Eye (2008) 22, 905–911

www.nature.com/eye

CLINICAL STUDY

Causes of blind certifications in England and Wales: April 1999–March 2000

C Bunce and R Wormald

Abstract

Aim **The last complete report on causes of blindness in England and Wales was for data collected during April 1990 to March 1991. This current study sought to update these figures, with data collected during April 1999 to March 2000, and examine variation in cause by age group.**

Methods **In England and Wales, registration for blindness is voluntary and is initiated by certification by a consultant ophthalmologist. The main cause of blindness was ascertained where possible for all certificates completed during April 1999 to March 2000 and tabulated by age group.**

Results **A total of 34 410 BD8 certificates were received, of which 13 788 (40%) were for people certified as blind. Different causes predominated within different age groups. Age related macular degeneration (AMD) was the lead cause in those aged 65 years and above, diabetic retinopathy was the lead cause in people of working ages (16–64 years), whereas cerebral visual impairment and disorders of the optic nerve accounted for over 40% of blind certificates completed for children.**

Conclusion **Estimates of vision impairment based on certifications for blindness in England and Wales are likely to be imprecise. They do, however, give some measure of the burden at hospital level of sight impairing eye conditions. If factors determining the imprecision remain constant, temporal monitoring of causes may enable changes and development of new conditions leading to vision impairment to be detected.**

Eye (2008) **22,** 905–911; doi:10.1038/sj.eye.6702767; published online 2 March 2007

Keywords: blind; registration; age-related macular degeneration; glaucoma; diabetic retinopathy

Introduction

The legal definition of blindness in England and Wales is 'so blind that they cannot do any work for which eyesight is essential'. Since 1851 the number of blind people in Britain has been counted. Reports on the causes of low vision in England and Wales began in 1950.[1–6] From the mid-1930s to November 2003, registration as blind in England and Wales was initiated by completion of a designated certificate—the BD8 which required the signature of an ophthalmologist. From 1991, the form consisted of five parts, part 5 being an anonymous epidemiological return containing data on the cause of visual impairment. Part 5's were dispatched to the Office of Population Censuses and Surveys (OPCS)—now known as the Office of National Statistics (ONS). The last analysis for all age groups was conducted by OPCS for all certificates completed during April 1990 to March 1991.[7] We have previously reported on the three leading causes of certifications for blindness and partial sight in April 1999–March 2000 and commented on changes since the last analysis.[8] Here we provide information on all (including rare) causes of certifications for blindness during this time period and examine variation in cause by age.

Materials and methods

Details regarding data collection and transmission have been reported previously.[8]

Part 5 of the BD8 form has 16 boxes in which medical information may be written, one for main cause, five for each eye for ophthalmic conditions, and five for diseases causing the ophthalmic conditions. In practice, the latter are rarely completed and here we present results from an analysis only on the main cause of blindness. For records where this field was not completed, the main cause was imputed

Research and Development, Moorfields Eye Hospital, London, UK

Correspondence: C Bunce, Research and Development, Moorfields Eye Hospital, London, ECIV 2PD UK
Tel: +44 0207 566 2820; Fax: +44 0208 608 6925.
E-mail: c.bunce@ucl.ac.uk

Received: 18 September 2006
Accepted in revised form: 30 January 2007
Published online: 2 March 2007

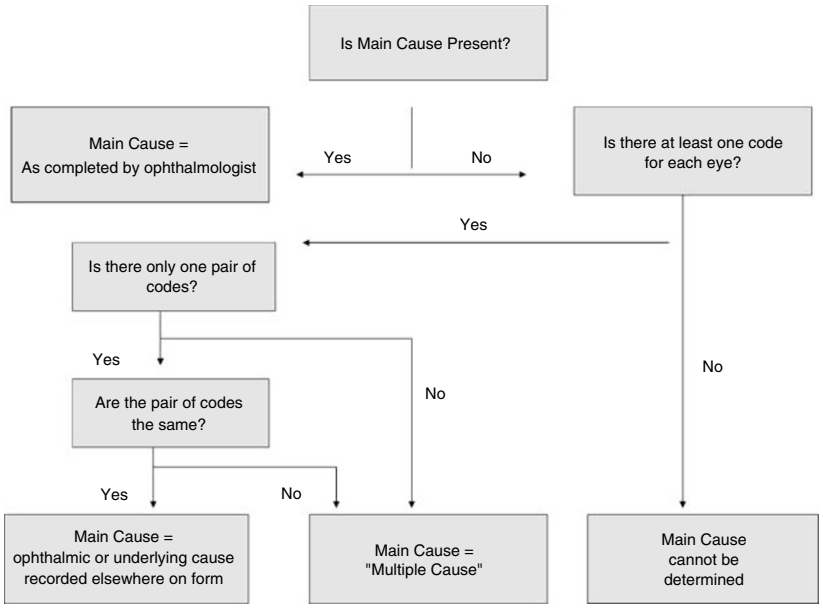

Figure 1 Algorithm used for imputation of main cause of blindness.

Table 1 BD8 (1990) Guidelines on Blind Certifiable Visual Function (apply to the better eye)

Best-corrected visual acuity (Snellen)		*Visual field*
Below 3/60		
Below 6/60	And	Very contracted
6/60 or above	And	Very contracted especially if in the lower part of the field

wherever possible using the algorithm shown in Figure 1. People who had a different cause of visual impairment in each eye or had several diseases in one or more eyes and where the ophthalmologist had not recorded which disease, in his her opinion, was mainly responsible for loss of visual function are included in the category 'Multiple Cause'.

Table 1 summarises guidance provided on the BD8 as to what the legal definition of blindness relates to in terms of visual function. It is important to note that in England and Wales certification is voluntary and there is no statutory requirement for it to be offered.

To facilitate comparison with 1990 analysis and to provide information for ophthalmologists of varying specialties, we tabulated the number of certificates attributed to each main cause of blindness (Table 3) and show these numbers as percentages of the total number of certificates for blindness (Table 4). Data were coded using ICD-9.[9] To illustrate more salient features of the data and examine variation by age, pie and bar charts of the more commonly occurring main causes of blindness are provided for different age groups (Figures 2–4).

Results

As reported previously of 34 410 BD8 certificates dated between April 1999 and March 2000, 13 788 (40%) were certificates completed for people newly blind and 1515 (4.4%) did not state whether the individual was blind or partially sighted.[8] Table 2 shows that the proportion of certificates without specification of visual status was similar in each age group.

Table 3 shows that the most commonly recorded main cause of blindness was degeneration of the macula and posterior pole (ICD 362.5), which largely comprises age-related macular degeneration (AMD). AMD was stated as the main cause on 7881 certificates, which was 57.2% of the total. 1497 certificates were completed for people newly blind with glaucoma (10.9%) and 817 certificates were completed for people newly blind with diabetic retinopathy (5.9%). There were 422 individuals newly certified blind due to optic atrophy (3.1%), whereas 347 individuals were diagnosed as blind owing to cardiovascular disease/accidents (2.5%).

Figures 2–4 clearly illustrate that different causes predominated at different age groups.

There were 328 blind certificates completed for children (aged 0–15 years). Cerebral visual impairment and disorders of the optic nerve (particularly optic atrophy) together accounted for 41.2% of certifications (Figure 2). Hereditary retinal disorders were cited as the

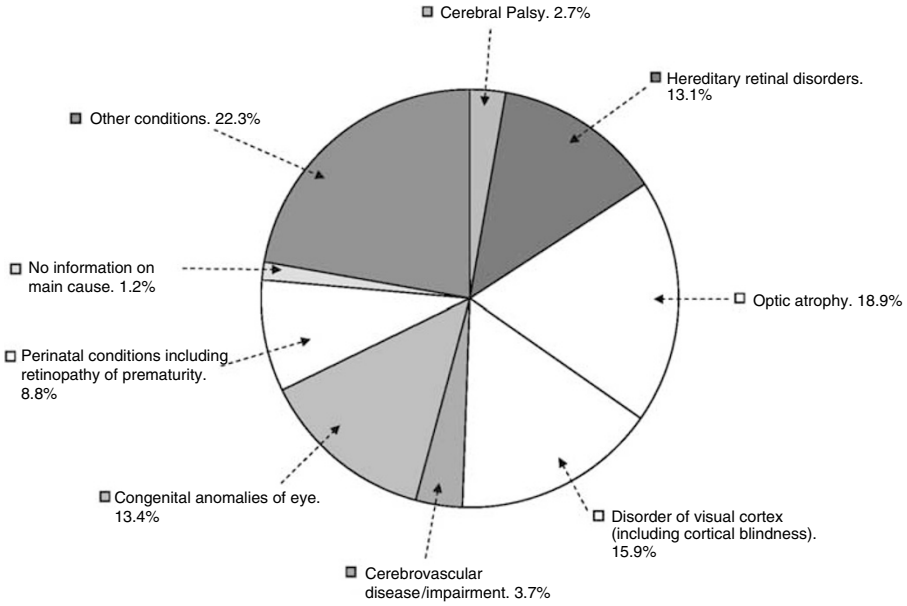

Figure 2 Causes of blindness in England and Wales ages 0–15 years: certifications April 1999–March 2000.

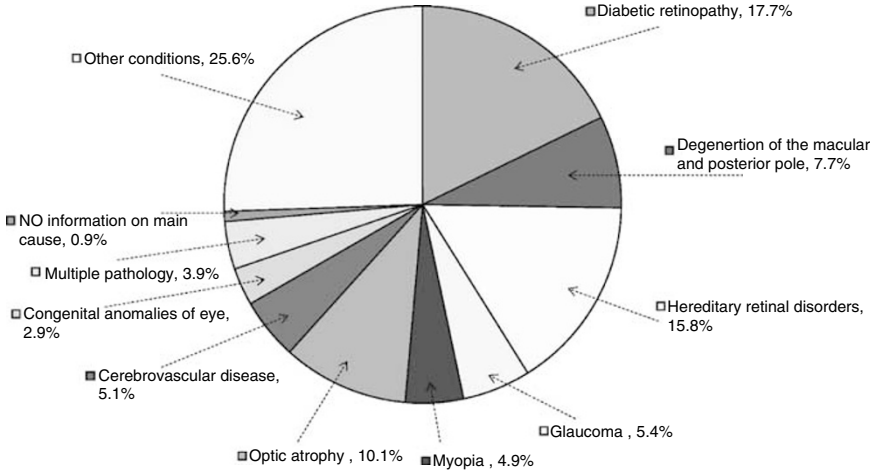

Figure 3 Causes of blindness in England and Wales ages 16–64 years: certifications April 1999–March 2000.

main cause of blindness in 13.1% of certificates. Congenital anomalies of the eye accounted for 13.4% of certificates completed for children, whereas perinatal conditions including retinopathy of prematurity were also an important cause (8.8%).

There were 1637 certificates completed for blindness for people of working age (aged 16–64 years). The leading cause was diabetes—290 certificates (17.7%) were completed citing diabetic retinopathy as the main cause whereas four people were certified blind with a cause of diabetes. Hereditary retinal conditions accounted for 15.8% of certificates and optic atrophy accounted for 10.1% of certificates. Degeneration of the macula and posterior pole was the cause in 7.7% of certificates. Glaucoma accounted for 5.4% of certificates.

Figure 4 shows that in the older age groups, degeneration of the macula and posterior pole accounted for increasing proportions of blind certifications—41.6% of those aged 65–74 years, 66.1% of those aged 75–84 whereas 74.3% of people newly blind aged 85 years or more were so because of AMD. Glaucoma was the leading cause in 11.6, 11.9, and 12.3%, respectively, of blind certifications for the 65–74, 75–84, and 85 and over age groups. Diabetic retinopathy accounted for 15.1% of certificates for the 65–74 age group and 4.2% of those aged 75–84 years.

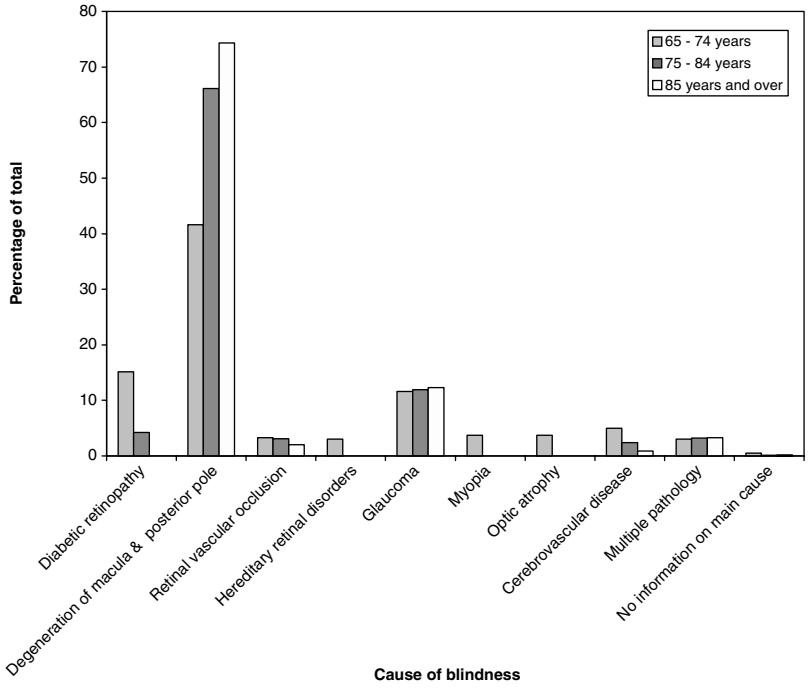

Figure 4 Causes of blindness in England and Wales ages 65–74, 75–84 and 85 years and over: certifications April 1999–March 2000.

Table 2 Numbers of BD8 certificates dated April 1999–March 2000 by visual status

Age group (years)	*Visual status blind number*	*Partially sighted number*	*Not stated number (row %)*	*Total*
0–15	328	520	28 (3.2)	876
16–64	1637	2,371	210 (4.98)	4218
65–74	1692	2,855	202 (4.25)	4749
75–84	4907	7334	511 (4.01)	12752
85 and over	4872	5536	431 (3.98)	10839
Unknown	352	491	133 (13.63)	976
Total	13788	19107	1515 (4.4)	34410

Discussion

The aim of this paper is to provide updated estimates on causes of certifiable blindness in England and Wales. There has been much criticism regarding the validity and coverage of the data collected during BD8 certification.[10–15] It is almost certainly true that many people who are eligible for certification are not certified and that many people who are certified may not always satisfy the criteria for certification. It is important to note, however, that measures of vision are subject to considerable variability and there is often a very necessary delay between the onset of certifiable visual loss and the offer of certification. These figures surely give some indication of the burden of vision impairment on the eye health services and provide a degree of insight into the relative burden of different eye diseases.

To facilitate comparison with the 1990–1991 data, we have presented the number of certificates attributed to each main cause of blindness and shown these numbers as percentages of the total number of certificates for blindness. There are similarities in this analysis and the previous. AMD is by far the leading cause of all-ages certifications for blindness. In 1990/1991 this condition accounted for 48.5% of certifications for blindness, whereas in 1999/2000 it accounted for 57.2%. Diabetic eye disease has remained the leading cause of blindness among people of working age (aged 16–64)—in 1990/1991, 11.9% of blindness certifications in this age group were for diabetic retinopathy—in 1999/2000 this figure was 17.7%. Proportionately, glaucoma has decreased slightly over the time period for blindness (11.9–10.9%) but increased for partial sight (9–10.2%). Cataract as a cause of certifiable blindness has decreased over the time

Table 3 Main causes of blindness in England and Wales by age group: certifications April 1999–March 2000

ICD 9 codes	*Cause*	*All ages*[a]	*0–15*	*16–64*	*65–74*	*75–84*	*85 & over*
001–139, 771	T: infections, congenital or acquired	30	3	15	5	6	0
140, 191, 194	T: all malignant neoplasms (excl eye)	17	4	7	2	1	1
225, 233, 234, 239	T: all benign and uncertain behaviour neoplasms (excl eye)	21	2	10	3	6	0
190, 224, 234	T: neoplams of eye: malignant, benign and uncertain behaviour	17	4	7	3	3	0
250	T: diabetes mellitus	10	0	4	4	1	1
270.2	T: albinism	15	3	11	1		0
322, 323	T: meningitis, encephalitis	10	3	4	1	0	0
325–359	T: other diseases of brain and nervous system	62	15	40	3	2	2
340	Multiple sclerosis	32	0	29	1	1	1
343	Cerebral palsy	17	9	7	1	0	0
360	T: rest of disorders of globe	26	1	10	5	6	3
361	T: retinal detachments and defects	66	5	26	7	16	11
362	T: other retinal disorders	9509	51	708	1079	3648	3780
362.0	Diabetic retinopathy	817	3	290	255	206	38
362.3	Retinal vascular occlusion	337	1	21	55	152	97
362.5	Degeneration of the macula and posterior pole	7881	0	126	704	3242	3615
362.7	Hereditary retinal disorders	392	43	258	50	30	9
363	T: chorioretinal inflammations and scars and other disorders of the choroid	60	0	23	9	13	15
364	T: disorders of iris and ciliary body	29	0	12	5	7	5
365	T: glaucoma	1497	6	88	196	582	597
365.1	Open angle glaucoma	307	0	15	33	127	129
366	T: cataract (excludes congenital)	132	0	16	15	29	68
367	T: disorders of refraction and accommodation	294	2	80	62	93	48
368	T: visual disturbances	38	1	15	3	13	6
368.0	Amblyopia ex anopsia	18	0	9	1	5	3
368.4	Visual field defects	19	1	5	2	8	3
370, 371	T: keratitis, corneal opacity and other disorders of cornea	107	3	25	18	32	26
371.0	Scars and opacities of cornea	26	1	2	4	13	5
371.5	Hereditary corneal dystrophies	18	0	5	2	4	6
371.6	Keratoconus	18	0	15	0	2	1
372–376	T: disorders of conjunctiva, eyelids and orbit	1	0	0	0	1	0
377	T: disorders of optic nerve and visual pathways	729	119	261	113	127	84
377.1	Optic atrophy	422	62	165	63	71	53
377.3	Optic neuritis	26	1	22	3	0	0
377.41	Ischaemic optic neuropathy	73	0	16	19	19	16
377.7	Disorders of visual cortex (and cortical blindness)	119	52	22	16	16	5
	Optic neuropathy	73	1	26	12	20	10
378	T: strabismus and disorders of binocular eye movements	3	1	1	1	0	0
379	T: other disorders of eye (except aphakia 379.3)	36	4	22	3	3	4
401–505	T: hypertension	2	0	1	0	1	0
430–438	T: cerebrovascular disease	347	12	83	84	117	43
440–459	T: other circulatory disease	26	0	1	5	15	4
446.5	Giant cell arteritis	21			4	14	3
740–742	T: congenital anomalies of brain and nervous system	2	1	1			
743	T: congenital anomalies of eye	106	44	48	2	6	3
760–779	T: other perinatal conditions (except Rubella 771.0)	44	29	14	0	1	0
765.1	Prematurity	26	22	4	0	0	0
800–999	T: injuries and accident	36	5	19	3	6	2
379.3	T: aphakia/pseudophakia	4	0	1	0	3	0
	Multiple cause	458	5	64	51	159	159
	All other diseases and conditions (including unknown)	12	1	5	1	3	2
	No information on main cause/illegible/invalid	42	4	15	8	7	8
	Total	**13788**	**328**	**1637**	**1692**	**4907**	**4863**

Abbreviation: T, total.
[a]Data includes age unknown.

Table 4 Percentage distribution of the main causes of blindness in England and Wales by age group: certifications April 1999–March 2000

ICD 9 codes	*Cause*	*All ages*[a]	*0–15*	*16–64*	*65–74*	*75–84*	*85 & over*
001–139, 771	T: infections, congenital or acquired	0.2	0.9	0.9	0.3	0.1	—
140, 191, 194	T: all malignant neoplasms (excl eye)	0.1	1.2	0.4	0.1	—	—
225, 233, 234, 239	T: all benign and uncertain behaviour neoplasms (exc eye)	0.2	0.6	0.6	0.2	0.1	—
190, 224, 234	T: neoplams of eye: malignant, benign and uncertain behaviour	0.1	1.2	0.4	0.2	0.1	—
250	T: diabetes mellitus	0.1	—	0.2	0.2	—	—
270.2	T: albinism	0.1	0.9	0.7	0.1	—	—
322, 323	T: meningitis, encephalitis	0.1	0.9	0.2	0.1	—	—
325–359	T: other diseases of brain and nervous system	0.4	4.5	2.4	0.2	—	—
340	Multiple sclerosis	0.2	—	1.8	0.1	—	—
343	Cerebral palsy	0.1	2.7	0.4	0.1	—	—
360	T: rest of disorders of globe	0.2	0.3	0.6	0.3	0.1	0.1
361	T: retinal detachments and defects	0.5	1.5	1.6	0.4	0.3	0.2
362	T: other retinal disorders	69.0	17.8	43.2	63.8	74.3	77.5
362.0	Diabetic retinopathy	5.9	0.9	17.7	15.1	4.2	0.8
362.3	Retinal vascular occlusion	2.4	0.3	1.3	3.3	3.1	2.0
362.5	Degeneration of macula and posterior pole	57.2	—	7.7	41.6	66.1	74.3
362.7	Hereditary retinal disorders	2.8	13.1	15.8	3.0	0.6	0.2
363	T: chorioretinal inflammations and scars and other disorders of the choroid	0.4	—	1.4	0.5	0.3	0.3
364	T: disorders of iris and ciliary body	0.2	—	0.7	0.3	0.1	0.1
365	T: glaucoma	10.9	1.8	5.4	11.6	11.9	12.3
365.1	Open angle glaucoma	2.2	—	0.9	2.0	2.6	2.7
366	T: cataract (excludes congenital)	1.0	—	1.0	0.9	0.6	1.4
367	T: disorders of refraction and accommodation	2.1	0.6	4.9	3.7	1.9	1.0
368	T: visual disturbances	0.3	0.3	0.9	0.2	0.3	0.1
368.0	Amblyopia ex anopsia	0.1	—	0.5	0.1	0.1	0.1
368.4	Visual field defects	0.1	0.3	0.3	0.1	0.2	0.1
370, 371	T: keratitis, corneal opacity and other disorders of cornea	0.8	0.9	1.5	1.1	0.7	0.5
371.0	Scars and opacities of cornea	0.2	0.3	0.1	0.2	0.3	0.1
371.5	Hereditary corneal dystrophies	0.1	—	0.3	0.1	0.1	0.1
371.6	Keratoconus	0.1	—	0.9	—	—	—
372–376	T: disorders of conjunctiva, eyelids, and orbit	—	—	—	—	—	—
377	T: disorders of optic nerve and visual pathways	5.3	35.3	15.9	6.7	2.6	1.7
377.1	Optic atrophy	3.1	18.9	10.1	3.7	1.4	1.1
377.3	Optic neuritis	0.2	0.3	1.3	0.2	—	—
377.41	Ischaemic optic neuropathy	0.5	—	1.0	1.1	0.4	0.3
377.7	disorders of visual cortex (and cortical blindness)	0.9	15.9	1.3	0.9	0.3	0.1
	Optic neuropathy	0.5	0.3	1.6	0.7	0.4	0.2
378	T: strabismus and disorders of binocular eye movements	—	0.3	0.1	0.1	—	—
379	T: other disorders of eye (except aphakia 379.3)	0.3	1.2	1.3	0.2	0.1	0.1
401–505	T: hypertension	—	—	0.1	—	—	—
430–438	T: cerebrovascular disease	2.5	3.7	5.1	5.0	2.4	0.9
440–459	T: other circulatory disease	0.2	—	0.1	0.3	0.3	0.1
446.5	Giant cell arteritis	0.2	—	—	0.2	0.3	0.1
740–742	T: congenital anomalies of brain and nervous system	—	0.3	0.1	—	—	—
743	T: congenital anomalies of eye	0.8	13.4	2.9	0.1	0.1	0.1
760–779	T: other perinatal conditions (except Rubella 771.0)	0.3	8.8	0.9	—	—	—
765.1	Prematurity	0.2	6.7	0.2	—	—	—
800–999	T: injuries and accident	0.3	1.5	1.2	0.2	0.1	—
379.3	T: aphakia/ pseudophakia	—	—	0.1	—	0.1	—
	Multiple cause	3.3	1.5	3.9	3.0	3.2	3.3
	All other diseases and conditions (including unknown)	0.1	0.3	0.3	0.1	0.1	—
	No information on main cause/illegible/invalid	0.3	1.2	0.9	0.5	0.1	0.2
	Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Abbrevaition: T, total.
[a]Data include age unknown – % less than 0.1 or no cases observed.

period from 3.3 to 1%. It is important to note, however, that a proportional comparison requires caution since an increase in one cause can result in a proportionate decrease in another cause.

This is likely to be the final complete analysis of data from BD8 forms from England and Wales. At the end of October 2000, a bulletin was circulated to all Directors of Social Services in England and Chief Executives of Health Authorities and Trusts by the Department of Health. This bulletin included a statement indicating that the Department of Health no longer required part 5 of the form to be sent to ONS and that part 5 was to be omitted for future reprint. In November 2003, following extensive consultation with service users and key stakeholders, form BD8 was replaced in England by the Certificate of Vision Impairment (CVI). CVI-W, the Welsh Version of the CVI, is to be launched in Wales later this year (2007).

The CVI has some advantages over the BD8. It records measures of visual function so that one can assess whether or not there is a shift in what is considered certifiable visual loss. It uses terminology found more acceptable by the sight impaired—no longer labelling people blind. Section C contains a list of the more commonly sight-impairing eye conditions to hopefully reduce transcription error when coding data. The CVI is not, however, without its problems. Causes of certifiable vision impairment in children are not well represented and some conditions have been included without reference to common causes (neoplasia). The CVI, like the BD8, was not piloted before being introduced, but with a move in the National Health Service (NHS) to increasing use of IT, it is hoped that the diagnostic sheet might be dynamic. Guide Dogs for the Blind Association are currently funding a 3-year project which hopes to develop an electronic CVI. Widespread use of this would hopefully improve data collection and allow users to have a greater role in determining the contents of the CVI.

Acknowledgements

This study was supported by a grant from the Department of Health and Research & Development support funding. The views expressed in this paper are those of the author and not necessarily any funding body.

References

1 Sorsby A. *The Causes of Blindness in England 1948–50*. London: HMSO, 1953.
2 Sorsby A. *Blindness in England 1951–54*. London: HMSO, 1956.
3 Sorsby. The incidence and causes of blindness in England and Wales 1948–62. *Reports of Public Health and Medical Subjects 114*. London: HMSO, 1966.
4 Sorsby A. The incidence and causes of blindness in England and Wales 1963–8. *Reports of Public Health and Medical Subjects 128*. London: HMSO, 1972.
5 Department of Health Social Security: Blindness partial sight in England 1969–1976. *Reports of Public Health and Medical Subjects no. 129*. London: HMSO, 1979.
6 Government Statistical Service. *Causes of Blindness and partial sight among adults in 1976–77 and 1980/81*. London: HMSO, 1988.
7 Evans J. Causes of blindness and partial sight in England and Wales 1990–1991. *In Studies on Medical and Population Subjects No. 57*. London: HMSO, 1988.
8 Bunce C, Wormald R. *Leading causes of certification for blindness and partial sight in England & Wales*. BMC Public Health, 2006 Mar 8: 6.58.
9 *International Classification of Diseases*, Ninth Revision. WHO: Geneva, 1977.
10 Bruce IW, McKennell AC, Walker EC. *Blind and partially sighted adults in Britain: the RNIB Survey* **1**. London: HMSO, 1991.
11 Walker EC, Tobin MHJ, McKennell AC. *Blind and partially sighted children in Britain: the RNIB Survey* **2**. London: HMSO, 1992.
12 Robinson R, Deutsch J, Jones HS, Youngson-Reilly S, Hamlin DM, Dhurjon L *et al*. Unrecognised and unregistered visual impairment. *Br J Ophthalmol* 1994; **78**(10): 736–740.
13 Bunce C, Evans J, Fraser S, Wormald R. BD8 certification of visually impaired people. *Br J Ophthalmol* 1998; **82**(1): 72–76.
14 King AJ, Reddy A, Thompson JR, Rosenthal AR. The rates of blindness and of partial sight registration in glaucoma patients. *Eye* 2000; **14**(Part 4): 613–619.
15 Barry RJ, Murray PI. Unregistered visual impairment: is registration a failing system? *Br J Ophthalmol* 2005; **89**(8): 995–998.