Reduced health care expenditures, an aging population, growing demands, differential access to health care services, rapidly changing technology, and rising medical costs are but a few of the many factors already shaping the delivery and utilisation of health care services worldwide. Neither ophthalmology nor the provision of eye care services more widely is immune from such changes and must continue to respond to the challenges placed upon it. Recently, therefore, considerable attention has been focused upon the development of relevant epidemiological, applied public health, and health economic methodologies to better understand those factors underpinning the provision and outcome of ophthalmic services in the UK and elsewhere.1–4 Thus, while much is beginning to be revealed about the distribution, delivery, utilisation, and cost effectiveness of various ophthalmic intervention strategies much yet remains to be done in terms of uniting many of the multifactorial issues surrounding the dynamic problem of providing both preventive and curative eye care services in an age of public and parapublic resource constraints.

In this issue of the *BJO* (p 784), Jones et al tackle the complex mix of factors affecting the rate of ophthalmic surgery for people aged 65 years and older in 135 English health districts with an ophthalmic unit. Leaving aside Moorfield’s Eye Hospital, London, which receives patients from across the UK and beyond, the authors found that the rate of ophthalmic surgery ranged from 11.6 to 39.8 per 1000 per annum, with a mean of 19.9 (SD 5.2). Adjusting for age and sex differences across various health districts, the authors performed univariate regression analysis on the rates of ophthalmic surgery according to 29 service delivery related criteria. In total, six of these criteria were found to be independently statistically significant with high rates of ophthalmic surgery—namely, throughput, beds per resident population, percentage of day cases, waiting list per consultant, percentage of emergency admissions, and theatre sessions per catchment population.

In presenting an aggregated cross sectional picture of the rates of all ophthalmic surgery performed in England over a representative period (1991–2), Jones et al have done considerable work in identifying major trends relevant to the provision of surgical eye care services. Their attempt to correlate the observed variations with the socioeconomic status of residents from different health districts across England has particular merit, even if no statistically significant association was found. This does not mean, however, that residents of certain health districts in England do not have problems in terms of gaining easy access to ophthalmic care, an observation noted by other authors in connection with AFro-American patients with glaucoma in the USA.5 In this regard, the authors are right to point out that other factors such as the relative number of ophthalmologists in private practice may significantly influence the rates of ophthalmic surgery. Unfortunately, it is virtually impossible to know with any precision the full impact of this variable in relation to published rates of ophthalmic surgery within the NHS.

A drawback of the analysis by Jones et al, however, is that no distinction appears to have been made between the various types of ophthalmic surgery personnel, a key factor in terms of analysing the provision of ophthalmic surgical care according to a more disease specific approach. Other authors, most notably Desai,6 have shown that there is no direct influence on the short term clinical outcome of cataract surgery in the UK attributable to any of the following factors: the region in which the surgery was performed; the type of hospital; the grade of surgeon; the type of admission (day case or inpatient); or the type of anaesthetic used (local or general). Thus, although Jones et al have shown that there is a marked variation in the rates of ophthalmic surgery for all surgical procedures combined, Desai’s conclusions specifically for cataract surgery do not support this observation. Indeed, Desai’s analysis of cataract surgery shows no countrywide variations in clinical outcomes associated with this particular surgical intervention.8

Because most blindness is age related, it is to be expected that ophthalmic surgical rates in the age group examined by Jones et al are necessarily high. Observed geographical variations in the rates of ophthalmic surgery may also be due to the complex mix of patient and eye care provider combinations obtained within any given health district. Further ophthalmic services research, however, needs to be undertaken in order to better evaluate and interpret regional and countrywide variations in disease specific surgical rates for other ocular diseases in addition to cataract—for example, glaucoma, diabetic retinopathy, and corneal transplants.

Andrew F Smith
Nuffield Laboratory of Ophthalmology, University of Oxford, Walton Street, Oxford OX2 6AW
Progression of diabetic retinopathy following cataract surgery: can it be prevented?

Diabetic patients have an increased risk of developing cataract. This risk is related to age, severity of retinopathy, duration of the disease and, possibly, systemic hypertension. Harding et al in 1992, using data from the Oxford Region in the UK, demonstrated that diabetes mellitus is associated with a fivefold increase in the risk of developing cataract. They further estimated that 11% of all cataracts in the UK were in diabetic patients. The Royal College of Ophthalmologists' audit of cataract surgery in 1991 revealed that 4% of all patients undergoing cataract surgery had diabetic retinopathy. Approximately 50 patients with diabetic retinopathy have cataract surgery each week in the UK. Cataract is very common after laser photoagulation for proliferative diabetic retinopathy. Blakemore, in 1989, reviewed all the survivors of the original diabetic retinopathy study photoagulation trial in 1976 and found that 13 out of 51 eyes had had cataract surgery in the 15 years after photoagulation. In addition, posterior vitrectomy for vitreous haemorrhage and tractional retinal detachment is frequently followed by cataract.

Cataract surgery in diabetic patients, therefore, forms a significant part of every eye department's workload. It is obviously important that such patients are managed appropriately to minimise visual loss from progression of diabetic retinopathy.

Cataract surgery in diabetics with little or no retinopathy has the same good prognosis as cataract surgery in non-diabetics. However, in the presence of significant diabetic retinopathy the results can be disappointing. The paper by Henricsson et al in this issue of the BJO (p 789) demonstrates, for the first time, that it is possible, in the presence of diabetic retinopathy, to predict outcome. In this small, but carefully documented prospective study, 89% of eyes achieved 6/12 (0.5) or better vision and maintained it for at least 18 months. One third of the eyes had non-proliferative diabetic retinopathy and almost a quarter had treated proliferative diabetic retinopathy.

Severe visual loss following cataract surgery in diabetics may be due to worsening macular oedema, continuing anterior and posterior segment proliferation, posterior capsule opacification, or unrelated events, such as retinal vein occlusion. Risk factors associated with worsening retinopathy after cataract surgery include pre-existing severe treated or untreated retinopathy, poor glycaemic control, increasing age, and planned or unplanned posterior capsule disruption.

Non-proliferative diabetic retinopathy can rapidly progress to severe diffuse macular oedema in the months following uncomplicated cataract extraction. Jaffe and Burton and later Schatz et al emphasised that the retinopathy progressed rapidly in the operated eye compared with the fellow, control phakic eye. None of the patients documented in these reports had received any preoperative photoagulation. Pollack et al, as well as Cunliffe et al, showed that macular oedema and neovascularisation can worsen after cataract extraction even with photoagulation. Fortunately, only a small minority of diabetics with non-proliferative diabetic retinopathy develop severe persistent macular oedema and poor vision after cataract surgery. Pollack et al also demonstrated that 81% of eyes with pre-existing background retinopathy developed clinical cystoid macular oedema after uncomplicated cataract surgery compared with only 32% of eyes without background retinopathy. Menchini et al compared the incidence of cystoid macular oedema following cataract extraction in diabetics with no diabetic retinopathy with normal non-diabetic controls using fluorescein angiography. They found that the incidence of fluorescein angiographic macular oedema was similar at 30 days in both groups, but that 24.5% of the pseudophakic diabetic eyes still had macular oedema at 1 year compared with none of the non-diabetic pseudophakic controls. This suggests that the blood-retinal barrier is significantly impaired, even in diabetics with no retinopathy and that cataract surgery worsens this impairment.

Preoperative and early postoperative photoagulation for macular oedema appears to reduce but not to eliminate the risk of visual loss. For this reason, careful preoperative assessment and regular follow up, if necessary using fluorescein angiography, are essential. Fluorescein angiography is particularly required to differentiate between pseudophakic cystoid macular oedema and worsening diabetic macular oedema which may require photoagulation.

Many patients, including those with diabetic retinopathy, may have very high expectations from cataract surgery. For this reason, patients with diabetic retinopathy and cataract need to be advised preoperatively that retinopathy and vision may worsen after cataract extraction.

Neovascular glucoma and rapidly progressive proliferative diabetic retinopathy can occur after extracapsular cataract surgery in treated and untreated proliferative diabetic retinopathy. Pollack et al described the rapid development of severe retinal ischaemia confirmed by fluorescein angiography in the 3 months following uncomplicated extracapsular cataract surgery. The visual results of extracapsular cataract surgery in treated proliferative diabetic retinopathy with maculopathy are frequently poor. However, good results have been reported in well treated proliferative diabetic retinopathy without maculopathy.

Adequate panretinal laser photoagulation is therefore essential if there is severe peripheral retinal ischaemia or early retinal neovascularisation. This photoagulation should be applied preoperatively. If this is not possible it can be done peroperatively using the laser indirect...