Title:	**Optical biometry February 2003**
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Aim

To assess the safety, accuracy and precision of partial coherence interferometry (PCI) as a technique for measuring the axial length of the eye prior to cataract surgery.

Conclusions and results

Safety: PCI, which may also be referred to as optical (or ocular) coherence biometry/tomography or laser Doppler interferometry, is safe at recommended doses.

Effectiveness: PCI biometry is a user and patient-friendly method for axial length determination and intraocular lens (IOL) planning in the preparation of cataract surgery. Its accuracy is statistically superior to that of the commonly used applanation ultrasound (AUS) and is comparable to that of the high-precision immersion ultrasound (IUS). PCI has the potential to become a routine method for IOL calculations in cataract surgery in cases of otherwise 'normal' cataract eyes without additional pathologies and with visual acuities $\geq$0.1 dioptres. However, it has been found that in certain cases PCI is unable to optically measure cataract eyes. Thus, it seems that with present technology the eyes of 9-15 per cent of the patients presenting at university eye clinics cannot be measured by PCI. In these cases, ultrasound biometry will continue to be indispensable.

Cost-effectiveness: A decision analytic modeled evaluation was used to determine the costs and effectiveness of PCI for axial length measurement prior to cataract surgery compared to the ultrasound techniques which are currently used. The economic analysis of the three measurement techniques (PCI, AUS, and IUS), assuming the same Medicare rebate for all three techniques, indicates that in terms of minimizing expected cost to the Australian government and maximizing expected outcome IUS is best followed by PCI and then AUS. IUS is therefore, the most cost-effective technique, and there are no cost-effectiveness trade-offs. These results are robust to sensitivity testing with 99 per cent confidence intervals. To make PCI a worthwhile investment without resorting to increasing fees or influencing patient choice, ophthalmologists would have to be able to benefit substantially from the reduced time involved in taking measurements. Total cost analysis reveals that the choice of measurement technique makes very little difference to the total cost to the Australian Government as the differences in cost per patient are small.

Recommendations

Method

A systematic review of the literature, on the role of PCI in measuring axial length prior to cataract surgery, was conducted (with eligibility criteria defined *a priori*) between January 1997 (as PCI is a relatively new technology it was felt by the experts that no comparison studies would be available before 1997) and August 2002 using biomedical electronic databases, the Internet and international health technology organisation websites.