on the prevalence of trachoma and clean faces and on latrine and water coverage. Newer data will automatically incorporate cases of recurrent trichiasis and latrines and water points that are no longer operational.

4.4 How to plan the programme

4.4.1 Conceptualize the nature of the programme

A programme can be considered to be a set of activities directed towards one or more defined objectives that help to achieve an overall goal. In the case of a trachoma control programme, in very general terms, the activities are surgery, antibiotic treatment, health promotion (including promotion of facial cleanliness) and environment improvement; the objectives are to reduce the prevalences of TT and TF, and the goal is to eliminate trachoma as a cause of blindness.

4.4.2 Set a time limit

If the district prevalence of TF in 1–9-year-old children is greater than 50%, or if more than 5 million persons living in endemic areas have yet to receive comprehensive implementation of SAFE, aim for elimination 10–15 years after the programme begins. Otherwise, aim for elimination within 6–9 years. Your target date for elimination should be 2020 or before. Setting a specific date by which the programme intends to have eliminated trachoma helps to focus the energies of government, current and potential partners and programme staff.

4.4.3 Set interim targets

Using the data on the trachoma situation and bearing in mind the date set for the programme goal, determine at 3-year intervals the objectives required to achieve elimination of trachoma on schedule. Three-year programme cycles are recommended because reassessment of the prevalence of TF is required every 3 years for implementation of ‘A’.

In a country with a huge trachoma problem, the interim targets might, for example, be: (1) comprehensive trachoma control programmes functional in all endemic districts within 3 years and (2) elimination of trachoma from half the endemic districts within 9 years.

4.4.4 Set annual treatment objectives

A realistic annual treatment objective (ATO) should be set for each programme component in each district on the basis of the ultimate intervention goals, interim targets and the resources available.

e.g. **S**: UIG-S = 900 cases. The first phase of the programme lasts 3 years, in which time the trichiasis backlog in the district should have been cleared. There is currently one surgeon in the district, with another to be trained this year. The ATO-S might be:

200 in year 1;
400 in year 2; and
300 in year 3.

A: UIG-A = 100 000 people. Each annual treatment is to be completed within 20 working days over 4 weeks. In pilot treatment rounds, each dispenser treated an average of 420 people per day. Therefore, (100 000 / (420 × 20)) = 12 dispensers are needed. Four nurses and one pharmacy assistant can be seconded from the district hospital. A nongovernmental organization can supply four nurses, and one medical assistant can be seconded from each of two health posts for 10 days each. If two nurses can be borrowed from adjacent districts, all 100 000 people could be treated in 20 working days. Assuming that sufficient antibiotics can be obtained, the ATO-A could be:

100 000 in year 1;
100 000 in year 2; and
100 000 in year 3.

F: UIG-F = 80 communities. A donor is willing to meet the total requirements for health promotion materials (which have already been tested successfully). By training trainers, an existing network of community health volunteers can be trained to undertake health promotion for trachoma control. Community health volunteers will help to set up women's groups in endemic communities, and the district education department is willing to include teaching about trachoma in the school health curriculum. The ATO-F can therefore be:

80 communities in year 1;
80 communities in year 2; and
80 communities in year 3.

E: UIG-L = 10 500 and UIG-W = 280. Several nongovernmental organizations are working to improve water supplies in the district, providing about 20 new water sources each year. The district water department's funds are limited, so that they install or refurbish about two water points each year. There are currently no projects to provide latrines. You plan to establish partnerships with agencies working in water provision and help them to attract more funds. In the first 3 years, you will also set up a programme to provide demonstration latrines to all 120 primary schools in the

district (6 for each school), to the household of each community health volunteer working with the trachoma control programme (1 per community) and to each of the 60 health posts (2 to each health post), for a total of 920 latrines. The ATO-L and ATO-W can therefore be:

30 water sources and 200 latrines in year 1;
50 water sources and 300 latrines in year 2; and
80 water sources and 420 latrines in year 3.

You should plan to reach the UIG-W in the second 3-year phase of the programme.

4.4.5 Prepare a detailed activity plan

Once district-level objectives are set for the first 3 years of the programme, each national programme manager should work with the district programme manager to prepare a detailed activity plan for his or her district. This should show, for each component, the specific activities and the months in which they will be performed, to ensure that the annual treatment objectives can be met.

4.4.6 Determine your programme requirements

On the basis of the activity plan, the programme needs should be determined in terms of:

- manpower;
- materials;
- mobility (vehicles, motorbikes and bicycles for personnel at all levels);
- money;
- motivation of personnel; and
- management.

The management structure will depend partly on existing relationships between the various government agencies and organizations in the trachoma control partnership. Ideally, the national trachoma task force will take overall responsibility for formulating national policy on trachoma and for overseeing implementation of the trachoma control programme. The national trachoma task force should report to the national committee for prevention of blindness of the ministry of health, or equivalent. The national programme manager should implement the policy of the national trachoma task force, taking responsibility for day-to-day management of the trachoma control programme.

Each district trachoma task force should contribute to the national policy and then be responsible for overseeing its implementation in their district to the fullest extent possible, given the district's own priorities and resources. The district trachoma task force should report to the national task force and to the district health council, or equivalent. The district programme manager should implement the policy of the district trachoma task force, taking responsibility for day-to-day management of the district programme. The national programme manager and the district programme manager should be seen to represent the national trachoma task force and the district trachoma task force, respectively, in all communications between these bodies.

4.5 How to prepare a budget

A highly detailed budget should be prepared, including costs per year and total costs. This is useful because it ensures that the interventions have been fully planned, for your own use and for potential funders. Furthermore, by comparing actual expenditure against anticipated expenditure after the first 3-year programme cycle, the budget estimates can be evaluated against a detailed framework. This allows good estimates of likely expenditure for subsequent programme cycles.

A template budget prepared in Microsoft Excel is provided in the accompanying CD-ROM.

4.6 How to finance the programme

Once the budget has been prepared, it provides an estimate of the money that will be required to implement the programme, and funding can be sought. A range of funding agencies might be prepared to support trachoma control activities, including the government, foreign governments, local and international nongovernmental organizations, civic organizations and private individuals. It is important to be as flexible as possible in accommodating the types of support that different agencies can offer, and to involve as many different supporters as possible, even if this makes coordination of partners more difficult. The more support available, the more successful the programme will be and the more current and potential partners will want to be involved.

Before a written application for funding is submitted, it is useful to meet informally with representatives of the potential partner to discuss their present areas of interest and future plans and to determine whether they would welcome an application for support. If an application is invited, complete instructions for the format and length should be obtained, with the name of the person to whom it should be addressed and the deadline for submission.

In addition to a detailed budget for the support requested, background information will probably be required about the magnitude of the trachoma problem in the country, the distribution of disease, the nature of existing control efforts (if any), the likely benefits of the control programme to the target community and an indication of the contribution that the requested support will make to realizing these benefits. Details of the way in which expenditure will be monitored and reported might also be requested.

4.7 How to set priorities for areas for intervention

In most endemic countries, particularly during the first few years of a trachoma control programme, the population of an area that requires implementation of SAFE for trachoma control exceeds the population that can be served adequately by the available human and material resources. A protocol for setting priorities on the basis of greatest need must therefore be defined.

Districts with the highest prevalence of TT should have priority for implementation of ‘S’. Districts with the highest prevalence of TF in 1–9-year-old children should have priority for implementation of ‘A’, ‘F’ and ‘E’. The districts with priority for ‘S’ need not be the same as those with priority for ‘A’, ‘F’ and ‘E’,

as a high prevalence of TT indicates that active disease was highly prevalent for a prolonged period some years ago and does not necessarily mean that active disease is still highly prevalent today. In many cases, however, areas with a high prevalence of TT still have a high prevalence of TF, and implementation of all four components of the SAFE strategy is appropriate.

5. Monitoring and evaluation

5.1 What are monitoring and evaluation?

Both monitoring and evaluation are used to measure programme performance. In the discussion below, the same terms are used to conceptualize a trachoma control programme as were presented in section 4.4.1.

Monitoring involves continuous checking of the programme to ensure that it is proceeding according to plan. It provides an answer to the question, "Is our programme progressing in such a way that its goal will be achieved?" Monitoring is conducted by collecting data (*indicators*) at regular intervals (such as monthly or yearly) to measure the extent to which (i) programme activities are taking place (*process* indicators), (ii) programme objectives are being met (*outcome* indicators) and (iii) the programme goal is being achieved (*impact* indicators). Making assessments, such as prevalence surveys, is a core activity that requires the time of programme staff and the use of programme resources, but assessments contribute only indirectly to attainment of the overall programme goal. Indicators for completion of assessment activities can therefore be put in a separate category (*assessment* indicators).

Evaluation involves determining the relevance, adequacy, effectiveness, efficiency and impact of programme components. Different types of evaluation can be undertaken at different stages of the programme. A formative evaluation can be carried out during the planning phase, a process evaluation during the implementation phase, and a summative evaluation at the programme's end. Depending on the type of evaluation undertaken, evaluation asks the question, "What is the best way to achieve our goal?", "Could our programme work better to achieve our goal?" or "Could our programme have worked better to achieve our goal?"

5.2 How to monitor the programme

5.2.1 Collect data from each district each month

On the last working day of each month, front-line workers should let their district programme manager know how many:

- people received TT surgery;
- people received antibiotics (separate figures for those who received azithromycin and those who received tetracycline eye ointment);
- communities received health promotion;
- new household latrines were constructed; and
- new water sources were installed

during that month.

As mass antibiotic treatment is an annual activity and should be undertaken in a district during only 1 or 2 months of any given year, the figure will be 0 in most months. This should not cause concern.

On the first working day of the new month, the district programme manager should compile all the data for the district that was received the previous working day and report the figures to the national programme manager.

5.2.2 Compile data at the national level each year

Each year, the national programme manager should complete a report for the ministry of health and the ministry's partners. This should include data on 2 assessment and 10 process indicators.

Assessment indicators

1. 'S': the proportion of districts in which the TT status is known and a decision on whether 'S' is required has been made
2. 'AFE': the proportion of districts in which the TF status is known and a decision on whether 'A', 'F' and 'E' are required has been made

Process indicators

1. number of people who received TT surgery in that year
2. number of people who received antibiotics in that year (separate figures for those who received azithromycin and those who received tetracycline eye ointment)
3. number of communities that received health promotion in that year
4. number of new household latrines constructed in that year
5. number of new water sources installed in that year
6. geographic programme coverage for 'S': the proportion of known districts indicated for inclusion in an 'S' programme in which active TT case finding and referral are being done
7. antibiotic coverage: number of persons treated with antibiotic each year divided by the eligible population in treated areas, as a percentage
8. geographic programme coverage for 'A' and 'F': proportion of known districts indicated for inclusion in an 'AFE' programme in which at least the 'A' and 'F' components are being done
9. geographic programme coverage for 'E': proportion of communities in an 'AFE' programme with adequate (to be defined nationally) water and sanitation
10. ultimate target population and percentage reached by SAFE: population of communities in which trachoma is a public health problem and the proportion currently being reached with SAFE

5.2.3 Use data at the level at which it is collected

All data should be used to guide programme decision-making at the level at which it is collected. For example, surgeons who report fewer TT operations than targeted in a given month should themselves consider why this occurred and take steps to either increase their output with existing resources or seek help to improve their surgical capacity. Similarly, national programme managers should not need to inform districts that they are not meeting their targets; district

programme managers should already be aware of any problems that exist and use collected data to identify programme components for which extra training, encouragement or resources are required.

5.3 How to evaluate the programme

A process evaluation should be undertaken in the third year of a programme's operation, and subsequently at 3-year intervals. Evaluations should be participatory, involving both internal programme staff and independent, external evaluators. If well conducted, such evaluations can be used to:

- collect and share information on achievements and challenges;
- identify future priorities;
- identify areas for improvements in the organization and implementation of the programme;
- identify areas in which technical assistance, training, human resources and infrastructure are needed; and
- identify key questions that need to be answered for the success of the programme.

A generic manual that can be adapted for evaluation of any trachoma control programme, with details of how it should be applied, is included in the CD-ROM that accompanies this guide.

References

1. Thylefors B et al. A simple system for the assessment of trachoma and its complications. Bulletin of the World Health Organization 1987;65:477–483.

2. Primary health care level management of trachoma (WHO/PBL/93.33). Geneva: World Health Organization, 1993.

3. Negrel AD, Taylor HR, West S. Guidelines for the rapid assessment for blinding trachoma. Geneva: World Health Organization, 2001.

4. Reacher M, Foster A, Huber J. Trichiasis surgery for trachoma: the bilamellar tarsal rotation procedure (WHO/PBL/93.29). Geneva: World Health Organization, 1993.

5. Smith PG, Morrow RH. Field trials of health interventions in developing countries: a toolbox (2nd ed). London: Macmillan, 1996.

Glossary

ATO	Annual Treatment Objective
CO	Corneal Opacity
community	the minimum group of individuals for which mass trachoma control is to be implemented
contraindication	a condition, especially any condition of disease, which makes a particular treatment improper or undesirable
district	the normal administrative unit for health care management
endemic	present in a population or area at all times (said of a disease or infectious agent)
incidence	the number of new cases of a specific disease or infection occurring in a particular population over a defined period
prevalence	the number of cases of a disease that are present in a population at a particular time
region	administrative unit one level higher than the district
SAFE	Surgery, Antibiotics, Face-washing, Environmental improvement
sign	evidence of a disease perceptible to an examining physician, as opposed to the subjective sensations (symptoms) of the person with the disease
TF	Trachoma inflammation – Follicular
TI	Trachoma inflammation – Intense
TRA	Trachoma Rapid Assessment
TS	Trachomatous Scarring
TT	Trachomatous Trichiasis
UIG	Ultimate Intervention Goal
WHO	World Health Organization

Annex

1. Inter-observer agreement form
2. Comprehensive assessment of trachoma form
3. Surgical log
4. Referral form
5. Census and treatment form
6. District summary form

Inter-observer agreement form

Examiner's name:_____ Reference examiner's name:_____

Community:_____ Date: ____/____/____

TF right/wrong

No.	R	L	R	L	Notes
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

TF right/wrong

No.	R	L	R	L	Notes
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

Score: /50

Comprehensive assessment of trachoma form

Community:_____ Household number: ☐☐☐☐ Page ☐ of ☐

Date: ____/____/____ Head of household:_____ Examiner:_____ Field assistant:_____

				[right eye]			[left eye]			
No.	Name	Gender	Date of birth	TT	CO	TF	TT	CO	TF	Comments

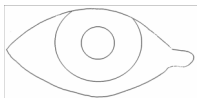
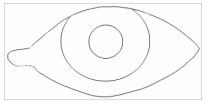
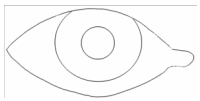
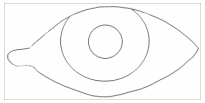
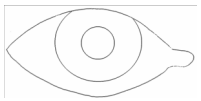
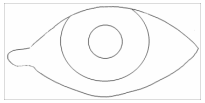
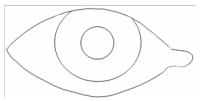
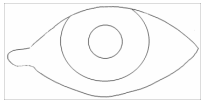
Does the household have its own latrine? Yes ☐ No ☐

In the dry season, how long does it take the person who collects water to walk from the house to the place where water is available?_____

Comments:_____

_____

_____

	No.		No.		No.		No.	
Name								
Date of birth								
Sex								
Address								
Visual acuity (with available correction)	R	L	R	L	R	L	R	L
TT (mark the position of any lashes touching the globe.)								
Evidence of epilation?								
CO (mark the position of any opacity)								
Date of surgery								
Place of surgery								
Operation								
Type of suture								
Comments								
Follow-up 1.Removal of sutures								

Referral form

National trachoma programme

Date:_____

To: Medical Officer

Outpatient / emergency department

_____ Hospital

Dear Doctor,

Re:_____ (Date of birth:_____)

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thank you for seeing this patient.

Yours,

_____

Census and treatment form

Community:_____ Household number: ☐☐☐☐ Page ☐ of ☐

Date of census: ____/____/____ Head of household:_____ Census prepared by:_____

No.	Name	Gender	Date of birth	Died / moved out (with date)	Treatment: 20____			Treatment: 20____			Treatment: 20____		
					Tabs	Susp	TEO	Tabs	Susp	TEO	Tabs	Susp	TEO
			Totals this page:										

Comments (with dates):_____

_____

_____

_____

District summary form

District name:_____

Estimated total population:_____

Estimated no. of households: _____ No. of villages:_____ No. of primary schools:_____

Calculations for best estimates of current need (use data on reverse, and notes in Guide)

1. TT%→UIG-S:_____
_____
_____

UIG-S [ ]

2. TF%→UIG-A:_____
_____
_____

UIG-A [ ]

3. TF%→UIG-F:_____
_____
_____

UIG-F [ ]

4. Latrine%→UIG-L:_____
_____
_____

UIG-L [ ]

5. Water%→UIG-W:_____
_____
_____

UIG-W [ ]

Current output and current resources

Output or resource	District hospital	Other:	Other:	Total
Persons who underwent TT surgery last year				
Persons who received antibiotics last year				
Communities that received health promotion last year				
New household latrines constructed last year				
New water sources installed last year				
Current trained trachoma graders				
Current trained TT surgeons				
Current trained antibiotic dispensers				
Current trained health promoters				
Current trained sanitation workers				
Current trained water engineers				
Current vehicles that could be used for trachoma work				

TT

Survey date	Location and sampling strategy	Age group examined	Sexes examined	Estimated TT prevalence	Name and institution of principal investigator

TF

Survey date	Location and sampling strategy	Age group examined	Sexes examined	Estimated TF prevalence	Name and institution of principal investigator

Latrines

Survey date	Location and sampling strategy	Definition of 'access to a latrine'	Estimated latrine coverage	Name and institution of principal investigator

Water

Survey date	Location and sampling strategy	Definition of 'access to water'	Estimated water coverage	Name and institution of principal investigator

Comments:_____

_____

_____

Notes