



Safety in Mines Research Advisory Committee

Final Report

SIMRAC PROJECT SIM 02-08-02

MONITORING AND EVALUATION OF SUSTAINED CLINICAL PERFORMANCE AND TUBERCULOSIS MANAGEMENT IN THE SA MINING INDUSTRY

DR JILL MURRAY

National Institute for Occupational Health, National Health Laboratory Service;
School of Public Health, Faculty of Health Sciences, University of the Witwatersrand

DR MICHELLE WONG

Respiratory Unit, Department of Medicine, Chris Hani Baragwanath Hospital.
School of Clinical Medicine, Faculty of Health Sciences, University of the
Witwatersrand

DR MARK HOPLEY

Respiratory Unit, Department of Medicine, Chris Hani Baragwanath Hospital.
School of Clinical Medicine, Faculty of Health Sciences, University of the
Witwatersrand

PROF PETER LOWE

March 2004

EXECUTIVE SUMMARY

SIMRAC GEN 509 enabled the Pathology Department at the National Institute for Occupational Health to upgrade the structure of the autopsy data capture sheet to produce comprehensive annual reports and conduct specific problem-orientated data analyses. It was then possible to quantify the high proportion of pulmonary tuberculosis in miners at autopsy that appeared to be undiagnosed during life (~ 60%).

SIMRAC Health 611 clearly demonstrated that significant problems exist with regard to the diagnosis of pulmonary tuberculosis (PTB). Clinicians failed to diagnose PTB in 62% of cases coming to autopsy. The results, although not unique to the mining industry, indicated a need to develop practice habits, which would improve clinical performance.

SIMRAC Health 808 explored an effective method for improving the diagnosis and management of PTB by identifying, producing and distributing appropriate educational material for implementation of best practice. A review of the literature identified process based performance review, undertaken by clinicians themselves, to be one of the most effective ways of developing successful practice habits. The products (a manual in paper format and a CD version of the performance review process, four posters and a bookmark) were piloted with doctors from the gold, coal and platinum industries and from small and large medical centres. They were workshopped and enthusiastically welcomed by the end-users.

The overall aims of SIM 02-08-02 were to entrench the TB Performance Based Process Review (PBPR) and to evaluate the impact of this programme.

During the course of the project, many doctors and other health professionals were trained on the PBPR programme through attendance at various presentations, as well as at on-site mine visits.

Disappointingly, and despite the efforts of the study team, the mine doctors did not independently participate in the review exercise and submit the review forms. This was primarily due to time constraints and other clinical responsibilities. The literature confirms that these are common reasons for doctors not participating in quality improvement programmes.

Nevertheless, the programme appears to have, at least in part, made an impact on the proportion of missed cases of PTB, which decreased from 65% in 1999 to 54% in 2003 in the mining industry. The platinum industry was targeted in particular, as it has the highest rates of PTB, and the greatest decrease was found in these mines (from 65% to 47%). The doctors themselves were supportive of the programme and stated that it has changed their clinical practices with regard to diagnosing PTB.

Recommendations

- ? In order to continue this trend in the improvement of PTB diagnosis, the PBPR programme should continue to be marketed in the mining industry.
- ? Mine doctors should be encouraged to access the information on the website.
- ? Those hospitals where the greatest improvement took place were notable for the enthusiasm displayed for the PBPR programme by the senior staff members. Thus the support of senior doctors at mines hospitals should be garnered to ensure improved clinical practice with regard to the diagnosis of TB.

ACKNOWLEDGEMENTS

This research project was funded by the Safety in Mines Research Advisory Committee (SIMRAC), of the Mines Health and Safety Council. Guidance, stimulation and intellectual support was provided by Prof Mary Ross throughout the project.

To the many persons who have made valuable contributions to this study, we gratefully acknowledge our debt.

Particular thanks are due to:

- ✍ Dr Lucille Blumberg, National Institute for Communicable Diseases, National Health Laboratory Service, who reviewed additional topics for the website.
- ✍ Dr David Stanton, Chamber of Mines, who designed the web page and ensured that all the materials were accessible.

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GLOSSARY

C

CPD points

Continuing Professional Development points - a legal requirement for ongoing registration with the Health Professions Council of South Africa (HPCSA), obtained through attendance at seminars, lectures and other training sessions accredited with the HPCSA

M

MMOA

Mine Medical and Other Healthcare Professionals Association

N

NCOH

National Centre for Occupational Health, Department of Health

NIOH

National Institute for Occupational Health, National Health Laboratory Service (formerly the National Centre for Occupational Health, until October 2003)

P

PBPR (Process Based Performance Review)

The assessment of what health care workers are actually doing, and how well they are doing it. The process involves the identification of clinically important actions that ought to have been carried out in particular circumstances, followed by a periodic review of whether these actions have actually been carried out.

INTRODUCTION

One of the first SIMRAC-funded projects undertaken by the Pathology Department of the NIOH enabled the upgrade of the autopsy data capture system to produce comprehensive annual reports and conduct specific problem-orientated data analyses (GEN 509).¹ As a result, it became possible to quantify the high proportion (~ 60%) of pulmonary tuberculosis (PTB) in miners that appeared to be undiagnosed during life (Figures 1 and 2).

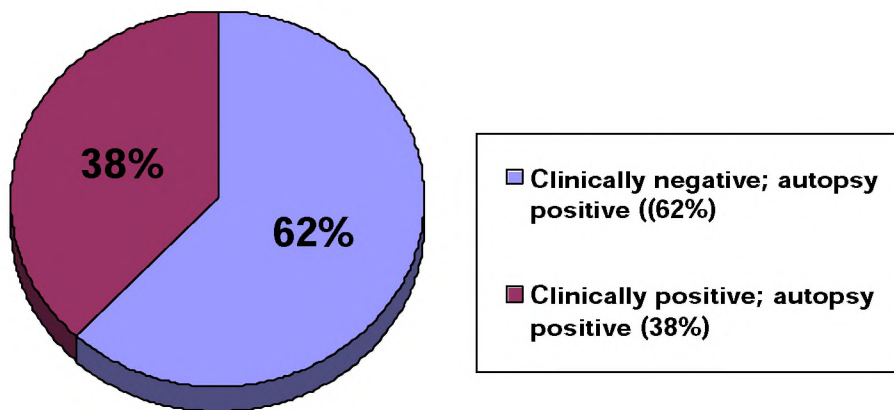


Figure 1. Distribution of cases with PTB at autopsy by clinico-pathological correlation

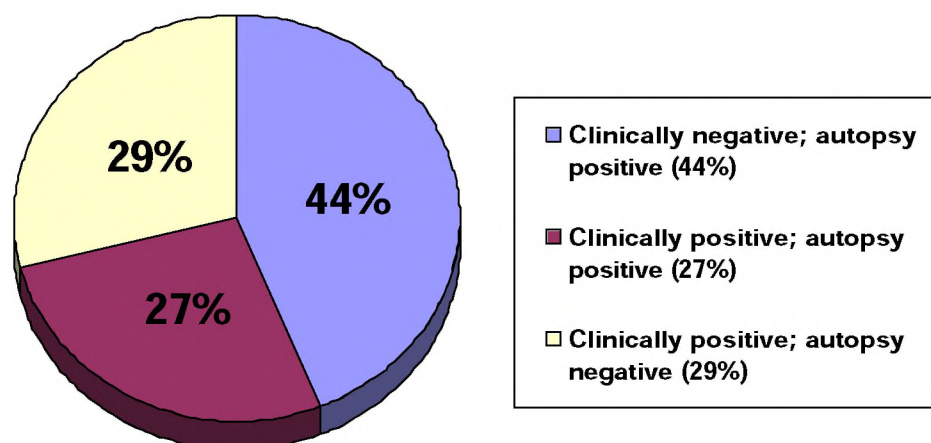


Figure 2. Distribution of cases with PTB at autopsy by clinico-pathological correlation

Consequently, a second SIMRAC project was undertaken (HEALTH 611: Clinico-pathological study to reduce the rate of missed and misdiagnosis PTB in the South African Mining Industry). The medical records of men found to have TB clinically and/or at autopsy in 1999, from a representative group of mine medical services, were reviewed. The omission of accurate clinical history, appropriate and timeous examination and diagnostic tests were identified as major contributing factors to delayed, mis- and missed diagnosis. The results, although not unique to the mining industry,²⁻⁵ indicated a need to provide the health care workers with an effective means of developing successful practice habits that would improve clinical performance.

The study team identified areas of clinical practice that could be improved to reduce the morbidity and mortality from TB, including omission of accurate laboratory diagnostic tests, and missed windows of opportunity for making a timely diagnosis at prior medical station / hospital visits. Clinicians failed to diagnose PTB in 62% of cases coming to autopsy.⁶

These two projects were instrumental in the design of Health 808 (Technology transfer of SIMRAC project HEALTH 611 to enhance clinical performance: process-based performance review for the diagnosis of PTB), which explored an effective method for improving the detection and management of PTB in life.

The purpose of this project was to develop, produce and distribute appropriate material to facilitate implementation of best practice with regard to TB in the mining industry. Although improvement in knowledge is essential, a structured, constructive and ongoing evaluation of health care workers' clinical performance is crucial to the success of the TB programme. Feedback based on autopsy findings in individual patients is invaluable. Although primarily focussed on TB, the process of performance based review also contributed to improved clinical practice related to other respiratory diseases, particularly those related to HIV infection.

HEALTH 808 developed innovative methods and technology to meet the identified needs of the end-users to enhance their clinical performance. A review of the literature^{7,8} identified process based performance review (PBPR), undertaken by clinicians' themselves, to be one of the most effective ways of developing successful practice habits. Process based performance review involves the identification of clinically important actions that ought to have been carried out in a particular condition, followed by a periodic review of whether these actions have actually been carried out.

A single page flow sheet was produced for review of medical records in conjunction with knowledge of the autopsy findings. The flow sheet format was chosen because it provides an efficient mechanism for constructive evaluation of clinical actions and has actually been shown to change clinicians' behaviour. The flow sheet identifies essential components in the history, physical examination and investigation for TB. The literature pertaining to these topics was reviewed and concise one page topic summaries were prepared to accompany the flow sheet.

The review process relies on the health care workers critically reviewing the process of patient care (in conjunction with the autopsy report) in order to identify and correct missed windows of opportunity to have made a timely and correct diagnosis.⁹

The products (a manual in paper format and a CD version of the performance review process, four posters and a bookmark) were piloted with doctors from the gold, coal and platinum industries and from small and large medical centres. They were workshopped with and enthusiastically welcomed by the end-users.

The overall aims of SIM 02-08-02 were to entrench the TB PBPR and to evaluate the impact of the Programme developed in Health 808.

OBJECTIVES AND METHODS

The objectives were:

1. To encourage the use of the training products developed in Health 808 through:
 - ? presentation of the Programme to medical personnel at various forums
 - ? on-site visits to mines to assist in establishing mine-based process based performance review programmes
 - ? awarding of Continued Professional Development (CPD) points
 - ? development of an on-line consultation service (web and e-mail based)
2. To analyse and evaluate the PBPRs developed in Health 808 and submitted by the mine health care workers, thereby evaluating the training products.
3. To refine the training products developed in Health 808
4. To monitor autopsies performed at NIOH on PTB cases to provide a measure of the Programme's impact.

Approximately 620 health professionals were exposed to the programme, either through presentations or at on-site visits.

PRESENTATION OF THE PROGRAMME

The proposed format of Health 808 was presented at the Mine Medical Officers' Association Annual Conference in May 2001.

Thereafter, two seminars, attended by a total of 96 people, were held to introduce the review process and distribute the material. A wide range of health care workers including doctors, nurses, physiotherapists and laboratory technologists attended. The seminars included "hands-on" practice using the flow sheet. The seminars were held at the Leslie Williams Memorial Hospital in Carletonville (gold mine) on 18 March 2002, and at the Rustenburg Golf Course (platinum mine) on 9 April 2002.

Health 808 was launched at two separate venues in 2002:

14 Nov 2002: Launch of Health 808. Lung Institute, University of Cape Town

23 Nov 2002: Launch of Health 808. Marie Curie Lecture Theatre, University of the Witwatersrand Medical School, Parktown, Johannesburg

In an effort to inform more medical personnel about the products of Health 808, to encourage the use of the TB PBPRs and to obtain interactive feedback to improve the interventive measures, the Programme was presented to the following audiences:

2 March 2002: University of the Witwatersrand DTM and H (Diploma in Tropical Medicine and Hygiene) postgraduate medical practitioners

19 April 2002: DME Mine Medical Inspectors: Annual Meeting for Mine Medical Officers, Hennops River

9 May 2002: Department of Medicine, Chris Hani Baragwanath Hospital

31 May 2002: Department of Medicine, Johannesburg Hospital

7 June 2002: Staff of the University of the Witwatersrand School of Public Health

24 October 2002: Research Forum, National Institute for Occupational Health

6 March 2003: University of the Witwatersrand DTM and H (Diploma in Tropical Medicine and Hygiene) postgraduate medical practitioners

28 May 2003: University of Pretoria DOH (Diploma in Occupational Health) students, CSIR, Lynnwood, Pretoria

11 November 2003: Progress report to SIMRAC, Mine Health and Safety Council, Braamfontein

4 February 2004: University of Pretoria DOH (Diploma in Occupational Health) students, CSIR, Lynnwood, Pretoria

4 March 2004: University of the Witwatersrand DTM and H (Diploma in Tropical Medicine and Hygiene) postgraduate medical practitioners

ON-SITE VISITS TO MINES

Due to the poor response of mine medical officers submitting the PBPR sheets (see section on analysis of PBPRs), it was apparent that a more proactive approach to the problem was required. The approach taken was in the form of face-to-face contacts. This was, however, hindered by the lack of resources with regard to time available to project members to coordinate and attend a large number of meetings at scattered locations. Drs Mark Hopley and Michelle Wong had an increased work load, and Dr Hopley resigned from Chris Hani Baragwanath Hospital early in 2003.

Two hospitals (Andrew Saffy Hospital and Anglo Platinum Mine Hospital) were targeted for follow-up visits, as the mine medical officers at these hospitals had indicated that they would value visits by the protagonists of the PBPR. Post-1999 data from PATHAUT also indicate that the incidence of active tuberculosis diagnosed at autopsy is greater in the platinum sector than the gold sector,¹⁰ which has traditionally been regarded as the priority commodity. These data suggested that the platinum sector was (and remains) an important target for clinical programme review.

19 June 2002: visit to Andrew Saffy Hospital, by invitation from Dr C Biden, Senior Medical Officer , Afrox Mining Health.

21 August 2002: visit to Anglo Platinum Mine Hospital by invitation from Dr Mark Thomson, Mine Officer in charge of TB at Anglo Platinum.

29 January 2003: a second meeting was held at Anglo Platinum mine hospital in Rustenburg. This meeting was initiated by Dr Lettie la Grange and coordinated by Dr Ravi Chetty, as Dr Mark Thomson had left the mine.

27 June 2003: the study team visited Dr Dave Griffiths and his staff at Duff Scott Hospital.

Other regional mine-based training seminars are planned for 2004 at Harmony Gold Mine in Welkom and St Helena Hospital. These seminars are being organised by Dr Stuart Shearer and Elmien le Roux and invitations will be sent to mine nurses, mine medical station staff and doctors, as well as TB state clinics, in the Welkom and Virginia regions.

NIOH autopsy reports on relevant cases were distributed to the doctors from participating mines, at on-site visits and, thereafter, on request.

REVISION AND DISTRIBUTION OF TRAINING MATERIALS

The training materials were reviewed and revised where necessary, taking into account comments received from those who participated in the PBPR process and training. The 2002 calendar on the back of the bookmark was replaced with a calendar for 2003.

Training materials were distributed at all presentations and on-site visits for widespread use within health care settings.

CPD ACCREDITATION

One CPD point is accredited for each PBPR form submitted. This system was established as an incentive for the doctors to return the forms. However, the envisaged return of CPD-accredited performance review sheets was abysmal. Only one doctor completed and submitted a PBPR flow sheet at his own initiative . Consequently, in November 2003, a consensus was reached that web-based CPD accreditation would not be feasible.

The mechanisms for the web-based version of CPD accreditation have been set up and will be activated, later, if the return of the PBPR can be stimulated, and if there is a desire for such a system by the users.

CPD points were credited to those who attended the seminars and on-site mine visits.

E-MAIL BASED CONSULTATION SERVICES

It was envisaged, at the start of the project that mine doctors would request information pertaining to TB and the PBPR, via e-mail. Thus, the implementation of interactive induced-response e-mails to elicit interest and meet the requirements of mine doctors was originally planned. However, it soon became apparent that a more interactive approach was required whereby mine medical officers could proactively access information pertaining to the PBPR of TB. Thus, a web-based system was developed and implemented, in preference to an e-mail system, with the assistance of Dr David Stanton.

WEB PAGE

The entire PBPR system was put onto a web page. This system can be accessed via the Mine Medical Officers Association website (<http://www.mmoa.org.za>) by clicking on "TB Subweb". Alternatively, the subweb can be accessed directly on <http://www.mmoa.org.za/TB>. The site is linked to both the Association of Societies for Occupational Safety and Health (<http://www.asosh.org>) and SIMRAC (<http://www.simrac.co.za>) websites.

Mine medical officers are alerted to updates and new information, using the MMOA e-mail mailing list. All the material for the PBPR of TB is accessible, including the 25 topic summaries that were developed for the review in Health 808.

Mine medical officers are able to request a visit, by the project team, to their mines. There is also an option to request copies of autopsy reports from the National Centre for Occupational Health. Clinical queries can be directed to Dr Michelle Wong, and laboratory queries to Dr Lucille Blumberg. In future, it will be possible to print both the posters and bookmarks directly from the website.

Current topics of interest will continue to be made available through the website. These have been, and will continue to be, prepared by Dr Michelle Wong and her staff at Chris Hani Baragwanath Hospital, and Dr Lucille Blumberg. The first five additional topics arose as a result of visits to the mines, and suggestions from the doctors there. These have been completed and are available through the website.

- ? Diagnosis of multi-drug resistant tuberculosis
- ? Treatment of multi-drug resistant tuberculosis
- ? The use of steroids in tuberculosis treatment
- ? Paradoxical reactions in tuberculosis
- ? Tuberculosis drugs and hepatotoxicity

ANALYSIS AND EVALUATION OF PROCESS BASED PERFORMANCE REVIEWS

Although the concept of PBPR in the diagnosis of tuberculosis was well-received at all centres where it was presented, the envisaged response (return of CPD-accredited performance review sheets) was disappointing. Verbal feedback from mine doctors indicated that, although the idea was regarded favourably, the completion and submission of the PBPR sheets was considered too time-consuming. Many expressed the view that they had benefited from attending the workshops and

had consequently changed their clinical practice. A number of anecdotal reports through the MMOA executive and others indicate implementation of the recommendations such as fine needle aspirations for diagnosis.

In 2003, it was decided that there could be no analysis of the process-based performance reviews, as originally planned. Instead, as described, regional-based training seminars continued for an extended period, at the request of mine medical officers.

MONITORING OF NIOH PERFORMED AUTOPSIES

The impact of Health 808 was evaluated by monitoring the concordance between clinicians' diagnoses and pathological findings from autopsies performed at NIOH, and comparing these to the findings of the Health 611 study. We anticipated that internal performance review at these hospitals would allow the more timely diagnosis and treatment of patients with TB, and expected this to be borne out by the finding of more accurate clinical diagnoses being made on death certificates and fewer deaths directly attributable to TB.

The overall rate of PTB at autopsy has increased from 1999 to 2002, by more than 50% (Table 1). This is largely attributed to the increase in the PTB rate in black miners, particularly in black platinum miners where the rate has more than doubled over this period, from 179 to 383 per 1000.

Table 1. Rate of PTB at autopsy (per 1 000)

Year*	Overall	Black men All industries	Black men Platinum	Black men Gold
1999	123	174	179	171
2000	159	217	251	219
2001	192	267	345	251
2002	206	287	383	274

* rates for 2003 are not yet available

To measure the effectiveness of the PBPR programme, it was necessary to calculate the proportion of cases coming to autopsy that were not diagnosed clinically (missed or misdiagnosed cases of PTB) since Health 611 was completed in 1999. Figures are available for 2003, and these were compared with the figures for the previous four years. There has been improvement in case finding. The proportion of "missed" cases has decreased from 65% in 1999 to 54% in 2003, in all miners coming to autopsy at NIOH, regardless of mining type (Figure 3). This difference is statistically significant.

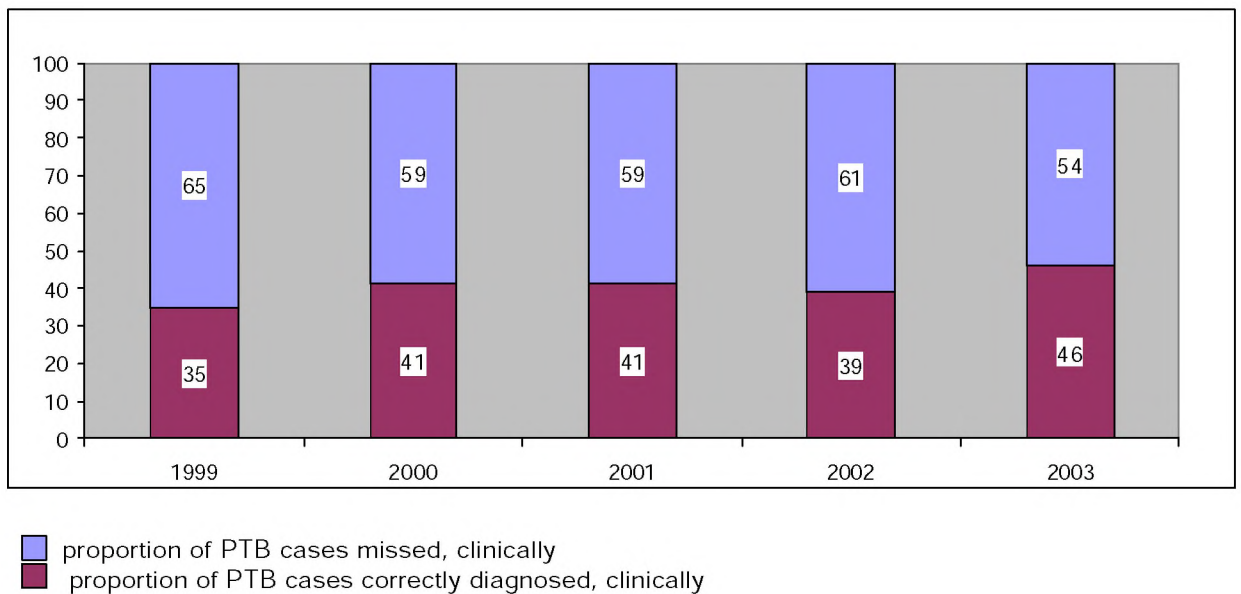


Figure 3. PTB cases diagnosed, all commodities

For gold miners, the reduction in missed or misdiagnosed cases of PTB was similar to that for all commodities. The proportion dropped from 64% in 1999 to 53% in 2003 (Figure 4). This difference is statistically significant.

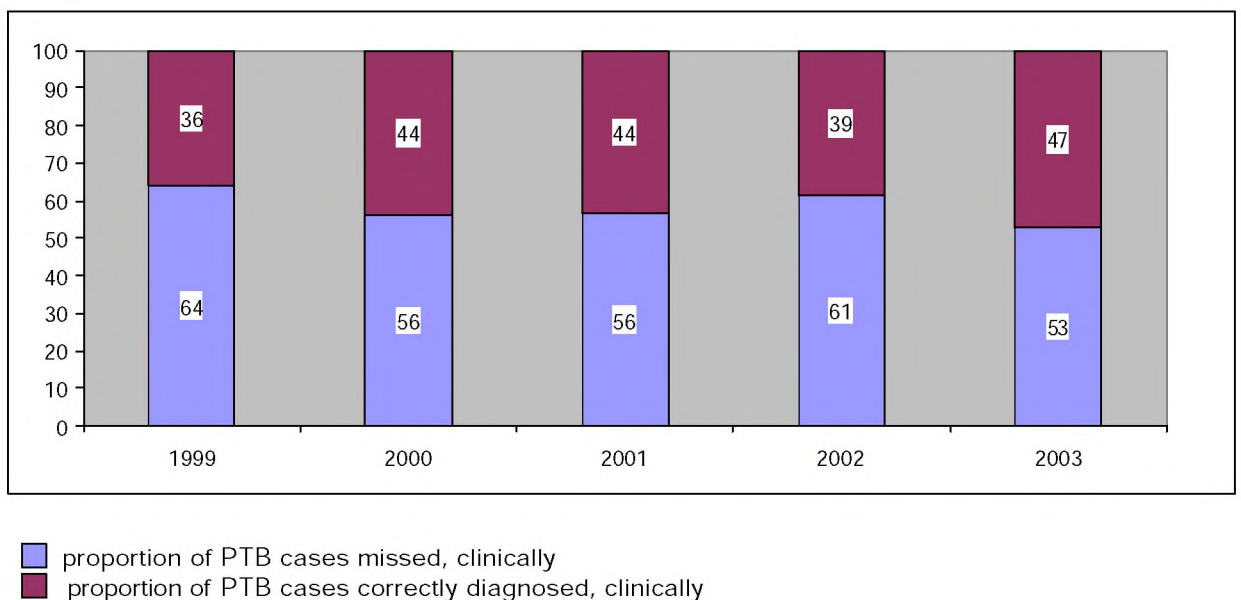


Figure 4. PTB cases diagnosed, gold mines

The platinum mines showed the most improvement. In 1999 the proportion of PTB missed clinically was 65%. Over the following four years there was a consistent decrease, to 47% in 2003 (Figure 5). This is not a statistically significant difference, probably due to the small number of platinum miners in the analysis.

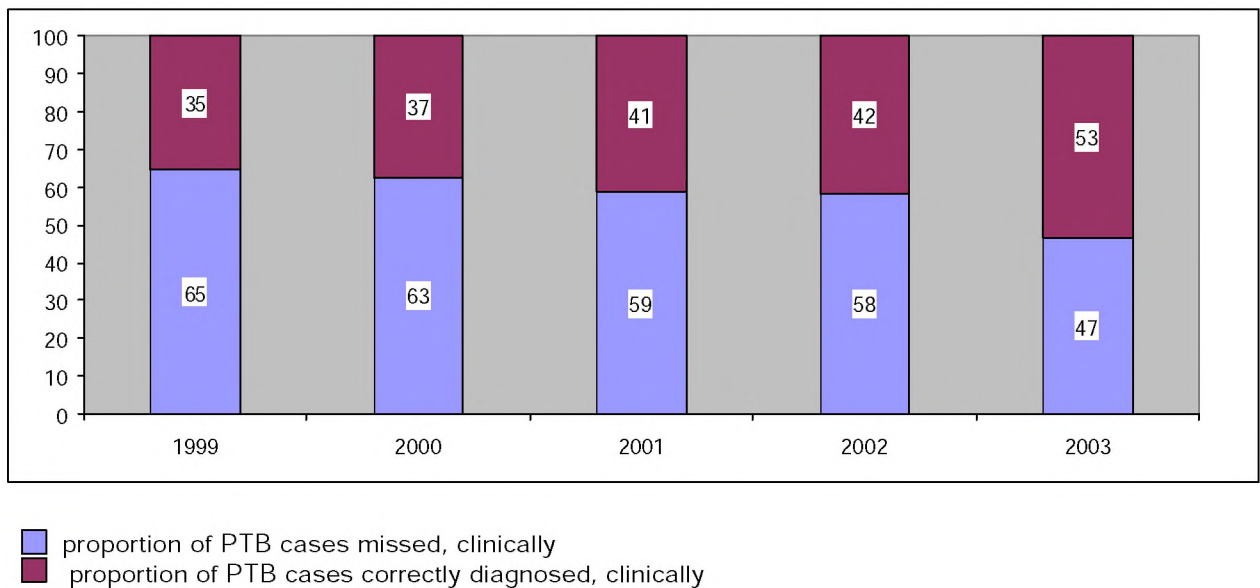


Figure 5. PTB cases diagnosed, platinum mines

DISCUSSION

At the beginning of this project, a consensus was reached to direct TB PBPR training to health personnel at the platinum mines. The primary reason for this was the increasing PTB rates in the platinum mining industry. It was therefore gratifying to see that the platinum mines showed the greatest consistent improvement in the diagnosis of PTB from 1999 to 2003. We had hoped to see a corresponding decrease in the TB rates at autopsy but it may, as yet, be too early to see this improvement reflected in TB mortality rates.

The optimism and enthusiasm that was displayed at each presentation, and at the on-site visits (where the process was followed, using TB cases from that mine) was encouraging. This general feeling was communicated to the study team on a number of occasions throughout the study period. The doctors reported that participating in the exercise of the PBPR had caused them to change their practice and that they were paying more attention to lymph node aspirations, TB cultures, dual pathology, miliary TB, etc. This is, to a certain degree, reflected in the results reported in this document.

At the meeting of the MMOA Executive Committee held on 28 March 2003, some of the executive members reported that PTB rates in their groups had increased over the last year and they attributed this, at least in part, to the implementation of the process-based performance review of TB which had led to improved diagnosis.

The formal utilisation of the PBPR programme was, however, disappointing. The doctors did not independently complete the review forms, reportedly due to an overload with other clinical and administrative responsibilities. The only PBPR that was submitted came from a platinum mine doctor. The doctor who submitted the report stated that the exercise had been greatly beneficial and had altered his practice. At the same time, he did not feel that it was necessary to continue the PBPR exercise as he had internalised the process.

Despite the relative ease of earning CPD points, time constraints remained a major obstacle. Accumulation of CPD points in this way is an active exercise, and doctors may favour passive attendance at a lecture or seminar for CPD accreditation.

We strongly believe that, had the doctors actively and independently participated in the programme, and submitted the review forms, we would have seen a far greater improvement in the diagnosis of TB.

The PBPR method was chosen because a review of the literature showed that providing informational material to increase knowledge in an attempt to improve clinical performance is unlikely to succeed as knowledge alone does not ensure improved clinical competence i.e. the ability to care for patients.^{7,11}

Although doctors have a desire to deliver high quality care, they also appear to have a resistance to organised efforts for quality improvement. Resistance by doctors towards activities promoting quality assurance and improvement is claimed to be found across all countries and health systems,¹² and there is extensive literature indicating that changing clinical performance is not easy.¹³⁻¹⁵

The reluctance to be proactive in improving clinical performance, and the reasons for this, have been discussed in the literature.¹⁶⁻¹⁹

Doctors may not agree with the type of quality improvement programme

This did not appear to be the case for non-compliance with the TB Review Process. The choice of the tool used in this project was well researched and has not been challenged. It was welcomed as appropriate and potentially effective for improving the diagnosis of TB. Feedback indicated that doctors were supportive of the review process, in principle (to the extent that some had changed their practices).

In order to change, one needs to acknowledge that, however good one's performance has been, it is not as good as it could be

Doctors may view quality improvement programmes as an opportunity to blame them for things that may happen to a patient. However, this Review Process provides a non-judgemental tool that can be effectively used to improve clinical skills, without the unpleasant task of admitting personal diagnostic shortcomings. Doctors voiced the opinion that they did not feel "judged" by the review process and were more than willing, in principle, to follow it.

Medical students are not taught the concept of continuous quality improvement and the core skills required for this

A crucial challenge is to help medical students learn the knowledge and skills needed for improvement during their undergraduate education at the same time as they learn their professional knowledge and skills. Until such a time however, this can only be achieved through ongoing training during clinical practice. Such training needs to be repeated often, due to the high turnover of medical staff on the mines, and consequent loss of skills. As an attempt to dilute this loss, we will continue to market the PBPR, primarily through material posted on the website, as well as through the ongoing distribution of the training materials.

Doctors believe that they are being asked to participate in a quality improvement programme in addition to all their other responsibilities

This is the most important reason that doctors do not participate in quality assurance programmes such as the PBPR. People cannot change unless they are so enabled. Sanctioned time included in working hours would provide the opportunity for PBPR in people's busy schedules and legitimise their contributions. Opportunities need to be

provided to help make change a practical and painless process. Sustained senior management support, as well as commitment to and enforcement of initiatives are prerequisites for the success of such a programme.

These well-established reasons for noncompliance may explain the fact that the mine doctors did not independently participate in the review exercise and submit the review forms, particularly the time constraints and other clinical responsibilities. However, despite these obstacles, the PBPR appears to have impacted on the mine doctors' clinical practice, decreasing the proportion of missed TB cases from 65% to 54% since 1999 when the programme was first introduced.

The doctors who participated in the PBPR programme will be notified of the improved statistics, thereby providing positive reinforcement of the programme and encouraging them to maintain the lessons learned.

Approximately 620 health care professionals were exposed to the programme during the study period; efforts will continue to reach other health care professionals in the mining industry, primarily through the distribution of the training materials.

CONCLUSION AND RECOMMENDATIONS

- ? In order to continue this trend in the improvement of PTB diagnosis, the PBPR programme should continue to be marketed in the mining industry. This could be through formal and informal presentations of the programme, or at more on-site visits. The DME medical inspectors could also be used as advocates of the programme. The possibility of an annual refresher workshop, attended by the mine medical officers could also be considered.
- ? Mine doctors should be encouraged to access the information on the website. The website should be "advertised", and mine doctors informed, through the MMOA, when new topics are posted on the website.
- ? Those hospitals where the greatest improvement took place were notable for the enthusiasm displayed for the PBPR programme by the senior staff members. Thus the support of senior doctors at mine hospitals should be garnered to ensure improved clinical practice with regard to the diagnosis of TB.

REFERENCES

1. Murray J, Hnizdo E, Coetzee L. Surveillance of Respiratory Disease across the mining industry using the autopsy (PATHAUT) database. Final Report SIMRAC GEN 509: Safety in Mines Research Advisory Committee, 1998.
2. Edlin GP. Active tuberculosis unrecognised until necropsy. *Lancet* 1978;**1**(8065):650-2.
3. Flora GS, Modilevsky T, Antoniskis D, Barnes PF. Undiagnosed tuberculosis in patients with human immunodeficiency virus infection. *Chest* 1990;**98**(5):1056-9.
4. Bobrowitz ID. Active tuberculosis undiagnosed until autopsy. *Am J Med* 1982;**72**(4):650-8.
5. Ashkin D, Hollender ES, Narita M. "Won't get fooled again" (by tuberculosis). *Chest* 1999;**116**(4):856-7.
6. Murray J, Back P, Coetzee L, Lowe JP. Clinico-Pathological Study to reduce the rate of missed and misdiagnosis of Pulmonary Tuberculosis in the South African Mining Industry. Final Report SIMRAC HEALTH 611: Safety in Mines Research Advisory Committee, 2000.
7. Sackett DL, et al. Evidence-based Medicine. 2nd Edition ed. Edinburgh: Churchill Livingstone, 2000.
8. Sackett DL, et al. How to review your own performance. In: Clinical Epidemiology. 2nd ed. Boston: Little, Brown and Company, 1991.
9. Murray J, Wong M, Hopley M, Lowe P. Technology transfer to enhance clinical performance: process-based performance review for the diagnosis of pulmonary tuberculosis. Final Report SIMRAC HEALTH 808: Safety in Mines Research Advisory Committee, 2002.
10. Murray J, Candy G, Nelson G, Khumalo L. Pathology Division Report: Demographic data and disease rates 2002. Report 7/2003: NCOH, 2003.
11. Norman GR, Neufeld VR, Walsh A, Woodward CA, McConvey GA. Measuring physicians' performances by using simulated patients. *J Med Educ* 1985;**60**(12):925-34.
12. Shekelle PG. Why don't physicians enthusiastically support quality improvement programmes? *Qual Saf Health Care* 2002;**11**(1):6.
13. Grimshaw JM, Russell IT. Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations. *Lancet* 1993;**342**(8883):1317-22.
14. Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance. A systematic review of the effect of continuing medical education strategies. *Jama* 1995;**274**(9):700-5.
15. Oxman AD, Thomson MA, Davis DA, Haynes RB. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *Cmaj* 1995;**153**(10):1423-31.
16. Davidoff F. Shame: the elephant in the room. *Bmj* 2002;**324**(7338):623-4.
17. Batalden PB, Stoltz PK. A framework for the continual improvement of health care: building and applying professional and improvement knowledge to test changes in daily work. *Jt Comm J Qual Improv* 1993;**19**(10):424-47; discussion 448-52.

18. Delivering better healthcare: Bandolier. Evidence-based health care, December 2001. <http://www.jr2.ox.ac.uk/bandolier/booth/mgmt/Better2.html>.
19. Grimshaw JM, Shirran L, Thomas R, et al. Changing provider behavior: an overview of systematic reviews of interventions. *Med Care* 2001;**39**(8 Suppl 2):112-45.

APPENDIX 1 First pages of TB Subweb

"TB Subweb", accessed via (<http://www.mmoa.org.za>)

Welcome to the TB pages of the MMOA Web Site

[Enter Here](#)

We invite members of the MMOA to contact: Dr Jill Murray (Head: Pathology Directorate, National Centre for Occupational Health) and/or Dr Michelle Wong (Head: Respiratory Unit, Chris Hani Baragwanath Hospital) for the purposes of arranging a visit to your hospital or clinic.

We welcome the opportunity to share your experiences in the diagnosis and management of TB, and are willing to discuss Process based Performance Review in the diagnosis of TB (SIMHEALTH 808).



[Dr. Michelle Wong](#) can be contacted for clinical queries.



[Dr. Jill Murray](#) may also be contacted for the results of autopsies performed on patients employed by the mines.



[Dr. Lucille Blumberg](#), Microbiologist, National Institute for Communicable Diseases, can be contacted for assistance on microbiological and laboratory aspects of TB.

TB updates posted regularly.

Contact [Dr. Jill Murray](#) for one-page summary on the use of Steroids for TB

[Resources](#)

17 November 2003

PROCESS-BASED PERFORMANCE REVIEW FOR THE DIAGNOSIS OF PULMONARY TUBERCULOSIS

Recent [SIMRAC](#) research in the mining industry (**SIMHEALTH 611**) found that clinicians failed to diagnose PTB in 44%, incorrectly ascribed PTB as the cause of death in 29%, and correctly ascribed PTB as the cause of death in 27% of patients autopsied. This high rate of missed diagnoses means that many patients will have died prematurely. It also means that patients continue to spread the TB organism to their fellows, when early diagnosis and treatment would have prevented this. **SIMHEALTH 808** aims to produce and distribute material that will help to improve clinical performance and programme management of TB.

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APPENDIX 2 Example of a PTB current topic of interest

THE USE OF STEROIDS IN TUBERCULOSIS

The adjunctive use of steroids in TB may be definitively advocated only in patients with adrenal TB. Additional reasonable indications are TB meningitis, pericarditis, lymphadenitis associated with compressive symptoms, and prominent persistent constitutional symptoms. Little data is available for HIV positive patients with TB.

Despite the availability of effective drugs against TB, many patients still suffer the consequences of the host's immune response to mycobacterial infection. This inflammation, often followed by fibrosis, may lead to organ dysfunction and result in permanent pathophysiological sequelae. The adjunctive use of steroids in TB would seem to be a reasonable strategy to minimize this and to improve outcome. Appraisal of medical literature reveals that there is a paucity of controlled, randomised trials investigating the potential benefit of steroids. Even more so, there is a dearth of reports in HIV positive patients with TB. The dose, duration and type of steroid used in reported studies varies considerably. It should also be noted that Rifampicin induces the metabolism of steroids (intended dose of steroids should be approximately doubled whilst patient is receiving Rifampicin).

Clinical situations where steroids have been shown to have benefit

- ? Adrenal insufficiency due to TB (Suggested dose: Hydrocortisone 100 – 200 mg IV 6 hourly in acute phase; then maintenance dose of Prednisone 15 mg PO mane)
- ? Steroids result in more rapid resolution of constitutional symptoms, but do not affect long-term outcome.

Clinical situations where steroids have possible benefit

- ? TB meningitis (may reduce mortality and neurological disability)
(Suggested dose: Dexamethasone 8 – 12 mg daily, tapered over 6 – 8 weeks)
- ? TB pericarditis (reduces size of pericardial effusion and rate of reaccumulation)
(Suggested dose: Prednisone 60 mg daily, tapered over 6 – 12 weeks)
- ? TB lymphadenitis causing compressive symptoms
(Suggested dose: Prednisone 30 – 60 mg daily, tapered over 4 – 6 weeks)
- ? "Paradoxical response" to TB therapy
(Suggested dose: Prednisone 30 – 60 mg daily, tapered over 2 – 6 weeks)

Clinical situations where steroids have not been shown to be of benefit (may be due to small number of patients in reported studies)

- ? Steroids do not increase the time to sputum negativity, nor the rate of long-term cure.
- ? TB pleuritis (resolution of effusion may be hastened, but no difference in long-term residual pleural thickening)
- ? Steroids do not reduce the likelihood of pericardial constriction in TB pericarditis.
- ? Miliary TB (unless there is associated adrenal insufficiency)

References

1. Dooley DP, Carpenter JL, Rademacher S. Adjunctive corticosteroid therapy for tuberculosis: a critical reappraisal of the literature. Clin Infect Dis 1997;25:872-887.
2. Prasad K, Volmink J, Menon GR. Steroids for treating tuberculous meningitis. Cochrane Database Syst Rev 2000;(3):CD002244.
3. Matchaba PT, Volmink J. Steroids for treating tuberculous pleurisy. Cochrane Database Syst Rev 2000;(2):CD001876
4. Mayosi BM, Ntsekhe M, Volmink JA, Commerford PJ. Interventions for treating tuberculous pericarditis (Cochrane Review). Cochrane Database Syst Rev 2002;(4):CD000526