The Epidemiology and Socioeconomic Associations of Retinal Detachment in Scotland: A Two-Year Prospective Population-Based Study

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Purpose. Rhegmatogenous retinal detachment (RRD) is a common ophthalmic emergency. Population-based data on primary RRD incidence has been variable, with large differences reported. This study is the first large-scale prospective examination of the incidence of primary RRD in the United Kingdom.

Methods. The authors established a two-year prospective, population-based observational study recruiting all cases of primary RRD in Scotland. The annual incidence was calculated and analyzed in relation to age, sex, refractive error, and lens status. A national, population-based tool, the Scottish Index of Multiple Deprivation (SIMD), was used to examine the socioeconomic distribution of all incident cases.

Results. A total of 1244 cases were identified during the study period from a population of 5,168,500 yielding an annual incidence of 12.05 per 100,000 population (95% confidence interval, 11.35–12.70). The age-specific incidence increased to a peak in both sexes in the 60- to 69-year age group. RRD was significantly more frequent in males than in females (14.70 vs. 8.75 per 100,000; $P < 0.001$). Of the cases without previous intraocular surgery, 53.2% were myopic, with a spherical equivalent refractive error > -1 D, 23.4% had undergone cataract surgery, and 10.4% had sustained traumatic injury. A strong association was found between RRD incidence and affluence, with a significant rising trend across quintiles of deprivation.

Conclusions. The estimated annual incidence of primary RRD in Scotland is 12.05 per 100,000. Based on this estimate, there are approximately 7300 new cases annually in the United Kingdom. RRD incidence increases with age, is more common in men and right eyes, and is strongly associated with affluence. (*Invest Ophthalmol Vis Sci.* 2010;51:4963–4968) DOI:10.1167/iovs.10-5400

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Primary rhegmatogenous retinal detachment (RRD) is a major cause of visual loss and is the most common ophthalmic emergency in the United Kingdom.[1] It is caused by a full-thickness break in the retina that initiates separation of the neurosensory retina from the underlying retinal pigment epithelium. The subsequent accumulation of fluid within the subretinal space extends the area of detachment, causing visual loss.[2] Most cases of RRD present when the macula is involved and require intervention to restore vision or prevent further visual loss. The treatment of RRD is surgical, and although in some countries the condition receives outpatient treatment, in Scotland RRD repair is usually an inpatient procedure.

Previous studies of RRD incidence have been affected by differences in case definition, case recruitment/ascertainment, and study methodologies. Incidence estimates vary threefold geographically and in different time periods. To date, there have been no systematic or prospective incidence estimates of RRD in the United Kingdom. This study presents the findings of a 2-year prospective study in which all incident cases of RRD in Scotland were recruited. Our intent was to calculate the incidence of RRD and to explore the clinical, demographic, and socioeconomic associations within the study group.

Methods

Study Design

The design of the Scottish Retinal Detachment Study has been described in detail elsewhere.[3] Briefly, the framework for health care provision in Scotland is based on free universal care funded nationally by the U.K. government and provided by the National Health Service. In Scotland, all suspected cases of primary RRD (including those with private health insurance) are referred to one of six specialist vitreoretinal surgical centers for treatment. All presenting cases to each center were prospectively identified and the patients were invited to participate. The study adhered to the tenets of the Declaration of Helsinki and was approved by the Multi-Centre Research and Ethics Committee Scotland (MREC-06/MRE00/19).

Eligibility Criteria

To be eligible, each patient had to be a Scottish resident with a primary RRD, defined as an area of subretinal fluid greater than 2 disc diameters with a full-thickness retinal break identified before or during surgery.[3] The diagnosis of RRD was made by a consultant vitreoretinal surgeon after biomicroscopic examination or, in the presence of a fundus-obscuring opacity, after B-scan ultrasonography. One RRD in one eye was recorded as a case. A patient who presented with simultaneous bilateral RRDs was recorded as one case. If the fellow eye developed RRD within the study period, it was recorded as a second case. Patients who met these criteria but did not undergo operative repair for social/

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medical reasons were also eligible. RRDs occurring after blunt trauma or previous cataract surgery were included.

The exclusion criteria were (1) previous posterior segment intraocular surgery, (2) previous penetrating injury in the presenting eye, (3) previous RRD in the presenting eye, and (4) all other types of retinal detachment (exudative, tractional, or combined).

Data Quality

Data collected on all incident cases between November 1, 2007, and October 31, 2009, included clinical, demographic, and treatment information.[3] A local investigator was nominated in each center to ensure complete case identification. Each site was visited by the lead researcher (DM) to guarantee complete recruitment. The busier centers were visited between one and three times weekly. The outlying centers were visited fortnightly, with weekly telephone contact maintained at these sites.

Several validation techniques were established to ensure complete case capture. Surgical logbooks in each center were examined to identify all cases that had vitreoretinal surgery of any type. This list was then checked against all collected data between visits to identify any potentially missed cases. Subsequently, all clinical case notes and discharge letters of patients who underwent vitreoretinal surgery were viewed individually to determine how many cases were not recruited during the short time period between visits. Incomplete information was followed up by contacting the patient or surgeon directly. Patients not recruited in the hospital were invited to participate at the first follow-up appointment. Each of the 16 vitreoretinal consultants in Scotland was asked to provide a weekly account, identifying patients who presented privately or those in whom surgery was not indicated. Over the study period, 4 patients presented privately, and 15 others did not have surgery.

Scottish Population

Scotland is a well defined geographic region with a stable population and a highly developed infrastructure and health care system, providing a rare opportunity to study disease incidence with great accuracy. Study participants were derived from the entire resident population of Scotland. Population data were obtained from the General Register Office of Scotland. The last formal census was conducted in 2001. Annual midyear estimates are calculated by the General Register Office, with a demographic cohort component method. Midyear population estimates for 2008 were used in the analysis. The total population in 2008 was 5,168,500 (males, 2,500,205; females, 2.668,295) (http://www.gro-scotland.gov.uk/statistics/publications-and-data/population-estimates/mid-year/mid-2008-pop-est/index.html).

Scottish Index of Multiple Deprivation

The Scottish Index of Multiple Deprivation (SIMD) is the Scottish Government's official tool for identifying small area concentrations of multiple deprivation across Scotland thus enabling effective targeting of policies and funding (http://www.scotland.gov.uk/Publications/2009/10/28104046/0). The SIMD approaches deprivation as a range of problems arising from a lack of resources or opportunities and provides a multidimensional indicator of deprivation. It uses 6505 datazones, which are population-based geographic areas with approximately 750 people living in each one. The datazone of each patient was identified by the postal code. The SIMD ranks these areas from 1, the most deprived, to 6505, the least deprived, providing a ranking for every datazone in Scotland. The datazones are ranked according to an overall deprivation score, which is a weighted sum of seven domain scores (current income, employment, health, education, geographic access, crime, and housing) derived from 37 different indicators. The SIMD index provides a relative ranking and not an absolute measure of deprivation (i.e., a datazone ranked 50 is not twice as deprived as the one ranked 100).

Statistical Methods

Annual RRD incidence rates and 95% confidence intervals (CIs) were calculated for sex and age group based on the Poisson distribution. Age-standardized incidences were calculated by a direct method, based on the European Standard Population. Differences in incidence between comparison groups were calculated by using the z-test. Proportionality differences, including trends, were calculated with the χ^2 statistic. Meta-estimates were based on a random-effects model and displayed as a forest plot. All reported probabilities (P) are based on two-sided tests.

Results

Sample Size

Over the 2-year study period, a total of 1202 cases of primary RRD were recruited. Through regular examination of all operating logbooks, we are confident that this represents 96.6% of all surgically treated cases of primary RRD in Scotland. An additional 42 cases met the inclusion criteria but were missed while in the hospital or refused to participate. Clinical data on these cases were not available and are not included in further analysis. Including these 42 cases, the annual incidence of RRD was 12.05 per 100,000 (95% CI, 11.35–12.70).

Age and Sex Distribution

Table 1 shows the baseline characteristics of all cases. The incidence rates are shown in Table 2. There is marked variation with both sex and age. A significantly higher incidence of all types of RRD was seen in the males. This sex difference was also noted in the age-standardized incidence (M-F, 1.76:1).

Pseudophakic RRD

RRD cases were divided between those that had been treated with cataract surgery (pseudophakic or aphakic) and those that had not (phakic). Approximately one (21.6%; 260/1202) in five presenting cases had undergone cataract surgery with intraocular lens insertion. The median time from cataract surgery to presentation with RRD was 3.28 years (IQR, 1.06–7.23 years). Of the pseudophakic cases, 46 (17.7%) of 260 were known to have had surgical complications at the time of cataract removal, with vitreous loss, and had a shorter median time to presentation of 1.38 years (IQR, 0.37–7.23 years). Sixty-eight percent (178/260) of pseudophakic RRDs occurred in males; the female pseudophakic RRD group had a higher proportion of complicated cataract surgery (23.1%; 19/82 vs. 15.1%; 27/178).

Refractive Error

Spherical equivalent refractive (SER) error measurements were calculated as diopters. To avoid inaccuracies between measured SER in phakic and pseudophakic cases, only the SERs of the 920 phakic patients were included for analysis (Table 1). The majority (53.1%) of cases were myopic, with an SER of ≥ -1 D and 18.1% of all cases were highly myopic, with an SER of > -6 D. Figure 1 demonstrates the age distribution of all phakic cases with a known SER (843/920). In those phakic cases younger than 50, 82.1% (161/196) exhibited myopia > -1 D. With increasing age, this trend diminished, with an increasing proportion of emmetropic individuals affected (Fig. 1). There was no difference in the sex distribution of RRD associated with myopia ($P = 0.511$).

Laterality

The right eye was affected significantly more frequently than the left eye (54.9% vs. 43.4%; $P < 0.0001$) in both males and

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TABLE 1. Baseline Characteristics of the Study Population

Baseline Characteristics	Cases, *n* (%)
Year of diagnosis	
2007–2008	594 (49.4)
2008–2009	608 (50.5)
Sex	
Male	735 (61.1)
Female	467 (38.9)
Ethnicity	
White British	1176 (97.9)
Pakistani	7 (0.6)
Chinese	6 (0.5)
Indian	4 (0.3)
Black	2 (0.2)
Other	6 (0.5)
Age group, y	
0–9	2 (0.2)
10–19	27 (2.2)
20–29	40 (3.3)
30–39	90 (7.4)
40–49	145 (12.1)
50–59	292 (24.3)
60–69	371 (30.9)
70–79	179 (14.9)
80+	56 (4.7)
Affected Eye	
Right	661 (54.9)
Left	522 (43.4)
Both (simultaneous)	18 (1.5)
Phakic status	
Phakic	920 (76.5)
Pseudophakic	260 (21.6)
Aphakic	22 (1.8)
Spherical equivalent refractive error (D)*	
≥+6 D	7 (0.8)
>+1 to <+6 D	79 (8.6)
≥−1 to ≤+1 D	269 (29.2)
>−1 to <−6 D	323 (35.1)
≥−6 D	166 (18.1)
Not known	76 (8.2)

* Spherical equivalent refractive error (SER) of all 920 phakic cases of RRD.

females. Less than 2% (18/1202) of cases presented with unilateral symptoms, but clinical examination revealed RRD to be present in both eyes. Six percent (70/1202) of cases had had an RRD in the fellow eye outside the study period, and 8/1202 (0.67%) sustained a consecutive fellow eye RRD during the study period.

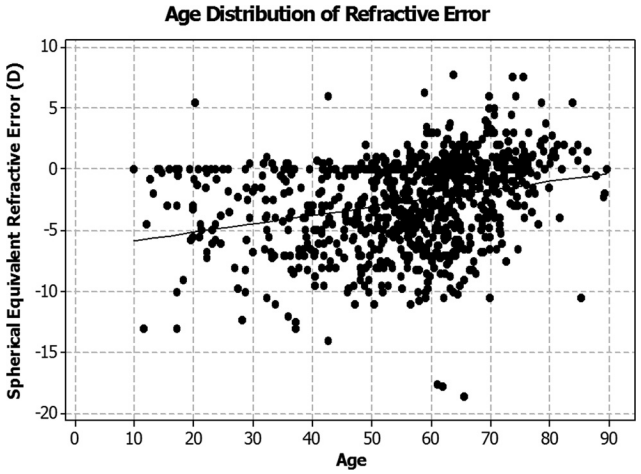

FIGURE 1. Scatterplot and trendline of age and SER error for 91.6% (843/920) of phakic cases of primary RRD.

Indices of Deprivation

Postal code data were available for matching to SIMD rank for 1178 cases. Figure 2 shows the age standardized annual incidence of primary RRD by quintile of ranked deprivation for males and females. The age standardized incidence of RRD rose from 9.15 to 13.5 per 100,000 between the most deprived and the least deprived quintiles, with a strong association across quintiles of increasing affluence ($\chi^2_{trend} = 22.48$; $P = 2.11 \times 10^{-6}$). This association was stronger in the males ($\chi^2_{trend} = 18.74$; $P = 1.49 \times 10^{-5}$) than in the females ($\chi^2_{trend} = 4.08$; $P = 0.043$). A similar trend was observed across the component domains making up the SIMD score, with a higher incidence in the more affluent quintiles. A significant trend was found in the domains of income, employment, health, education, and housing ($P < 0.0001$). The strongest association was found in the domain of education ($\chi^{2\,trend}_2 = 40.22$; $P = 2.27 \times 10^{-10}$). Geographic access to essential services demonstrated the opposite trend ($\chi^2_{trend} = 8.29$; $P = 0.004$; see Supplementary Fig. S1, http://www.iovs.org/cgi/content/full/51/10/4963/DC1).

TABLE 2. Annual Incidence of Primary RRD Based on All Diagnosed Cases in Scotland over a 2-year Period

	Male	Female	*P*†
Overall incidence*	14.70 (13.60–15.80)	8.75 (8–9.60)	<0.0001
Age group			
0–9	0.35 (0.10–1.30)	—	—
10–19	2.65 (1.50–4.25)	1.65 (0.80–3)	0.3
20–29	3.30 (2.10–4.90)	2.50 (1.45–4)	0.49
30–39	7.30 (5.35–9.70)	6.20 (4.45–8.30)	0.48
40–49	11.90 (9.55–14.60)	6.55 (4.90–8.55)	<0.0001
50–59	28.90 (24.95–33.33)	14.60 (11.90–17.75)	<0.0001
60–69	45.85 (40.30–50)	21.40 (17.80–25.50)	<0.0001
70–79	27.10 (21.85–33.20)	19.85 (15.90–24.50)	0.04
80+	16.70 (10.8–24.65)	10.70 (7.25–15.20)	0.13
Age standardized incidence	13.09 (11.23–14.95)	7.41 (6.43–8.39)	<0.0001
Traumatic RRD	2 (1.60–2.40)	0.5 (0.35–0.75)	<0.0001
Nontraumatic RRD	12.70 (11.75–13.75)	8.25 (7.50–9.05)	<0.0001

Data are expressed as annual incidences per 100,000 (95% CI).

* Overall annual incidence of all eligible cases is 12.05 (11.35–12.70).

† Incidence comparison between males and females.

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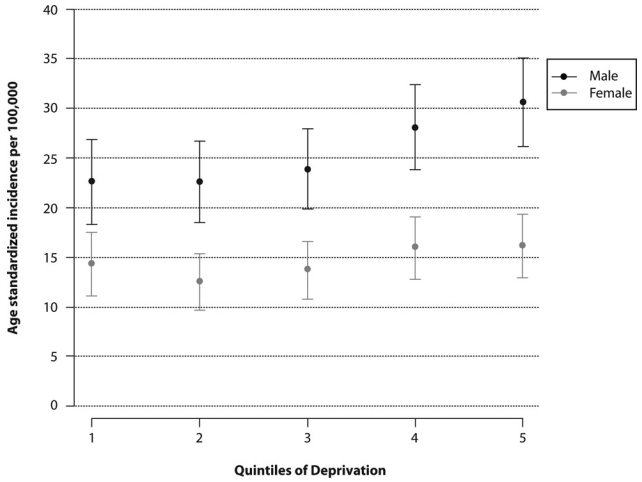

FIGURE 2. Age standardized incidence and 95% CI of primary RRD by quintiles of deprivation in males and females (χ^2_{trend} males = 18.74, $P = 1.49 \times 10^{-5}$; χ^2_{trend} females = 4.08, $P = 0.043$). 1, most deprived quintile; 5, least deprived quintile.

Attachment of the macula at presentation, which is the most important determinant of final visual outcome, showed a marked variation across quintiles of deprivation (Supplementary Table S1). Sixty-five percent of cases in the most deprived quintile presented with a detached or bisected macula at diagnosis compared with 50.8% in the most affluent quintile ($\chi^2_{trend} = 6.83$; $P = 0.0089$).

The extent of detachment may be an indicator of chronicity of RRD and this parameter also demonstrated significant variation across quintiles of deprivation (Supplementary Table S2). One quadrant of detachment was more frequent in the least-deprived quintile than in the most deprived (29% vs. 18%; $\chi^2_{trend} = 9.69$; $P = 0.0018$). Total RRD (four quadrants of detachment) was much more frequent in the most deprived quintile than in the most affluent (13% vs. 4%; $\chi^2_{trend} = 14.17$; $P = 0.0001$).

A higher proportion of cases in the most deprived quintile had undergone cataract surgery than in the least-deprived (28.4% vs. 18.8%; $\chi^2_{trend} = 8.74$, $P = 0.003$). There were no significant differences between quintiles of deprivation in the proportions of significant ocular trauma (Supplementary Tables S3, S4).

Refractive error and SIMD ranking were available in 90.4% (832/920) of phakic cases. Figure 3 illustrates the proportion of low (≥ -1 to ≤ -6 D) and high (> -6 D) myopia across quintiles of deprivation for these cases. A significant trend was noted for low myopia (≥ -1 to ≤ -6 D; $\chi^2_{trend} = 7.85$; $P = 0.005$), with 32.4% of cases in the most affluent quartile having low myopia compared with 22.4% in the most deprived. No such trend was observed for high myopia (> -6 D; 16.4% in the most affluent quartile versus 11.7% in the most deprived; $\chi^2_{trend} = 1.34$; $P = 0.24$). An examination of all cases with SER error > -1 D showed a significant trend ($\chi^2_{trend} = 11.19$; $P = 0.00081$), with 48.8% of cases in the most affluent quartile compared with 34% in the most deprived.

DISCUSSION

In one of the largest prospectively recruited studies of primary RRD, we found the annual incidence in a population of 5.1 million to be 12.05 per 100,000 population. In the United Kingdom, this rate equates to approximately 7300 incident cases of primary RRD annually.

There have been several studies over the past 40 years that were conducted with the principal goal of estimating the incidence of primary RRD, reporting a wide range of results.[4–16] In only one study, from Beijing, China,[17] was a population comparable to ours in size examined, and it produced a much lower estimate of annual incidence (7.98 per 100,000; 95% CI, 7.3–8.67). This difference may be attributable in part to the age distribution of the study population. In Beijing, 14% of the population was older than 60 years, compared with 22.6% in Scotland. In previous reports with a sample size of more than 500 cases, a minimum recruitment period of 1 year, and predefined case eligibility, the annual incidence varied nearly twofold, between 7.98 and 14 per 100,000.[4–6,17] In reports from European countries only, a similar variation exists, with annual incidence rates varying between 6.9 and 14 per 100,000 population.[6,10] There are several possible reasons for the noted variation: the methodology used in previous studies has differed considerably[18]; there were no clearly defined inclusion criteria across studies making accurate comparison problematic. RRD incidence varies with age, sex, affluence and prevalence of both myopia and pseudophakia; thus, characteristics of the underlying study population will influence the reported incidence. Finally, changing treatment modalities for RRD and a move toward more daycase surgery and outpatient procedures[19] may influence case recording, making comparison of rates between countries and different time periods difficult.

We found a large difference in the incidence of RRD between men and women (M-F ratio, 1.68:1). The significant difference in incidence persisted in the age-standardized incidence ratios (M-F, 1.76:1) and was not affected by excluding trauma and previous cataract surgery (M-F, 1.40:1). Within the pseudophakic group, the overrepresentation of men was even more marked (M-F, 2.3:1), despite a higher rate of cataract surgery in women in the United Kingdom.[20] Most previous studies show a higher incidence in males,[8,11,13,14,21] (M-F, 1.3:1 to 2.3:1); a minority have found that women predominate in the phakic, nontraumatic group.(M-F, 1:1.16 to 1:1.4)[5,12] A meta-estimate of previous studies reporting the sex distribution in RRD incidence indicate a male proportionality of between 52% and 59% ($P < 0.0001$; Supplementary Fig. S2). Long-term cohort studies in Taiwan have demonstrated that the risk of RRD after cataract surgery is higher in males. The increased risk of RRD in patients with myopia and a history of RRD was seen to be significant in males only, up to 4 years after cataract surgery.[22,23] Perhaps, due to lifestyle differences, the men tend to underreport lesser trauma that may contribute to RRD risk; however, there may also be an inherent difference in sex risk.

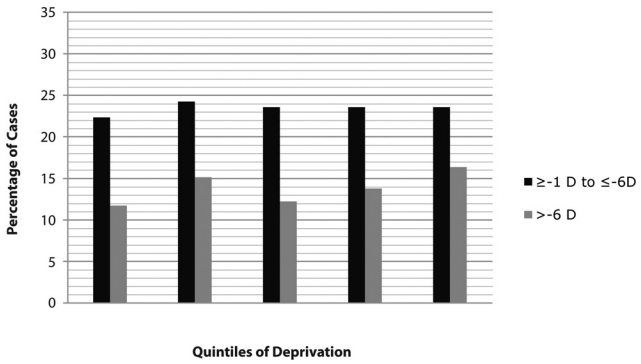

FIGURE 3. Distribution of low and high myopia across quintiles of deprivation for 90.4% (832/920) of all phakic cases (low myopia [≥ -1 to ≤ -6 D]: $\chi^2_{trend} = 7.85$, $P = 0.005$; high myopia [> -6 D]: $\chi^2_{trend} = 1.34$, $P = 0.2462$; all SER errors > -1 D: $\chi^2_{trend} = 11.1987$, $P = 0.00081$). 1, most deprived quintile; 5, least deprived quintile.

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The age distribution of our cases indicates a peak in both sexes in the 60- to 69-year age group, widely supported by the findings in other studies.[4–16]

The right eye was involved more frequently than the left eye (1.26:1); most studies support this finding (ratios ranging between 1.09:1 and 1.36:1).[5,7,9,10,17] Excluding all cases with previous cataract surgery and reported trauma, we continued to find a right-to-left eye ratio of 1.18:1 ($P = 0.001$). A meta-estimate of previous studies reporting this statistic indicates a right eye proportionality of 53.5% to 56.7% ($P < 0.0001$; Supplementary Fig. S2). The reason for the greater incidence in the right eye remains unknown.

Socioeconomic status can affect the incidence of many diseases and the association between deprivation and visual impairment is well known.[24] Unexpectedly, we found a disparity in the incidence of RRD between socioeconomic groups, with an association between affluence and RRD. This trend was a significant finding in both sexes but was much more marked in men. The trend was significant in five of seven socioeconomic demographic domains that determine the overall deprivation score and the strongest association was found in the domain of educational achievement ($\chi^2_{\text{trend}} = 40.21$; $P = 2.3 \times 10^{-10}$). In addition to the association with affluence, the characteristics of RRD at presentation showed dramatic variation between quintiles of deprivation. RRD cases from the most deprived quintile more frequently presented with a total RRD (13% vs. 4%) and more frequently presented when the macula was detached (65% vs. 51%) when compared with the least-deprived quintile. These findings indicate that cases from more deprived areas tend to present later and with more extensive detachments. This trend has important consequences for final visual prognosis.

We explored several possible explanations for the association between RRD and affluence. The incidence of RRD increases with age to a peak in the sixth decade. Age-specific mortality rates may differ between the most deprived and least deprived quintiles so that fewer people from deprived areas live long enough to be at greatest risk of retinal detachment. Similarly, elderly individuals may have accrued more wealth over many years and a larger proportion of elderly individuals may live in affluent areas. However, we found a significant increase in the age-specific incidence of RRD across quintiles of deprivation in the age groups comprising the highest natural incidence of RRD (age groups, 50–59 and 60–69), suggesting that the influence of age was not the primary factor behind the association with affluence (Supplementary Table S5).

Trauma may influence the incidence of RRD; however, the proportion of traumatic cases was equal across quintiles. Previous cataract surgery, a known risk factor for RRD, did not significantly influence the association with affluence, as more pseudophakic RRD cases were present in the more deprived quintiles.

This study has only recorded patients on presentation to hospital, and it is possible that patients from areas of greater deprivation have poorer access to health care services and have been excluded from the study. However, based on the SIMD classification of our cases, those from the most deprived areas ranked higher than those from the least deprived areas in the geographic-access-to-services domain, which suggests that access to essential services was not a limiting factor in presentation to a hospital.

Myopia is a significant risk factor for RRD and has been associated with higher educational achievement and IQ, and thus, perhaps, higher income and socioeconomic status.[25–27] It is interesting to note that of the SIMD rank determinants, the strongest association was found between RRD and educational achievement. Detachments in the most affluent quintiles were more likely to be associated with myopia than those in the most deprived quintiles. This increased proportion of myopic RRD cases in more affluent areas is an important factor that partly explains the increase in RRD incidence between the most and least deprived quintiles. Although myopia is an important factor in the observed association between RRD and affluence, we cannot exclude other, as yet unidentified risk factors associated with socioeconomic status that may underlie this observation.

In summary, we prospectively estimated the overall incidence of primary RRD in Scotland to be 12.05 per 100,000 population. Men were affected more than women in all age groups and all types of RRD. More than 50% of all phakic cases were myopic. One in five cases with RRD had had cataract surgery. RRD incidence and the proportion of myopic RRD are significantly associated with affluence; however, RRD cases from more deprived datazones frequently present with a more extensive area of detachment.

References

1. Grey RH, Burns-Cox CJ, Hughes A. Blind and partial sight registration in Avon. *Br J Ophthalmol.* 1989;73(2):88–94.
2. D'Amico DJ. Clinical practice: primary retinal detachment. *N Engl J Med.* 2008;359(22):2346–2354.
3. Mitry D, Charteris DG, Yorston D, et al. Rhegmatogenous retinal detachment in Scotland: research design and methodology. *BMC Ophthalmol.* 2009;9:2.
4. Wong TY, Tielsch JM, Schein OD. Racial difference in the incidence of retinal detachment in Singapore. *Arch Ophthalmol.* 1999; 117(3):379–383.
5. Tornquist R, Stenkula S, Tornquist P. Retinal detachment: a study of a population-based patient material in Sweden 1971–1981. I. Epidemiology. *Acta Ophthalmol (Copenh).* 1987;65(2):213–222.
6. Algvere PV, Jahnberg P, Textorius O. The Swedish Retinal Detachment Register, I: a database for epidemiological and clinical studies. *Graefes Arch Clin Exp Ophthalmol.* 1999;237(2):137–144.
7. Haimann MH, Burton TC, Brown CK. Epidemiology of retinal detachment. *Arch Ophthalmol.* 1982;100(2):289–292.
8. Limeira-Soares PH, Lira RP, Arieta CE, Kara-Jose N. Demand incidence of retinal detachment in Brazil. *Eye.* 2007;21(3):348–352.
9. Rowe JA, Erie JC, Baratz KH et al. Retinal detachment in Olmsted County, Minnesota 1976 through 1995. *Ophthalmology.* 1999; 106(1):154–159.
10. Laatikainen L, Tolppanen EM, Harju H. Epidemiology of rhegmatogenous retinal detachment in a Finnish population. *Acta Ophthalmol (Copenh).* 1985;63(1):59–64.
11. Ivanisevic M, Bojic L, Eterovic D. Epidemiological study of non-traumatic phakic rhegmatogenous retinal detachment. *Ophthalmic Res.* 2000;32(5):237–239.
12. Sasaki K, Ideta H, Yonemoto J, Tanaka S, Hirose A, Oka C. Epidemiologic characteristics of rhegmatogenous retinal detachment in Kumamoto, Japan. *Graefes Arch Clin Exp Ophthalmol.* 1995; 233(12):772–776.
13. Polkinghorne PJ, Craig JP. Northern New Zealand Rhegmatogenous Retinal Detachment Study: epidemiology and risk factors. *Clin Exp Ophthalmol.* 2004;32(2):159–163.
14. Mowatt L, Shun-Shin G, Price N. Ethnic differences in the demand incidence of retinal detachments in two districts in the West Midlands. *Eye.* 2003;17(1):63–70.
15. Zou H, Zhang X, Xu X, Wang X, Liu K, Ho PC. Epidemiology survey of rhegmatogenous retinal detachment in Beixinjing District, Shanghai, China. *Retina.* 2002;22(3):294–299.
16. Wilkes SR, Beard CM, Kurland LT, Robertson DM, O'Fallon WM. The incidence of retinal detachment in Rochester, Minnesota 1970–1978. *Am J Ophthalmol.* 1982;94(5):670–673.
17. Li X. Incidence and epidemiological characteristics of rhegmatogenous retinal detachment in Beijing, China. *Ophthalmology.* 2003; 110(12):2413–2417.
18. Mitry D, Charteris DG, Fleck BW, Campbell H, Singh J. The epidemiology of rhegmatogenous retinal detachment: geographic variation and clinical associations. *Br J Ophthalmol.* 2010;94(6):678–684.

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19. Sodhi A, Leung LS, Do DV, Gower EW, Schein OD, Handa JT. Recent trends in the management of rhegmatogenous retinal detachment. *Surv Ophthalmol.* 2008;53(1):50–67.
20. Keenan T, Rosen P, Yeates D, Goldacre M. Time trends and geographical variation in cataract surgery rates in England: study of surgical workload. *Br J Ophthalmol.* 2007;91(7):901–904.
21. Rosman M, Wong TY, Ong SG, Ang CL. Retinal detachment in Chinese, Malay and Indian residents in Singapore: a comparative study on risk factors, clinical presentation and surgical outcomes. *Int Ophthalmol.* 2001;24(2):101–106.
22. Sheu SJ, Ger LP, Chen JF. Male sex as a risk factor for pseudophakic retinal detachment after cataract extraction in Taiwanese adults. *Ophthalmology.* 2007;114(10):1898–1903.
23. Sheu SJ, Ger LP, Ho WL. Late increased risk of retinal detachment after cataract extraction. *Am J Ophthalmol.* 2010;149(1):113–119.
24. Tielsch JM, Sommer A, Katz J, Quigley H, Ezrine S. Socioeconomic status and visual impairment among urban Americans: Baltimore Eye Survey Research Group. *Arch Ophthalmol.* 1991;109(5):637–641.
25. The Eye Disease Case-Control Study Group. Risk factors for idiopathic rhegmatogenous retinal detachment. *Am J Epidemiol.* 1993;137(7):749–757.
26. Williams C, Miller LL, Gazzard G, Saw SM. A comparison of measures of reading and intelligence as risk factors for the development of myopia in a UK cohort of children. *Br J Ophthalmol.* 2008;92(8):1117–1121.
27. Saw SM, Tan SB, Fung D et al. IQ and the association with myopia in children. *Invest Ophthalmol Vis Sci.* 2004;45(9):2943–2948.

APPENDIX

Scottish RD Study Group

The following persons and institutions were involved in the Scottish RD Study: Harry Bennett: Princess Alexandra Eye Pavilion, Edinburgh; Alan Cox, Harry Hammer, John Murdoch, and Shohista Saidkasimova: Gartnavel General Hospital, Glasgow; Zachariah Koshy, Karen Madill, and Arvind Singh: Ayr Hospital, Ayr; Graham Cormack, John Ellis, and Paul Baines: Ninewells Hospital, Dundee; Hatem Atta, Noemi Lois, John V. Forrester, and Mohammed S. Mustafa: Aberdeen Royal Infirmary, Aberdeen; and Simon Hewick and Iain Whyte: Raigmore Hospital, Inverness.

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