



Diabetic RetinaScreen Statistical Bulletin 2016-2017



An tSeirbhís Náisiúnta Scagthástála
National Screening Service

Diabetic 
RetinaScreen
An Clár Náisiúnta Scagthástála Reitíní do Dhiabéitigh
The National Diabetic Retinal Screening Programme

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Programme Performance

The figures reported relate to clients invited by the Diabetic RetinaScreen programme for screening between 01 January 2016 and 31 December 2017. A number of these clients may have been screened in early 2018.

Programme standards, against which the performance is measured, are based on the *Standards for Quality Assurance in Diabetic Retinopathy Screening*.¹

This report demonstrates the impact of the programme, with large number of patients receiving sight-saving pan-retinal laser for proliferative diabetic retinopathy. In addition, the patients have also gained access in a more rapid manner than historically had been the case for injections and focal laser treatment for maculopathy.

There are continual improvements to be made, however these should not detract from the fact that the establishment of the programme has been a significant milestone in the improvement of diabetic retinopathy detection and early treatment in Ireland.

Eligible Population by Gender and Age Group

The data presented below pertains to the third and fourth years of screening for diabetic retinopathy in Ireland. The data for Years 1 and 2 have previously been published.² Year 3 took place from 1 January to 31 December 2016, and Year 4 took place from 01 January to 31 December 2017.

Table 1 outlines the population eligible for screening on the Diabetic RetinaScreen register on 31 December 2017, and is comprised of men, women and children aged 12 years and older with Type 1 and Type 2 diabetes. The register was compiled from national health schemes, such as the Medical Card Scheme, Drugs Payment Scheme and Long-term Illness Scheme. The register is continuously updated by GPs who can register people with diabetes with the programme.

At the end of Year 3 there were 156,855 men and women on the Diabetic RetinaScreen register. At the end of Year 4, there were 164,569 men and women on the register. This represents a 5 per cent year-on-year increase in eligible people. Of the total, 95,417 (58 per cent) were males compared to 69,152 (42 per cent) females. This is consistent with international experience.³

Table 1. Eligible population by gender and age group on the Diabetic RetinaScreen register*

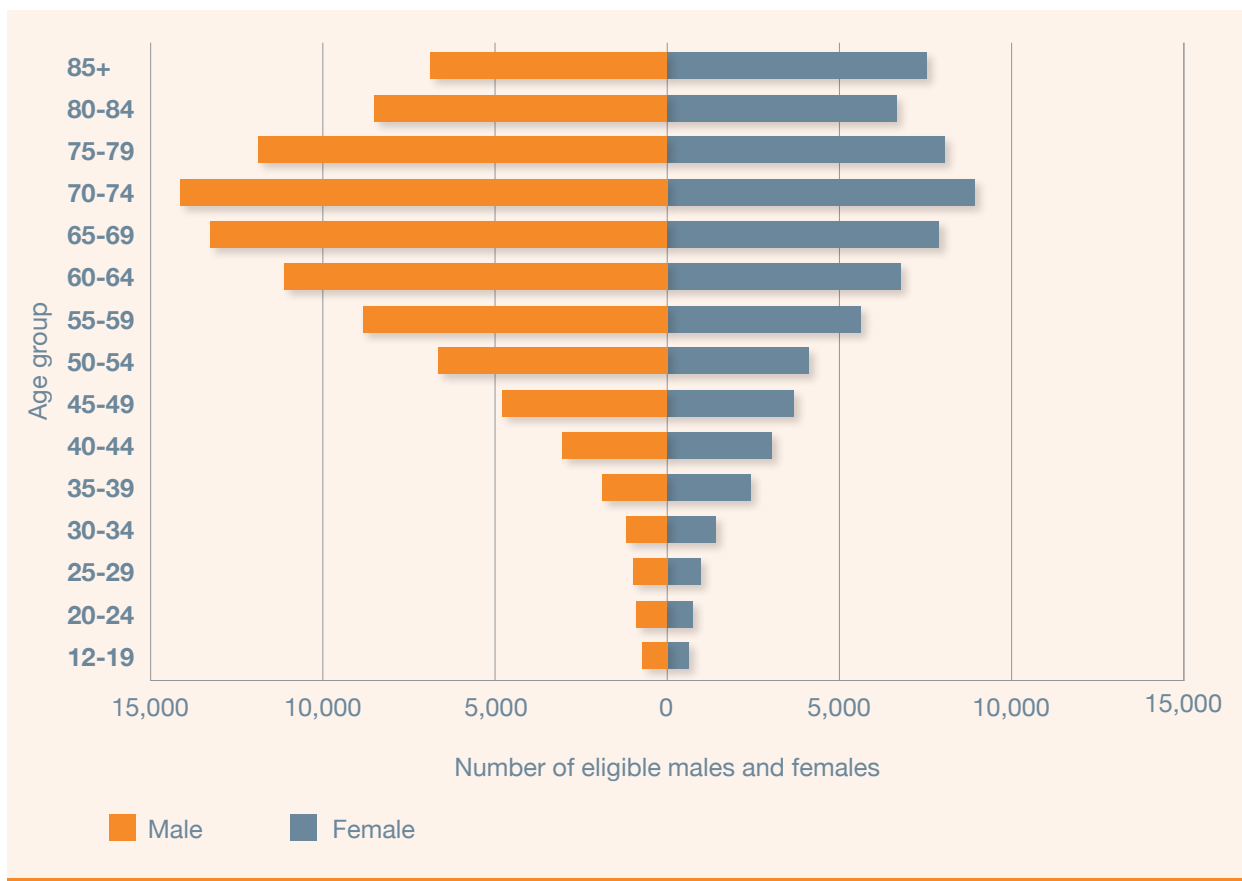
Age	Male	Female	Totals
12-19	729	698	1,427
20-24	862	778	1,640
25-29	1,002	977	1,979
30-34	1,212	1,457	2,669
35-39	1,888	2,436	4,324
40-44	3,055	3,096	6,151
45-49	4,834	3,735	8,569
50-54	6,686	4,162	10,848
55-59	8,926	5,670	14,596
60-64	11,185	6,793	17,978
65-69	13,314	7,916	21,230
70-74	14,219	8,999	23,218
75-79	11,960	8,128	20,088
80-84	8,576	6,736	15,312
85+	6,969	7,571	14,540
Total	95,417	69,152	164,569

* Eligible population as of 31st December 2017.

Eligible population pyramid

The population pyramid in Figure 1 shows the age distribution of known eligible clients on the Diabetic RetinaScreen register. The 70-74 age group accounts for the greatest proportion of the eligible population for both males (8.6 per cent) and females (5.5 per cent). The population pyramid also highlights that there are more males compared to females in the eligible population (58 per cent male; 42 per cent female).

Figure 1. Eligible population pyramid*



*Eligible population as of 31st December 2017

Screening Participation

During Year 3, 55,090* people were sent a letter to participate and 47,841* were sent a letter in Year 4 (Table 2). The programme issues a minimum of two letters sent in each screening year upon registration. Repeat letter(s) to non-responders are sent during the following year.

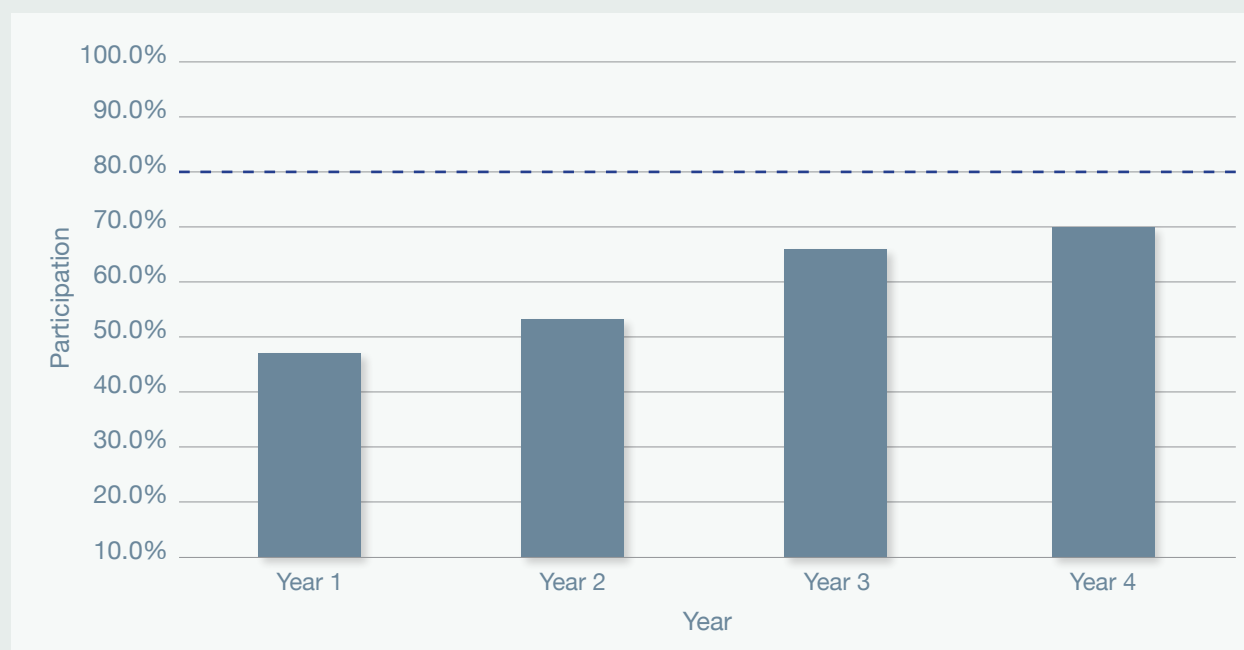
During Year 3, 17,648 eligible clients consented to take part, and 14,836 eligible people consented to take part in Year 4. Following consent, clients are offered a screening appointment at a designated location. In addition, clients who had attended previously (and were not in treatment) were offered a screening appointment the following year. There was an increase in the numbers invited for screening between Year 3 and Year 4, rising from 105,932 to 114,095. A similar increase was seen in the numbers screened in the two years, rising from 95,040 in Year 3 to 102,522 in Year 4. Overall, 66.3 per cent (95,040 of 143,374) of the eligible cohort attended for screening in Year 3. Participation increased to 69.7 per cent (102,522 of 114,095) in Year 4. Participation has increased year-on-year since the programme began (Figure 2).

Table 2. Overall screening activity*

	Year 3 (2016)	Year 4 (2017)	QA standard
Clients sent consent letter*	55,090	47,841	
Clients consenting to take part in the programme	17,648	14,836	
Total clients contacted/invited in the period	143,374	147,100	
Eligible clients offered a screening appointment	105,932	114,095	
Clients attended for screening	95,040	102,522	
Participation	66.3%	69.7%	
Overall acceptance	89.7%	89.9%	> 70%
Clients who opted out of the programme	689	1,275	

* Includes new registrants, and clients who were re-invited having not responded in a previous round.

Figure 2. Participation in screening by screening year



Acceptance of Screening by Consented Clients

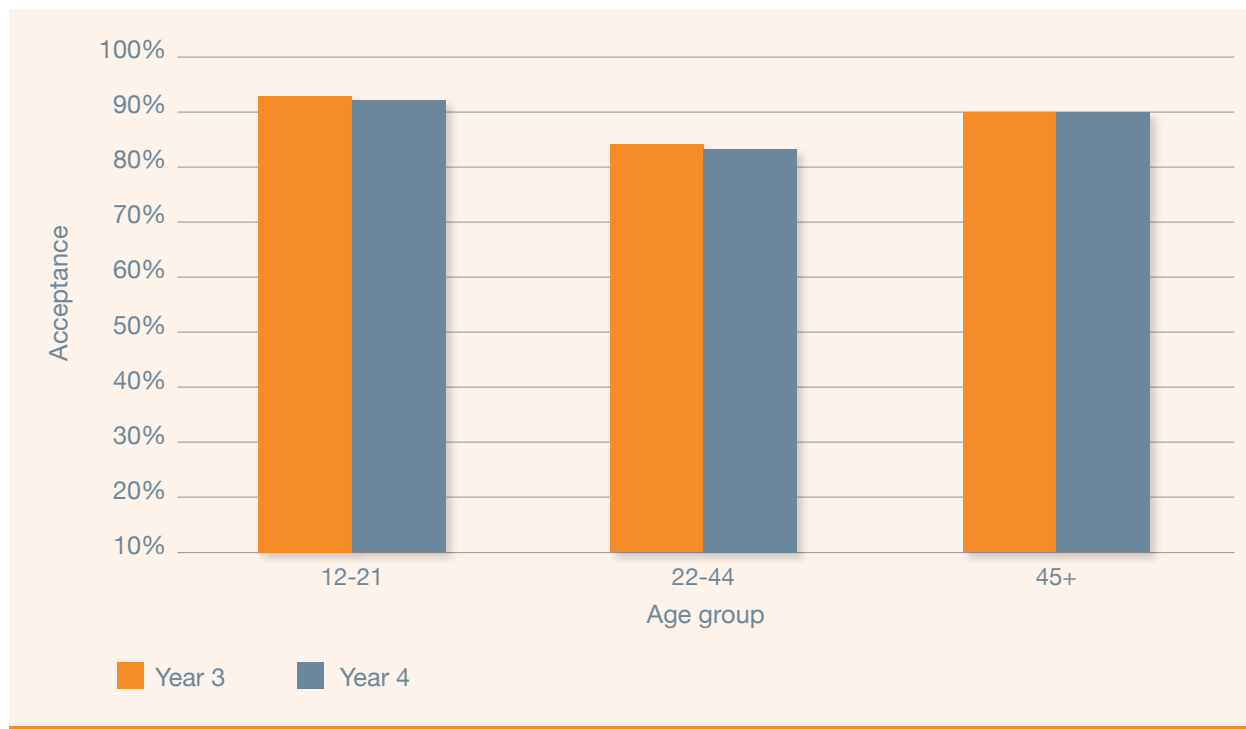
Acceptance of screening relates to those who have provided consent to participate and have attended a screening appointment. Overall acceptance in Years 3 and 4 were 89.7 per cent and 89.9 per cent respectively (Table 2). Acceptance of screening in Year 3 and Year 4 was slightly higher overall for males than for females (Year 3; 90.3 per cent compared to 88.9 per cent), (Year 4; 90.6 per cent compared to 88.8 per cent) (Table 3). Acceptance was higher among males in the 22-44 and 45 plus age groups. This trend was also observed in the first two screening years².

Figure 3 demonstrates that acceptance of screening by consented clients in Year 3 was similar in Year 4 for all age groups.

Table 3. Acceptance of eligible clients by age group and gender

	Year 3		Year 4		Year 3		Year 4		Year 3		Year 4	
Age group	12-21				22-44				45+			
Sex	M	F	M	F	M	F	M	F	M	F	M	F
Eligible invited	1,035	991	1,107	1,034	4,995	4,350	5,444	4,714	56,439	38,105	60,701	41,078
Screened	951	926	1,019	963	4,248	3,645	4,590	3,963	51,210	34,045	55,296	36,676
Acceptance	91.9%	93.4%	92.1%	93.1%	85.0%	83.8%	84.3%	84.1%	90.7%	89.3%	91.1%	89.3%

Figure 3. Acceptance of consented clients by age group and year



Screening Outcomes; Final Grade by year

In the first two years of screening the proportion of clients screened with an ungradable image was very low at 0.7 per cent.² In Year 3, this decreased to 0.5 per cent with a further decrease in Year 4 to 0.3 per cent, well within the QA standard of 7 per cent (Table 4). During Years 3 and 4, 66.9 per cent and 70.8 per cent of screened clients respectively had no retinopathy detected.

More than a quarter of clients had background retinopathy in Year 3, decreasing to under a quarter in Year 4 (24.1 per cent) and smaller numbers had pre-proliferative and proliferative retinopathy. A considerable amount of non-diabetic eye disease (NDED) was detected and referred appropriately. Figure 4 illustrates the reduction in proliferative retinopathy since the programme began.

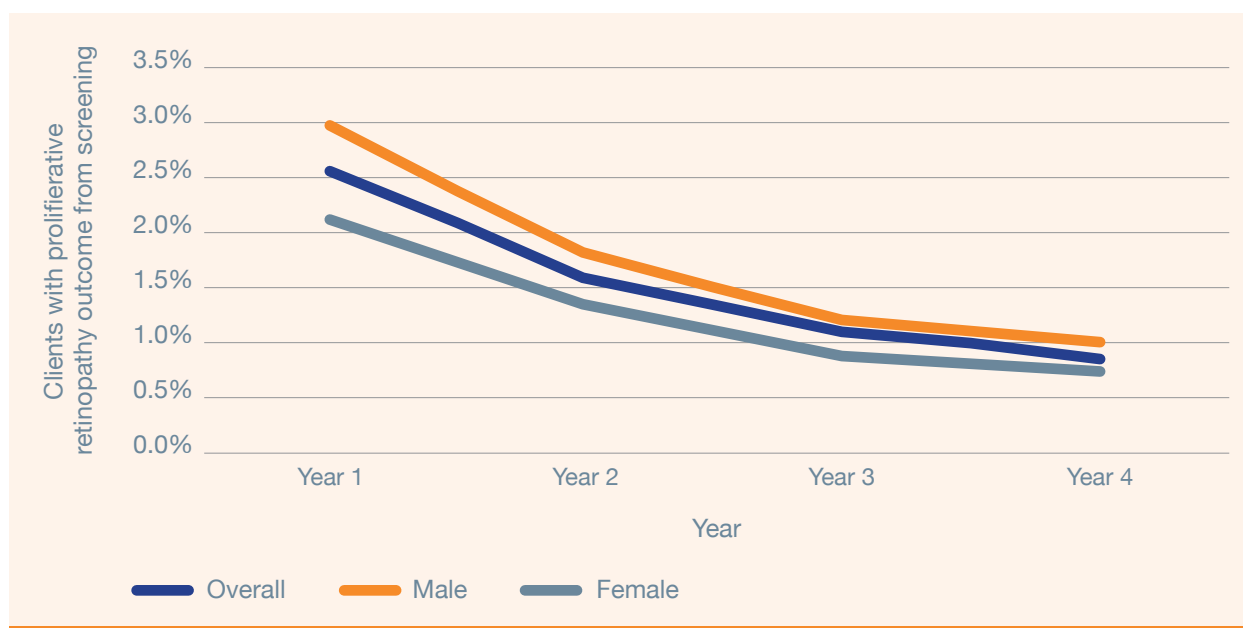
While not established to act as a general eye screening service, detection of incidental eye disease has played a role in preventing and treating vision impairment by non-diabetic causes including cataract, macular degeneration and glaucoma.

Table 4. Screening outcomes; final grade by year

	Year 3	Year 4	QA Standard
Number of clients attending for screening	95,040	102,522	
Number of clients screened with an ungradeable image	429	307	
Proportion of clients screened with an ungradeable image	0.5%	0.3%	< 7%
No Retinopathy detected	63,556	72,549	
Proportion Retinopathy detected	66.9%	70.8%	
Background Retinopathy	26,009	24,700	
Background Retinopathy	27.4%	24.1%	
Pre-proliferative Retinopathy	740	667	
Pre-proliferative Retinopathy	0.8%	0.7%	
Proliferative Retinopathy	1,015	907	
Proliferative Retinopathy	1.1%	0.9%	
Non-diabetic eye disease	3,077	3,108	
Non-diabetic eye disease	3.2%	3.0%	
ARMD*	214	284	
ARMD	0.2%	0.3%	

* Age-related macular degeneration (ARMD)

Figure 4. Clients with proliferative retinopathy outcome from screening



Referral rates to ophthalmology based on outcomes from screening by year

In Year 3 and Year 4, 89.7 per cent and 91.4 per cent respectively of screened clients were returned for routine annual recall, compared to 86.2 per cent and 89.2 in Year 1 and Year 2. During Year 3 and Year 4, 9.1 per cent and 7.5 per cent were referred to treatment (Routine, Urgent and NDED referrals). Routine referrals to ophthalmology were 7.9 per cent (including NDED) in Year 3 with 1.3 per cent of clients requiring urgent referral to treatment, a decrease from the first two years.

In Year 4, 6.3 per cent of clients were given a routine referral to ophthalmology with 1.1 per cent referred for urgent ophthalmology (Figure 5). While participation in the programme has increased since the first screening year, the referral rate to our ophthalmology clinics is reducing. This indicates the higher impact of detected retinopathy in the first and second year, with patients now receiving appropriate treatment in a timely manner. The programme expects an ongoing reduction in these rates over the coming years of the programme, as the incidence of eye disease is identified.

We identify potential non-diabetic disease ocular conditions as part of the programme and these are referred to our ophthalmology clinics for confirmatory diagnosis and onward referral to ophthalmologists. Urgent NDED referral is reserved for obvious active age related macular degeneration (ARMD).

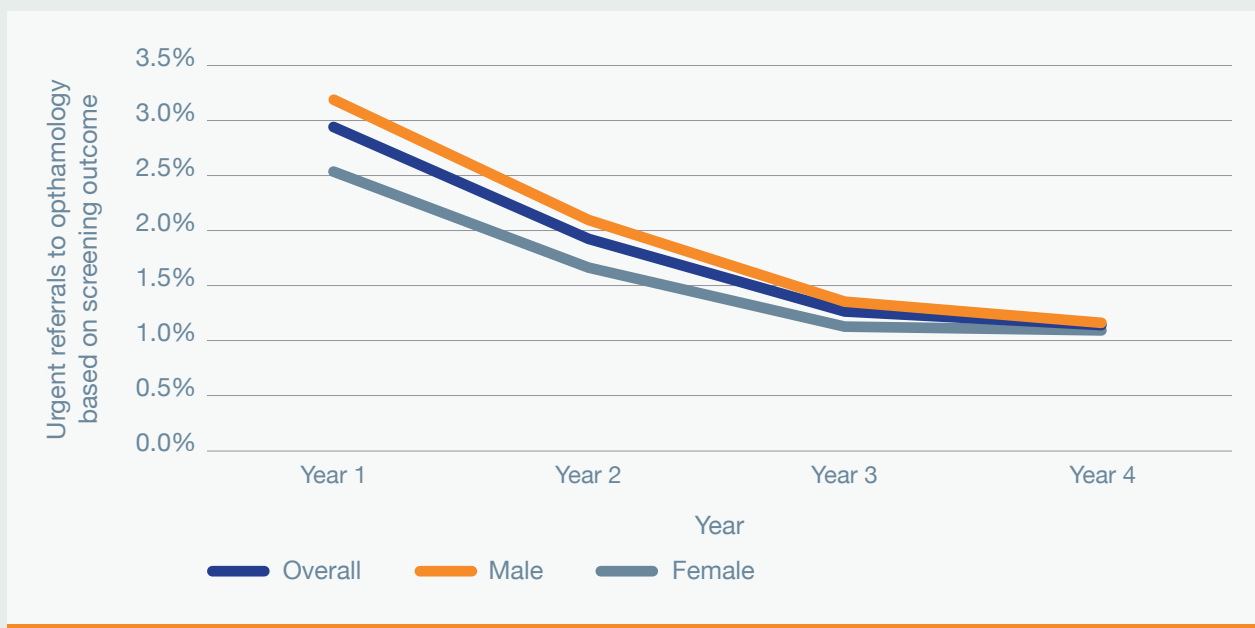
The low rates of ungradeable images indicate a robust process of image acquisition and grading. In the event of grading not being possible at the initial screening event, a referral is made for a slit lamp appointment in a hospital outpatient clinic to check for diabetic retinopathy. In Years 3 and 4 this was 0.8 per cent (Table 5). If a grade is not possible using slit lamp, then a clinical examination is performed to attempt to give a screening grade prior to the decision to refer for treatment.

Table 5. Referral rates to ophthalmology based on outcomes from screening by year

	Year 3	Year 4
Number of clients attending for screening	95,040	102,522
Annual recall	85,256	93,747
Annual recall	89.7%	91.4%
Routine referral to ophthalmology	4,877	3,909
Routine referral rate	5.1%	3.8%
Urgent referral to ophthalmology	964	876
Urgent referral rate	1.0%	0.9%
Referral to slit lamp	796	802
Slit lamp referral rate	0.8%	0.8%
Referral to digital surveillance	27	311
Digital surveillance referral rate	0.03%	0.3%
NDED* urgent referral to ophthalmology	228	292
NDED urgent referral to ophthalmology	0.2%	0.3%
NDED routine referral to ophthalmology	2,677	2,571
NDED routine referral to ophthalmology	2.8%	2.5%
Other outcome	215	14
Other outcome	0.20%	0.01%

* Non-diabetic eye disease (NDED)

Figure 5. Urgent referrals to ophthalmology based on screening outcomes*



* Including NDED

Screening Outcomes on Final Grade by year, age and gender

In screened clients above the age of 22 years, background retinopathy was higher among males than females across both screening years (Table 6). For both males and females, the rate of background retinopathy was highest among 22 to 44 year age groups. Likewise pre-proliferative and proliferative retinopathy was highest in this age group, with males having higher detection rates than females. The youngest age group (12 to 21 years) has the highest rate of no retinopathy across both screening years. Rates of ARMD were low and ARMD was only detected among older clients. All grades of retinopathy may include patients with maculopathy. These can be referable (M1) or non-referable (M0).

The rate of urgent diabetic eye disease referral to ophthalmology was highest among screened clients aged 22 to 44 years, with males having higher referral rates than females (Table 7). Patients with sight-threatening proliferative retinopathy were referred in each year. The proportions are highest in those aged 22-44; the proportions fell in each age and gender subgroup between Years 3 and 4, with the exception of the youngest age group (12-21).

The same pattern of age and gender was found for routine referral to ophthalmology; the prevalence of diabetic retinopathy increases as patients get older and the longer the client has diabetes. The younger patient cohort has lower levels of diabetic retinopathy. Rates of NDED requiring urgent referral to ophthalmology were highest among older clients with active macular degeneration. While some of these clients were under an existing care plan, a significant number were able to enter an appropriate care pathway following referral, which is a significant additional benefit of the programme.

Table 6. Screening outcomes based on final grade by year, age and gender

	Year 3			Year 4			Year 3			Year 4			Year 3			Year 4		
	12-21			12-21			22-44			22-44			45+			45+		
	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
Age group	12-21			12-21			22-44			22-44			45+			45+		
Sex	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%	M	F	%
Attending for screening	951	926		1,019	963		4,248	3,645		4,590	3,963		51,210	34,045		55,296	36,676	
Screened with an ungradeable image	1	2	0.11%	0	1	0.0%	8	5	0.14%	5	5	0.13%	235	178	0.46%	181	115	0.31%
Screened with an ungradeable image	0.11%	0.22%		0.0%	0.1%		0.19%	0.14%		0.11%	0.13%		0.46%	0.52%		0.33%	0.31%	
No Retinopathy	719	671		811	745		2,337	2,177		2,735	2,517		33,833	23,808		38,631	27,099	
No Retinopathy	75.6%	72.46%		79.59%	77.36%		55.01%	59.73%		59.59%	63.51%		66.07%	69.93%		69.86%	73.89%	
Background Retinopathy	229	248		205	209		1,685	1,318		1,646	1,311		14,313	8,212		13,690	7,635	
Background Retinopathy	24.08%	26.78%		20.12%	21.7%		39.67%	36.16%		35.86%	33.08%		27.95%	24.12%		24.76%	20.82%	
Pre-proliferative Retinopathy	0	3		2	1		84	47		78	30		408	198		364	192	
Pre-proliferative Retinopathy	0.0%	0.32%		0.2%	0.1%		1.98%	1.29%		1.7%	0.76%		0.8%	0.58%		0.66%	0.52%	
Proliferative Retinopathy	1	1		1	2		103	66		90	73		572	272		494	247	
Proliferative Retinopathy	0.11%	0.11%		0.1%	0.21%		2.42%	1.81%		1.96%	1.84%		1.12%	0.8%		0.89%	0.67%	
Non-diabetic eye disease	1	1		0	5		30	31		34	25		1,743	1,271		1,792	1,252	
Non-diabetic eye disease	0.11%	0.11%		0.0%	0.52%		0.71%	0.85%		0.74%	0.63%		3.4%	3.73%		3.24%	3.41%	
ARMD	0	0		0	0		1	1		2	2		106	106		144	136	
ARMD	0.0%	0.0%		0.0%	0.0%		0.02%	0.03%		0.04%	0.05%		0.21%	0.31%		0.26%	0.37%	

Table 7. Referral rates to treatment based on outcomes from screening by year, age and gender

	Year 3		Year 4		Year 3		Year 4		Year 3		Year 4	
	12-21		12-21		22-44		22-44		45+		45+	
	M	F	M	F	M	F	M	F	M	F	M	F
Age group												
Sex												
Attending for screening	951	926	1,019	963	4,248	3,645	4,590	3,963	51,210	34,045	55,296	36,676
Annual recall	926	898	999	939	3,636	3,265	4,091	3,627	45,844	30,672	50,436	33,640
Annual recall	97.37%	96.98%	98.04%	97.51%	85.59%	89.57%	89.13%	91.52%	89.52%	90.09%	91.21%	91.72%
NDED urgent referral to Ophthalmology	0	0	0	0	1	1	4	2	115	111	148	138
NDED urgent referral to Ophthalmology	0.0%	0.0%	0.0%	0.0%	0.02%	0.03%	0.09%	0.05%	0.22%	0.33%	0.27%	0.38%
NDED routine referral to Ophthalmology	2	1	0	3	34	22	35	18	1,528	1,090	1,507	1,008
NDED routine referral to Ophthalmology	0.21%	0.11%	0.0%	0.31%	0.8%	0.6%	0.76%	0.45%	2.98%	3.2%	2.73%	2.75%
Urgent referral to Ophthalmology	1	1	1	2	96	65	86	72	542	259	476	239
Urgent referral rate	0.11%	0.11%	0.1%	0.21%	2.26%	1.78%	1.87%	1.82%	1.06%	0.76%	0.86%	0.65%
Routine referral to Ophthalmology	22	24	16	16	457	273	326	218	2,616	1,485	2,130	1,203
Routine referral rate	2.31%	2.59%	1.57%	1.66%	10.76%	7.49%	7.1%	5.5%	5.11%	4.36%	3.85%	3.28%
Referral to slit lamp	0	0	1	2	4	4	2	1	441	347	444	352
Slit lamp referral rate	0.0%	0.0%	0.1%	0.21%	0.09%	0.11%	0.04%	0.03%	0.86%	1.02%	0.8%	0.96%
Referral to digital surveillance	0	0	2	1	1	3	45	25	16	7	147	91
Digital surveillance referral rate	0.0%	0.0%	0.2%	0.1%	0.02%	0.08%	0.98%	0.63%	0.03%	0.02%	0.27%	0.25%
Other outcome	0	2	0	0	19	12	1	0	108	74	8	5
Other outcome	0.0%	0.22%	0.0%	0.0%	0.45%	0.33%	0.02%	0.0%	0.21%	0.22%	0.01%	0.01%

References

1. *Standards for Quality Assurance in Diabetic Retinopathy Screening*, National Screening Service, First edition 2013, Revision 4.0, published 2017. ISBN 978-1-907487-11-8.
2. *Diabetic RetinaScreen, Programme Report 2013-2015*, National Screening Service. Available from: [https://www.diabeticretinascreen.ie/fileupload/Documents/Diabetic%20RetinaScreen%20Programme%20Report%202013-15%20\(FINAL%20web%202\)%20\(4\).pdf](https://www.diabeticretinascreen.ie/fileupload/Documents/Diabetic%20RetinaScreen%20Programme%20Report%202013-15%20(FINAL%20web%202)%20(4).pdf)
3. *Changes observed in diabetic retinopathy: eight-year follow-up of a Spanish population* by Romero-Aroca P, de la Riva-Fernandez S, Valls-Mateu A, et al. *Br J Ophthalmol*, 2016.



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