10. Kasugi T. Prognosis of early gastric cancer. *Gastroenterology* 1970; **58:** 429-431.
11. Lee S, Iida M, Yao T, *et al.* Risk of gastric cancer in patients with non-surgically treated peptic ulcer. *Scand J Gastroenterol* 1990; **25:** 1223-1226.
12. Sawyer RB, Sawyer KC, Sawyer KC jun, Spencer JR. Duodenal ulcer and gastric cancer. *Arch Surg* 1962; **85:** 125-130.
13. Neeman A, Shoenfeld Y, Kadish U. Does duodenal ulcer lead to an early diagnosis of gastric cancer? *J Clin Gastroenterol* 1987; **9:** 37-39.
14. Fisher A, Clagett OT, McDonald JR. Coexisting duodenal ulcer and gastric malignancy. *Surgery* 1947; **2:** 168-174.
15. Rumball JM. Coexistent duodenal ulcer. *Gastroenterology* 1971; **61:** 622-629.
16. Goldin E, Zimmermann J, Okon E, Rachmilewitz D. Should we worry about gastric cancer in duodenal ulcer patients? *J Clin Gastroenterol* 1985; **7:** 227-231.
17. Wilbur DL, Rivers AB. The association of duodenal ulcer and gastric carcinoma. *Mayo Clin Proc* 1932; **7:** 241-243.
18. Burns GP, Taubman J. The association of gastric carcinoma with duodenal ulcer. *Br J Surg* 1967; **54:** 174-176.
19. Fonkalsrud EW, Barker WF. Synchronous occurrence of gastric carcinoma, leiomyosarcoma, and duodenal ulcer. *Arch Surg* 1968; **96:** 915-919.
20. Graham DY. *Campylobacter pylori* and peptic ulcer disease. *Gastroenterology* 1989; **96:** 615-625.
21. Blaser MJ. *Helicobacter pylori:* its role in disease. *Clinical Infection Diseases* 1992; **15:** 386-391.

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# The design of a case register for tuberculosis

## A pilot study in the south-western Cape

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**The development and piloting of a tuberculosis register that aims at providing a single source of information for the surveillance of tuberculosis and the measures for its control are discussed. Old-fashioned punch cards are appropriate in both isolated rural and sophisticated urban settings.**

**The card system proved an effective and efficient clinic-based epidemiological tool but its implementation on a broad scale depends on the rationalisation of current administrative procedures.**

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Tuberculosis remains the most common notifiable disease in South Africa. It accounts for approximately three-quarters of all notifications received annually by the Department of National Health and Population Development.[1] The large case load, the infectious nature of the disease, the duration and cost of treatment, and the disability and mortality rate among untreated patients hold enormous financial implications for this country. Effective management of the Tuberculosis Control Programme[2] remains a priority.

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Reliable information is essential to appropriate management decisions. Information on the surveillance of tuberculosis and the measures aimed at its control needs to be both accessible and accurate.

At present there is a wide variety of systems for the collection of data in clinics under the different local authorities. Computerisation has been introduced in some instances but is costly to implement and maintain. Access to resources varies dramatically throughout the country.

Previous research into simple parameters of management at a clinic in Cape Town where admission, treatment and discharge data had to be collated from a number of documents, proved unsuccessful. The information was not available from a single source.[3]

The authors decided to investigate the possible development of a data-gathering method that would lend uniformity and simplicity to the collection of the necessary data, while taking into account the technological differences between clinics (i.e. a method that could be assimilated both manually and by computer). In addition, it was felt that clinic staff should be able to gain access to the epidemiological data that they collect. In order to facilitate the introduction of such a system, care was taken to ensure that it be simple to understand and easy to manage, entailing as little extra work for clinic staff as possible. To this effect, a tuberculosis register card was designed along the lines of the old-fashioned punchcard index system. The aim of this data-gathering method was to provide a fast and effective means of collating epidemiological information to facilitate decision-making.

## The punchcard system

The cards are approximately 240 mm x 160 mm in size and have a series of holes punched along the edges. Each hole represents a classification, a title or a number (Fig. 1). Information is recorded on the card by the ticking off of an appropriate box. The marked boxes are then punched with a hard punch (Fig. 2).

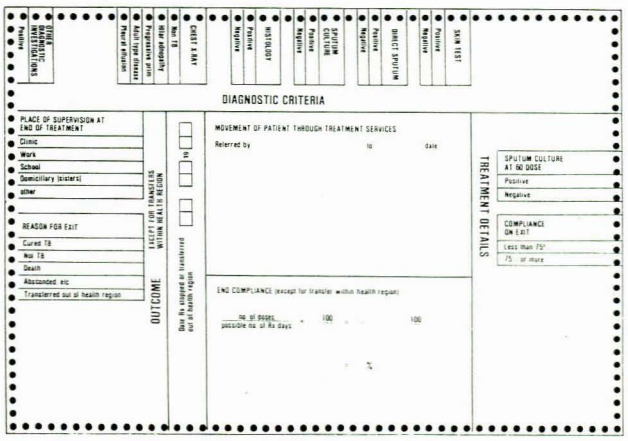


**Fig. 1. Illustration of punchcard.**

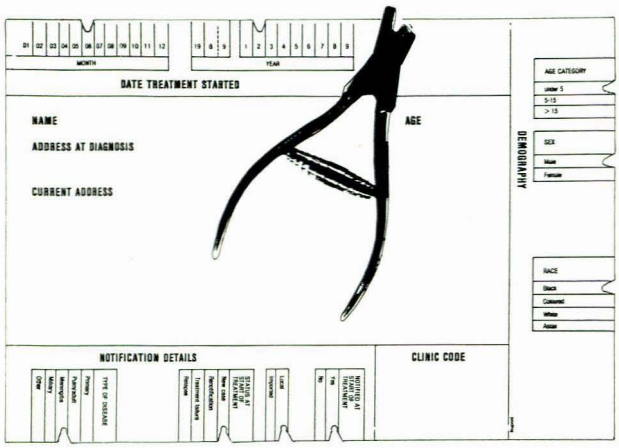


**Fig. 2. Illustration of the punching of data using the punchcard index system.**

The data are collated manually or by computer. Manual collation is effected by the passing of a long needle through the series of holes that correspond to the information required. Cards which have been punched are easily separated from the main file. Card sorting is fast, easy and efficient. It is possible to select and classify up to 1 000 cards per minute. The presentation of information in an ordered form facilitates computerisation where such facilities exist.

The quality of the cards may be selected according to the durability required of the records; the cards may be colour coded according to the year or area.

The punchcard was adopted to function as a case summary of the notified tuberculosis patient's period of treatment at the clinic. It was decided in this study that this summary card would be attached to the folder of each notified tuberculosis patient at commencement of treatment. Data would be entered on the punchcard at this time. On discharge, the patient's summary card would be completed from information on the clinic and treatment cards. To facilitate reliable data collection, the data recorded on the summary card were kept to a minimum. All data are easily accessible from the patient's folder and concern demographic details, diagnosis and notification, the commencement of treatment, the outcome of therapeutic intervention and compliance with the prescribed treatment.

The completed cards are filed together, forming a register of cases seen at each clinic. The summary cards of patients who were transferred remain in the clinic of origin. New cards are issued at the clinic of referral. It is feasible to forward a copy of the card for central (computer) processing. At the end of each year the data are collated to obtain a comprehensive analysis of tuberculosis management at each clinic.

## A pilot study

A retrospective study was designed to identify problems with the register. The aim of the pilot study was threefold: (*i*) to evaluate whether the punchcard format presented difficulties for staff; (*ii*) to assess the effectiveness of the card as a register, i.e. to assess whether it carried sufficient information for a useful epidemiological analysis of the cohort; and (*iii*) to explore the possibility of implementing the system on a wide scale in the local authority tuberculosis clinics.

The pilot study was conducted in a clinic in Atlantis, an industrial area near Cape Town that falls under the jurisdiction of the Regional Services Council.

The cohort comprised all patients treated for tuberculosis at the clinic the previous year whose records were filed at the clinic. No attempt was made to check and search for lost records.

Two 2-hour sessions were planned. During the first session, the rationale behind the punchcard index register was outlined and details of the card explained. The nursing staff, comprising 6 registered nurses and 4 assistants, then transferred the information from the clinic and treatment cards of the cohort onto the punchcards. During the second session, the results of the survey which had been manually analysed by the researcher, were presented to the staff. Their opinions and suggestions regarding the use and implementation of the punchcard register were sought.

## Results

The sample comprised 67 folders which were filed alphabetically in a box in the clinic. Demographic, diagnostic, exit and compliance data were readily accessible from these folders and no major problems occurred in the transfer of the data onto the punchcards. The punchcards presented a compact summary of epidemiological data on this group of 67 patients.

The punching and analysis were completed within 2 hours. The cards yielded a comprehensive epidemiological profile of the cohort.[4] All the information necessary for the analysis was included on the card and all data on the card proved relevant to the analysis.

The nurses were intrigued by the mechanism of manual analysis of the cards. In the feedback session they expressed their appreciation of the 'medical audit'. They were most constructive in their interpretation of the data, and the process of review allowed them new insight into problem areas such as poor compliance.

Despite the fact that the cards were easily managed and that many constructive proposals came out of the discussion, the suggestion that the register be implemented on a routine basis met with firm opposition from the staff on the grounds that they already have numerous forms to complete for each patient.

## Discussion

The first two aims of the pilot study were met positively. The staff had no difficulty with the punchcard format and easily transcribed the necessary data into the allocated spaces. The card appeared both effective and efficient as an epidemiological tool.

The staff were particularly interested in data on adherence to treatment. Non-compliance remains the predominant problem in the management of tuberculosis. With regard to the third aim, the implementation of the system on a wide scale, there were mixed feelings. Although the project was initially received with enthusiasm by the staff, who enjoyed the access to epidemiological data that the system provided, the prospect of additional routine administrative work outweighed their positive feelings. A subsequent investigation into the workload of clinic nurses in a western Cape urban clinic confirmed the heavy administrative workload: 48% of clinic nurses' time is spent on indirect patient care.[5] Much of this time is spent on the collection of data for statistical purposes. The punchcard could simplify this process. It would concurrently provide the relevant information to clinic staff for management purposes. Although the plethora of forms may well reflect the complexity of the treatment and management of tuberculosis, a comprehensive epidemiological profile remains essential to efficient planning.

# Conclusion

A simple and accurate means of collecting health data remains a priority in the evolving primary health care system.

The punchcard system provides an easy, efficient, 'hands-on' tool for this task. No similar system appears to be described or implemented elsewhere. The implementation of the method on a wide and routine basis would not be possible without rationalisation of the existing administrative load.


**REFERENCES**

1. Küstner HGV. Editorial. *Epidemiological Comments* 1991; **18**(1): 3-15.
2. Küstner HGV. Tuberculosis control programme — 1988. *Epidemiological Comments* 1990; **17**(1): 3-13.
3. Youngleson SM. The accessibility and validity of demographic treatment and compliance data at Ravensmead Clinic. Unpublished report. Parowvallei, CP: CERSA/MRC, 1989.
4. Dick J. Developing a case register for tuberculosis in the western Cape. Report on the pilot study in Atlantis. Parowvallei, CP: CERSA/MRC, 1989.
5. Dick J, Pekeur P. An investigation into the workload of clinic nurses at a local authority clinic. Unpublished report. Parowvallei, CP: NPTB/MRC, 1992.



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