

# Situation analysis for cervical cancer diagnosis and treatment in East, Central and Southern African countries

Zvavahera M. Chirenje,<sup>1</sup> Simbarashe Rusakaniko,<sup>2</sup> Leah Kirumbi,<sup>3</sup> Edward W. Ngwalle,<sup>4</sup> Pulani Makuta-Tlebere,<sup>5</sup> Sam Kaggwa,<sup>6</sup> Winnie Mpanju-Shumbusho,<sup>7</sup> & Lucy Makoa<sup>8</sup>

**Objective** To determine the factors influencing cervical cancer diagnosis and treatment in countries of East, Central and Southern Africa (ECSA).

**Methods** Data were collected from randomly selected primary health care centres, district and provincial hospitals, and tertiary hospitals in each participating country. Health care workers were interviewed, using a questionnaire; the facilities for screening, diagnosing, and treating cervical cancer in each institution were recorded, using a previously designed checklist.

**Findings** Although 95% of institutions at all health care levels in ECSA countries had the basic infrastructure to carry out cervical cytology screening, only a small percentage of women were actually screened. Lack of policy guidelines, infrequent supply of basic materials, and a lack of suitable qualified staff were the most common reasons reported.

**Conclusions** This study demonstrates that there is an urgent need for more investment in the diagnosis and treatment of cervical cancer in ECSA countries. In these, and other countries with low resources, suitable screening programmes should be established.

**Keywords:** cervix neoplasms, diagnosis, therapy, surgery; cervix dysplasia, diagnosis; cytodiagnosis; vaginal smears; community health centers; hospitals, district; hospitals, general; Zimbabwe; Lesotho; Kenya; United Republic of Tanzania; Uganda.

**Mots clés:** tumeur du col de l'utérus, diagnostic, thérapeutique, chirurgie; dysplasie du col de l'utérus, diagnostic; cytodiagnostic; frottis vaginal; centre de santé communautaire; hôpital régional; hôpital général; Zimbabwe; Lesotho; Kenya; République-Unie de Tanzanie; Ouganda.

**Palabras clave:** neoplasmas del cuello uterino, diagnóstico, terapia, cirugía; displasia del cuello uterino, diagnóstico; citodiagnóstico; frotis vaginal; centros comunitarios de salud; hospitales de distrito; hospitales generales; Zimbabwe; Lesotho; Kenya; República Unida de Tanzania; Uganda.

*Bulletin of the World Health Organization*, 2001, **79**: 127–132.

Voir page 131 le résumé en français. En la página 132 figura un resumen en español.

## Introduction

Cancer of the cervix is having a devastating impact on women's health around the world, especially in developing countries, where it is the most common cancer and the leading cause of death from cancer in

women. It is estimated that 500 000 new cases occur every year worldwide, the majority (80%) being in the developing world (1).

Although cervical cancer is a preventable disease, it still remains a major burden on public health resources in sub-Saharan Africa. Countries in this region have some of the world's highest age-standardized death rates from cervical invasive cancer, e.g. 67 per 100 000 people in Harare, Zimbabwe (2) and 40.8 per 100 000 in Kampala, Uganda in 1997 (3). Data from hospital-based registers in Nairobi, Kenya have indicated that cancer of the cervix accounted for 70–80% of all cancers of

<sup>1</sup> Senior Lecturer, Department of Obstetrics & Gynaecology, University of Zimbabwe, PO Box A178, Avondale, Harare, Zimbabwe. Correspondence should be addressed to this author.

<sup>2</sup> Lecturer, Department of Obstetrics & Gynaecology, University of Zimbabwe, Harare, Zimbabwe.

<sup>3</sup> Lecturer, Department of Obstetrics & Gynaecology, University of Nairobi, Nairobi, Kenya.

<sup>4</sup> Senior Lecturer, Department of Obstetrics & Gynaecology, University of Dar es Salaam, United Republic of Tanzania.

<sup>5</sup> Consultant, Ministry of Health, Maseru, Lesotho.

<sup>6</sup> Regional Director, Commonwealth Regional Health Community Secretariat, Arusha, United Republic of Tanzania.

<sup>7</sup> Lecturer, Makerere University, Kampala, Uganda.

<sup>8</sup> Clinical Nursing Officer, Ministry of Health, Maseru, Lesotho.

Ref. No. 99-0444

the genital tract and 8–20% of all cancer cases for the period 1981–90. It has been reported that there are 10–15 new cases of cervical cancer in Nairobi, Kenya each week (4). These findings are similar to data from Zimbabwe where cancer of the cervix accounted for 30% of all registered cancers and 80% of gynaecological cancers in the entire country in 1995 (2).

The effectiveness of cervical cancer screening by exfoliative cytology was demonstrated in the Scandinavian countries, where a substantial fall in incidence of cervical cancer occurred 5–10 years after the introduction of screening programmes (5). The Canadian Cancer Institute has also shown that there was a threefold reduction in the age-standardized death rate from invasive cervical cancer between 1969 and 1990, thanks to the national screening programme (6).

Accurate data on the magnitude of morbidity and mortality from cervical cancer in the countries of East, Central and Southern Africa (ECSA) are scanty and usually hospital based. Cancer registration in most of the low-resource countries is difficult because of inadequate sources of information within the health delivery system, and lack of reliable population data for estimating accurate incidence rates. To facilitate the proper planning of services for the prevention, early diagnosis and treatment of cervical cancer in the ECSA countries, a situation analysis was carried out. The objective of the study was to establish which factors influence cervical cancer diagnosis and treatment in the ECSA region.

## Materials and methods

A multicentre cross-sectional study was carried out in Kenya, Lesotho, Uganda, United Republic of Tanzania, and Zimbabwe between 1 May and 31 December 1997. For each participating country, data were collected from tertiary hospitals, provincial hospitals, district hospitals, and primary health care (PHC) centres selected at random by computer.

### Definitions of health care facilities in ECSA countries

*Primary health care (PHC) centres* are the basic operational facilities in the health care delivery system, focusing mainly on disease prevention and health promotion. Each centre usually serves a catchment area of 10 000 people living within a radius of 8–10 km from the centre. In this study, dispensaries, health centres, maternity homes and clinics were classified as PHC centres. *District hospitals* usually have surgical facilities, are headed by a medical officer and are the first referral unit for the PHC centres in the district. *Provincial hospitals* have specialists such as gynaecologists and general surgeons, and are referral centres for patients from the district hospitals in the province. *Tertiary hospitals* provide highly specialized care and usually have subspecialties in various disciplines (e.g. renal medicine, cardiology, and gynaecological oncology).

## Data collection

Interviews were conducted at each level of health care facility, and were carried out by pre-trained health workers, using a questionnaire. At PHC centres, the nurse in charge and other relevant health workers were interviewed. At district and provincial hospitals, the gynaecologist, medical officer in charge, director and nurse in charge of the maternal and child health services were questioned. At tertiary centres, the consultant gynaecologist, nurse in charge of the gynaecology outpatient clinic, nurse in charge of the maternal and child health services, and hospital administrator were interviewed. Each questionnaire addressed issues concerning the screening, diagnostic, and treatment facilities; human resources; and the communication and referral structures available to cervical cancer patients.

The facilities for screening, diagnosing and treating cervical cancer were recorded during visits to all the selected health institutions, using a previously designed checklist. The data collected in each country were coded by the principal investigator before entry into the computer, using the EpiInfo Version 6 programme, and cleared by each in-country coordinator before being sent to the coordinating centre in Harare, Zimbabwe. The data from the five countries were merged into one file and then analysed using EpiInfo.

## Results

The situation analysis was carried out in 159 PHC centres, 48 district hospitals, 24 provincial hospitals, and 12 tertiary hospitals in the five ECSA countries (Table 1). The tertiary and provincial hospitals in the study were all public institutions to which most of the referral cases from both public and private PHC centres and district hospitals were sent for treatment.

### Primary health care (PHC) centres

A total of 159 PHC centres participated in the study (42 in Kenya, 20 in Lesotho, 28 in Uganda, 40 in the United Republic of Tanzania, and 29 in Zimbabwe); this sample included 66 dispensaries (14 in Kenya, 20 in Uganda, and 32 in the United Republic of Tanzania). As seen in Table 2, most of the PHC centres surveyed had an examination room (92%), or an examination couch (87%) and screen (80%), where a patient could have a pelvic examination and a cervical smear taken. Basic prerequisites for taking a cervical smear (i.e. a speculum, spatula, glass slides, and a working light source) were available in 70% of the PHC centres. Although 80% of the health care workers in the five countries were aware of what a cervical Pap (Papanicolaou) smear was, only 17% of them had taken a smear in the preceding six months. Lesotho and Zimbabwe were the only countries in the ECSA region performing cervical cancer screening at a PHC centre. The number of Pap smears performed per centre across the five countries averaged four per month (nine per month in

Table 1. **Distribution of health care facilities (number existing and number surveyed) in the five ECSA countries**

Health care level		Kenya	Lesotho	Uganda	United Republic of Tanzania	Zimbabwe	Total
Primary	Existing	200	157	117	103	1114	<b>1691</b>
	Surveyed	42	20	28	40	29	<b>159</b>
District	Existing	60	NA	39	63	52	<b>214</b>
	Surveyed	12	NA	12	16	8	<b>48</b>
Provincial	Existing	7	16	4	17	8	<b>52</b>
	Surveyed	3	10	4	4	3	<b>24</b>
Tertiary	Existing	1	2	1	4	4	<b>12</b>
	Surveyed	1	2	1	4	4	<b>12</b>

NA = not applicable in this country.

ECSA = East, Central and Southern African countries.

Zimbabwe, while the other countries had one or none per month).

Some of the reasons given by health workers why very few women were screened in the ECSA region were the absence of policy guidelines, frequent shortages of materials needed for taking Pap smears, and the long distance and cost of sending the smear to the processing centre. The PHC centres surveyed in the five countries showed an average of six trained staff members per centre (two nurse clinicians, two state registered nurses, and two state certified nurses). It was reported that these numbers were adequate for staffing a cervical cancer screening service.

The records and follow-up of the 17% of patients who were screened in Lesotho and Zimbabwe showed an absence of precise management protocols, and resulted in poor outcomes. Some 31% of the PHC centres surveyed had seen at least two cases of invasive cervical cancer in the preceding year. Among the common problems and difficulties faced by women with cervical cancer, as reported by PHC staff, were the high cost of travel to the referral centre, the advanced stage of the disease due to late presentation in the PHC centre, and inadequate palliative care for terminally ill cases. There were no differences in the availability of facilities, staffing levels, and the number of women screened per month between the public-sector and privately-owned PHC centres in the mining and commercial farming areas.

### District and provincial hospitals

Of the 72 district and provincial hospitals surveyed, 37 (52%) carried out screening of patients for cervical cancer (Table 3). There were fewer institutions for screening in Uganda (15%) and the United Republic of Tanzania (5%) than in the other countries. The infrastructure required for taking a Pap smear (i.e. an examination room, or an examination couch and screen) was available in 99% of the institutions, while

Table 2. **The number of diagnostic facilities (in the checklist) available in primary health care centres surveyed in the five ECSA countries**

Diagnostic facilities	Kenya	Lesotho	Uganda	United Republic of Tanzania	Zimbabwe	Total
Examination room	37	20	20	40	29	<b>146</b>
Examination couch	37	19	22	31	29	<b>138</b>
Light source	29	14	17	22	27	<b>109</b>
Screen	33	14	16	36	28	<b>127</b>
Gloves	34	18	19	35	29	<b>135</b>
Sterilizers	29	16	21	37	28	<b>131</b>
Kidney dishes	35	20	21	37	29	<b>143</b>
Vulsellum forceps	14	16	9	27	27	<b>93</b>
Speculum	31	20	0	32	29	<b>112</b>
Spatula	30	15	14	31	28	<b>118</b>
Glass slides	16	13	12	38	27	<b>106</b>
Fixatives	3	11	0	20	15	<b>49</b>
Slide holder	8	9	0	27	8	<b>52</b>
Stationery	20	12	11	38	23	<b>104</b>
Marker pencil	10	11	11	37	15	<b>84</b>
Detergents	29	11	16	40	26	<b>122</b>

ECSA = East, Central and Southern African countries.

a speculum, spatula and glass slides were available in 80% of the hospitals.

Shortages of test materials (especially fixatives) and of staff (including cytology technicians), and lack of policy guidelines were the most common reasons given for not being able to carry out screening. The institutions performing screening were mostly family planning clinics (45%), postnatal clinics (29%), and gynaecology outpatient clinics (20%). A high proportion (57%) of the smears collected were taken by doctors. The number of Pap smears taken averaged only 24 per month per hospital, and the processing was carried out in the provincial hospitals (14%), tertiary hospitals (65%), and private laboratories (21%).

The absence of a cytology technician or histopathologist in all the district and most provincial

Table 3. Percentages of screening and treatment facilities, including the percentages of diagnostic facilities (in the checklist), in the district and provincial hospitals surveyed in the five ECSA countries

Facilities	Kenya	Lesotho	Uganda	United Republic of Tanzania	Zimbabwe	Total
	%	%	%	%	%	%
Screening	56	94	15	5	88	<b>52</b>
<b>Types of clinic carrying out screening</b>						
Gynaecology outpatient	7	36	5	5	47	<b>20</b>
Antenatal	1	19	0	0	6	<b>5</b>
Postnatal	9	58	0	10	66	<b>29</b>
Family planning	64	74	5	12	69	<b>45</b>
Average percentage of women screened per week	5	6	10	0	7	<b>6</b>
Punch biopsy	38	24	45	45	22	<b>35</b>
Cone biopsy	31	24	25	5	69	<b>31</b>
Colposcopy	13	0	5	5	5	<b>6</b>
Hospitals with a colposcope	19	0	5	5	5	<b>6</b>
<b>Diagnostic facilities</b>						
Examination room	100	100	95	100	100	<b>99</b>
Examination couch	100	100	100	95	100	<b>99</b>
Light source	100	930	80	65	100	<b>88</b>
Speculum	100	100	95	85	100	<b>96</b>
Spatula	88	100	40	65	97	<b>78</b>
Detergents	81	87	65	68	97	<b>80</b>

ECSA = East, Central and Southern African countries.

hospitals surveyed made it necessary for the specimens taken for screening to be dispatched to the tertiary hospitals and private laboratories. It took, on average, 4 weeks to obtain the results of the Pap smear and sometimes 6–8 weeks.

The survey also showed that only 31% of district and provincial hospitals had facilities to perform a biopsy on a woman with an abnormal Pap smear. Colposcopy was not available in any of the district hospitals, but 6% of provincial hospitals had this facility. The only mode of treatment offered for cervical precancer was cone biopsy (31%) at provincial hospitals. Equipment for cryotherapy and loop electrosurgical excision procedure (LEEP) was, however, not available in all the district and provincial hospitals surveyed. Only 21% of the provincial hospitals had a gynaecologist in place during the survey; their absence was a common reason given for failure to offer any cervical cancer treatment at these institutions throughout the ECSA region.

### Tertiary hospitals

All 12 tertiary hospitals in the participating countries were surveyed (1 in Kenya, 2 in Lesotho, 1 in Uganda,

4 in the United Republic of Tanzania, and 4 in Zimbabwe). All the hospitals reported that screening for cervical cancer was being carried out at the time of the study, except in the United Republic of Tanzania, where only one out of the four tertiary hospitals carried out screening. Screening facilities were available in all the hospitals, but the three Tanzanian hospitals that did not carry out screening reported infrequent supplies of materials such as fixatives and laboratory reagents as the most common constraint.

An average of 86 smears per month were carried out at each hospital, with the Tanzanian hospitals having the lowest number (40 per month). All the tertiary hospitals had facilities to process cervical smears although they reported having an inadequate number of cytology technicians. All had at least two histopathologists in place at the time of the survey. Punch biopsy, cone biopsy, and colposcopy services were available in all. Cryotherapy and LEEP were available in two hospitals: one in Zimbabwe and the other in Lesotho. The remaining hospitals used cone biopsy as the primary mode of treatment for cervical precancer. Surgical treatment services were available in all hospitals, but only those in Zimbabwe had two functional radiotherapy units with adequate staffing at the time of the survey. Hospitals in Lesotho had no radiotherapy equipment in place, while those in Kenya, Uganda and the United Republic of Tanzania, which had equipment, reported shortages of staff (a radiation oncologist and physicists) and isotopes.

Patients with advanced cervical cancer in most of the tertiary hospitals were offered palliative radiotherapy, analgesia, psychosocial support (through Island Hospice), blood transfusion and haematinics (agents to increase the haemoglobin content of the blood), and antibiotics for secondary pelvic infections.

## Discussion

As screening for cervical cancer in most developing countries is minimal or non-existent, there are few opportunities to diagnose precancerous lesions. Consequently the majority of patients are diagnosed with advanced-stage disease, which carries a high morbidity and mortality rate (1). In several ECSA countries, cervical cancer accounts for 80% of all gynaecological cancer admissions among young women, with a peak incidence in women aged 45 years; more than 50% of the patients present cancers beyond stage 3 (4, 7).

This study showed that 95% of the institutions surveyed at the primary, district, provincial and tertiary levels in ECSA countries had the basic infrastructure to perform exfoliative cervical cytology screening. However, only very few women were actually being screened for cervical cancer at the time of the survey, with an average of only four Pap smears per month at the primary level. On average, 20 smears per month were performed at the district



and provincial levels, and 86 smears per month at the tertiary level. Uganda and the United Republic of Tanzania showed the lowest numbers of women screened per month. This study thus confirms the findings from WHO, which reported that <5% of women in developing countries were screened for cervical cancer per year, compared with 45–50% of women in industrialized countries (8). The considerable differences in cervical cancer incidence rates are a result of the very low screening coverage in developing countries.

This survey showed that there were no clear policy guidelines on cervical cancer screening throughout the entire ECSA region. The few women who were screened were screened more by chance: they were often women under 25 years of age (at which age precancer lesions are not common), or symptomatic women who were harbouring invasive disease. The lack of policy guidelines could partly explain the very low number of women being screened in institutions that have the basic infrastructure and facilities for cervical cancer screening. However, the infrequent supply of materials (such as fixatives and laboratory reagents for staining the smears) and lack of cytology technicians in most of the surveyed institutions were often the reasons for missed screening opportunities.

Facilities to perform cone biopsy were available in 42% of the district and provincial hospitals, and yet it was carried out in only 31% of the provincial hospitals. Cone biopsy still remains an important procedure for both diagnostic and therapeutic management of cervical precancer, which ought to be available in all district and provincial hospitals. Only 4% of institutions surveyed in the region had the equipment to perform cryotherapy, although this mode of cervical precancer treatment is relatively inexpensive, does not require general anaesthesia, and has an 84% cure rate for treating cervical intra-epithelial neoplasia grade III (carcinoma in situ) lesions (9).

This study demonstrated that there is an urgent need for more investment in the diagnosis and treatment of cervical cancer in ECSA countries. Several studies have consistently shown that visual inspection of the cervix (VIA) or cervicospoty, after staining the cervix with 3–4% acetic acid, has a sensitivity of between 60% and 70% (10–12). Thus, countries with low resources (including those in ECSA) where organized cytology screening pro-

grammes are not feasible need to implement VIA programmes as an alternative to seeking new investments for the management of invasive cervical cancer. Currently, VIA increases treatment costs due to false-positive referrals. These high rates of false positives can be reduced by rigorous training programmes, especially if incorporated into a combined testing with VIA and treatment options with cryotherapy and LEEP (10).

Surgical facilities to operate on women with cervical cancer were available in 46% of the provincial hospitals, of which 21% had a gynaecologist to perform the operation. Thus, the majority of women with invasive cervical cancer are referred to tertiary hospitals, resulting in huge transport costs to the patient. There is also a need for investment so that a cytology technician or histopathologist is available in all provincial hospitals of the ECSA region. For any cervical cancer screening programme to be effective, each provincial hospital must have a resident pathologist and gynaecologist to avoid costly referrals to tertiary hospitals. The numbers of oncosurgeons, radiotherapists and physicists in the tertiary hospitals were inadequate. Radiotherapy centres were also few for the number of cervical cancer cases diagnosed each year. Kenya and the United Republic of Tanzania, each with a population of 30 million, have one radiotherapy centre for the entire country, in sharp contrast to Zimbabwe, which has a population of 11 million and two radiotherapy centres.

A direct association between increased incidence of cervical cancer and HIV infection has not been demonstrated (13), although increased rates of abnormal cytology among HIV-infected females has been observed (14). It would be cost-effective for policy-makers in HIV endemic areas in the ECSA region to incorporate urgently cervical cancer screening programmes with newly tested screening technologies such as VIA or cervicospoty, supported by cryotherapy and LEEP as treatment modes. ■

### Acknowledgements

We thank the Commonwealth Regional Health Community Secretariat (CRHCS) and the governments of Kenya, Lesotho, Uganda, United Republic of Tanzania, and Zimbabwe for granting permission to carry out this study, and for scientific and technical support. Funds for this project were provided by CRHCS and the Rockefeller Foundation (for data analysis and report writing).

## Résumé

### Diagnostic et traitement du cancer du col de l'utérus en Afrique orientale, centrale et australe : analyse de la situation

**Objectif** Déterminer quels sont les facteurs qui influencent le diagnostic et le traitement du cancer du col de l'utérus dans les pays d'Afrique orientale, centrale et australe.

**Méthodes** Dans chacun des pays participants, les données ont été recueillies auprès d'établissements de

différentes catégories – centre de soins de santé primaires, hôpitaux de district et de province et hôpitaux tertiaires – choisis par tirage au sort. Le personnel soignant a été interrogé au moyen d'un questionnaire, et on a utilisé une liste de contrôle préétablie pour noter les moyens de dépistage, de diagnostic et de traitement du

cancer du col de l'utérus en usage dans chaque établissement.

**Résultats** Bien que 95 % des établissements de santé des pays d'Afrique orientale, centrale et australe disposent, quel que soit leur niveau, de l'infrastructure de base pour le dépistage cytologique du cancer du col de l'utérus, seul un faible pourcentage de femmes en bénéficient réellement. L'absence de lignes directrices, les lacunes de l'approvisionnement en fournitures de

base et le manque de personnel qualifié en sont les raisons les plus fréquemment avancées.

**Conclusion** Cette étude montre qu'il est urgent que les pays d'Afrique orientale, centrale et australe investissent davantage dans le diagnostic et le traitement du cancer du col de l'utérus. Dans ces pays, ainsi que dans d'autres pays dont les ressources sont limitées, des programmes de dépistage appropriés devront être établis.

## Resumen

### Análisis del estado del diagnóstico y el tratamiento del cáncer cervicouterino en países de África oriental, central y meridional

**Objetivo** Determinar los factores que influyen en el diagnóstico y el tratamiento del cáncer cervicouterino en países de África oriental, central y meridional (AOCM).

**Métodos** Los datos proceden de una muestra seleccionada al azar de centros de atención primaria, hospitales distritales y provinciales y hospitales terciarios de cada país participante. Se entrevistó a los agentes de salud mediante un cuestionario, y se utilizó una lista de comprobación previamente establecida para registrar los servicios de cribado, diagnóstico y tratamiento del cáncer cervicouterino de que disponía cada institución.

**Resultados** Aunque el 95% de las instituciones de todos los niveles asistenciales de los países de AOCM

disponían de la infraestructura básica para llevar a cabo análisis citológicos del cuello uterino, en la práctica sólo se cribaba a un pequeño porcentaje de mujeres. Las razones más citadas para explicar ese hecho fueron la falta de directrices de política, el insuficiente suministro de material básico y la falta de personal cualificado.

**Conclusión** Este estudio demuestra que es urgente invertir más medios en el diagnóstico y el tratamiento del cáncer cervicouterino en los países de AOCM. Es necesario emprender programas de cribado adecuados tanto en esos países como en otros con recursos escasos.

## Referencias

1. **Parkin DM, Pisani P, Ferlay J.** Estimates of the worldwide incidence of eighteen major cancers in 1985. *International Journal of Cancer*, 1993, **54**: 594–606.
2. *1995 Annual Report.* Harare, Zimbabwe National Cancer Registry, 1997.
3. **Wabinga H.** Kampala Cancer Registry Data. In: Parkin DM et al., eds. *Cancer incidence in five continents. Vol. VII.* Lyon, International Agency for Research in Cancer, 1997: 82–85 (IARC Scientific Publication No. 143).
4. **Rogo KO et al.** Carcinoma of the cervix in an African setting. *International Journal of Obstetrics and Gynaecology*, 1990, **33**: 249–255.
5. **Hakama M et al.** Evaluation of screening programmes for gynaecological cancer. *British Journal of Cancer*, 1985, **52**: 669.
6. *Canadian cancer statistics, 1996.* Toronto, National Cancer Institute of Canada, 1996: 15.
7. **Kasule J, Coulson R, Akino V.** Cancer of the cervix in Zimbabwe: a prospective clinico-epidemiological study of 211 patients. *Obstetrics and Gynaecology of East and Central Africa*, 1989, **8**: 61–64.
8. Control of cancer of the cervix uteri (Memorandum from a WHO meeting). *Bulletin of the World Health Organization*, 1986, **64**: 607–618.
9. **Anderson ES, Huth M.** Cryosurgery for cervical intra-epithelial neoplasia: 10 year follow-up. *Gynaecologic Oncology*, 1992, **45**: 240–242.
10. **Megevand E et al.** Acetic acid visualisation of the cervix: an alternative to cytologic screening. *Obstetrics and Gynaecology*, 1996, **88**: 383–386.
11. **Wesley R et al.** Evaluation of visual inspection as a screening test for cervical cancer. *British Journal of Cancer*, 1997, **75**: 436–440.
12. **Chirenje ZM et al.** Visual inspection with acetic acid for cervical cancer screening: test qualities in a primary care setting. *Lancet*, 1999, **353**: 869–873.
13. **Beral V, Newton R.** Overview of the epidemiology of immunodeficiency-associated cancers. *Journal of the National Cancer Institute*, 1998, **23**: 1–6.
14. **Johnstone FD et al.** A population-based controlled study of the relationship between HIV infection and cervical neoplasia. *British Journal of Obstetrics and Gynaecology*, 1994, **101**: 986–991.