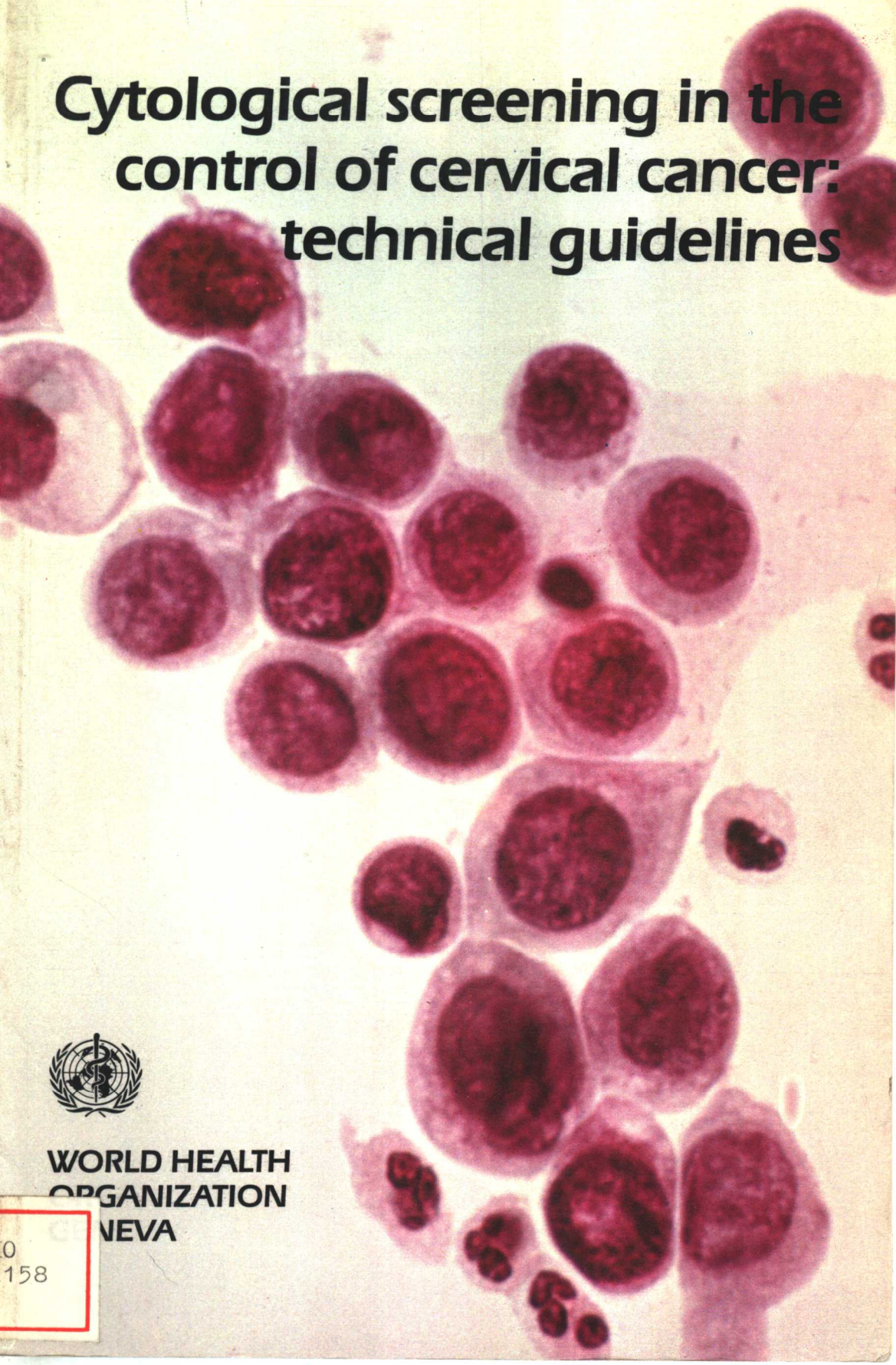
# Cytological screening in the control of cervical cancer: technical guidelines



WORLD HEALTH
ORGANIZATION
GENEVA

# Cytological screening in the control of cervical cancer: technical guidelines

WORLD HEALTH ORGANIZATION GENEVA 1988

ISBN 92 4 154219 5



TYPESET IN INDIA

PRINTED IN ENGLAND

86 7117 Macmillan/Clays - 4000

# Preface

This book should be viewed in conjunction with a forthcoming WHO publication entitled *Cervical cancer screening programmes: managerial guidelines*. These two books are intended to assist in the planning, development, and review of cervical cancer early detection programmes. They also contribute to the overall objective of improving the health of women, and thus should be considered alongside the numerous other technical and managerial guidelines on maternal health and family planning methods published by WHO. The present volume provides an outline of the technical factors to be considered in setting up a screening programme, while the book on managerial guidelines focuses on the managerial and conceptual aspects of such programmes, including the possible relationship of cytology programmes to the provision of maternal health and family planning services, and on the formulation of cervical cancer screening programmes as part of national cancer control programmes.

WHO wishes to acknowledge with gratutude the important contributions of Dr A. Hutchinson, British Columbia, Canada, and Dr E. Johannisson, Basel, Switzerland, in preparing the initial manuscript, and also the valuable contributions of Professor N. Aristizabel, Cali, Colombia, Dr J. Jones, Cardiff, Wales, and Professor Leopold G. Koss, New York, USA. The *Manual of norms and procedures for cervical cancer control*, first published by the Pan American Health Organization in 1972, and recently updated,[1] was a fundamental contribution to this work, and WHO also wishes to thank the participants in a WHO meeting on the control of cancer of the cervix uteri, held in Geneva in November 1985, and the many reviewers who have given unselfishly of their time in the preparation of this text.

WHO is most grateful to the United Nations Fund for Population Activities (UNFPA) for its financial contribution towards the

[1] *Manual of norms and procedures for cervical cancer control*. Washington, DC, Pan American Health Organization, 1985 (PALTEX Series, No. 6) (in Spanish).

preparation and publication of this book and the one referred to above entitled *Cervical cancer screening programmes: managerial guidelines.*

# Contents

# 1. Cervical cytology: basic considerations

The magnitude of the problem of cervical cancer, its etiology and natural history, and the clinical and economic rationale for using cytology screening programmes to control invasive cervical cancer, are all described fully in another WHO publication, which should be read in conjunction with these technical guidelines.[1] However, because of the importance of this information some of the main points are summarized below.

## Magnitude of the problem of cervical cancer

Cancer of the cervix is the most common cancer in women in developing countries, and the second most common cancer in women throughout the world, with approximately 500 000 new cases each year, many of them fatal (see Table 1). Prevention of this large number of premature deaths among women is, therefore, a goal worthy of urgent and serious consideration. There is excellent evidence that effective cervical cytology screening programmes result in a reduction in mortality due to this disease.

## Rationale for cervical cytology screening

Because the causes of cervical cancer are not yet fully understood (although current research suggests that the viral agent responsible for genital warts may play an important role) and because the main factor thought to be associated with increased risk (sexual activity of both men and women) is not very amenable to regulation or control, primary prevention is not practical at the present time.

[1] *Cervical cancer screening programmes: managerial guidelines.* Geneva, World Health Organization (in preparation).

Table 1. Estimated annual number of new cases of cervical cancer[1]

| Region | New cases |
|---|---|
| North America | 15 700 |
| Latin America | 44 000 |
| Europe | 47 200 |
| USSR | 31 300 |
| Africa | 36 900 |
| China | 131 500 |
| India | 71 600 |
| Japan | 9 700 |
| Australia/New Zealand | 1 200 |
| Other Asian countries | 70 300 |
| Developed regions | 105 100 |
| Developing regions | 354 300 |
| Total | 459 400 |

[1] Data from 1975, adapted from: PARKIN D. M. ET AL. *Bulletin of the World Health Organization*, **62**: 163–182 (1984).

Fortunately, however, the natural history of cervical cancer is such that it is possible to detect it early and to take measures to prevent it from progressing into a life-threatening illness.

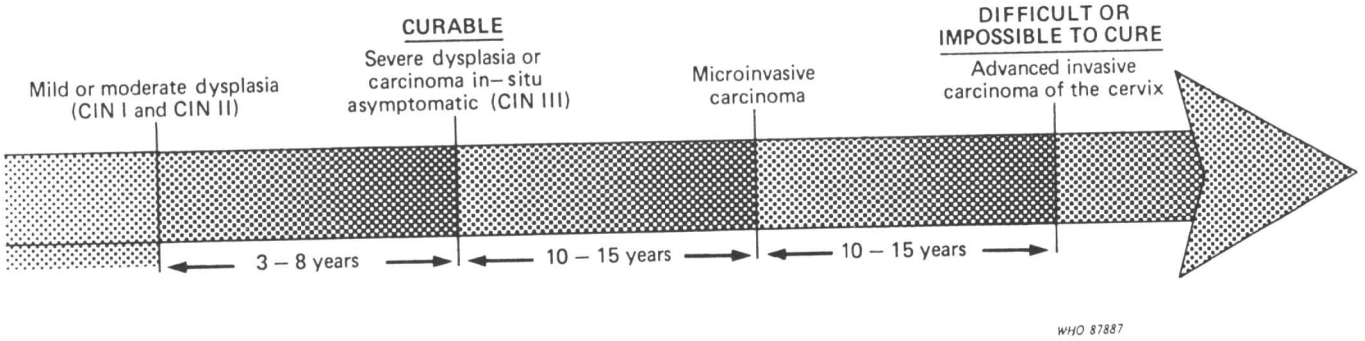
Cancer of the cervix uteri starts with a pre-invasive curable stage (epithelial abnormalities known as dysplasia and carcinoma *in situ* or as grades of cervical intraepithelial neoplasia — CIN) that normally progresses slowly over a period of years before it reaches an invasive stage, when it is much more difficult and expensive (and frequently impossible) to cure (Fig. 1).

Detection of the preclinical stages of cervical cancer is possible by microscopical examination of cells scraped from the uterine cervix and smeared on a glass slide. Early detection makes treatment relatively inexpensive and almost always successful and leads to a marked decline in the number of women who develop fatal invasive cancer.

## Economic considerations

As noted above, cervical cancer inflicts a heavy burden on a society. A screening programme can reduce this burden, but such a programme must be cost-effective. Screening programme costs must therefore be kept as low as possible if the programme is to make economic sense. High productivity and accuracy at the screening laboratory are essential to keep costs down. These requirements are best met by large, non-profit-making, centralized facilities with high

Fig. 1. A typical sequence of events in the natural history of carcinoma of the cervix



volumes of work, computerized recordkeeping, and well organized professional supervision and quality control. The screening programme should be integrated into existing primary health care services as far as possible.

### Time considerations

It takes several years before the beneficial results of a screening programme can be seen. Indeed, during the first phase, the number of new cases of cervical cancer will actually seem to increase as additional new cases are found that would previously have remained undiagnosed. It is essential that those responsible for funding and operating such a programme understand and accept these facts and are prepared to make a long-term (5–10 years) financial commitment, knowing that the programme's usefulness will not be immediately apparent.

### Role of cervical cytology screening

Cervical cytology is only part of the complete system that is required for control of cervical cancer. It serves only to identify cases needing appropriate follow-up and treatment and is of no value without adequate, integrated, diagnosis and treatment services (such as colposcopy, gynaecological pathology, gynaecological surgery, and radiation therapy) to deal with patients found to have abnormal smears. These facilities must be adequate to absorb the expected demand for diagnosis and treatment.

It should be emphasized also that cervical cytology screening is a *public health programme* aimed at detecting cervical cancer in the population at risk in its early asymptomatic form when it can be successfully treated, thereby reducing morbidity and mortality due to this disease. It should *not* be used as a "diagnostic test" for specific patients with symptoms. These patients should be examined and appropriately investigated individually as indicated by their symptoms, no matter what the status of their cervical screening test.[1]

The overall responsibility for the planning, organization, and operation of a cytology screening programme should rest with the cytopathologist in charge of the cytology laboratory. This person should ensure that a satisfactory system of smear collection and interpretation and patient follow-up is in place.

To be effective, the programme should screen as many women as possible, using a population register if one exists, to ensure a systematic, efficient, and thorough screening process, especially in

[1] Cytology services can also be used for the early detection and diagnosis of cancers situated at sites other than the cervix uteri.

those age and social groups who may otherwise remain poorly covered by screening. The aspect of screening that affects the cost of the programme most is the number of screenings per technician per day. If technicians are trained to look primarily for cancer cells, a screening rate of 80–90 slides per day is easily attainable. If equal emphasis is placed on the diagnosis of *Monilia*, *Chlamydia*, trichomoniasis, etc., the rate will fall to 20–25 slides per day.

# 2. Collection of smears

The objectives of smear collection in a cervical cancer control programme are to collect satisfactory smears from as many women at risk as possible, as cheaply as possible. The emphasis should be on maximizing the total number of women screened. Frequent rescreening the same women, while often more easily done, is not cost-effective. For example, screening all women once every 10 years would achieve much more than screening the same 50% of women every 5 years, although the number of smears examined would be the same in each case.

In countries where resources are limited, the aim should be to screen every woman once in her lifetime at about the age of 40 years. When more resources are available the frequency of screening should be increased to once every 10 years, and then once every 5 years, for women between the ages of 35 and 55 years. Ideally, if resources allow, screening should start at the age of 25 years and be done annually for 2 years, and then if these initial screenings are negative, every three years from then to the age of 60 years. (For practical reasons concerning follow-up, annual rescreening appointments are scheduled in some programmes.) The emphasis should be placed on coverage of the population at risk, rather than on frequency of rescreening (see Table 2).

To ensure that as many women as possible are reached by a screening programme, smear collection centres should be decentralized and located near the main centres of population. Screening centres must be open during hours that are convenient for women, and other factors such as the availability of transportation and child care services should be considered. In many countries, mother and child care services can be used as starting points for smear collection as they are usually known to the population and, most importantly, they already exist in almost all settings. The use of mobile units, especially in rural areas, and at market places and factories, should be taken into consideration to facilitate a more effective coverage.

Table 2. Reduction in the cumulative rate of invasive cervical cancer for the age group 35–64 years, with different frequencies of screening[a]

| Screening every | Percentage reduction in the cumulative rate[b] | No. of tests |
|---|---|---|
| 1 year | 93.3 | 30 |
| 2 years | 93.3 | 15 |
| 3 years | 91.4 | 10 |
| 5 years | 83.9 | 6 |
| 10 years | 64.2 | 3 |

[a] Adapted from: DAY, N. E. The epidemiological basis for evaluating different screening policies. In: Hakama, M. et al., ed. *Screening for cancer of the uterine cervix*. Lyons, International Agency for Research on Cancer, 1986 (IARC Scientific Publication, No. 76).

[b] Assuming that women are screened at the age of 35 years, and that one previous screening had been performed.

All personnel involved must have a patient-oriented attitude so that women will encounter an atmosphere that will encourage them to comply with the programme.

For women attending for the first time, it is important to have an adequate reception area and to schedule sufficient time for orientation. The orientation process may be aided by a recorded sound programme, a slide/tape presentation, or even a video cassette programme if resources are available and patient numbers are high, but in most cases it will be done, at least in part, by the personnel responsible for taking the smear. These personnel should anticipate the woman's worries and questions, and be prepared to deal with them in a professional and reassuring manner. The woman should be helped to understand what to expect during the taking of the smear, when to expect a report, and when to have the next routine smear done.

To ensure reliable follow-up, accurate basic personal information must be obtained from each woman during her first visit so that she can be reached for subsequent periodic screenings, and for referral to a diagnostic and treatment facility if her smear is abnormal. In addition to the patient's precise home address, clinical and epidemiological information should be obtained. The type and amount of this information should be defined carefully; superfluous information causes unnecessary unproductive work, but inadequate data will not allow the overall programme to be properly assessed and may prevent patients from being adequately followed-up.

### Options for organization of smear collection

In most areas, an active recruitment programme will be essential to ensure that the population at risk is adequately screened. Public education by means of radio, television, newspapers, posters, and pamphlets can be useful, but the most effective means of convincing women to enter a screening programme is by personal contact with

respected, knowledgeable members of their own community. Cancer leagues or societies can be most useful in this respect, particularly if well known women take part in meetings and other educational activities. Primary health care workers can also play an important role in encouraging women to be screened. Nurses, midwives, workers in clinics for maternal and child health, sexually transmitted diseases, and family planning, for example, can be invaluable advocates of the screening programme. In some areas, the names and addresses of women at risk can be determined from voters' lists or other documents and recruitment by home visits or letters could be considered.

In planning a screening programme, it is essential to consider the psychological, social, and ethical consequences of any screening. All individuals recruited for screening must be fully informed concerning the potential benefits of screening as well as any risk — including false positive and false negative rates. Following such information, each individual must be given the clear choice whether or not to participate in the screening programme.

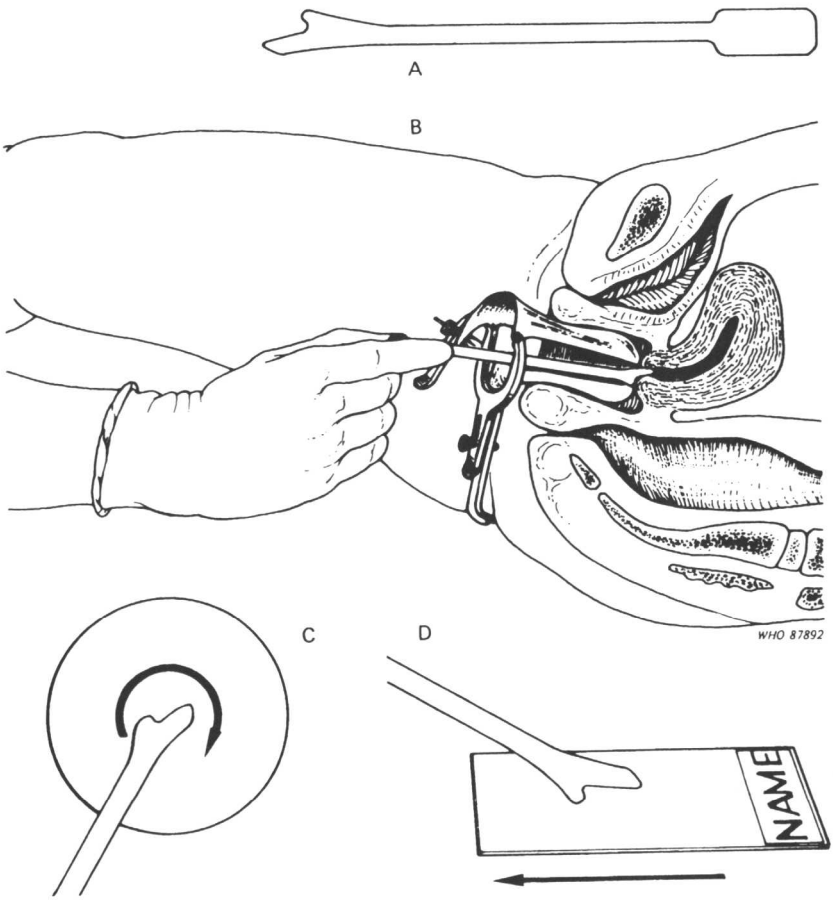
Primary health care facilities such as neighbourhood clinics, health centres, clinics for maternal and child health, sexually transmitted diseases, and family planning, and hospital outpatient clinics can be used for smear collection. (In some areas it may also be appropriate to include private physicians' offices in the programme, but if this is done, care must be taken not to encourage unnecessary screening and not to impose any financial burden on the patients.) Additional new facilities will generally not be required, but additional financial resources and personnel will often be needed.

Smears can be taken by different types of health care worker (provided they are appropriately trained) and the task need not be limited to gynaecologists. Primary care physicians, medical assistants, nurses, midwives, paramedical personnel (such as medical social workers) and even technicians can take satisfactory smears if specially trained for this purpose in a standardized programme. It is very important that a particular person be nominated to explain the cytology report to the patient and to ensure adequate follow-up and management of any patient with an abnormal cytology report. This person may be the practitioner who took the smear, or the person responsible for the overall management of the primary health care facility, but the responsibility must be clearly designated, clearly understood, and faithfully discharged.

### Taking of smears

The technical procedures of smear-taking are illustrated in Fig. 2. Satisfactory smear collection requires direct observation of the

Fig. 2. Smear-taking procedures



cervix through a vaginal speculum. Women should not be using intravaginal medication at the time of examination and the speculum should be lubricated with water only. A wooden or plastic spatula (see Fig. 2A) is introduced with the narrow end in the endocervical canal (see Fig. 2B) and cells are collected by rotating the spatula through 360° while gently scraping the circumference of the squamocolumnar junction (Fig. 2C). The collected material should be smeared on a glass slide that has a frosted end (Fig. 2D) on which the name of the woman, her identification number, the name of the clinic, and the date has been written with a pencil. (Ink or ballpoint pen should NOT be used as the writing will become blurred.) Alternatively, plain glass slides can be used and the patient's name, etc., inscribed with an inexpensive diamond pencil. In areas without a colposcopy service, the taking of two smears from each patient is preferable in an attempt to reduce the number of false-negatives (in particular in women with endometrial lesions); these should consist of the standard cervical smear taken with the narrow end of the Ayre spatula and a second smear obtained from the posterior fornix pool with the broad end of the Ayre spatula.

Smears should be fixed as soon as possible after collection. The simplest chemical fixation is achieved by immersion of the slide in 95% ethanol for 30 minutes. A commercial, aerosol, fixing spray can be used (even aerosol hairspray lacquer has been successfully employed when nothing else was available). Alternatively, slides may be sent to the cervical cytology laboratory after air-drying. If this method is used, slides must be rehydrated at the laboratory with 50% glycerol for 2 minutes before staining.

### Transport of slides

Each labelled slide should be attached to a correctly completed examination request form. (Fig. 3 shows an example of such a request form.) Often the request form is wrapped around the slide and held there by an elastic band. They should be suitably packaged to prevent breakage in transport. The frequency of dispatch of slides to the centralized cytology laboratory will vary according to the work-load of the centre and the method of transport used, but slides should be sent at least once a week so that reports are returned to the clinic no later than 3–4 weeks after the smear has been taken. Delays of more than 1 month will interfere with appropriate follow-up and will eventually discredit the programme. The post office services or transport by health care vehicles, whichever is the cheapest or most reliable, can be used to deliver the slides to the laboratory.