Diabetic RetinaScreen
An Clár Náisiúnta Scagthástála Reitiní do Dhiaibéitigh
The National Diabetic Retinal Screening Programme

Diabetic RetinaScreen Statistical Bulletin

2020-2021

An tSeirbhís Náisiúnta Scagthástála
National Screening Service

Contents

Introduction

Diabetic RetinaScreen is for everyone with type 1 or type 2 diabetes aged 12 and over. It's free of charge and if treatment is needed, this is also free.

Diabetic eye screening looks for signs of an eye disease called retinopathy - a complication of diabetes that affects the small blood vessels at the back of the eye. It can cause damage to a person's eyesight and can cause sight loss over time.

When diabetic retinopathy is found early, treatment can reduce or prevent damage to the eyesight.

The data presented represent diabetic retinopathy screening in Ireland for 2020 and 2021. Data for previous periods has been published, with details outlined in the reference section of this report.[1-3]

Programme standards are listed in our published Standards for Quality Assurance in Diabetic Retinopathy Screening.[4]

In February 2021, Diabetic RetinaScreen introduced a new pathway for participants who had two consecutive screening tests with a result of no retinopathy. This group receives an appointment for screening every two years.

The new pathway reduces the number of screening appointments, and unnecessary clinic visits and examinations. This pathway is in keeping with international best practice and follows screening models in other countries including Iceland and Scotland.[5-7]

As with all screening programmes in Ireland and worldwide there was marked disruption during the COVID-19 pandemic. Screening was suspended from 18 March 2020 to 30 June 2020. When screening restarted it was limited by safety measures, however, working with our screening providers, we delivered a steady return to normal activity.

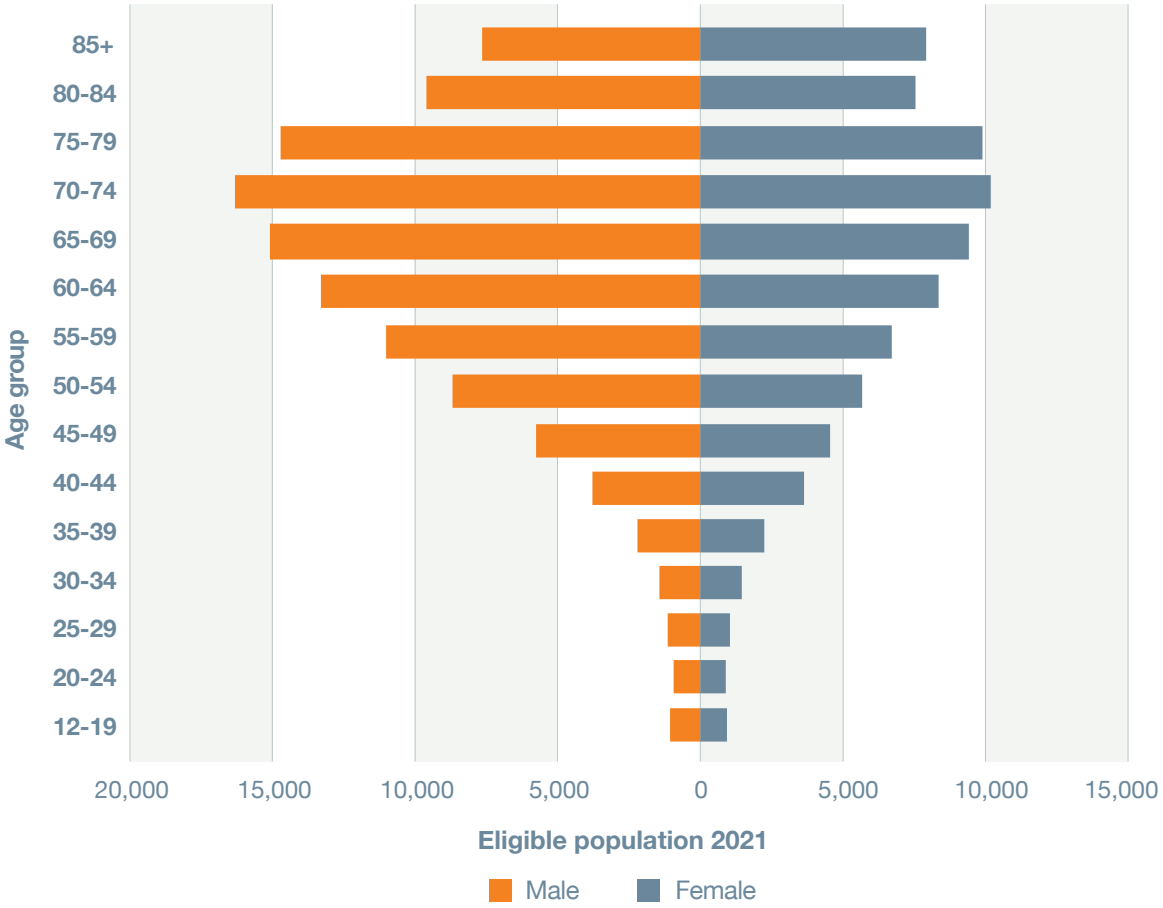
The new pathway reduces the number of screening appointments, and unnecessary clinic visits and examinations.

Eligible population by gender and age group

The pyramid in Figure 1 shows the age distribution of eligible people on the Diabetic RetinaScreen register. The pyramid highlights that diabetes is age related, with the 70-74 age group accounting for the greatest proportion of the eligible population for both males (8.5 per cent) and females (5.3 per cent).

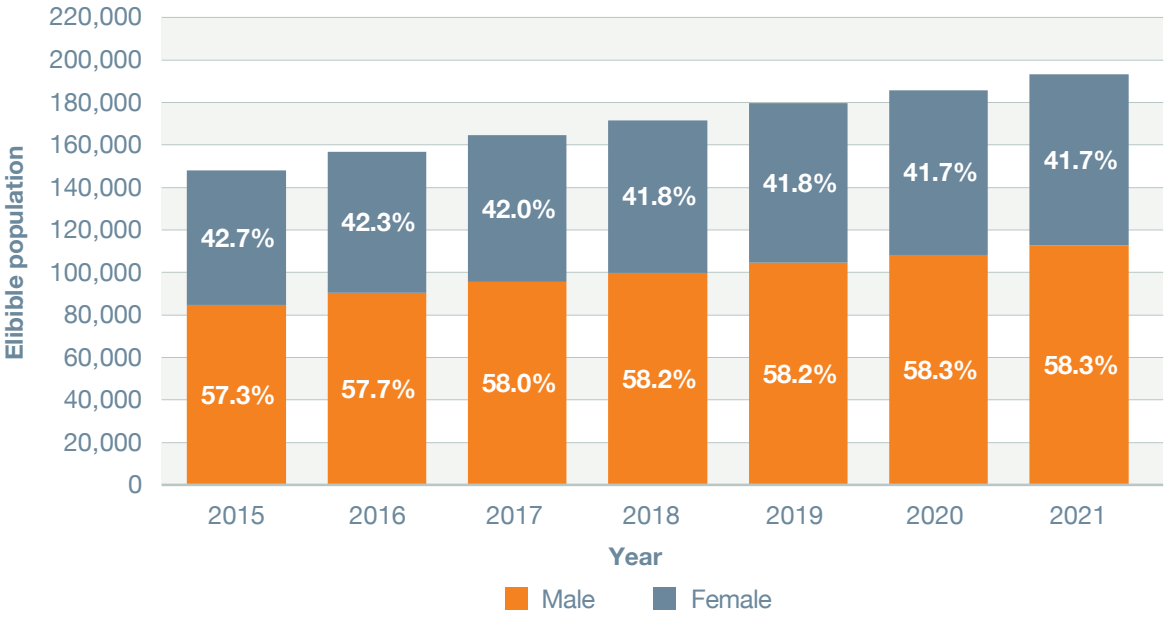
By the end of December 2021 there were 193,108 adults and children on the register (112,664 males and 80,444 females). This gender ratio is consistent with international experience.[8] The register is updated following receipt of a GP referral or by online self-registration. Figure 2 shows the growth in the number of people on the register since 2015. This represents a 4 per cent year-on-year increase in eligible people since 2015.

Figure 1 | Eligible population* pyramid as of 31st December 2021



*The eligible population refers to those who have diabetes, are within the specified age range and do not have NLP (no light perception).

Figure 2 | Eligible population on the Diabetic RetinaScreen register by year and gender



Screening participation

Participation refers to the proportion of people who attended a screening appointment out of all those who are known to the programme and are eligible. Acceptance is the proportion of people offered a screening appointment who attended.

During 2020 and 2021, we invited 36,509 and 35,963 people respectively to participate in the programme (Table 1). These numbers include both people who had been newly registered with the programme following a diagnosis of diabetes, and people who had previously been sent an invitation to participate, but did not respond. We issue a minimum of two letters in each year following registration.

A total of 12,582 eligible people consented to taking part in the programme in 2020 while in 2021, 14,188 people consented to taking part. Following consent, people are offered a screening appointment at a designated location.

There was almost a 31 per cent increase in eligible people invited for screening between 2020 and 2021, rising from 104,280 to 136,110. This increase may be explained by delayed diagnosis of diabetes due to COVID-19. A larger increase (49.3 per cent) was seen in the numbers screened, rising from 65,246 in 2020 to 97,441 in 2021. Participation increased between 2020 and 2021 by 14 per cent (Table 1 and Figure 3).

Overall participation increased steadily in the first six years of the programme (2013/2014-2019). It exceeded the programme standard for the first time (72.4%) in 2018 with an increase to 75.2% in 2019. 2020 saw a COVID-19 related reduction but participation again exceeded the standard in 2021 (Figure 3).

Previous NSS research has demonstrated an association between a number of factors and non-attendance. These include: being female, with increasing age over 70 years, type 2 diabetes, low socio-economic status, longer driving time to the screening clinic, increase in years since the first appointment and previous non-attendance.[9]

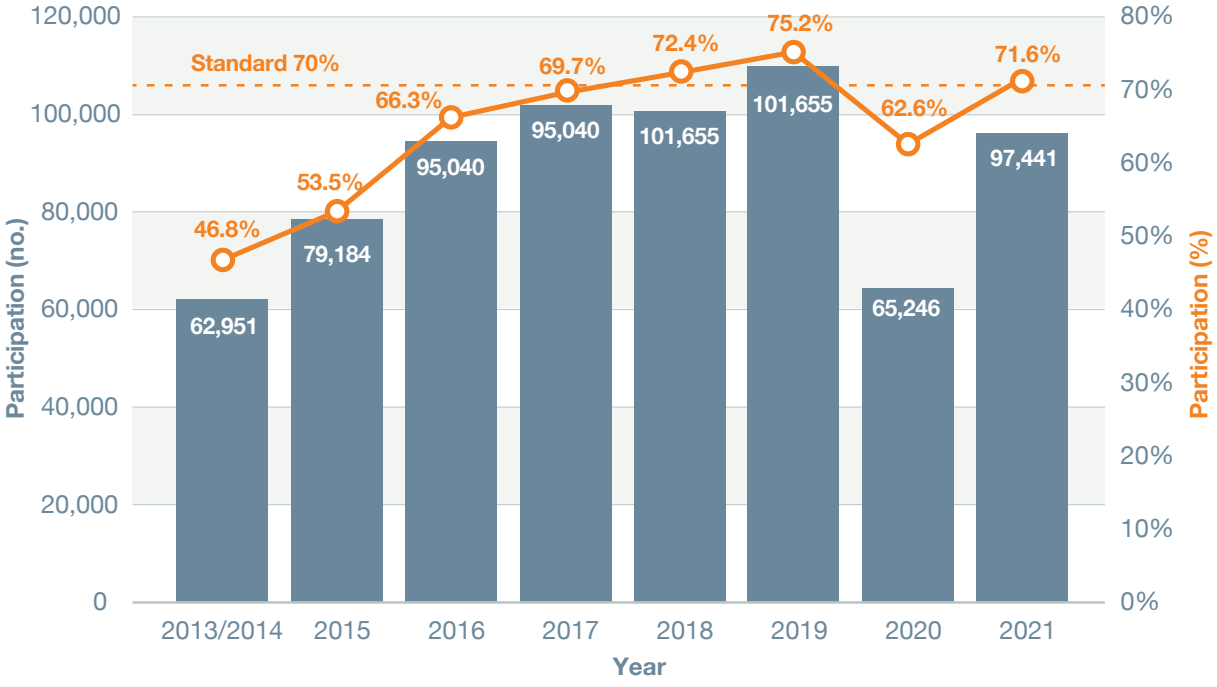
We are exploring measures to address these challenges such as new information resources that are accessible to everyone eligible for screening, and a new eLearning module for health and social care staff so that they can support people to take part in the programme.[10,11]

Table 1 | Invitation and screening activity

	2020	2021	% change 2020-2021	QA standard
Programme consent process				
People invited to participate*	36,509	35,963	-1.5%	
People consenting to take part in the programme	12,582	14,188	+12.8%	
Screening activity				
Total people contacted/invited in the period	104,280	136,110	+30.5%	
Eligible people offered a screening appointment	80,353	114,335	+42.3%	
People attended for screening	65,246	97,441	+49.3%	
Participation	62.6%	71.6%	+14.4%	>70%
Overall acceptance	81.2%	85.2%	+4.9%	
People who opted out of the programme	1,316	979	-25.6%	

*People with diabetes are sent letters inviting them to consent to taking part. This includes people who newly registered with the programme following a diagnosis of diabetes, and those who were re-invited having not responded previously. People consent by contacting the programme.

Figure 3 | Participation (by number and per cent) in screening from 2013/2014 to 2021



Acceptance of screening

Acceptance by age group

Overall acceptance in 2020 and 2021 was 81.2 per cent and 85.2 per cent respectively (Tables 1 & 2). Acceptance of screening was lowest in those aged 22-44 years in both years (Figure 4, Table 2).

Acceptance by gender and age group

Acceptance of screening in 2020 and 2021 was higher overall for males than for females. Acceptance was highest in the youngest age group for all people (Table 2).

Figure 4 | Acceptance (%) by age group

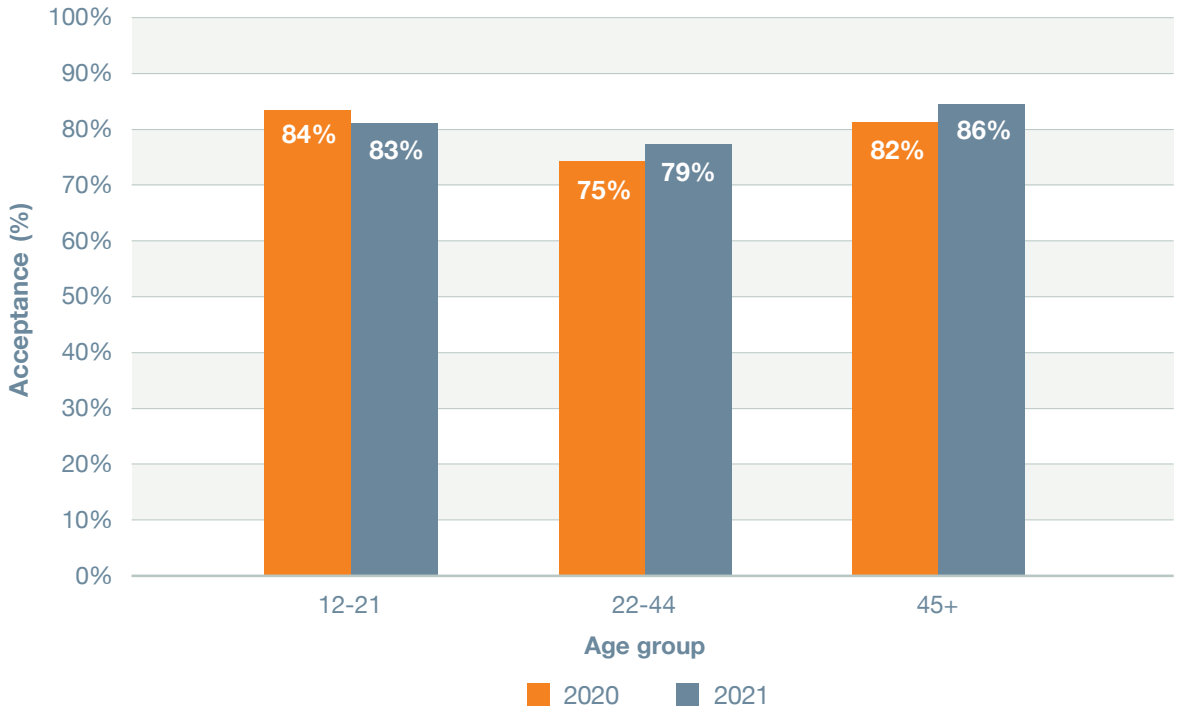


Table 2 | Acceptance by year, age group and gender

	2020		2021		2020		2021	
Age group	**12-21**				**22-44**			
Gender	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Eligible invited	764	705	1,052	1,016	4,085	3,484	5,287	4,651
Screened	641	597	874	851	3,096	2,593	4,224	3,617
Acceptance	83.9%	84.7%	83.1%	83.8%	75.8%	74.4%	79.9%	77.8%

	2020		2021		2020		2021	
Age group	**45+**				**All ages**			
Gender	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Eligible invited	42,475	28,734	60,762	41,443	47,324	32,923	67,101	47,110
Screened	35,574	22,646	52,965	34,794	39,311	25,836	58,063	39,262
Acceptance	83.8%	78.8%	87.2%	84.0%	83.1%	78.5%	86.5%	83.3%

Outcomes

During 2020 and 2021, 62.4 per cent and 64.2 per cent of screened people respectively had no retinopathy detected (Table 3). Fewer than one in three people had background retinopathy in 2020 (30.0 per cent) and 2021 (28.2 per cent) and smaller proportions had pre-proliferative and proliferative retinopathy. Non-diabetic eye disease (NDED) was detected in 1,988 and 2,948 screened people in 2020 and 2021, respectively.

All people with NDED were referred appropriately. 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.

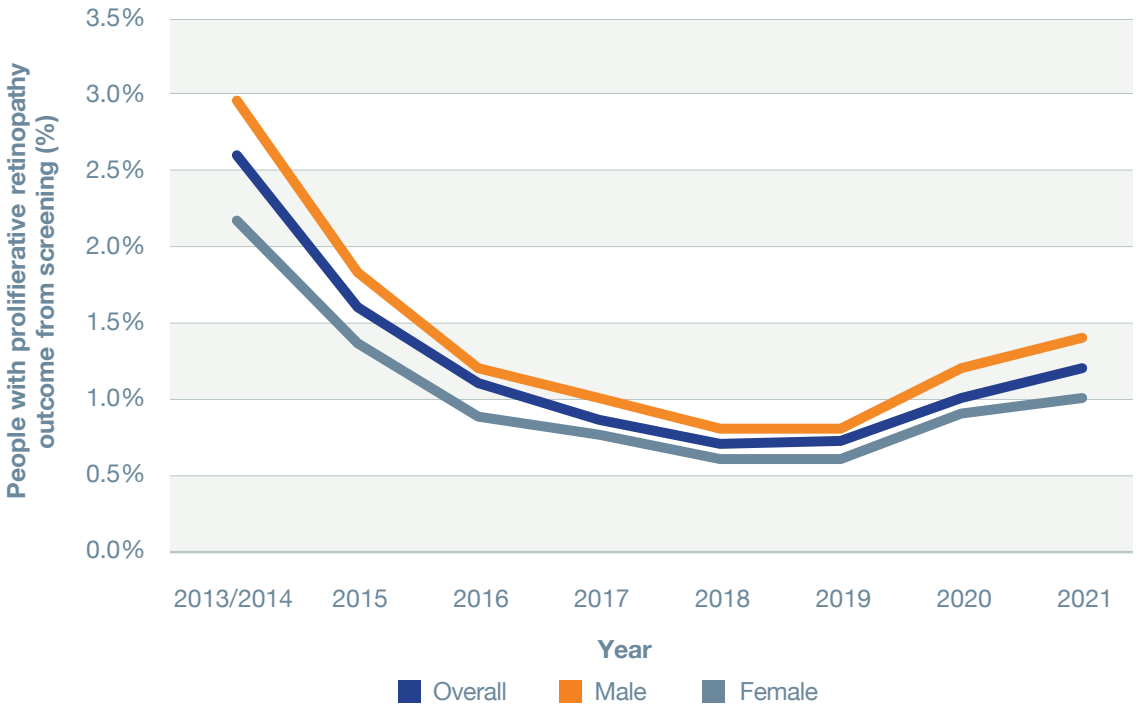
Table 3 | Screening outcomes by year

	2020	2021	QA Standard
	n (%)	**n (%)**	**%**
Number of people attending for screening	65,246	97,441	
People screened with an ungradable image	1,170 (1.8)	1,497 (1.5)	<7%
No retinopathy detected	40,727 (62.4)	62,516 (64.2)	
Background retinopathy	19,603 (30.0)	27,439 (28.2)	
Pre-proliferative retinopathy	705 (1.1)	1,279 (1.3)	
Proliferative retinopathy	678 (1.0)	1,181 (1.2)	
Non-diabetic eye disease	1,988 (3.1)	2,948 (3.0)	
Age-related macular degeneration	375 (0.6)	581 (0.6)	

Outcomes by year, age group and gender

Since the beginning of the programme the detection of proliferative retinopathy reduced year on year to 2018/2019. This was followed by an increase in 2020 and 2021 (Figure 5).

Figure 5 | People with proliferative retinopathy outcome from 2013/2014 to 2021



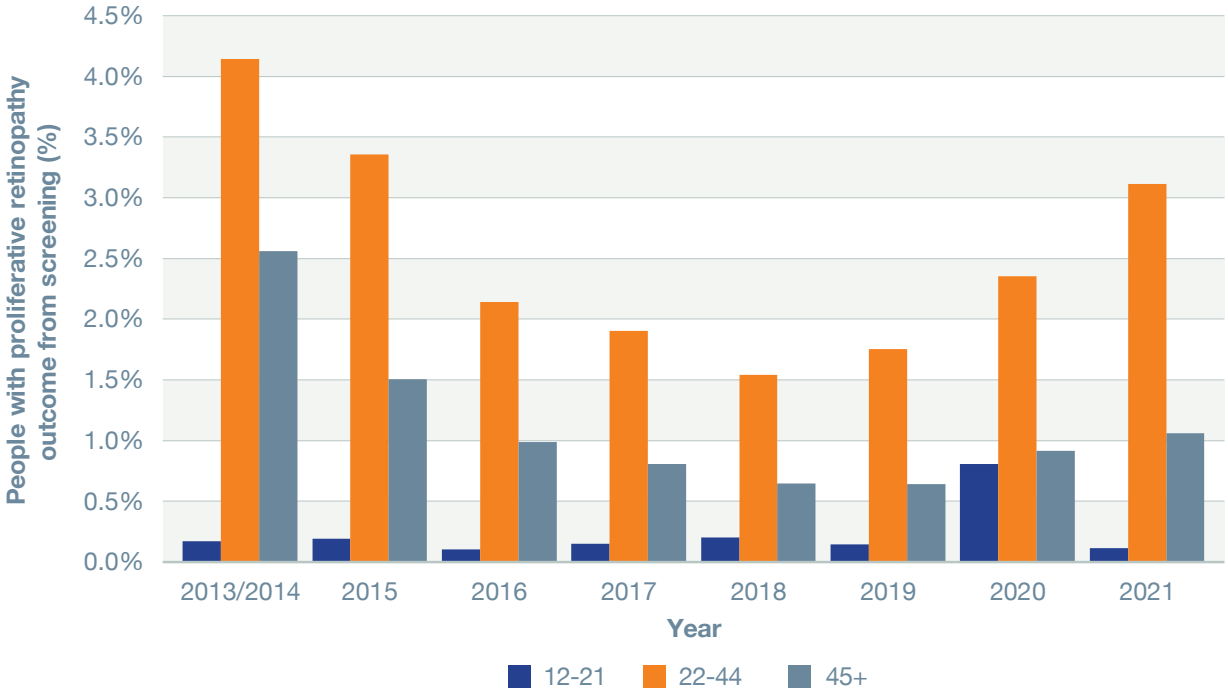
In screened people above the age of 22 years, background retinopathy was higher among males than females across both years (Table 4). For both males and females, the rate of background retinopathy (both pre-proliferative and proliferative retinopathy) was highest among 22-44 year olds. The youngest age group (12-21 years) had the highest rate of no retinopathy across both years. Rates of age-related macular degeneration (ARMD) were low and ARMD was mainly detected among older people (0.6 per cent overall in both years).

All grades of retinopathy may include patients with maculopathy. These can be referable (M1) or non-referable (M0).

While the proportion of people aged over 22 years with proliferative retinopathy detected decreased considerably during the first five years of the programme, this increased in 2019 followed by further increases in 2020 and 2021, most notably among people aged 22-44 years.

In the 45+ year age group, a similar pattern was observed – the proportion of people in this age group with proliferative retinopathy detected declined during the first five years, remaining level in 2019, followed by slight increases in 2020 and 2021. The numbers in the 12 to 21 age group are too low from which to draw any inference (Figure 6).

Figure 6 | Rate of proliferative retinopathy by age group and year



For both males and females, the rate of background retinopathy (both pre-proliferative and proliferative retinopathy) was highest among 22-44 year olds.

Table 4 | Screening outcomes based on final grade by year, age group and gender

	2020		2021		2020		2021	
Age group	**12 - 21**		**12 - 21**		**22-44**		**22-44**	
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Gender	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Attending for screening	641	597	874	851	3,096	2,593	4,224	3,617
Screened with an ungradeable image	~ (0.2)	~ (0.2)	~ (0.2)	~ (0.1)	13 (0.4)	10 (0.4)	13 (0.3)	9 (0.3)
No Retinopathy detected	475 (74.1)	424 (71.0)	692 (79.2)	651 (76.5)	1,539 (49.7)	1,451 (55.9)	2,146 (50.8)	2,102 (58.1)
Background Retinopathy detected	154 (24.0)	160 (26.8)	174 (19.9)	193 (22.7)	1,347 (43.5)	1,008 (38.9)	1,729 (40.9)	1,322 (36.6)
Pre-proliferative Retinopathy detected	~ (0.3)	5 (0.8)	~ (0.3)	~ (0.4)	86 (2.8)	49 (1.9)	144 (3.4)	62 (1.7)
Proliferative Retinopathy detected	6 (0.9)	~ (0.7)	~ (0.1)	~ (0.1)	82 (2.7)	52 (2.0)	151 (3.6)	93 (2.6)
Non-diabetic eye disease detected	~ (0.3)	~ (0.5)	~ (0.1)	~ (0.1)	27 (0.9)	20 (0.8)	41 (1.0)	26 (0.7)
Age-related macular degeneration detected	~ (0.2)	0 (0.0)	~ (0.1)	~ (0.1)	~ (0.1)	~ (0.1)	0 (0.0)	~ (0.1)

	2020		2021		2020		2021	
Age group	**45+**		**45+**		**All ages**		**All ages**	
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Gender	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Attending for screening	35,574	22,646	52,965	34,794	39,311	25,836	58,063	39,262
Screened with an ungradeable image	705 (2.0)	440 (1.9)	816 (1.5)	656 (1.9)	719 (1.8)	451 (1.7)	831 (1.4)	666 (1.7)
No Retinopathy detected	21,808 (61.3)	14,945 (65.9)	33,492 (63.2)	23,337 (67.1)	23,822 (60.6)	16,820 (65.1)	36,330 (62.6)	26,090 (66.5)
Background Retinopathy detected	10,921 (30.7)	6,001 (26.5)	15,309 (28.9)	8,698 (25.0)	12,422 (31.6)	7,169 (27.8)	17,212 (29.6)	10,213 (26.0)
Pre-proliferative Retinopathy detected	414 (1.2)	149 (0.7)	724 (1.4)	342 (1.0)	502 (1.3)	203 (0.8)	871 (1.5)	407 (1.0)
Proliferative Retinopathy detected	370 (1.0)	163 (0.7)	654 (1.2)	279 (0.8)	458 (1.2)	219 (0.9)	806 (1.4)	373 (1.0)
Non-diabetic eye disease detected	1,164 (3.3)	771 (3.4)	1,674 (3.2)	1,202 (3.5)	1,193 (3.0)	794 (3.1)	1,716 (3.0)	1,229 (3.1)
Age-related macular degeneration detected	192 (0.5)	177 (0.8)	296 (0.6)	280 (0.8)	195 (0.5)	180 (0.7)	297 (0.5)	284 (0.7)

~ corresponds to <5.

Referral rates to ophthalmology

In 2020 and 2021, 86.4 per cent and 72.7 per cent respectively of screened people had an outcome of return to routine annual recall (Table 5), compared to 90.5 per cent and 90.4 per cent in 2018 and 2019. The reductions may be due to a combination of factors including the introduction of two-yearly screening for some people and the impact of COVID-19 on service delivery.

During 2020 and 2021, 1.6 per cent and 1.8 per cent were referred for urgent treatment (for diabetic retinopathy and NDED), representing a slight increase from 1.0 per cent in 2018 and 1.2 per cent in 2019 (Figure 7). Routine referral rate to ophthalmology was 2.4 per cent in 2020 and 2.7 per cent in 2021 (Table 5), compared to 3.5 per cent in 2018 and 2019, respectively.

We identify potential non-diabetic disease ocular conditions as incidental findings of the screening programme and people 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.

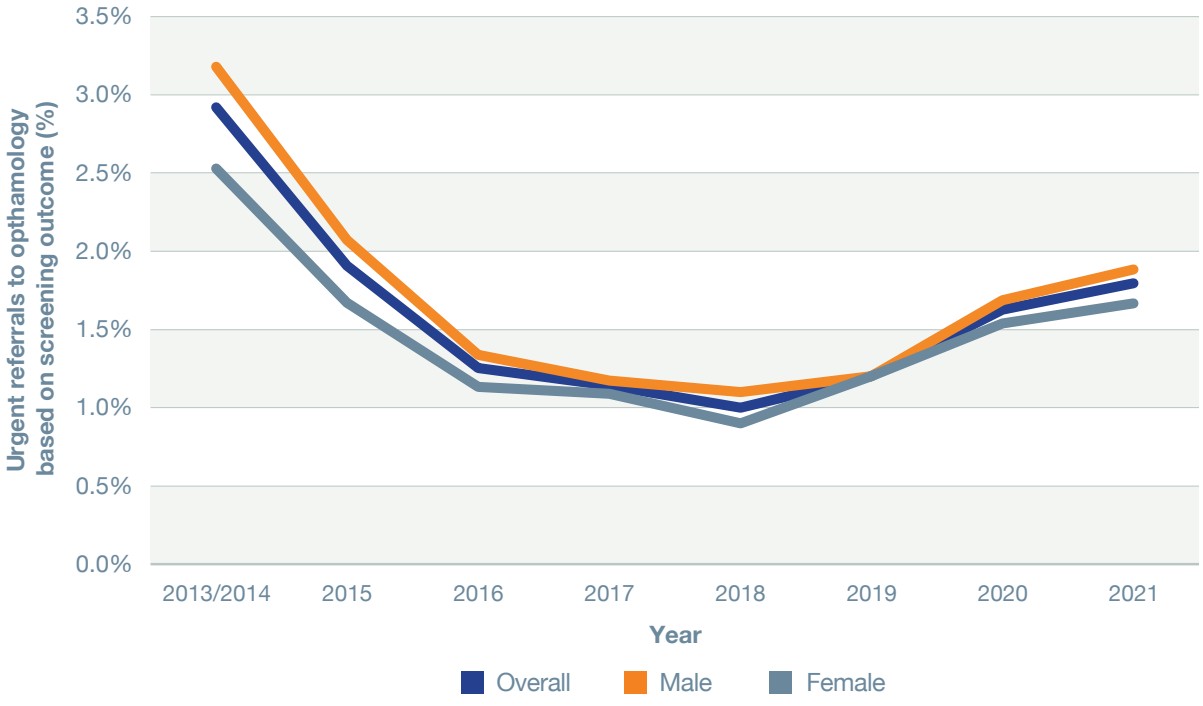
In the event of grading not being possible at the initial screening, we refer the person for a slit-lamp appointment to check for diabetic retinopathy. In 2020 and 2021 this was 1.4 per cent and 1.1 per cent of screened people respectively (Table 5). If grading is not possible using slit-lamp, then we perform a clinical examination 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

	2020	2021
	n (%)	n (%)
Number of people attending for screening	65,246	97,441
Routine annual recall	56,369 (86.4)	70,811 (72.7)
Two-yearly recall*	n/a	13,077 (13.4)
Routine referral to ophthalmology	1,546 (2.4)	2,609 (2.7)
Urgent referral to ophthalmology	677 (1.0)	1,159 (1.2)
Referral to slit-lamp	922 (1.4)	1,088 (1.1)
Referral to digital surveillance	3,221 (4.9)	4,894 (5.0)
Non-diabetic eye disease urgent referral to ophthalmology	384 (0.6)	590 (0.6)
Non-diabetic eye disease routine referral to ophthalmology	2,127 (3.3)	3,213 (3.3)

*Two-yearly recall was introduced in February 2021.

Figure 7 | Urgent referrals (for diabetic retinopathy and non-diabetic eye disease (NDED)) to ophthalmology based on screening outcomes by year and gender



Referral rates to treatment

The prevalence of diabetic retinopathy increases with age and the longer the person has diabetes (Table 6). The routine referral to ophthalmology rate was highest among screened males aged 22-44 years in both screening years (3.6 per cent in 2020 and 4.3 per cent in 2021).

Among screened females the routine referral rate was highest among those aged 22-44 years (2.6 per cent) in 2020, and those aged 45+ years (2.5 per cent) in 2021. The rates of referral to digital surveillance are increasing slightly year on year with the highest rates for both males and females in those aged 22-44 years in both screening years (Table 6).

Rates of NDED requiring urgent referral to ophthalmology were highest among older people with macular degeneration. While some of these people were under an existing care plan, a significant number were able to enter an appropriate care pathway following referral, which is an important additional benefit of the programme.

Table 6 | Referral rates to treatment based on outcomes from screening by year, age group and gender

	2020		2021		2020		2021	
Age group	**12 - 21**		**12 - 21**		**22-44**		**22-44**	
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Gender	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Attending for screening	641	597	874	851	3,096	2,593	4,224	3,617
Routine annual recall	614 (95.8)	577 (96.7)	741 (84.8)	710 (83.4)	2,529 (81.7)	2,221 (85.7)	3,110 (73.6)	2,775 (76.7)
Urgent referral to ophthalmology	6 (0.9)	~ (0.7)	~ (0.1)	~ (0.1)	82 (2.7)	52 (2.0)	147 (3.5)	89 (2.5)
Routine referral to ophthalmology	5 (0.8)	9 (1.5)	~ (0.5)	5 (0.6)	111 (3.6)	66 (2.6)	180 (4.3)	83 (2.3)
Referral to slit lamp	~ (0.2)	0 (0.0)	~ (0.1)	0 (0.0)	9 (0.3)	8 (0.3)	8 (0.2)	~ (0.1)
Referral to digital surveillance	12 (1.9)	~ (0.7)	11 (1.3)	19 (2.2)	332 (10.7)	224 (8.6)	476 (11.3)	339 (9.4)
Non-diabetic eye disease urgent referral to ophthalmology	~ (0.2)	0 (0.0)	~ (0.1)	~ (0.1)	~ (0.1)	~ (0.1)	0 (0.0)	~ (0.1)
Non-diabetic eye disease routine referral to ophthalmology	~ (0.3)	~ (0.5)	~ (0.2)	~ (0.1)	31 (1.0)	19 (0.7)	43 (1.0)	30 (0.8)

	2020		2021		2020		2021	
Age group	**45+**		**45+**		**All ages**		**All ages**	
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Gender	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Attending for screening	35,574	22,646	52,965	34,794	39,311	25,836	58,063	39,262
Routine annual recall	30,556 (85.9)	19,777 (87.3)	38,064 (71.9)	25,312 (72.8)	33,699 (85.7)	22,575 (87.4)	41,915 (72.2)	28,797 (73.4)
Urgent referral to ophthalmology	369 (1.0)	163 (0.7)	644 (1.2)	275 (0.8)	457 (1.2)	219 (0.9)	792 (1.4)	365 (0.9)
Routine referral to ophthalmology	870 (2.5)	483 (2.1)	1,480 (2.8)	855 (2.5)	986 (2.5)	558 (2.2)	1,664 (2.9)	943 (2.4)
Referral to slit lamp	544 (1.5)	360 (1.6)	597 (1.1)	478 (1.4)	554 (1.4)	368 (1.4)	606 (1.0)	482 (1.2)
Referral to digital surveillance	1,781 (5.0)	868 (3.8)	2,647 (5.0)	1,401 (4.0)	2,125 (5.4)	1,096 (4.2)	3,134 (5.4)	1,759 (4.5)
Non-diabetic eye disease urgent referral to ophthalmology	203 (0.6)	175 (0.8)	300 (0.6)	285 (0.8)	206 (0.5)	178 (0.7)	301 (0.5)	289 (0.7)
Non-diabetic eye disease routine referral to ophthalmology	1,251 (3.5)	820 (3.6)	1,818 (3.4)	1,316 (3.8)	1,284 (3.3)	842 (3.3)	1,863 (3.2)	1,347 (3.4)

~ corresponds to <5.

References

1. National Screening Service. (2017) *Diabetic RetinaScreen, Programme Report 2013-2015*. Available from: https://www.diabeticretinascreen.ie/_fileupload/Documents/Diabetic%20RetinaScreen%20Programme%20Report%202013-15%20(FINAL%20web%202)%20(4).pdf
2. National Screening Service. (2019) *Diabetic RetinaScreen, Statistical Bulletin 2016-2017*. Available from: https://www.diabeticretinascreen.ie/_fileupload/Documents/DRS-Statistical-Bulletin-2016-2017-FINAL-29_11_19.pdf
3. National Screening Service. (2024) *Diabetic RetinaScreen, Statistical Bulletin 2018-2019*. Available from: https://assets.hse.ie/media/documents/Diabetic_RetinaScreen_Statistical_Bulletin_2018-2019.pdf
4. National Screening Service. (2025) *Standards for Quality Assurance in Diabetic Retinopathy Screening*. Revision 6.1. Available from: https://assets.hse.ie/media/documents/Standards_for_Quality_Assurance_in_Diabetic_Retina_Screening.pdf
5. Looker, H.C. et al. (2013) 'Predicted impact of extending the screening interval for diabetic retinopathy: the Scottish Diabetic Retinopathy Screening programme,' *Diabetologia*, 56(8), pp. 1716–1725. https://doi.org/10.1007/s00125-013-2928-7.
6. Olafsdottir, E. and Stefansson, E. (2007) 'Biennial eye screening in patients with diabetes without retinopathy: 10-year experience,' *British Journal of Ophthalmology*, 91(12), pp. 1599–1601. https://doi.org/10.1136/bjo.2007.123810.
7. NHS Scotland. (2022) *Changes to diabetic eye screening*. https://publichealthscotland.scot/our-areas-of-work/disease-registration-and-screening/screening/diabetic-eye-screening/overview/changes-to-diabetic-eye-screening/.
8. Romero-Aroca, P. et al. (2016) 'Changes observed in diabetic retinopathy: eight-year follow-up of a Spanish population,' *British Journal of Ophthalmology*, 100(10), pp. 1366–1371. https://doi.org/10.1136/bjophthalmol-2015-307689.
9. Kelly, S.R. et al. (2021) 'Factors associated with non-attendance in the Irish national diabetic retinopathy screening programme (INDEAR study report no. 2),' *Acta Diabetologica*, 58(5), pp. 643–650. https://doi.org/10.1007/s00592-021-01671-4.
10. Kavanagh, Helen. (2024) 'New Diabetic RetinaScreen eLearning module developed for health and social care staff', Your Health Service (hse.ie), 25 March. Available from: https://www2.healthservice.hse.ie/organisation/nss/news/new-diabetic-retinascreen-elearning-module-developed-for-health-and-social-care-staff/ (Accessed 16 January 2025).
11. Mullins, Gerry. (2023) 'Working with our partners to create new leaflets about eye screening for people with diabetes', Your Health Service (hse.ie), 03 July. Available from: https://www2.healthservice.hse.ie/organisation/nss/news/new-leaflets- about-eye-screening-for-people-with-diabetes/ (Accessed 16 January 2025).

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