

data – but remember that even if analysis is automatic, data entry will still be a tedious manual task. It is important to achieve a balance between collecting all the information that may be useful, and collecting information from every patient. For monitoring purposes it is better to collect minimum data from everyone than a lot of data from a few patients.

Any cataract monitoring system should minimise the extra work required. If possible, the routine recording of clinical data should be integrated with outcome evaluation. This can be done by using a standard form for all cataract operations. This ensures that the necessary details are recorded, and makes it simple for a clerical worker to transfer them to a computer. The form is placed in the patient's file, and becomes the clinical record of the cataract surgery and post-operative care.

Data should be collected on all patients, even those in whom a good outcome is impossible owing to pre-existing co-morbidity – e.g., previous glaucoma surgery. Although this means that a higher proportion of eyes will have a poor outcome, it permits a more reliable estimate of trends within the clinic.

A defect of many outcome evaluations is that the data are collected, and analysed, but are not readily available to the surgeons and so fail to influence their practice. If surgeons do not see the results, they are not going to be motivated to collect the data. A vital part of any evaluation of outcomes is to provide regular reports to the surgeons, and to develop ways of including the findings into practice. One way of doing this is to have a quarterly meeting, at which all patients with a poor outcome are discussed, and the cause of the poor outcome is identified. Where possible, a change of practice is planned to avoid poor outcomes in the future. For example, at Kikuyu Eye Unit, Kenya, we identified vitreous loss at surgery as being associated with a ten-fold greater risk of poor outcome. This led to changes in our management of vitreous loss, and a significant reduction in the proportion of eyes suffering a poor outcome following complicated surgery.

Some surgeons may feel threatened by discussing poor outcomes in front of their colleagues. The purpose of monitoring surgical results is not to identify incompetent surgeons, but to enable every surgeon to improve their own outcomes. The World Health Organization has set targets of a minimum of 90% of eyes seeing 6/18, and a maximum of 5% seeing less than 6/60, with correction, by two months after surgery. Although it is important to aim for these targets, no one would suggest that,

once they have been achieved, there is no room for further improvement. Monitoring should not be used to check outcomes against other clinics, surgeons, or targets, but to demonstrate trends. Since different surgeons and clinics have different case loads, equipment, and patients, comparisons should be made only against historical data from the same clinic, as this is the only way to show if standards of care at any unit are improving or not.

## Computerised Monitoring of Outcomes

### Advantages

The major advantage of using a computerised system to monitor outcomes is that reporting can be automatic. Commercially available databases (such as Microsoft Access) have a reporting function. This allows reports to be designed, and then automatically updated. These reports may be text (Table 1), or they can be graphical (Table 2). Surgeons can obtain an immediate report of outcomes at any time, providing they know how to turn on the computer and to open the database!

Computers are good at handling numbers, so the reports can include calculations, such as the mean post-operative refractive error. In clinics that carry out pre-operative biometry, patients whose final spherical error differs from the planned refraction can be identified. Surgically induced astigmatism can be measured, and different surgical techniques compared. If pre-operative visual acuity is recorded for both eyes, it is easy to calculate the number of blind patients who have their sight restored by surgery. Outcomes for specific groups of patients – e.g., diabetics – can be evaluated separately. Although it is possible to do all this from a paper register of outcomes, it is very time-consuming, and it would be difficult to provide regular updates. Once a computerised system is in place, data analysis is easy.

### Disadvantages

The major disadvantage of using a computerised system is the cost and complexity of getting it established. Although minimal computing skills are required to use the database, and to obtain reports, the design of the database and the reports do need input from someone with the necessary expertise. The necessary hardware and software should not cost more than \$1,500 - \$2,000. Many clinics will already have a computer that can be used for outcome monitoring, in which case the costs are minimal.

The second disadvantage of computerised systems is the possibility of data

loss. Irregular electricity supplies, theft, or computer viruses can all lead to corruption of vital data. The easy way to avoid this is to have an automated back-up system that copies the database on to a removable disk. This can then be stored in a safe place. If this is done regularly, then data is more secure on a computer than it is in a book, as it is impractical to copy a cataract register at frequent intervals.

## Experience of Evaluating Outcomes

At Kikuyu Eye Unit, we found using a computerised system to be a valuable tool. As Table 2 shows, there was a statistically significant improvement in the results of surgery over the first year of using the system. It is hard to identify any single factor that led to this improvement. Management of the complications of surgery improved, and the number of patients with known pre-existing co-morbidity declined. I believe the most important factor was a change in attitudes. The ready availability of the outcome data meant that surgeons were immediately aware of their own results. This led to a move away from just concentrating on the numbers of operations to a culture in which quality is as important as quantity.

## References

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## Letter

### Dear Editor

I read Professor M Daud Khan's article 'Training of a Cataract Surgeon' in the Journal (*J Comm Eye Health* 2002; **15**: 21–22) with keen interest. I would like to suggest that the trainee should also receive 25–30 sutures (10–0 monofilament nylon) in addition to the other equipment and materials given to them. This would complete the kit.

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