Screening for HIV related disease and sexually transmitted infections in patients with tuberculosis in Malawi

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SUMMARY.

A package of care for diagnosis and treatment of HIV-related disease and sexually transmitted infections (STI) was offered to patients with tuberculosis (TB) in Ntcheu and Mangochi. The aims of the study were to determine i) the prevalence of HIV-related disease and STI in TB patients, and ii) the feasibility of actively and regularly screening TB patients at the time of registration and during anti-TB treatment. During a 12-month registration period, all TB patients aged 15 years and above were screened and treated for HIV-related disease and STIs using a syndromic approach at time of registration and during treatment. 1230 adult TB patients were registered, of whom 1179 (96%) were screened soon after registration. 362 (31%) patients had an HIV-related disease and 61 (5%) had an active STI. 698 (57%) patients completed treatment and 346 (28%) died. HIV-related disease (OR 2.4 [95% CI, 1.8 - 3.2]) and STI (OR 2.6 [95% CI, 1.4 - 4.6]) were more commonly diagnosed on admission in patients who subsequently died compared with patients who completed treatment. During treatment, 240 HIV-related diseases and 21 STIs were diagnosed. Of those who completed treatment, the proportion who were screened progressively decreased and the proportion of screened patients diagnosed and treated with HIV-related disease and STI also progressively declined. Screening TB patients for HIV-related disease and STIs is worthwhile at the time of registration. During treatment, active screening for HIV-related disease is also useful, but there is no justification for active screening of STIs.

INTRODUCTION.

In Malawi, there is a strong association between HIV infection and tuberculosis (TB). In some districts, over 70% of TB patients are HIV-seropositive[1,2]. There is also a strong association between HIV and sexually transmitted infections (STI). The diagnosis and management of STI in health care facilities in the country is based on the syndromic approach proposed by the World Health Organization[3]. In Lilongwe, the capital city of Malawi, over 60% of patients with STIs were HIV-seropositive in the late 1980s[4]. In 1995, 70% of patients with STI in Blantyre and 40 - 55% of patients with STI in semi-urban areas were also found to be HIV-seropositive (source: National AIDS Control Programme, Malawi: 1995).Clinical research studies in Malawi[5], and elsewhere in sub-Saharan Africa[6,7,8,9], have found a high prevalence of HIV-related diseases in TB patients being registered for treatment. Some diseases, such as oral candidiasis, chronic diarrhoea and peripheral neuropathy, are amenable to inexpensive treatments which should be available for patients even in resource-poor countries. There is scarce information about the prevalence of STIs in TB patients in sub-Saharan Africa. Using a syndromic approach to diagnosis, the prevalence of an active STI in TB patients registered at Queen Elizabeth Central Hospital, Blantyre, in 1996 was high, and significantly more common than that found in patients of similar age and sex attending a general out-patient clinic[10]. These results support our belief that in high HIV-prevalent areas in sub-Saharan Africa a significant proportion of TB patients have an active STI. Treatment of bacterial STIs is highly effective in terms of cost per healthy life year saved [11], particularly as such treatment has been shown to reduce transmission of HIV infection[12,13]. Early diagnosis and treatment of STIs in TB patients would therefore be of benefit to the individual and also to the community. Despite these findings in clinical research studies, in routine health care settings in Malawi it is our impression that many HIV-related diseases and almost all STIs are unrecognised at the time of registration and may remain untreated during the course of anti-TB treatment. We therefore decided in two rural districts of Malawi to offer a package of care to patients with TB aimed at diagnosing and treating STIs and HIV-related disease at the time of registration and during anti-TB treatment. The aims of the study were i) to determine the prevalence of HIV-related disease and STIs in TB patients at the time of registration and during the course of treatment, and ii) to assess the feasibility of actively and regularly screening TB patients for these problems during the course of anti-TB treatment.

METHODS.

Setting.

The study was conducted in Ntcheu and Mangochi districts in Malawi between 1997 and 1999. Ntcheu is in the central region, with an estimated population in 1998 of 505,000. Mangochi is in the southern region, with an estimated population in 1998 of 699,000. Ntcheu district has one government hospital and 31 health centres, and Mangochi has one government hospital and 28 health centres. In 1996, the HIV-seroprevalence rate in women attending antenatal clinics was 24% in Ntcheu and 17% in Mangochi[14]. Annual TB case notification rates in 1997 were 96 per 100,000 in Ntcheu and 103 per 100,000 in Mangochi (source: National TB Control Programme). There is no information about community rates of STI in either district.

Diagnosis, Registration and Treatment of TB.

Diagnosis of TB in Malawi is based on passive case finding. Adult patients who have been coughing for 3 weeks or more are regarded as pulmonary (PTB) suspects. All such patients first submit three sputum specimens for smear microscopy for acid-fast bacilli (AFB). Patients who are sputum smear positive for AFB are classified as smear positive PTB and usually undergo no further investigations. In patients who are sputum smear-negative, routine chest radiography is performed and a diagnosis of smear-negative PTB is made on those with radiographic abnormalities consistent with TB. The diagnosis of extra-pulmonary TB (EPTB) is made according to clinical features, radiographic and laboratory findings. Once the diagnosis of TB has been made, patients are registered with the District TB officer at the District Hospital. Clinical details including age, sex, type of TB and history of previous treatment are entered into the District TB Registers. Treatment regimens for new TB patients differed in the two districts. In Ntcheu, a new oral ambulatory regimen was being piloted at the time of this study with the initial phase of DOT (directly observed treatment) being offered at hospital, at a health centre or by a guardian at home. All new patients with smear-positive PTB and serious forms of EPTB were given 2 months of daily directly observed rifampicin, isoniazid, pyrazinamide and ethambutol three times a week, followed by 6 months of daily self-administered isoniazid and ethambutol at home (2R3H3Z3E3 / 6HE). New patients with smear-negative PTB and less serious forms of EPTB were given a similar regimen except that ethambutol was removed from the initial phase. Patients were admitted to hospital for a period of 15 days for intensive health education about the need to take all their medication and to receive DOT. Patients were allowed to go home after 15 days if fit enough and if able to continue their initial phase by DOT at either a health centre or from a guardian. In Mangochi, the established regimens in use in the rest of Malawi were given to patients. New patients with smear-positive PTB and serious forms of EPTB received 2 months of daily directly observed streptomycin, rifampicin, isoniazid and pyrazinamide in hospital, followed by 6 months of daily self-administered isoniazid and ethambutol at home (2SRHZ / 6HE). New patients with smear-negative PTB and less serious forms of EPTB received 1 month of daily directly observed streptomycin, isoniazid and ethambutol in hospital, followed by 11 months of daily self-administered isoniazid and ethambutol at home (1SHE / 11 HE).

In both districts, the retreatment regimen for relapsed smear-positive PTB and treatment for patients with TB meningitis was given in accordance with IUATLD15 and WHO guidelines[16].

In all TB patients the final treatment outcome at 8 months or at 12 months was determined from the TB register and from TB treatment cards: these outcomes were categorised according to IUATLD and WHO guidelines[15,16].

TABLE 1. DRUG TREATMENTS FOR HIV-RELATED DISEASES AND STIs.

Sexually Transmitted Infections	
Syndrome:	**Treatment**
Genital Ulcer Disease (GUD)	Benzathine Penicillin and Erythromycin
Urethral Discharge (UD)	Gentamicin and Doxycycline
Genito-urinary symptoms in women: high risk (GUS-HR)	Gentamicin and Doxycycline and Metronidazole
Genito-urinary symptoms in women: low risk (GUS-LR)	Metronidazole
Pelvic Inflammatory Disease (PID)	Gentamicin and Doxycycline and Metronidazole
Acute scrotal swelling/pain (SS)	Gentamicin and Doxycycline
Painful inguinal lymph nodes (BU)	Doxycycline
Balanitis	Topical Gentian Violet
Genital warts	Podophyllin paint or Silver nitrate
HIV-related diseases	
Disease:	**Treatment**
Chronic diarrhoea	Co-trimoxazole or Metronidazole
Itching of the skin	Oral anti-histamine
Skin lesions (eg folliculitis)	Topical calamine lotion
Herpes zoster scar	Analgesics if painful
Kaposi's sarcoma	Analgesics if painful
Painful feet	Pyridoxine; amitryptiline
Oral candidiasis	Oral nystatin
Pain on swallowing (oesophageal candida)	Oral nystatin
Persistent Generalised Lymphadenopathy (PGL)	No treatment

TABLE 2: PREVALENCE OF HIV-RELATED DISEASE AND SEXUALLY TRANSMITTED INFECTIONS AT TIME OF REGISTRATION.

	Total	Ntcheu	Mangochi	Odds ratio [95% CI]a
No. patients aged 15 years and above who were registered	1230	485	745	
No (%) patients screened at time of registration	179 (96%)	454 (94%)	725 (97%)	
Of patients who were screened:-				
No (%) patients with HIV- disease	362 (31%)	176 (39%)	186 (26%)	1.8[1.4-2.4]
No. patients with 1 HIV- disease	273	127	146	
No. patients with 2 HIV- diseases	76	43	33	
No. patients with 3 HIV- diseases	13	6	7	
No (%) patients with STIb	61 (5%)	37 (8%)	24 (3%)	2.6[1.5-4.5]
No. patients with 1 STI	59	35	24	
No. patients with 2 STIs	2	2	0	

a Odds ratios - Ntcheu compared with Mangochi (only significant values shown)
b Sexually transmitted infection

Diagnosis and Treatment of HIV-related disease and STIs.

TB patients aged 15 years and above were screened clinically for HIV-related disease and active STIs (Table 1). STI screening was done using the syndromic approach proposed by WHO[3]. HIV-serological testing was not carried out because facilities for performing these tests were not available at either hospital. The two hospitals and their respective health centres were given antibiotics for treating STIs. Medications for treating HIV-related diseases came through the usual central medical stores/ district hospital channels. While the patients were receiving the initial phase of treatment in hospital, screening was carried out by a specially assigned clinical research officer (CRO). This was done soon after registration and thereafter every month - a private room was used for this purpose. When patients were discharged to the community, screening was carried out every month at a health centre by a medical assistant when patients were attending to collect the next one month's supply of anti-TB drugs. Specially designed proformas were used to record i) whether the patient

TABLE 3: TYPE OF HIV-RELATED DISEASE AND STI IN RELATION TO GENDER

No. patients screened	**Total 1179**	**Men 547**	**Women 632**
No (%) patients with:-			
HIV-related disease:	362(31%)	162(30%)	200(32%)
Chronic diarrhoea	67 (6%)	27 (5%)	40 (6%)
Skin itching	10 (1%)	3 (1%)	7 (1%)
Painful feet	27 (2%)	12 (2%)	15 (2%)
Pain on swallowing	13 (1%)	5 (1%)	8 (1%)
Oral candidiasis	97 (8%)	37 (7%)	60 (9%)
Lymphadenopathy (PGL)	112(9%)	59 (11%)	53 (8%)
Kaposi's Sarcoma	14 (1%)	9 (2%)	5 (1%)
Herpes Zoster scar	45 (4%)	19 (3%)	26 (4%)
Miscellaneous[a]	79 (7%)	24 (4%)	55 (9%)
STI:	61 (5%)	29 (5%)	32 (5%)
Genital ulcer disease	42 (4%)	24 (4%)	18 (3%)
Urethral discharge	1	1	N/A*
BU[b]	1	1	0
Scrotal swelling	0		
Balanitis	1	1	N/A
Genital warts	3	3	0
PID[c]	2	N/A	2
GUS-HR[d]	2	N/A	2
GUS-LR[e]	11	N/A	11

* = Not applicable
a = usually skin lesions
b = (BU) Painful inguinal lymphadenopathy
c = (PID) Pelvic Inflammatory Disease
d = (GUS-HR) Genito-urinary symptoms - high risk
e = (GUS-LR) Genito-urinary symptoms - low risk

had been screened, and ii) the type of HIV-related disease and/or STIs which had been diagnosed and treated. The diseases / syndromes recorded and the treatments given are shown in **TABLE 1**. These proformas were attached to the TB treatment cards, but duplicates were also kept by each CRO.

The CROs travelled to health centres in their districts on a regular basis to supervise the screening process and to update duplicate proformas which were kept in files back at the district hospital.

during one of the following periods: i) time of registration, ii) during the first 1 - 2 months of treatment, iii) during months 3 to 5 of treatment, iv) during months 6 to 8 of treatment and v) during months 9 - 12 of treatment (for patients receiving 1SHE/11HE in Mangochi only). Patients who die, default or transfer out to another district stop coming to health centres for clinical screening. To assess feasibility of screening patients at health centres after hospital discharge, we performed the analysis for patients who were known to have completed

TABLE 4: PREVALENCE OF HIV-RELATED DISEASE AND SEXUALLY TRANSMITTED INFECTIONS (STI) DURING ANTI-TUBERCULOSIS TREATMENT

	Total	Ntcheu	Mangochi	Odds ratio[a] [95% CI]
No.patients screened at registration	1230	485	745	
No screened during Months 1 and 2	856	212	644	
No (%) with HIV-disease	105 (12%)	43 (20%)	62 (10%)	2.4 [1.5-3.7]
No (%) with STI	13 (2%)	6 (3%)	7 (1%)	
No screened during Months 3,4,5,	510	180	330	
No (%) with HIV-disease	75 (15%)	46 (26%)	29 (9%)	3.6 [2.1-6.1]
No (%) with STI	3	2	1	
No screened during Months 6,7,8	396	128	268	
No (%) with HIV-disease	22 (6%)	16 (13%)	6 (2%)	6.2 [2.2-18.4]
No (%) with STI	4	2	2	
No screened during Months 9 - 12	105	-	105[b]	
No (%) with HIV-disease	0	-	0	
No (%) with STI	0	-	0	

a Odds ratios - Ntcheu compared with Mangochi (only significant values shown)
b Only patients in Mangochi with smear-negative PTB and less serious EPTB received standard treatment for 12 months

Training in Management of HIV-related disease and STIs.

The district TB officer, CROs, hospital clinical staff and medical assistants from health centres in each district underwent a special training course in the syndromic diagnosis and treatment of STIs before the study commenced. At the same time, they received education and retraining in the diagnosis and treatment of HIV-related diseases.

Data collection, evaluation and analysis.

In each district, base-line data was collected in all TB patients (adults and children) who were registered over a 12 month period: in Ntcheu this was between June 1997 and May 1998, and in Mangochi it was between May 1997 and April 1998. Data on clinical features, type of TB, TB-treatment outcome, HIV-related diseases and STIs were collected onto the special proformas for each patient. Data were entered into EPI-INFO, version 6.0 software.

Data were analysed to determine whether a) a clinical screening for HIV-related disease or STI had been done, and b) an HIV-related disease /STI had been diagnosed and treated at any time treatment and were therefore alive during the whole course of treatment. Differences between dichotomous variables and between districts were compared using the X2 test and 2-tailed Fisher's exact test, with differences at the 5% level being regarded as significant. Odds ratios (OR), their 95% confidence intervals (CI) and P values were calculated where appropriate.

RESULTS.

Patient characteristics.

There was a total of 1396 TB patients (adults and children), 569 in Ntcheu and 827 in Mangochi. There were 1230 TB patients aged 15 years and above, 571 men and 659 women with a mean (SD) age of 35 (12) years. With regard to marital status, 741 (60%) patients were married, 143 (12%) were single, 232 (19%) were divorced, 78 (6%) were widowed and in 36 (3%) the information was missing. There were 668 (54%) patients with smear-positive PTB, 332 (27%) with smear-negative PTB and 230 (19%) with EPTB. 1159 (94%) had new TB and 71 (6%) had a recurrent episode of TB. The only difference in

these characteristics between Ntcheu and Mangochi was a higher proportion of smear-positive PTB patients in Ntcheu (62%) compared with Mangochi (49%) - $p<0.05$.

HIV-related disease and STIs at registration.

Results are shown in **TABLE 2** for Ntcheu, Mangochi and for the two districts combined. Over 95% of patients aged 15 years and above were screened for HIV-related disease / STI at registration (similar between men and women). The proportion of screened patients was higher in Mangochi compared with Ntcheu. The reasons for not screening patients included death soon after admission (30 patients), patients being missed by the CRO (15) and patients absconding or being transferred early to another district (6). Of the unscreened patients, a higher proportion in Ntcheu (65%) died soon after admission compared with Mangochi (50%). Altogether 31% of screened patients had an HIV-related disease and 5% had an active STI, these proportions being significantly higher in Ntcheu compared with Mangochi. The different types of HIV-related disease and STI seen at registration for all patients, and for men and women are shown in **TABLE 3**. There were no differences in the proportion of men and women with an HIV-related disease or STI. Univariate analysis for marital status, type and category of TB showed significant differences for men only. The prevalence of HIV-related disease was significantly lower in single men (14%) and in men with smear-positive PTB (25%). Types of HIV-related disease were similar between men and women, except miscellaneous diseases (usually skin lesions) were found significantly more frequently in women compared with men - $p < 0.05$.

HIV-related disease and STIs during anti-TB treatment.

The numbers of TB patients who were screened during each treatment period, and the numbers and proportion who were diagnosed with an HIV-related disease or an STI are shown in **TABLE 4.** In both districts, the proportion of patients with HIV-related disease was less during treatment periods than at registration, and for smear-negative PTB patients who were seen during months 9 - 12 no HIV-related diseases were identified. During the three follow-up treatment periods (months [1,2]; months [3,4,5]; months [6,7,8]), significantly more patients from Ntcheu had an HIV-related disease compared with Mangochi. During these treatment periods, there was a total of 240 HIV-related diseases, including 30 patients with chronic diarrhoea, 23 with skin itching/papular folliculitis, 54 with painful feet and 50 with oral candidiasis/ painful swallowing. Few patients were diagnosed with STI. There were a total of 21 different STIs which included 9 genital ulcers, 4 of which had also been diagnosed at registration.

Screening Process and HIV-related disease / STI in relation to treatment outcome.

Of 1230 TB patients aged 15 years and above, 698 (57%) completed treatment, 346 (28%) died, 37 (3%) defaulted, 30 (2%) transferred out, 7 (1%) failed and in

TABLE 5: SCREENING ASSESSMENTS AND PREVALENCE OF HIV-RELATED DISEASE AND SEXUALLY TRANSMITTED INFECTIONS (STI) DURING ANTI-TUBERCULOSIS TREATMENT IN PATIENTS WHO COMPLETED TREATMENT.

	Total	Ntcheu	Mangochi	Odds ratio[a] [95% CI]
No.patients who completed treatment	698	260	438	
No (%) screened during Months 1 and 2 No (% screened) with HIV-disease No (% screened) with STI	569 (82%) 43 (8%) 7 (1%)	140 (54%) 15 (11%) 4 (3%)	429 (98%) 28 (7%) 3 (1%)	0.02 [.01-.05]
No (%) screened during Months 3,4,5 No (% screened) with HIV-disease No (% screened) with STI	438 (63%) 52 (12%) 1	180 (69%) 30 (17%) 1	330 (75%) 22 (7%) 0	2.8 [1.5-5.2]
No (%) screened during Months 6,7,8 No (%) with HIV-disease No (%) with STI	380 (54%) 20 (5%) 3	123 (47%) 15 (12%) 1	257 (59%) 5 (2%) 2	0.6 [0.5-0.9] 7.0 [2.3-22.7]
No. patients completing 12 months of treatment:- No (%) screened during Months 9 - 12 No (%) with HIV-disease No (%) with STI	156 102 (65%) 0 0	- - - -	156 102 (65%) 0 0	

a Odds ratios - Ntcheu compared with Mangochi (only significant values shown)

b Only patients in Mangochi with smear-negative PTB and less serious EPTB received standard treatment for 12 months

112 (9%) there was no information because treatment cards could not be found. Of those patients who died, the date of death was known in 274: 170 (62%) died during the first two months of treatment.

There were 314 TB patients who had clinical screening for HIV-disease / STI soon after registration and who subsequently died during treatment. 135 (43%) of these patients had HIV-related disease and 29 (9%) had an STI. There 686 TB patients who were screened soon after registration and who completed treatment. 164 (24%) of these patients had HIV-related disease and 26 (4%) had an STI. HIV-related disease (OR 2.4 [95% CI, 1.8 - 3.2]) and STI (OR 2.6 [95% CI, 1.4 - 4.6]) were diagnosed more commonly soon after registration in patients who died compared with patients who completed treatment. Screening assessments and the prevalence of HIV-related disease and STI were determined in patients who were known to have completed treatment. Results are shown in **TABLE 5**. In each treatment period up to 8 months, there was a gradual decrease in the proportion of all patients being screened: 82% in months 1 and 2, 63% in months 3 - 5, and 54% in months 6 - 8. The proportion of patients being screened was significantly lower in Ntcheu compared with Mangochi. 115 patients were identified with an HIV-related disease during this follow-up period, a higher proportion in Ntcheu compared with Mangochi. 11 patients in total were diagnosed with an STI during the follow-up period.

DISCUSSION.

In two rural districts in Malawi, over 95% of all adult TB patients who were registered for TB treatment were screened for HIV-related diseases and for STIs. The main reason for not screening patients was early death, soon after the start of TB treatment. Of those patients who were screened soon after registration, just over 30% had clinical HIV-related disease and 5% had an active STI. All the STIs were treated according to management guidelines, and many of the HIV-related diseases also received some treatment. The prevalence of HIV-related disease and STI was similar when analysed by gender, marital status, type and category of TB, with the exception that single men and men with smear-positive PTB had a lower prevalence of HIV-related disease. This latter finding is not unexpected. HIV-seroprevalence is lower in smear-positive PTB patients compared with those who have smear-negative PTB or EPTB[2], and HIV-infected patients with smear-positive PTB have less pronounced immunosuppression than HIV-infected patients with smear-negative TB[17].

The prevalence of HIV-related disease and STI was higher in Ntcheu than in Mangochi. There are several possible reasons for this. First, the HIV-seroprevalence rate in women attending

ante-natal clinics in 1996 was higher in Ntcheu than in Mangochi[14], and it is possible that HIV-seroprevalence rates in TB patients follow a similar pattern. In 1995, HIV-seroprevalence in TB patients in Ntcheu was 66%, similar to that observed in urban hospitals in the country[18]. Unfortunately, we have no comparable HIV-seroprevalence data in TB patients from Mangochi. Second, the quality of the clinical screening by the clinical research officers may have differed between the two sites. This was an operational study, and we did not check on quality of screening.

During the follow-up period, a lower proportion of screened patients were diagnosed with HIV-related disease and STI, and for smear-negative TB patients in Mangochi during the last 4 months of treatment no diseases were diagnosed at all. There are various explanations for these findings. First, diagnosing and treating HIV-related disease and STI at the time of admission should decrease the prevalence of these conditions during the following few months of treatment. Second, HIV-related disease and STIs were diagnosed more frequently on admission in patients who subsequently died during treatment compared with patients who completed treatment.

Where date of death was known, over 60% of the patients died during the first two months of treatment. Thus, survivors in the cohort were more likely to have a normal screening assessment. Third, clinical skills training is less of a priority for medical assistants than clinical officers, and the clinical screening of patients at health centres may have been less thorough than screening by CROs at the hospital. However, it was reassuring that during follow-up a similar pattern was found of more HIV-related disease and STIs being diagnosed in Ntcheu compared with Mangochi.

In patients who were known to have completed 8-months treatment, there was a general decline in the proportion who were screened as the months of treatment went by. During months 6 to 8, only 54% of all patients were screened and in Ntcheu this proportion was less than 50%. While it is possible that patients were screened but no information entered to the proforma, we feel that this is unlikely because entering data was an important part of the training and CROs supervised health centres specially to check on this aspect of the study.

The results of this study are helpful to the National TB Control Programme (NTP) in Malawi. Screening TB patients just after registration for HIV-related disease and STIs is a worthwhile clinical activity. There is the individual benefit of diagnosing and treating non-TB related morbidity, and early diagnosis and treatment of STIs has useful public health implications as well[12,13,19]. In both hospitals in Ntcheu and Mangochi, a special clinic has now been set up for syndromically diagnosing and treating STIs, and it is now routine for all adult TB patients to be referred to these clinics after registration. If other district hospitals have special STI clinics, then the NTP would advocate that TB patients be actively referred in the same way; one hospital in the Northern region has already started this practice. It is well recognised that a considerable proportion of patients with STI are asymptomatic, and it has been suggested that mass treatment of STI be considered as an alternative or a complimentary approach to STI and HIV control[20]. Further discussion, debate and research is probably needed before considering whether this approach is useful or cost-effective for TB patients in sub-Saharan Africa.

The NTP feels that it is also worthwhile actively assessing TB patients for HIV-related diseases during treatment. New problems occur, old problems recur and many can be treated with simple and inexpensive treatment. However, the results of this study do not support active screening of TB patients for STIs during anti-TB treatment. It is expensive to train health care workers from health centres, the training would have to be repeated at regular intervals because of staff mobility and illness, there needs to be regular supervision, and there are logistic problems in distributing and in ensuring security of anti-STI antibiotics in health centres. In this operational study, we found a steady decline in the proportion of TB patients being actively screened in health centres as anti-TB treatment progressed, and the pick-up rate of STIs was low. It is probably better to educate patients to self-recognise and report any new occurring STI to the health centre or the hospital.

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GLOSSARY

Guest glossarist: Ambrose Bierce (1842-?1914)

In 1911, when he was 69, the American cynic Ambrose Bierce published 'The Devil's Dictionary'. Many of the definitions in his Dictionary had a medical slant, and these are still worth noting today.

Belladonna, n. In Italian a beautiful lady; in English a deadly poison. A striking example of the identity of the two tongues.

Consult, v.t. To seek another's approval of a course already decided upon.

Dawn, n. The time when men of reason go to bed. Certain old men prefer to rise at about that time, taking a cold bath and a long walk with an empty stomach, and otherwise mortifying the flesh. They then point with pride to these practices as the cause of their sturdy health and ripe years; the truth being that they are hearty and old not because of their habits but in spite of them. The reason we find only robust persons doing this thing is that it has killed all the others who have tried it.

Dentist, n. A prestidigitator who, putting metal into your mouth, pulls coins out of your pocket.

Diagnosis, n. A physician's forecast of disease by the patient's pulse and purse.

Diaphragm, n. A muscular partition separating disorders of the chest from disorders of the bowels.

Distance, n. The only thing that the rich are willing for the poor to call theirs and keep.

Diversity, n. In each human heart are a tiger, a pig, an ass and a nightingale. Diversity of character is due to their unequal activity.

Editor. One who flings about him the splintering lightning and sturdy thunders of admonition till he resembles a bunch of firecrackers petulantly uttering its mind at the tail of a dog; then straightway murmurs a mild, melodious lay, soft as the cooing of a donkey intoning its prayer to the evening star.

Education, n. That which discloses to the wise and diguises from the foolish their lack of understanding.

Egotist, n. A person of low taste, more interested in himself than in me.

Liver. A large red organ thoughtfully provided by Nature to be bilious with. It was at one time thought to be the seat of life; hence its name - liver, the thing we live with...

Luminary, n. One who throws light upon a subject, as an editor by not writing about it. [We are rather hurt by Bierce's apparently low regard for editors - Ed].