

DEVELOPING AN OBJECTIVE DEFINITION OF VISUAL IMPAIRMENT

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Historically, the field of low vision care has resisted the adoption of quantitative definitions of terms "low vision" and "visual impairment," because such quantification tends to obscure the uniqueness of the visual, psychological and social profile of each patient.^{1,2,3} While the complexity of the individual's profile is of paramount importance in individual care, it is also recognized that objective definition is valuable for documenting prevalence of functional vision disorders, and for determining who is eligible to receive benefits based on disability and reimbursement for vision rehabilitation in private and national health care systems. This paper reviews prominent definitions that have been put forth to date, and proposes an inclusive but compact definition of functional visual impairment.

Except for definitions of legal blindness, most definitions that have been put forth attempt some type of graded or multi-level classification. Here we are concerned with a more modest goal: identifying a single definition that includes all (in a practical sense) visually-impaired persons.

Desirable features of a definition are

1. determinable by simple and objective visual function tests.
2. includes all conditions leading to functional impairment due to a disorder of the visual system.
3. can co-exist with existing international standards.
4. can serve as a screen for eligibility for reimbursement benefits for vision rehabilitation that includes most individuals who can benefit from such rehabilitation.

Before putting forth a suggested definition that meets these criteria, we review some prominent proposed systems of classification.

Review of existing definitions

I. Blindness definitions

Simple blindness definitions arising from legislation intended to identify those who

cannot work due to visual disability (e.g. the Social Security Act of 1925 in the United States and the National Assistance Act of 1948 in Great Britain) are generally agreed to exclude an enormous number of people with severe functional impairment. Typical interpretations of this type are (in the US: visual acuity $\leq 20/200$ [6/60], or visual field of ≤ 20 deg; in Holland: $\leq 3/60$ visual acuity or normal acuity with visual field ≤ 10 deg). As Bier⁴ has pointed out, such definitions are intended to include only those who can perform *no work* for which vision is essential, rather than including those who are prevented from performing their customary, or any particular occupation.

In our view there is nothing wrong *in principle* with dichotomous definitions such as these. The main difficulty lies in the fact that they are too stringent with respect to recognizing disability, and thus exclude a majority of people with significant disabling vision loss. A related problem is that the term "blindness" applied to vision impairment connotes inability to make effective use of vision.

I. Graded definitions intended to indicate function level

Some definitions of visual impairment attempt to define a percentage or efficiency of functional vision that is correlated with studies of earning potential from 1925,^{5,6} or on unspecified criteria.^{7,8,9,10} The former type of definition is of questionable validity, yet seems to form the basis¹¹ for the American Medical Association's complicated and inconsistent system for evaluating visual impairment.⁷ This system provides tables with high specificity of percentage impairment as a function of measured visual acuity that are presented without reference to empirical data. Similarly, methods are given for scoring visual fields that are based on a grid scoring system developed by Esterman.^{4,5,6} These are presented without empirical basis, and have been criticized for their lack of task specificity and lack of geometric correspondence to binocular visual space.¹²

Classifications based on World Health Organization (WHO) guidelines^{13,14,15} such as ICD-9 and ICD-9-CM are less ambitious in that they divide impairment into the categories of normal, near-normal, moderate visual impairment, severe visual impairment, profound visual impairment, near-total visual impairment, and total visual impairment, which appear to be based on consensus of a 1972 WHO Study Group, and on a proposal by Colenbrander.¹⁶ "Low vision" comprises moderate and severe impairment, whereas the term "blindness" is applied to all categories with performance worse than these. These categories are applied to each eye, and the combination of function descriptors for both eyes makes up the ICD-9-CM coding for blindness and low vision.

In our view, relatively crude graded definitions such as those based on the WHO classifications may be useful for coding and for statistical purposes, whereas systems indicating "visual efficiency" or percentage of loss provide a degree of specificity that is arbitrary and difficult to justify.

I. Classifications based on complex performance criteria

An example of this kind of system is Hyvärinen's multidimensional classification¹⁷ of visual impairment, which organizes impairment into functioning in the four categories of a) mobility and orientation, b) activities of daily life, c) communication and d) sustained near vision tasks. An individual's function in each of these categories is characterized by the level of techniques used by the individual to perform the tasks within a category. Technique levels are blind, profoundly visually impaired, partially sighted, and normally (or near normally) sighted. Thus an individual with moderate bilateral macular disease might be categorized as partially sighted in mobility and orientation and communication, normally sighted in activities of daily life, and blind in sustained near vision tasks.

This scheme may be useful for understanding functioning, but lacking objective means of evaluating performance in the four function categories, probably cannot be quantified sufficiently to serve as a screen for eligibility.

Proposed definition

Below we propose a provisional definition of visual impairment that is intended as a baseline departure from commonly accepted ideas about what constitutes "normal" vision.

Functional visual impairment is a significant limitation of visual capability resulting from disease, trauma, or congenital condition, that cannot be fully ameliorated by standard refractive correction, medication, or surgery, that is manifested by one or more of the following:

1. insufficient visual resolution (worse than 20/60 in the better eye with best correction of ametropia).
2. inadequate field of vision (worse than 20 deg along the widest meridian in the eye with the more intact central field; or homonymous hemianopsia).
3. reduced peak contrast sensitivity ($< 1.7 \log$ CS binocularly).

Ideally, we would favor adding an additional defining characteristic that would address those with significant functional impairment at high or low light levels, e.g.

4. insufficient visual resolution or peak contrast sensitivity (see nos. 1 and 3) at high or low luminances within a range typically encountered in everyday life.

However, there is as yet little agreement on what constitutes luminances typically encountered in daily life.

We hope that this relatively simple definition will stimulate discussion and advance current thinking about what levels of functional impairment health care systems should recognize as functionally impaired.

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