

ocular inflammation. The first and second patients had acute painless vision loss 1 and 2 days after the procedure, respectively. On examination, they showed heavy haze and Tyndall effect in both the anterior chamber and vitreous that precluded visualization of the fundus. Hypopyon and redness were typically absent. In both cases, sterile endophthalmitis was suspected and only cycloplegic agents and topical antibiotics were used. Inflammation spontaneously subsided in 1 week and both patients experienced visual improvement. However, 2 weeks after the initial visit, the second patient developed a rhegmatogenous retinal detachment that required further surgery.

Comment. This interventional case series shows that sterile intraocular inflammation can also occur when BA is mostly removed. It asks whether BA is a cause or the only cause of sterile endophthalmitis. Other hypotheses should be taken into account. Hypothetical causes for sterile endophthalmitis other than BA include the formulation of TA itself and bacterial contaminants such as endotoxins potentially present in the vials.^{2,5} To support the latter hypothesis, Roth et al² reported 7 cases of sterile endophthalmitis after 104 intravitreal injections that were performed during a 14-month period. All of the observed cases of sterile endophthalmitis were clustered in a 5-week period, raising the suspicion that some toxin existed in the vials and caused an inflammatory reaction. The membrane-filter method was shown to provide a very high bacterial recovery efficiency.⁶ Isolating TA through back-flushing sterilizing filters (with small pores) actually does recover and concentrate hypothetical contaminants such as bacterial pyrogens. The true cause of sterile endophthalmitis after TA injection remains unknown. Reducing the BA concentration by approximately 90% does not eliminate sterile endophthalmitis after TA injection. Other methods for isolating TA that are better than filtering commercially available TA would be advisable.

José Lorenzo Carrero, MD, PhD
Miguel González Barcia, PhD
Ines Pérez Flores, MD

Correspondence: Dr Lorenzo Carrero, Retina Unit, Departamento de Oftalmología, Hospital Povisa, C/Salamanca 5, Vigo 36211, Spain (josel.carrero@yahoo.es).

Financial Disclosure: None reported.

1. Westfall AC, Osborn A, Kuhl D, Benz MS, Mieler WF, Holz ER. Acute endophthalmitis incidence: intravitreal triamcinolone. *Arch Ophthalmol*. 2005; 123(8):1075-1077.
2. Roth DB, Chieh J, Spirn MJ, Green SN, Yarian DL, Chaudhry NA. Noninfectious endophthalmitis associated with intravitreal triamcinolone injection. *Arch Ophthalmol*. 2003;121(9):1279-1282.
3. Morrison VL, Koh HJ, Cheng L, Bessho K, Davidson MC, Freeman WR. Intravitreal toxicity of the kenalog vehicle (benzyl alcohol) in rabbits. *Retina*. 2006;26(3):339-344.
4. García-Arumi J, Boixadera A, Giral J, et al. Comparison of different techniques for purification of triamcinolone acetonide suspension for intravitreal use. *Br J Ophthalmol*. 2005;89(9):1112-1114.
5. Narayanan R, Mungcal JK, Kenney MC, Seigel GM, Kuppermann BD. Toxicity of triamcinolone acetonide on retinal neurosensory and pigment epithelial cells. *Invest Ophthalmol Vis Sci*. 2006;47(2):722-728.
6. Carter J. Evaluation of recovery filters for use in bacterial retention testing of sterilizing-grade filters. *PDA J Pharm Sci Technol*. 1996;50(3):147-153.

The Burden of Amblyopia and Strabismus: Justification of Treatment and Screening Revisited

In an editorial in the June issue of the *Archives*, Beauchamp¹ addressed the complicated issue of the burden that amblyopia and strabismus impose on affected individuals as well as the consequences this has on the justification of treatment and screening for these conditions. Unfortunately, Beauchamp appears to have confused treatment and screening for amblyopia, to have used available evidence in a questionable way, and to have chosen to bring forward only selected references.

Dr Beauchamp picked a utility number of 0.83 from an article on a cost-utility analysis of therapy for amblyopia² and used this number throughout the editorial as evidence for the negative impact of untreated amblyopia. However, in the very same article the following can be read: "It has been noted that the mean time trade-off utility values of individuals with visual loss due to multiple ocular diseases decrease in direct proportion to the severity of visual loss in the better-seeing eye."² Amblyopia is most often a unilateral disorder, with normal visual acuity in the nonamblyopic fellow eye, ie, without visual loss in the better-seeing eye. In addition, the utility value of 0.83 is drawn from studies of individuals with acquired vision loss, which most likely differs substantially from amblyopia. Patients with acquired vision loss have previously had good vision and are in many cases affected with a progressive and inherently bilateral disease that with time may lead to severe visual impairment or even blindness. Moreover, in many ophthalmic diseases, there are additional visual problems such as reduction of visual field and reduced color vision that those with amblyopia do not have. Untreated amblyopes do not have a progressive disorder and do not have previously good vision with which to compare their current experience. It seems quite improbable that subjects with unilateral amblyopia would rank this deficit in the same category as cancer and stroke. And, is it really plausible that strabismus, which quite contrary to straight-eye and microtropic amblyopia is cosmetically obvious, would have a significantly lower utility value than amblyopia?

To my knowledge, there are no data available on the utility value for unilateral amblyopia. No objective study has been able to show that it is in fact disabling to be unilaterally amblyopic. In a study on the relationship between amblyopia and academic performance in school children, Helveston et al³ could not find any connection. Regarding possible professional consequences of amblyopia, Chua and Mitchell⁴ found a borderline significant effect of amblyopia on higher university degrees but no effect on lifetime occupational class. Snowdon and Stewart-Brown⁵ interviewed health care professionals, adults with amblyopia, and children in amblyopia treatment to gain an understanding of how amblyopia and treatment for amblyopia affect people's lives. Their conclusion was that health care professionals consider amblyopia to be disabling, whereas amblyopic subjects do not. We need to think about whether we, the profes-

sional ophthalmology community, are doing patients and families harm by exaggerating the risk and potential negative effect of amblyopia. This also applies to the issue of parents feeling frustration with noncompliant amblyopic children and relatives feeling guilty for "causing" the condition. Fewer than half of children with strabismus have a family history of this disorder and most amblyopic subjects lack highly predictive and easily identifiable risk factors for the condition.^{6,7} It should be up to us as physicians to be able to explain to patients and parents that there is no simple hereditarity in amblyopia and no individual family member caused the amblyopia.

Today there is evidence that individuals with amblyopia of sufficient magnitude visiting an eye clinic should be treated (after a period of refractive adaptation). In these cases, treatment for amblyopia has been shown to be successful and cost-efficient. However, evidence for treatment of amblyopia cannot be directly translated into justification for preschool vision screening. A screening system needs to fulfill several criteria: the screening program must have an effect on a population basis; the conditions for which the individuals are screened must have a high prevalence in the population, be significantly disabling, and have a known natural history; and the conditions should have a presymptomatic phase. Moreover, there has to be an accessible treatment that is effective and acceptable to the participants. Arguments for treatment of amblyopic cases encountered in regular eye care and arguments for preschool vision screening of amblyopia are far too often confused and intermixed.

There is currently not enough evidence to demonstrate that preschool vision screening is worthwhile from the point of view of cost-effectiveness and utility. In a cost-utility analysis on screening for amblyopia (again using utility values not from amblyopes but from subjects with acquired unilateral visual loss), König and Barry⁸ concluded that merely the risk of losing the better eye does not justify vision screening from a cost-effective point of view. If, however, amblyopia is associated with loss in utility, vision screening would likely be justified presuming that amblyopia treatment restores utility. This last comment is an important one: presuming that amblyopia treatment restores utility. Cost-utility studies assume that successfully treated amblyopes have the same utility value as healthy subjects. This has not been shown. If future studies evince that amblyopia is related to some kind of disability or loss of utility, then it is important to establish whether successful treatment reduces this disability or utility loss.

Beauchamp claims that preschool vision screening virtually has eliminated amblyopia in Sweden, a statement that is not correct. The cited article⁹ shows that severe amblyopia (visual acuity ≤ 0.3 decimal) is 10 times less common in a Swedish screened population, but the prevalence of residual amblyopia (visual acuity ≤ 0.5 decimal) has been shown by these and several other investigators to be one-third to one-half that in an unscreened population.¹⁰ This must also be viewed in light of the very high participation rates for the Swedish preschool vision screening program,¹¹ as more than 99% participate! Discussing the issue of participation rates,

Beauchamp praises the project See by Three with a stated participation rate of 71% but fails to give any information on whether this program actually has an effect on a population basis. A previous study by Williams et al¹² showed that a participation rate of 67% was not enough for effectiveness on a population point of view, which is required to justify a general screening program. In their study, Williams and colleagues compared the prevalence of amblyopia in 7½-year-old children with and without screening at 37 months. When comparing those who actually attended screening with those who were unscreened, there was a small but statistically significant difference in outcome. Comparing those who were offered screening (67% actually participated) with those who were not offered screening, this difference disappeared. This points to the need for very high attendance rates for a screening system to be effective and worthwhile from a population point of view.

Preschool vision screening might also get credit for detection of disorders that were found in other ways and most likely would have received treatment even without screening. A Swedish population-based study showed that only 22% of children diagnosed with strabismus and only 47% of children diagnosed with amblyopia are detected at screening.¹³ The remaining cases are found not only before but also after preschool vision screening.

Finally, I would like to draw attention to the fact that the most common (and perhaps most easily treated) "chronic" eye disorder that causes vision loss during the first 4 decades of life worldwide is not amblyopia but rather uncorrected refractive error.¹⁴

Josefin Nilsson, MD, PhD

Correspondence: Dr Nilsson, Department of Clinical Neurophysiology, Sahlgrenska University Hospital, 413 45 Göteborg, Sweden (josefin.nilsson@neuro.gu.se).

Financial Disclosure: None reported.

1. Beauchamp GR. Chronic amblyopia and strabismus in children. *Arch Ophthalmol*. 2007;125(6):821-822.
2. Membreno JH, Brown MM, Brown GC, Sharma S, Beauchamp GR. A cost-utility analysis of therapy for amblyopia. *Ophthalmology*. 2002;109(12):2265-2271.
3. Helveston EM, Weber JC, Miller K, et al. Visual function and academic performance. *Am J Ophthalmol*. 1985;99(3):346-355.
4. Chua B, Mitchell P. Consequences of amblyopia on education, occupation, and long term vision loss. *Br J Ophthalmol*. 2004;88(9):1119-1121.
5. Snowdon S, Stewart-Brown S. *Amblyopia and Disability: A Qualitative Study*. Oxford, England: Health Services Research Unit, University of Oxford; 1997.
6. Sjöstrand J, Abrahamsson M. Can we identify risk groups for the development of amblyopia and strabismus? [in German]. *Klin Monatsbl Augenheilkd*. 1996;208(1):23-26.
7. Sjöstrand J, Abrahamsson M. Risk factors in amblyopia. *Eye*. 1990;4:787-793.
8. König HH, Barry JC. Cost-utility analysis of orthoptic screening in kindergarten: a Markov model based on data from Germany. *Pediatrics*. 2004;113(2):e95-e108.
9. Kvarnström G, Jakobsson P, Lennerstrand G. Visual screening of Swedish children: an ophthalmological evaluation. *Acta Ophthalmol Scand*. 2001;79(3):240-244.
10. Ohlsson J, Villarreal G, Sjöström A, Abrahamsson M, Sjöstrand J. Visual acuity, residual amblyopia and ocular pathology in a screened population of 12-13-year-old children in Sweden. *Acta Ophthalmol Scand*. 2001;79(6):589-595.
11. Kvarnström G, Jakobsson P, Lennerstrand G. Screening for visual and ocular disorders in children, evaluation of the system in Sweden. *Acta Paediatr*. 1998;87(11):1173-1179.
12. Williams C, Northstone K, Harrad RA, Sparrow JM, Harvey I; ALSPAC Study Team. Amblyopia treatment outcomes after preschool screening v school entry screening: observational data from a prospective cohort study. *Br J Ophthalmol*. 2003;87(8):988-993.

13. Ohlsson J, Sjöstrand J. Preschool vision screening: is it worthwhile? In: Lorenz B, Moore AT, eds. *Pediatric Ophthalmology, Neuro-Ophthalmology, Genetics*. Heidelberg, Germany: Springer-Verlag; 2006:19-36.
14. Dandona L, Dandona R. What is the global burden of visual impairment? *BMC Med*. 2006;4:6.

Band-Aids and Amblyopia

Beauchamp's editorial¹ asserts that amblyopia is associated with a significant decrement in quality of life. However, adults with amblyopia did not "regard themselves as 'disabled' and none of them attributed to amblyopia a problem they regarded as significant. . . . Patching appeared to have been responsible for more disabling effects than amblyopia itself."² Bullying and impaired social interactions related to patching are factors in reducing quality of life for children³ and in limited compliance.⁴

A retrospective demographic investigation found the following:

No functionally or clinically significant differences existed between people with and without amblyopia in educational outcomes, behavioral difficulties or social maladjustment, participation in social activities, unintended injuries (school, workplace, or road traffic accidents as driver), general or mental health and mortality, paid employment, or occupation-based social class trajectories.⁵

This directly contradicts Beauchamp's essential premise and his utility calculations.

The optimistic cost-benefit approximations are challenged by limited outcomes in patients with poor initial vision⁶ as well as impaired reading ability⁷ and recidivism in about 50% of successfully treated patients.⁸

Strabismus and poor visual function are often concurrent with congenital disorders. Anisometropia may be attributed to unequal eye growth secondary to primary visual impairments.⁹ Congenital esotropia is not present at birth but develops in early infancy.⁸ It is linked to maternal use of tobacco¹⁰ and alcohol¹¹ as well as low birth weight.¹² The declining occurrences of strabismus surgery¹³ might indicate increased awareness of the risks of alcohol and tobacco use during pregnancy. A paucity and disarray of nerve fibers may be the primary defect leading to poor vision and its secondary effects.

The association of amblyopia with low birth weight and other congenital defects indicates that improving the prenatal fetal environment would be productive in reducing the incidence of amblyopia. Prevention, rather than using Band-Aids, is a cost-effective technique for managing vision problems.

Philip Lempert, MD

Correspondence: Dr Lempert, Park View Health Care Campus, 10 Brentwood Dr, Ste A, Ithaca, NY 14850 (eyechartplus@aol.com).

Financial Disclosure: None reported.

1. Beauchamp GR. Chronic amblyopia and strabismus in children. *Arch Ophthalmol*. 2007;125(6):821-822.
2. Snowdon SK, Stewart-Brown SL. *Amblyopia and Disability: A Qualitative Study*. Oxford, England: Health Services Research Unit, University of Oxford; 1997.
3. Williams C, Horwood J, Northstone K, Herrick D, Waylen A, Wolke D;

ALSPAC Study Group. The timing of patching treatment and a child's wellbeing. *Br J Ophthalmol*. 2006;90(6):670-671.

4. Holmes JM, Beck RW, Kraker RT, et al; Pediatric Eye Disease Investigator Group. Impact of patching and atropine treatment on the child and family in the amblyopia treatment study. *Arch Ophthalmol*. 2003;121(11):1625-1632.
5. Rahi JS, Cumberland PM, Peckham CS. Does amblyopia affect educational, health, and social outcomes? findings from 1958 British birth cohort. *BMJ*. 2006;332(7545):820-825.
6. Flynn JT, Schiffman J, Feuer W, Corona A. The therapy of amblyopia: an analysis of the results of amblyopia therapy utilizing the pooled data of published studies. *Trans Am Ophthalmol Soc*. 1998;96:431-450.
7. Stifter E, Burgasser G, Hirmann E, Thaler A, Radner W. Monocular and binocular reading performance in children with microstrabismic amblyopia. *Br J Ophthalmol*. 2005;89(10):1324-1329.
8. Simons K. Amblyopia characterization, treatment, and prophylaxis. *Surv Ophthalmol*. 2005;50(2):123-166.
9. Raviola E, Wiesel TN. Neural control of eye growth and experimental myopia in primates. *Ciba Found Symp*. 1990;155:22-38.
10. Hakim RB, Tielsch JM. Maternal cigarette smoking during pregnancy: a risk factor for childhood strabismus. *Arch Ophthalmol*. 1992;110(10):1459-1462.
11. Strömland K, Miller M, Cook C. Ocular teratology. *Surv Ophthalmol*. 1991; 35(6):429-446.
12. Holmström G, el Azazi M, Kugelberg U. Ophthalmological follow up of pre-term infants: a population based, prospective study of visual acuity and strabismus. *Br J Ophthalmol*. 1999;83(2):143-150.
13. MacEwen CJ, Chakrabarti HS. Why is squint surgery in children in decline? *Br J Ophthalmol*. 2004;88(4):509-511.

In reply

We should continue to explore together the notions of disability and disutility—and please note, these are very different concepts—while being aware of the many barriers to our understanding. We may parse evidence in a concatenation of reductionist steps that seem logical, even statistically significant. Further, we may debate about methods of all sorts: diagnostic, therapeutic, social, medical system, and so on. Still, amblyopia is a real disease with neuroanatomic and neurophysiologic decrements. We humans know a bad thing when we encounter it and we have a sense of how bad things are in a relative sense; these are statements of utility. And, we know the elimination of preventable vision loss in children is a fundamental good.

Lempert seems to posit the following: (1) treatment yields no decrease in disability and therefore seemingly does not matter; (2) treatment is fundamentally bad because it is associated with bullying and engenders ill will; and (3) treatment is ineffective in reversing the vision loss, hence there can be no effect on utility. He concludes: "Prevention, rather than using Band-Aids, is a cost-effective technique for managing vision problems." I respectfully disagree on all counts.

First, Lempert fails to distinguish between and among scales of disability and utility. Disability scales measure what patients specifically cannot do. Utility is much more universal, like happiness but broader, capturing in a single number something fundamental in the human spirit. In health care, utility refers to the quality of life associated with a health status, including an ability to know what in that realm is good and what is not, as well as how one good (or bad) may compare with another. Second, to suggest that any professional should countenance bullying as an acceptable part of a therapeutic plan runs afoul of the notion of a caring and healing profession. Retrospective interviews garnering points of view about past experiences may yield revisionist or rationalizing appraisals of efforts put forth by the family and professional team allied in saving sight. And third, this space does not permit a full review of the benefits of amblyopia