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NOD
National Ophthalmology Database Audit

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The Fourth Report of Age-related Macular Degeneration Audit (AMD)

Patients starting treatment for neovascular AMD in the 2023 NHS year (01 April 2023 to 31 March 2024)

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The ROYAL COLLEGE of OPHTHALMOLOGISTS

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Foreword

This fourth annual NOD report highlights the significant variation in performance between different centres across the UK. It is encouraging to see that audit participation has increased from 63 to 75 centres and it is really essential that commissioners insist on participation as a contractual obligation for all providers of AMD services. We see marginal improvements in patients completing loading doses within 10 weeks and starting with better vision. However, the percentage of injections given by doctors remains too high at 25%. The economic argument is clear that other members of the ophthalmic team can reliably and safely deliver injections when appropriately trained. Commissioners need to be supporting providers to move to non-doctor delivered injections.

Perhaps most worrying is the drop in number of patients receiving their first treatment within 2 weeks of referral from around 40% to 30%. Whilst we don't know the reason for this reduction, I can't help wondering if the hundreds of millions of pounds spent on reducing cataract waiting lists could have been better spent on making sure patients with treatable, irreversible causes of blindness get treatment on time. Although there now seems to be a clear shift away from using for profit providers, commissioners would have a much better understanding of provider activity if all services submitted to the NOD database. Perhaps units performing disproportionately high numbers of injections would have to explain their retreatment regimes and demonstrate improved outcomes to justify the additional cost and burden on their patients. Likewise failing services offering too few injections can be rapidly identified and supported as needed.

The difficulty that persists with some large providers of Electronic Health Records supplying data to the audit again highlights the need for IT interoperability standards throughout healthcare. The leaders of healthcare systems across the UK need to take a lead on this and mandate compliance to nationally set standards.

As a final note, I would like to thank Martin McKibben for all his excellent work in developing the AMD audit through its initial 3 years and it is clear from this report that Romi Chhabra has successfully taken on the AMD audit lead mantle. I look forward to seeing how she develops the audit going forward, especially with the changes in practice related to the introduction of biosimilars.

The NOD AMD audit has so much potential to help commisoners to do their job of monitoring contracts effectively and I remain baffled as to why it isn't compulsory for all providers and centrally funded. We can but dream...

Ben Burton
President, The Royal College of Ophthalmologists

Funding

The project has been previously funded by hands off grants from industry partners with no involvement in the development or implementation of the project. The project is now funded purely by on-going support through subscription fees from participating centres.

Report at a glance

Summary data for eyes starting treatment for neovascular AMD in the 2023 NHS year

Number of patients
26,040

Number of eyes
28,655

No. of participating centres
75

Baseline characteristics

80 YEARS Median age at the start of treatment in the first eye

60 BASELINE LETTERS Median baseline acuity

HVZ NCV CZS 29.6% Proportion of eyes with baseline acuity ≥70 ETDRS letters

HVZ NCV CZS 8.5% Proportion of eyes with baseline acuity ≤25 ETDRS letters

Visual acuity outcomes after 12 months

12 MONTHS 66 LETTERS Median visual acuity

HVZ NCV CZS 43.7% Proportion of eyes with acuity ≥70 ETDRS letters

HVZ NCV CZS 17.5% Proportion of eyes with an increase of ≥15 ETDRS letters

Care pathway

31.8% Percentage of eyes starting treatment within 14 days of primary care referral

66.4% Percentage of eyes completing the first 3 injections within 10 weeks

7 Median number of injections in first year of treatment

10 WEEKS Median interval between injections at the end of the first year

74.3% Proportion of injections given by trained, non-medical staff

Safety outcomes

70.7% Proportion of centres with zero cases of presumed infectious endophthalmitis

Performance against quality markers

Improved for:

Data quality on recording of visual acuity at both baseline and month 12

Completing the first 3 monthly injections within 10 weeks

Deteriorated for:

Data quality on recording of date of referral from primary care

Starting treatment within 14 days of referral

Provider level adjusted "good" and "poor" visual acuity outcomes at 12 months of treatment

Safety and incidence of presumed infectious endophthalmitis

1. Introduction

Age-related macular degeneration (AMD) is a progressive disorder of the centre of the retina (the macula). The two late forms of AMD, namely geographic atrophy (formerly "dry" AMD) and macular neovascularisation (formerly "wet" AMD) account for most of the associated sight impairment. Neovascular AMD (nAMD) is the more rapidly progressive form of AMD. It is characterised by the development of new and abnormal blood vessels below and within the retina, causing sight impairment by a combination of fluid leakage, bleeding and scar formation. Untreated, around half of affected eyes will experience a significant decrease (≥15 ETDRS letters) in vision after 12 months, and a similar proportion would be classified as legally blind (≤35 ETDRS letters) in the same time period.[1] nAMD is common, affecting 1.2% of people aged 65 years or over, rising to 6.3% of those aged 80 years or over, with an estimated 40,000 new cases per year in the United Kingdom.[2]

The standard of care for nAMD involves repeated intravitreal anti-VEGF therapy, which has been shown in landmark randomised controlled trials to maintain and improve visual acuity over several years.[3,4] Subsequent meta-analyses and real-world studies confirm sustained effectiveness, with the greatest visual gains observed in the first year of treatment.[5,6]

Baseline visual acuity is a key determinant of long-term outcomes. Patients initiating treatment with better vision are more likely to maintain functional vision, whereas those presenting with poorer vision may improve but rarely achieve comparable final visual acuity.[7]

Timely initiation of treatment is critical. Delays in starting anti-VEGF therapy have been associated with irreversible loss of vision, even after treatment is commenced.[8] Similarly, completion of the initial loading phase, followed by ongoing treatment guided by disease activity and regular monitoring with minimal delays, is associated with improved visual outcomes and is recommended in National Institute for Health and Care Excellence (NICE) **Guidance (NG82)** and **Quality Standard (QS180)**. Proactive treatment approaches, such as treat and extend regimens, are also associated with improved outcomes compared with reactive strategies.[5]

nAMD treatment is of great benefit to patients in terms of maintaining their quality of life and independence. There are also benefits to the wider society with reductions in the costs of providing care and support to elderly people with severe sight impairment. However, treatment is demanding, both for patients who will have multiple appointments for assessment and injection over several years and for the ophthalmology centres that provide the service. The treatment is also expensive, with an estimated annual cost of £350 million for anti-VEGF therapies for nAMD in England alone. The introduction of biosimilar anti-VEGF agents offers the potential to deliver substantial cost savings for the NHS while maintaining comparable efficacy and safety.

NICE has approved treatment for nAMD, based on the treatment results obtained in clinical trials. Given the significant demands on patients, ophthalmology providers and the high cost of treatment, it is essential the AMD services in the United Kingdom are regularly monitored and audited to ensure the outcomes for patients are in line with expectations and the care they receive is both safe and of high quality. The Fourth National Ophthalmology Database (NOD) Audit of AMD services evaluates performance across the United Kingdom using seven key indicators focused on service quality, safety, and visual outcomes. It is designed to support Integrated Care Boards (ICBs) and providers in delivering high-quality, sustainable services, enabling benchmarking against regional peers, national standards, and established quality markers to support transparency and data driven decision making.

By benchmarking performance against national standards and regional peers, the audit helps commissioners and providers identify variation, adopt best practice, and drive continuous improvement in the quality and outcomes of nAMD care.

2. Audit participation and framework

Participation in the audit is open to all providers of NHS-funded nAMD treatment, NHS trusts and independent sector organisations, provided permission for data extraction and transfer to NOD was given by clinical leads / medical directors and Caldicott guardians or other equivalent. All eyes with a recorded diagnosis of nAMD and starting treatment in the relevant NHS years are eligible for inclusion. Exclusion criteria include eyes with any prior treatment for nAMD before the relevant NHS year, eyes receiving any clinical trial drugs and eyes from patients aged <55 years at the start of treatment.

For this report, data recorded into electronic medical record (EMR) systems as part of routine clinical care at participating centres was submitted to the National Ophthalmology Database and analysed. Data was available for reporting from 77 centres, with representation from the Channel Islands, England, Northern Ireland, Scotland and Wales. Details of each participating centre, the EMR used, and the year four data is available on the National Ophthalmology Database **website**.

3. Methodology

Detailed descriptions of the audit methodology, covering the small numbers policy, Limitations, Data Cleaning, Definitions, Statistical modelling and Quality markers are available elsewhere and can be accessed at **NOD Audit AMD Full Annual Report 2024** and **AMD Audit Visual Outcomes Statistical Model 2025**.

Context

This fourth annual report focusses on the baseline characteristics, care pathway and 12-month visual acuity and safety outcomes for the eyes of patients starting treatment in the 2023 NHS year (April 2023 to March 2024). Two-year outcomes are also reported for eyes starting treatment in the 2022 NHS year (April 2022 to March 2023). During the 2023 NHS year, available treatments for nAMD included Eylea (aflibercept) 2mg, Vabysmo (faricimab) 6mg, Beovu (brolucizumab) 6mg, Avastin (bevacizumab) 1.25mg and ranibizumab 0.5mg, both as the originator product (Lucentis) and as biosimilar preparations.

Changes to definitions since the last annual report:

In previous annual reports, the time window used to calculate the annual number of injections was defined as one year + an additional 84-day period. In response to feedback, this report shortens the 84-day "tolerance period" to 28 days.

4. Eligibility, data quality and follow-up

Eligibility

For this fourth annual report, the number of centres, patients and eyes at the different stages of the analysis is shown in **Figure 1**. The number at each stage varies because of data quality and application of the small numbers policy. The focus for this report is on baseline characteristics, the care pathway and the 12-month treatment outcomes for eyes starting treatment in the 2023 NHS year but 24-month outcome data are also presented for eyes starting treatment in the 2022 NHS year.

Data quality

The data analysed for the AMD Audit is recorded within EMRs at participating centres as part of routine clinical care. Good data quality is essential to ensure the results of analysis are valid. No external validation of data quality and completeness is possible or available. Prior to the publication of each annual report, participating centres are contacted and invited to review the number of eyes and patients starting treatment in the relevant NHS year, baseline visual acuity and the elements of the care pathway in the NOD dataset for that centre. When there appears to be a significant discrepancy between the expected data and that in the NOD dataset, centres can request their data is removed from the annual report.

Prior to publication of this fourth annual report, clinicians at two centres asked for their data to be removed. First, due to non-extraction of the visual acuity data and second following concerns that the number of eyes completing the initial three injections within ten weeks at the start of treatment was lower than expected. At present, validation of much of the data in the AMD Audit annual reports is neither easy nor quick. Improved functionality within EMR systems would facilitate more reliable capture and extraction of key audit variables, including visual acuity measurements and the date of referral from primary care, which should be routinely and easily recorded.

For the 28,655 eyes of 26,040 patients starting treatment in the 2023 NHS year and included in the analysis, data recording for sex, ethnicity, referral from primary care, visual acuity at baseline only and both baseline and month 12 are shown in **Table 1**. Comparative figures for the 2021 and 2022 NHS years are also available but the number and location of the centres is different for each year.

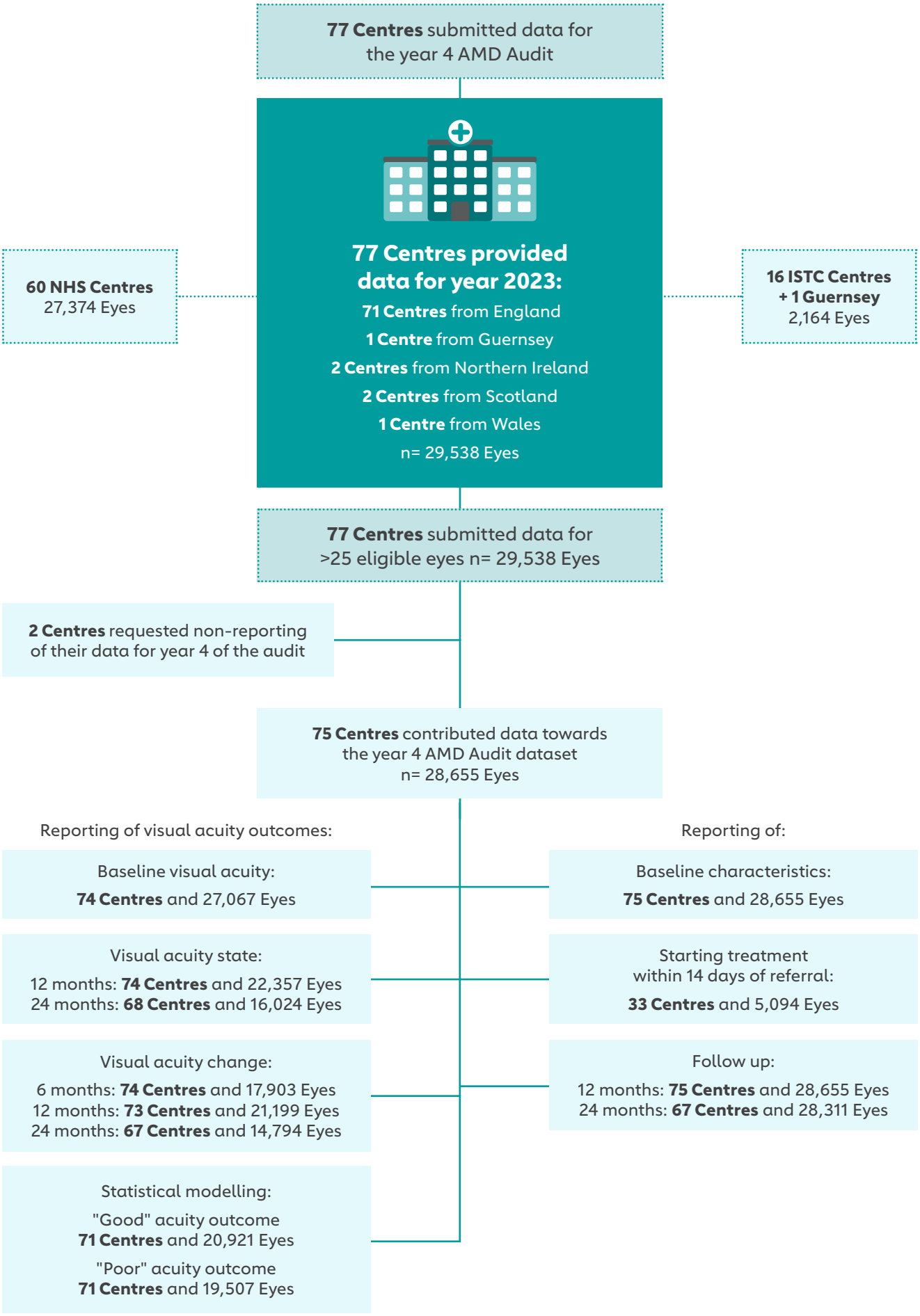
Table 1: Reported data quality

	Available data		
	Year 2023 Number (%)	Year 2022 Number (%)	Year 2021 Number (%)
Sex	26,662 (93.0)	25,048 (97.6)	25,674 (97.7)
Ethnicity	16,372 (57.1)	16,285 (63.5)	17,019 (64.8)
Referral within 90 days	5,235 (18.3)	5,614 (21.9)	5,881 (22.4)
Visual acuity at baseline	27,067 (94.5)	24,288 (94.6)	24,876 (94.7)
Visual acuity at baseline and after 12 months of treatment	21,199 (74.0)	18,659 (72.7)	19,255 (73.3)

Between providers the overall proportion of eyes with referral data recorded in the EMR within 90 days of the start of treatment ranged from 0% to 97.4%. Data quality for recording of referral dates was very good for centres using custom or in-house EMRs. By contrast, 9.5% of the Medisoft or mediSIGHT centres and 100.0% of centres using OpenEyes did not record any referral data.

For the eyes with referral information, 4,260 (81.4%) were first treated eyes, 246 (4.7%) were second treated eyes and 729 (13.9%) were immediately sequential bilateral intravitreal treatment (ISBIVT) eyes.

Figure 1: The number of centres and eyes at different stages of analysis



Changes in data quality over time

Several quality markers were introduced in the **second annual report**, covering performance in relation to data quality, aspects of the care pathway and adjusted visual acuity outcomes. The quality markers were derived from performance observed for eyes starting treatment in the 2021 NHS year. "Acceptable" performance was that achieved by 50% of providers in the 2021 audit. These centres were felt to be providing a good quality service, and all centres were encouraged to meet this level of performance in future audit cycles. "Desirable" performance was that achieved by the top 25% of providers in the 2021 audit. These centres were felt to be providing an excellent service and to be examples of best practice. With data now available in three annual reports, centres are encouraged to compare and track local performance with peers, aggregate results and the new quality markers and to implement change, when necessary. Over time, it is expected that relevant levels of performance for each quality marker will improve.

Data quality performance markers are available for the proportion of eyes with the date of referral from primary care recorded within three months of starting treatment, and for compliance with visual acuity recording within predefined windows at both baseline and 12-month visits. Comparison of performance between the third and fourth annual reports shows:

The proportion of eyes with a referral from primary care recorded within 90 days of starting treatment

- The proportion of centres meeting an acceptable level of performance decreased from 48.3% in the 2022 year to 39.4% in the 2023 NHS year
- The proportion of centres meeting a desirable level of performance decreased from 21.6% in the 2022 year to 12.1% in the 2023 NHS year

Visual acuity recording compliance at baseline and 12 months

- The proportion of centres meeting an acceptable level of performance stayed on the same level with 54.8% in the 2022 year compared to 54.7% in 2023 NHS year
- The proportion of centres meeting a desirable level of performance slightly decreased from 42.5% in the 2022 year to 41.3% in the 2023 NHS year

Follow-up to months 12 and 24 after the start of treatment

High rates of follow-up to months 12 and 24 are required to add credibility to the visual acuity outcomes after treatment. Prior annual reports have shown patients lost to follow-up were more likely to be older and to have worse baseline visual acuity. Both factors are associated with poor visual acuity outcomes. Loss to follow-up within the time windows for each milestone visit may be the result of death, comorbidity, holiday, caregiver availability, perceived treatment failure, treatment burden, poor patient experience or provider factors, such as clinic administration, lack of capacity or a change in the EMR. In this situation, data may have been submitted from a prior EMR but with the follow-up milestone visits recorded in the newer, replacement EMR. Some of the patients may also have started treatment in one location and moved to another for ongoing treatment. At present, NOD cannot link patients' data when treatment is provided at more than one organisation.

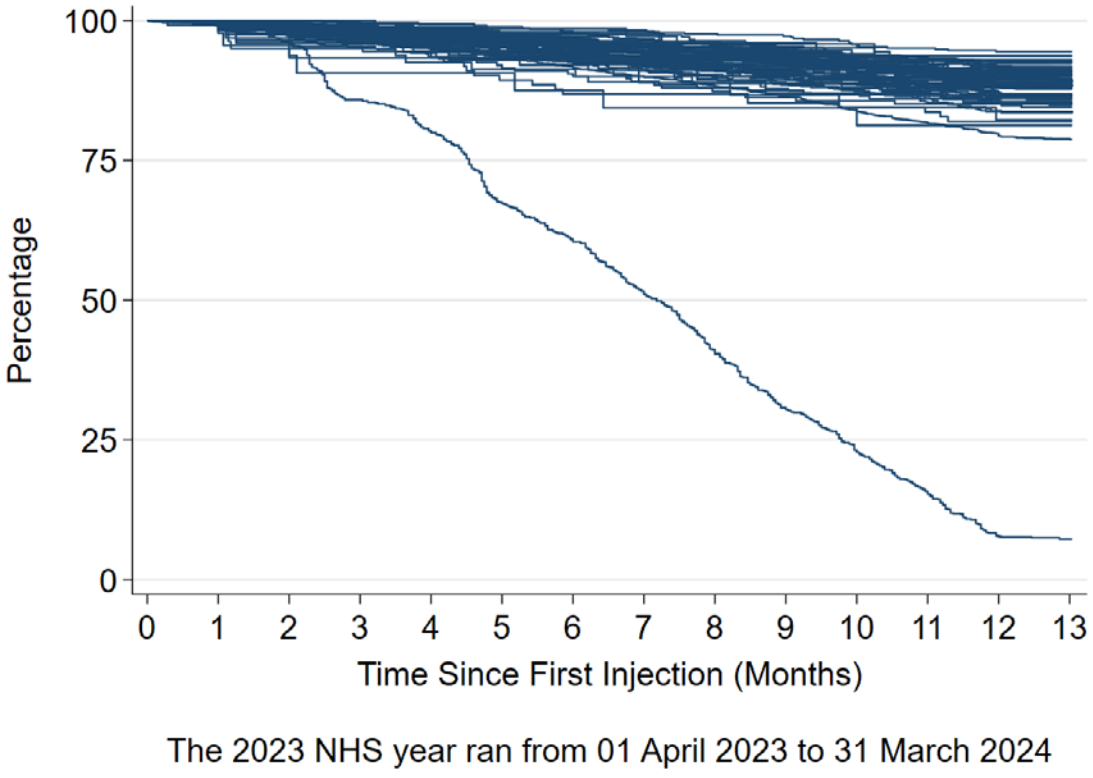
Of the 28,655 eligible eyes starting treatment in the 2023 NHS year, 4,800 (16.8%) eyes did not have a follow-up visit recorded within the month 12 visit window. Patient death was the reason for lack of follow-up for 881 eyes (18.4% of the eyes without follow-up to month 12). For the other patients / eyes, no reason for loss of follow-up at month 12 was identifiable.

The percentage of eyes lost to follow-up within one year of treatment varied between centres (range: 6.6% to 92.9%). One (1.3%) centre had a loss to follow-up rate of more than 50.0% and two (2.7%) centres approximately 25.0% (**Figure 2a**). For the centre with a loss to follow-up rate of >50%, the key reason was EMR migration.

Of the 28,311 eligible eyes starting treatment in the 2022 NHS year from 76 centres and eligible for analysis in the month 24 outcomes, 4,114 (14.5%) did not have a follow-up recorded in the month 12 visit window and 10,751 (38.0%) eyes did not have a follow-up visit recorded within the month 24 visit window. Patient death was the reason for loss to follow-up for 1,755 eyes, with death occurring in 861 patients in year one and in 894 patients in year two. For the remaining patients / eyes, no reason for loss of follow-up data at month 24 was identifiable.

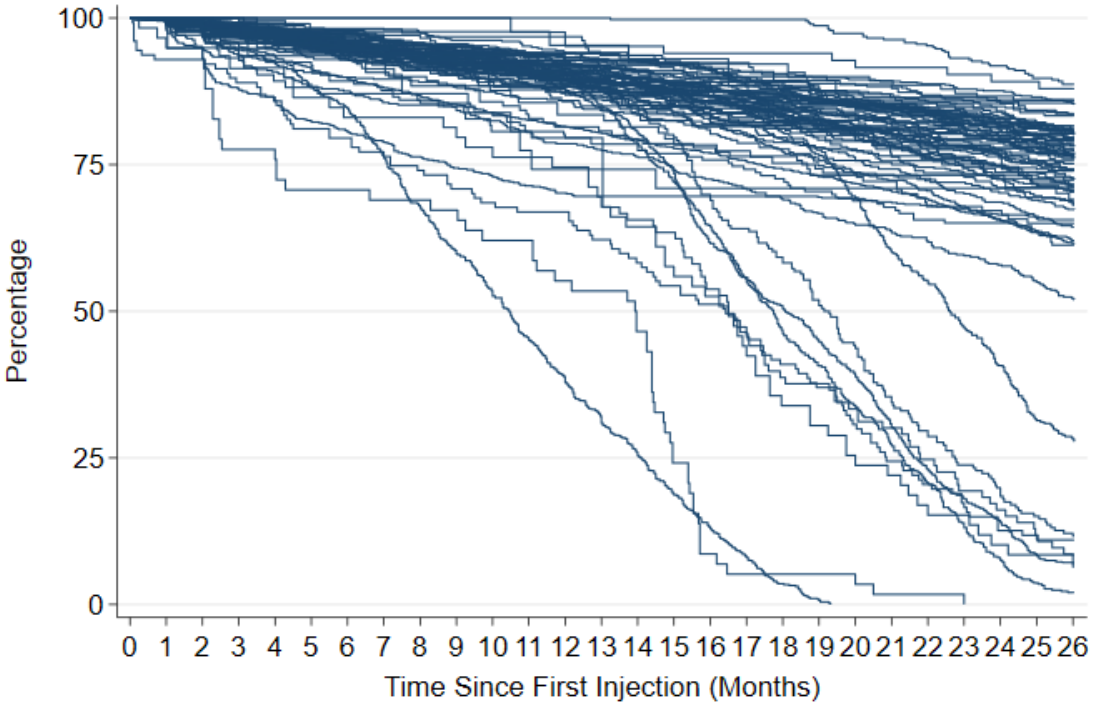
The percentage of eyes lost to follow-up within two years of treatment varied between centres (range: 13.3% to 100.0%). Ten (13.2%) centres had a loss to follow-up rate of more than 50% and 55 (72.4%) centres more than 25%. Key reasons for loss to follow-up rates of ≥50% included EMR migration, no data submitted for 2023, and poor data quality (**Figure 2b**).

Figure 2a: Kaplan-Meier curve for percentage of eyes starting treatment in the 2023 NHS year without a recorded follow-up visit in the month 12 visit window by participating centre*



* One centre with more than 25.0% loss to follow up rate has not been plotted on the graph due to the data quality issue.

Figure 2b: Kaplan-Meier curve for percentage of eyes starting treatment in the 2022 NHS year without a recorded follow-up visit in the month 24 visit window by participating centre



The 2022 NHS year ran from 01 April 2022 to 31 March 2023

5. Results and key questions

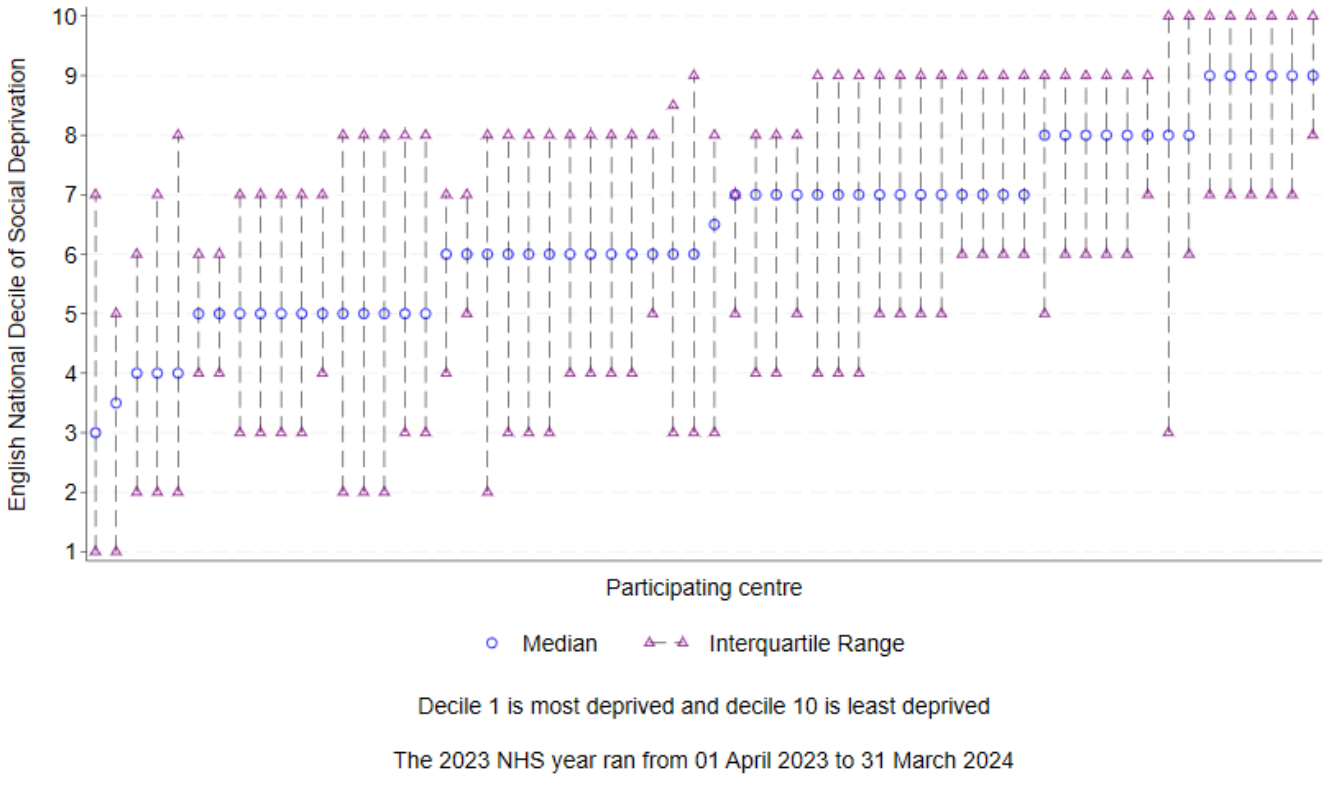
Baseline characteristics for patients and eyes starting treatment in the 2023 NHS year:

Baseline characteristics are reported for 28,655 eligible eyes from 26,040 individual patients starting treatment in the 2023 NHS year. When sex and ethnicity were recorded, the majority were female (61.0%) and Caucasian (88.9%). The number of first, second and immediately sequential bilateral intravitreal treatment (ISBIVT) eyes was 19,855 (69.3%), 5,422 (18.9%) and 3,378 (11.8%) respectively. The median age in years of the patients at the start of treatment of their first, second and ISBIVT eyes was 80.4 (IQR: 74.9 - 85.8), 82.1 (IQR: 76.8 - 87.2) and 81.1 (IQR: 74.8 - 86.4) respectively.

The number of eligible eyes at each centre varied considerably, with a median of 322 eyes (IQR: 176 – 527) starting treatment.

The English index of multiple deprivation (IMD) was calculated for 17,812 patients from 60 participating English centres with data recorded on the Medisoft or mediSIGHT EMRs from 57 centres and three centres from OpenEyes and data from one in-house database centre. All centres, except 10, treated patients in the most deprived national decile of social deprivation (decile 1) and all centres treated patients in the least deprived national decile of social deprivation (decile 10). There was notable variation in the median English national decile of social deprivation for the patient population at different centres, **Figure 3**. Results for social deprivation are only produced for English centres as different indices are used in the other home nations and too few centres in Northern Ireland, Wales and Scotland submitted data to be representative of results for these nations. IMD data has not yet been added to the statistical modelling.

Figure 3: Median and IQR national deciles of social deprivation by participating centre in England – ordered by median national decile within each centre



Why this is important?

Evidence suggests that higher levels of deprivation may be associated with poorer baseline visual acuity and suboptimal treatment outcomes. By analysing IMD data, we can identify health inequalities and work toward ensuring that all patients regardless of their postcode have equal access to timely, sight saving treatment.

5.1 What was the baseline distance visual acuity for first and second eyes?

Introduction

Distance visual acuity is the standard measure of visual function reported in clinical trials and real-world datasets. In routine clinical practice, it is typically measured using habitual spectacle or contact lens correction using an ETDRS chart. Appendix 2 shows the relationship between ETDRS letter score, LogMAR and Snellen visual acuities.

Why this is important?

- Published evidence and prior AMD Audit reports have consistently shown that the best visual outcomes are achieved when treatment is started while visual acuity remains relatively good.
- NICE Guidance (NG82) and Quality Standard (QS180) recommend initiating treatment, where appropriate, within 14 days of referral from primary care, and emphasise regular monitoring of the fellow eye for signs of nAMD during treatment of the first eye.
- Baseline visual acuity for both first and second treated eyes may therefore act as an indirect marker of:
  - The effectiveness of local primary care referral pathways
  - The timeliness of triage and access to diagnostic assessment
  - The adequacy of second eye screening
  - Adherence to NICE recommendations
- Poor baseline vision at treatment initiation may reflect delays within the pathway, capacity constraints, or variation in referral processes, all of which have implications for long term visual outcomes.

Aggregate results

The median baseline visual acuity was 60 ETDRS letters (IQR: 45 to 70 letters). The proportion of eyes in each visual acuity category is shown in **Table 2**. Baseline acuity measurements were available for 27,067 eyes (94.5%). The majority of eyes (62.0%) had a baseline acuity between 25 and 70 letters, corresponding to the original NICE guideline for treatment (Snellen equivalent 6/12 to 6/96). The 5.5% of missing baseline acuity data was primarily from a centre affected by EMR migration.

Table 2: Categories of baseline visual acuity for each year of the AMD Audit

	Baseline ETDRS visual acuity		
	2023 (n=27,067)	2022 (n=25,855)	2021 (n=25,349)
Baseline visual acuity category	Percentage of eyes	Percentage of eyes	Percentage of eyes
≤25	8.5	9.4	9.3
26-35	7.7	8.2	8.7
36 – 55	26.5	26.8	28.4
56 – 69	27.7	27.0	26.5
≥70	29.6	28.6	27.1

The proportion of eyes starting treatment with ''good'' baseline visual acuity (≥70 ETDRS letters) has risen steadily from 27.1% in 2021 to 29.6% in 2023.

The median baseline acuity was six ETDRS letters lower in first treated eyes than in second treated eyes. See **Table 3**. This suggests that first eye treatment may be initiated at a more advanced stage of visual loss or that second treated eyes are identified, diagnosed and treated at an earlier stage of disease development. While the baseline acuity for second treated and ISBIVT eyes has not changed since the first annual report, there has been a modest increase in the baseline acuity of first treated eyes, with a corresponding decrease in the 'first eye gap', the difference in acuity between first and second treated eyes.

Table 3: Baseline visual acuity by treated eye status for each year of the AMD Audit

	Baseline ETDRS visual acuity					
	2023 (n=27,067)		2022 (n=25,855)		2021 (n=25,349)	
	Percentage of eyes	Median (IQR)	Percentage of eyes	Median (IQR)	Percentage of eyes	Median (IQR)
Treated eye						
First eyes	69.2	59 (44-70)	69.2	58 (40.5-70)	70.1	55 (40-68)
Second eyes	19.0	65 (55-74)	19.4	65 (55-73)	17.7	65 (53-73)
ISBIVT eyes	11.8	60 (44-70)	11.4	60 (43-70)	12.2	60 (43-70)
Overall	**100.0**	**60 (45-70)**	**100.0**	**60 (45-70)**	**100.0**	**60 (44-70)**

Variation in performance

- Median baseline visual acuity varied from 28.5 to 68 ETDRS letters between centres and was between 26-35 ETDRS letters in a single (1.4%) centre, between 36-55 letters in six (8.1%) centres, between 56-69 letters in 67 (90.5%) centres. No centres had a median baseline acuity of ≤25 or ≥70 ETDRS letters.
- The percentage of centres with median baseline visual acuity above 55 letters has increased over time from 79% in year 2021 to 88% in year 2022 and 91% in year 2023.
- There was no clinically significant difference in median baseline visual acuity between the sexes. Median acuity at baseline was worse with increasing age, decreasing from 64 letters for patients aged under 70 years to 59 letters for those aged 80 or more years.

Limitations

- Baseline visual acuity recording remains high (94.5%) and has improved compared with earlier audit years. However, 5.5% of eligible eyes did not have a recorded baseline measurement. Missing data may be related to factors such as EMR migration, use of parallel electronic systems, or baseline assessments recorded at a different organisation.
- This analysis presents the data as reported and does not adjust for differences in patient characteristics between centres. These differences may affect baseline visual acuity and should be considered when comparing centres.

Interpretation

Since the first NOD AMD report (2020 NHS year), overall median baseline visual acuity has remained stable at 60 ETDRS letters. This suggests that the point at which treatment is started nationally has not changed significantly. However, some important trends are evident:

- The proportion of eyes starting treatment with ≥70 letters has increased gradually from 27.1% in 2021 to 29.6% in 2023 reflecting a positive national shift toward earlier intervention.
- The proportion of centres achieving a median baseline acuity above 55 letters has risen substantially from 79% in 2021 to 91% in 2023, demonstrating a significant reduction in regional variation.
- The 'first eye gap' has reduced from 10 to 6 ETDRS letters, suggesting earlier diagnosis and treatment of first eyes.
- The proportion of eyes presenting with “poor acuity” (≤25 letters) has remained broadly stable at around 8–9%, indicating ongoing late presentation in a minority of patients.

Recommendations

- All providers are encouraged to work with commissioners and primary and secondary care colleagues to develop referral and treatment pathways that enable treatment to be started quickly, when visual acuity is still good. Dedicated referral pathways should be promoted locally and triaged daily.
- Centres with lower median baseline visual acuity should review local referral processes, clinic capacity, and time-to-treatment metrics to identify avoidable delays in the pathway.

Although more than 29% of eyes had “good” visual acuity (≥70 ETDRS letters) at the start of treatment, 16% of eyes started with vision worse than 35 ETDRS letters and more than half of those had acuity of 25 letters or worse. Prior analysis has found only a minority of these eyes achieve a good visual acuity after 12 months of treatment. Clinicians should use these audit results to support shared decision making, providing patients with poor baseline vision a realistic understanding of the treatment burden versus the likely visual outcomes. This enables patients to make an informed choice about whether to commit to a long-term injection regimen.

5.2 How many patients started treatment within 14 days of referral from primary care?

Introduction

When nAMD develops in the first eye, patients typically present to their high-street optometrist and are referred directly for secondary care assessment and diagnosis, usually via a dedicated referral pathway. The NICE Quality Standard on Serious Eye Disorders recommends treatment should be started, when appropriate, within 14 days of receipt of the referral from primary care as an example of best practice to help patients retain their eyesight. Capture of the date of receipt of the primary care referral within the EMR is required to identify whether this recommendation was met. Referral data is most likely to be available for patients with a new nAMD diagnosis. Other patients with nAMD in the first eye may present directly to an acute referral clinic or be identified during review within another ophthalmology secondary care pathway. During treatment of the first eye, monitoring of both eyes is recommended by NICE (QS180) to identify second eye disease as quickly as possible. For these patients, there may be no referral from primary care.

Why this is important?

- Published clinical trials and prior reports of the AMD Audit have shown the best visual acuity outcomes are obtained when treatment is started quickly, and visual acuity is still good.

Aggregate results

- Referral data within 90 days of the start of treatment was available for 5,094 eyes (17.8%), of which 4,151 (81.5%) were first treated eyes.
- For the eyes with referral data, the median time between receipt of referral and the start of treatment was 22 days (IQR 13 to 42) and the intervals between receipt of the referral from primary care and the start of treatment are shown in **Table 4**.
- Performance against the relevant care pathway quality markers has deteriorated with 39.4% and 12.1% of centres achieving the acceptable and desirable levels of performance for starting treatment within 14 days of primary care referral, compared to 48.6% and 21.6% in the third annual report.

Table 4: Time from referral to first injection

Time from referral to first injection (days)	Number of eyes (%)
≤14	1,620 (31.8)
15-28	1,411 (27.7)
29-90	2,063 (40.5)
Number of eyes with referral data	**5,094**

Variation in performance

- The proportion of eyes starting treatment within 14 and between 0-28 days of referral from primary care varied between providers from 5.7% to 78.3% and from 18.1% to 91.3% respectively. The median time from receipt of referral to the start of treatment also varied between providers from 8 to 53 days.

- The proportion of eyes starting treatment within 14 days of referral was higher for first (31.7%), and ISBIVT (33.4%) eyes compared to second eyes (28.8%). The median time from referral to the start of treatment was five days shorter for first treated eyes than second treated eyes.

- The proportion of eyes starting treatment within 14 days of referral was lower in the eyes of the younger patients (under 75 years) and oldest (over 85 years) compared to the other age groups. The median time from referral to the start of treatment was two days shorter for the oldest patients (aged over 85 years) compared to the youngest (aged under 70 years).

Limitations

- Referral data within 90 days of treatment initiation was available for only 17.8% of all eyes (5,094 eyes), which limits the reliability of these findings as a complete representation of real-world practice.

- Self-reported data submitted via other channels (e.g. GIRFT) often indicates higher performance, suggesting that the current national dataset may be affected by recording challenges, such as EMR migrations and inconsistent documentation practices across centres.

- The low levels of data recording also mean it is not possible to draw firm conclusions around whether the proportion of eyes starting treatment within 14 days of referral is changing over time.

Interpretation

- NOD recorded data suggest that only around one third of eyes (31.8%) start treatment within 14 days of referral. There is considerable variation between centres, reflecting a combination of differences in data capture and genuine clinical delays.

- The 14-day target is most relevant to first eye presentations, where a similar proportion (31.7%) start treatment within the recommended timeframe. Second eyes are typically identified through internal hospital monitoring rather than external referrals, and the lower proportion of referral data (28.8%) likely reflects the absence of a formal referral rather than delay in care.

- At present, referral to injection time is not a fully reliable metric for ICB level performance due to limited completeness of the national dataset.

Recommendations

- All providers should ensure primary care referral date is recorded accurately and consistently within their EMR system. They should work with EMR providers to make recording the date of referral from primary care simple and integrated with other routine workflow documentation.

- Providers should use a multidisciplinary workforce to ensure there is sufficient capacity to triage referrals and start treatment quickly, when the visual acuity is expected to be good.

- Continued prioritisation of first eye assessment remains important, as timely intervention in these patients has the greatest impact on long term visual outcomes.

5.3 How many patients completed their initial loading phase of three injections within ten weeks?

Introduction

Current clinical practice for the treatment of eyes with nAMD involves an initial, loading phase of three or four injections at fixed monthly intervals, followed by an ongoing, maintenance phase of treatment at longer intervals, according to the response to treatment.

Statistical modelling in the year two report of the UK AMD Audit found the odds ratio of a "good" acuity outcome after 12 months of treatment was almost 40% greater in eyes that completed their initial three-monthly injections within ten weeks. The odds ratio of a "poor" visual acuity outcome was also reduced by 12% in the same eyes.

The new care pathway quality markers for the treatment of nAMD state providers should ensure the first, three monthly injections at the start of treatment are given within ten weeks in ≥75% and ≥83% of eyes for acceptable and desirable performance.

Why this is important?

- Eyes completing the initial three injections, during the loading phase of monthly treatment, quickly have better visual acuity outcomes than eyes with slower or no completion of the loading phase.

Aggregate results

- For the 28,655 eyes that started nAMD treatment in the 2023 NHS year, 19,026 (66.4%) eyes completed the initial three anti-VEGF injections during the loading phase of treatment within ten weeks of the first injection. A further 2,852 (10.0%) eyes completed the first three injections within ten to 12 weeks, and 2,021 (7.1%) eyes completed these injections within 12 to 16 weeks. There were 2,647 (9.2%) eyes for which it took more than 16 weeks for the first three anti-VEGF injections to be given. An additional 2,109 (7.4%) eyes received fewer than three injections during the first year of treatment.

- The proportion of centres meeting the acceptable (≥75%) and desirable (≥83%) thresholds for completing the initial loading phase of three injections within ten weeks improved to 52.0% and 28.0% respectively, up from 41.1% and 19.2% in the third annual report.

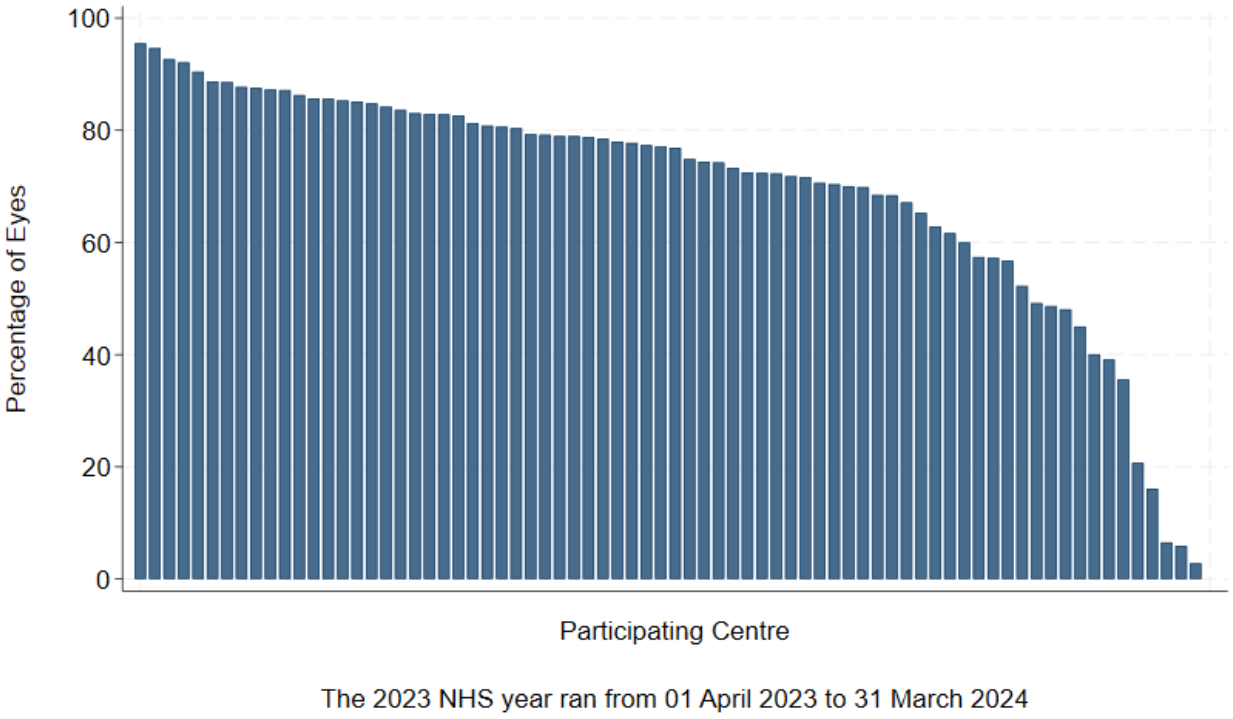
Variation in performance

- The proportion of eyes completing the initial three injections during the loading phase of treatment within ten weeks varied between centres and ranged from 2.8% to 95.5%. There were 12 (16.0%) centres with <50% eyes, 39 (52.0%) centres with ≥75% and six (8.0%) centres with ≥90% eyes completing the loading phase within ten weeks, **Figure 4**.

- The percentage of eyes completing the initial three injections within ten weeks was 67.5% for first treated eyes, 66.0% for second treated eyes and 60.5% for ISBIVT eyes.

- The percentage of eyes completing the initial three injections within ten weeks was 66.9% for the patients aged over 70 years, 69.0% for patients aged 70-74 years, 70.2% for patients aged 75-79 years, 68.1% for patients aged 80-84 years and 61.8% for patients 85 years and older.

Figure 4: Percentage of eyes completing the initial three-monthly injections during the loading phase of treatment within 10 weeks of the first injection. (Participating centres are ordered in descending order.)



Limitations

- Recording of intravitreal injection dates within EMRs appears generally reliable, with no widespread data quality concerns identified. However, completeness and accuracy remain dependent on local data entry practices.
- Second and third loading injections may be administered outside the main centre which may contribute to underreporting.

Interpretation

- Significant variation persists between centres (range 2.8%-95.5%), suggesting ongoing differences locally in clinic capacity, scheduling, or service organisation.
- While the overall completion rate of 66.4% for the first three injections within ten weeks represents an improvement from last year's report, it remains below the acceptable performance standard of ≥75%.
- Just over half of centres (52%) met the acceptable threshold, and only 28% achieved the desirable standard of ≥83%, highlighting considerable variation between centres.
- Completion rates are lower in patients aged ≥85 years (61.8%), suggesting that frailty or transport issues may impact the ability for patients to maintain timely visits.

Recommendations

- Providers should continue to use a multidisciplinary workforce to ensure there is sufficient capacity to start treatment and complete the loading phase of monthly treatment quickly but without delaying follow-up of other patients during the subsequent maintenance phase.
- Centres with completion rates below 50% should review internal processes and engage with their ICB and trust managers responsible for macular services to address operational barriers, including clinic capacity, staffing, and scheduling.
- For patients receiving ISBIVT, centres should promote same day bilateral treatment to reduce the number of visits required, thereby improving the completion rate of 3 loading injections within 10 weeks.

5.4 How often is planned treatment or follow-up delayed by at least two weeks on more than one occasion during the first year of treatment?

Introduction

After the initial loading phase of monthly treatment, further treatment is typically given at longer intervals during the maintenance phase of treatment. These intervals are decided according to the response to treatment and the presence or absence of signs of active disease. Delay to the planned treatment intervals can lead to poor visual acuity outcomes and are a cause of concern to patients. The NICE Quality Standard on Serious Eye Disorders recommends monitoring the proportion of scheduled appointments that are cancelled or delayed by the provider.

Why this is important?

- Non-adherence with nAMD treatment, defined as having two or more planned appointments delayed by more than two weeks in a period of 12 months, is often associated with poor visual acuity outcomes.

Aggregate results

- Data for the delayed follow-up visit were available for 11,981 patients (46.0%). The majority of these data were sourced from mediSIGHT (60.7%) and OpenEyes (33.4%). For centres still using the older version of Medisoft, this information was not available; however, data availability is expected to improve over time as all Medisoft centres transition to mediSIGHT.
- Planned treatment was delayed for two weeks or more at least twice for 58.6% of patients with available data (7,017 individuals).
- Using the data submitted to the National Ophthalmology Database, it was not possible to identify whether delays were the result of patient or hospital factors.

Limitations

- Data were unavailable for over half of the patients (54%), and it is unknown whether non-reporting centres performed better or worse than those that submitted data. Therefore, the reliability and representativeness of the findings have lower confidence.

Recommendations

- Providers should ensure sufficient capacity for follow-up of adults with nAMD at intervals determined by the responsible healthcare professional.
- Healthcare professionals should work with EMR providers to make planned versus actual appointment dates a mandatory and easily recorded data field, enabling delays to be tracked for local service improvement and national NOD reporting. In the longer term, incorporating a simple categorisation of delay reasons such as hospital, patient, or clinical factors would allow centres to distinguish between capacity and patient related issues, supporting more targeted service improvement.
- Centres using older EMR versions that do not currently capture delayed follow-up data should prioritise transitioning to systems that support this functionality (e.g. Medisoft to mediSIGHT), to ensure complete and accurate national audit reporting.

5.5 How many injections are given in first and second years of treatment? Which staff are giving the injections? What are the average intervals between treatments at the end of the first and second years?

Introduction

Neovascular AMD is a chronic disease, and treatment often needs to be given at regular intervals and over several years to maintain visual function. After the initial loading phase of monthly treatment, many patients can be treated at longer intervals according to the response to treatment. Newer treatment plans, including "treat and extend", and therapies that may be longer acting can help to reduce the treatment burden.

Both Vabysmo (faricimab) and the biosimilar forms of ranibizumab (including Ongavia, Ximulci and Byooviz) were licensed and made available for use within the NHS during Summer 2022. Clinical staff will typically use available data from clinical trials and real-world practice to select a first line therapy. Drug cost and local commissioning policy will also influence the choice of first-line therapy and explain any variation in drug usage between centres.

Why this is important?

- Real world studies and prior UK AMD Audit reports have shown the number of injections in the first year of treatment is associated with visual acuity outcomes. Under-treatment may be a marker of inadequate capacity, sub-optimal treatment or non-compliance with treatment and is often associated with poor visual acuity outcomes.

Aggregate results

- For the 28,655 eyes starting treatment for nAMD in the 2023 NHS year, a total of 179,420 injections were administered. The proportion of injections administered for each anti-VEGF agent was: 54.0% with Eylea (aflibercept), 29.6% with Vabysmo (faricimab), 9.7% with Ongavia (ranibizumab biosimilar) 3.0% with Lucentis (ranibizumab), 3.7% with Avastin (bevacizumab), and less than 1.0% each with Beovu (brolucizumab) and Ximluci (another ranibizumab biosimilar).
- For all eyes, the median number of injections in the first and second year of treatment was 7 (IQR 4 to 8) and 4 (IQR 3 to 6) respectively (**Table 5**).
- The median interval between intravitreal injections at the end of the first year of treatment was ten weeks. The proportion of eyes treated at different intervals at the end of the first year is shown in **Table 6**. The results were analogous for the eyes finishing the second year of treatment.
- Of all injections, 18.6% were administered by doctors, 66.6% by nurses, and 7.7% by other healthcare professionals. For 7.1% of injections, the profession of the person administering the intravitreal injection was not recorded.

Table 5: Median intervals between injections after one and two years of starting treatment by drug

	First year of treatment		Second year of treatment	
	Year 2023 (n=22,894)		Year 2022 (n=15,313)	
Drug	Median number of injections during first year of treatment	Median (IQR) interval between injections at the end of the first year of treatment (weeks)	Median number of injections during second year of treatment	Median (IQR) interval between injections at the end of the second year of treatment (weeks)
Eylea	7.0	10 (6-12)	5.0	10 (8-14)
Vabysmo	7.0	10 (8-14)	4.0	12 (8 - 16)
Ongavia	7.0	8 (6-12)	6.0	10 (8-14)
Lucentis	7.0	6 (4-10)	5.0	10 (6-14)
Avastin	7.0	8 (4-10)	6.0	10 (6-12)
Beovu	7.0	8 (4-10)	6.0	8 (4-12)
Ximluci	13.0	8 (4-8)	n/a	n/a

Variation in performance

- The median number of anti-VEGF injections per eye administered within the first 12 months at each centre ranged from one to nine, **Figure 5**.
- No eyes were recorded as switching anti-VEGF drug during the 12 or 24-month follow-up period; therefore, all eyes remained on the same treatment throughout the analysis period.
- For eyes persisting with treatment to month 12, the median number of injections varied by drug, ranging from seven to thirteen injections, **Table 5**.
- The median interval between injections differed by drug, ranging from six to ten weeks at the end of the first year and from eight to 12 weeks at the end of the second year, **Table 5**.
- The median number of injections at one year was lower (six injections) for the eyes of patients aged over 85 years at the start of the treatment, compared to the other age groups (seven injections). The median time between injections was longer by two weeks (ten weeks) for patients 75 years and over at the start of the treatment, compared to the other age groups (eight weeks).
- Almost 55% of all centres used a biosimilar medicine for injection. The median proportion of injections involving a biosimilar medicine was 1.9% in these centres and it varied from less than 0.1% to 84.2% of injections per centre. Eight centres used biosimilar medicines for more than 25.0% of injections.
- The proportion of anti-VEGF injections given by different professionals varied between centres and ranged from 0.0%-80.6% for doctors, 0.0%-99.9% nurses, 0.0%-82.6% other healthcare professionals and 0.0%-100.0% for unrecorded professionals, **Figure 6**.

Figure 5: Median number of anti-VEGF injections over a year by participating centre

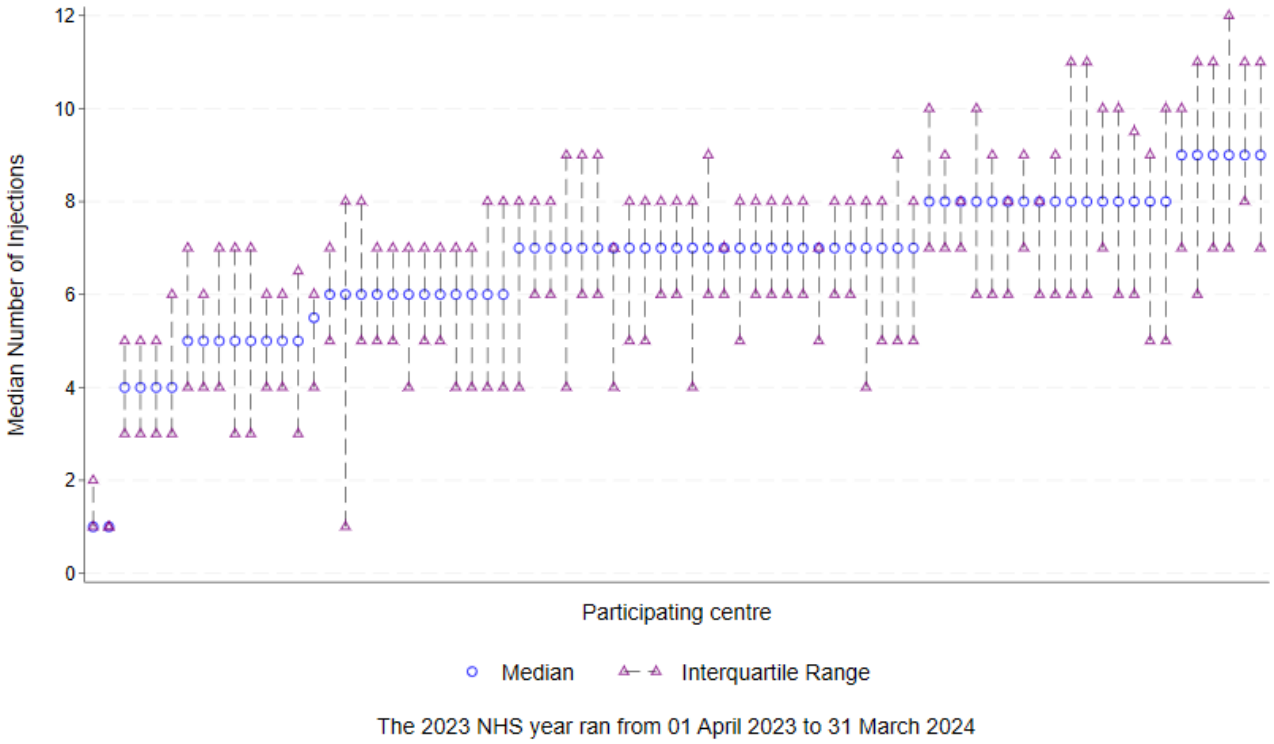


Figure 6: Percentage of anti-VEGF injections administered over a year by profession of the injector and for each participating centre

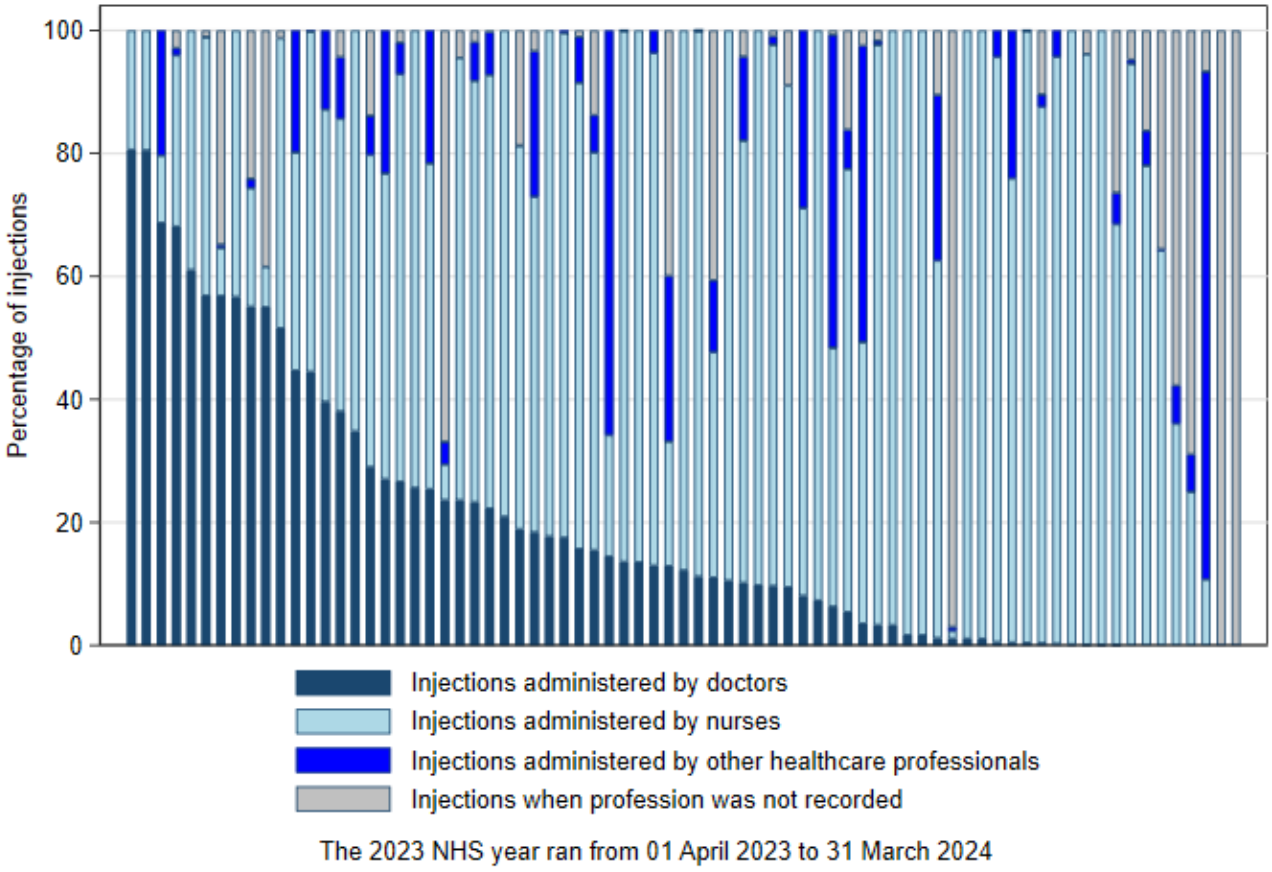


Table 6: Intervals between injections one and two years after starting treatment

	First year of treatment		Second year of treatment
	Year 2023 (n= 23,192)	Year 2022 (n=23,621)	Year 2022 (n=17,389)
Time between injections at one year	Percentage of eyes	Percentage of eyes	Percentage of eyes
4 weeks	15.0	17.9	12.8
6 weeks	11.5	11.4	9.8
8 weeks	19.9	21.5	18.2
10 weeks	15.0	15.1	13.3
12 weeks	16.2	14.2	14.9
14 weeks	8.0	7.1	8.9
16 weeks	5.3	4.5	8.4
18 weeks	2.4	2.1	3.2
20 weeks	6.6	6.2	10.5

Limitations

- Variation in drug usage and injection frequency between centres may reflect local commissioning policies, staged adoption of newer therapies, and service capacity constraints, rather than clinical preference alone.
- During periods of EMR migration, treatment data may be incompletely captured or transferred to NOD. In addition, the audit does not capture reasons for treatment choice, switching decisions, or interval adjustment. As a result, centre level variation in injection frequency (range 1-9 injections per year) cannot be fully explained and should not be interpreted as a standalone measure of care quality.
- Real-world treatment patterns may also reflect differing approaches to defining disease control, including variation in anatomical versus functional retreatment thresholds.

Interpretation

- Data quality within EMRs for recording the drugs used for treatment is generally good. However, observed variation between centres likely reflects a combination of differences in clinical practice and data driven artefacts caused by EMR migrations, or care partly delivered in community settings that is not captured within hospital systems.
- There has been a notable shift in prescribing patterns, with increased use of newer, longer acting therapies such as Vabysmo (29.6% in 2023 vs. 9.1% in 2022). The median number of injections in the first year remained consistent at 7.0 across most agents. For Vabysmo, this included the four loading doses administered in accordance with its licensed posology at the time.
- In the second year, Vabysmo was associated with a lower injection burden, with a median of 4 injections compared with 5 for Eylea and Lucentis, as well as longer treatment intervals (12 weeks vs. 10 weeks for other agents such as Eylea, Lucentis, and Avastin). As newer therapies become more established in routine clinical practice, future NOD reports are likely to better reflect maintenance phase treatment patterns.
- Centres reporting very low injection frequencies (e.g. <4) in the first year of treatment should review whether this reflects data capture issues or potential service capacity constraints.
- The mandated introduction of aflibercept biosimilars in England under the 2025 commissioning guidance is expected to influence treatment patters. The impact of this policy change may become evident in future NOD reports as more data becomes available.

Recommendations

- Following completion of the loading phase, providers should adopt evidence-based maintenance strategies, such as treat and extend, with treatment intervals adjusted according to disease activity rather than aiming for complete anatomical dryness alone.

- Multidisciplinary workforce models remain essential to support clinical decision making and injection delivery. Robust capacity planning is required to ensure that the initial loading phases for new patients do not compromise the timely follow-up and monitoring of established patients.

- Providers are encouraged to review local treatment protocols to ensure alignment with national commissioning guidance and clinical trial evidence. Real-world data should be monitored to ensure that higher injection frequencies in routine practice reflects clinical need.

- NOD data will be invaluable over successive reporting cycles to evaluate the longitudinal impact of commissioning shifts. This includes assessing the real-world outcomes of biosimilar uptake, the cost-effectiveness of newer durable therapies, and the influence of evolving treatment paradigms on treatment burden and long-term visual outcomes.

5.6 What are the visual acuity outcomes after one and two years of treatment?

Introduction

Without treatment, nAMD causes progressive and irreversible central vision loss. Almost 50% of eyes experience a significant decrease in vision (≥15 ETDRS letters) within 12 months, and a similar proportion reach legal blindness (≤35 ETDRS letters) in the same period1.The primary goal of anti-VEGF treatment is to maintain vision and reduce the risk of further loss.[3,4] Whilst many patients experience an initial improvement following the loading phase, vision typically stabilises or gradually declines over subsequent years.[4,6,7] Eyes with lower baseline visual acuity tend to experience greater initial gains, whereas those with higher baseline acuity typically do not show further improvement but usually retain a high level of visual acuity after 12 months of treatment.[7] Adjustment of visual acuity outcomes for differences in baseline patient characteristics between centres enables more meaningful comparison of outcomes across providers.

Why this is important?

- Distance visual acuity is the main functional outcome measure of response to treatment and is associated with quality of life and independent living.

- The new adjusted visual acuity outcome quality markers for the treatment of nAMD state providers should aim to achieve:

  "Good" visual acuity (≥70 ETDRS letters) after 12 months of treatment in ≥41% and ≥46% of eyes for acceptable and desirable performance.

  "Poor" visual acuity outcomes (decrease from baseline of ≥10 ETDRS letters) after 12 months of treatment in fewer than <14% and <12% of eyes for acceptable and desirable performance.

Results

Best measured visual acuity state at month 12

The median visual acuity at one year was 66 ETDRS letters (IQR: 50 to 75 letters). The acuity at one year was ≤25 letters in 1,804 (8.1%) eyes, 26 - 35 letters in 1,477 (6.6%) eyes, 36 - 55 letters in 4,099 (18.3%) eyes, 56 - 69 letters in 5,212 (23.3%) eyes and ≥70 letters in 9,765 (43.7%) eyes.

Best measured visual acuity state at month 24

The median visual acuity after two years of treatment was 65 ETDRS letters (IQR: 48 to 75 letters). The acuity at two years was ≤25 letters in 1,370 (8.6%) eyes, between 26 - 35 letters in 1,125 (7.0%) eyes, between 36 - 55 letters in 3,063 (19.1%) eyes, between 56 - 69 letters in 3,841 (24.0%) eyes and ≥70 letters in 6,625 (41.3%) eyes.

Change in best measured visual acuity 0-12 months

The median change in acuity from baseline was a three ETDRS letter gain (IQR: 4 letter loss to 10 letter gain). Median visual acuity change varied by baseline visual acuity. Overall, 19,169 (90.4%) eyes maintained stable acuity at 12 months and avoided a loss of ≥15 ETDRS letters (3 LogMAR lines). A gain of ≥15 ETDRS letters from baseline was experienced by 3,706 (17.5%) eyes, **Table 7**.

Change in best measured visual acuity 6-12 months

The median change in acuity from months 6 to 12 was a zero ETDRS letter change (IQR: 5 letter loss to 4 letter gain). The median VA at one year was the same or better than the median VA at six months for 11,392 (63.6%) eyes. A loss of ≥15 ETDRS letters (3 LogMAR lines) was experienced by 1,250 (7.0%) eyes and gain of ≥15 ETDRS letters (+3 LogMAR lines) by 844 (4.7%) of eyes, **Table 7**.

Change in best measured visual acuity at 24 months

The median change in acuity from baseline was a two ETDRS letter gain (IQR: 6 letter loss to 11 letter gain). Overall, 12,696 eyes (85.8%) of eyes maintained stable acuity at 24 months and avoided a loss of ≥15 ETDRS letters (3 LogMAR lines). A gain of ≥15 ETDRS letters was experienced by 2,793 (18.9%) eyes, **Table 7**.

Table 7: Change in best measured visual acuity over time

		Percentage of eyes gaining ETDRS letters			Percentage of eyes losing ETDRS letters		
Time period	Median Change (IQR)	5-9 letters	10-14 letters	≥15 letters	5-9 letters	10-14 letters	≥15 letters
0-12 months	4 (-4, 10)	16.0	11.7	17.6	9.7	5.3	9.6
6-12 months	0 (-5, 4)	13.6	5.7	4.7	15.2	6.6	7.0
0-24 months	2 (-6, 11)	14.5	11.0	18.9	10.0	6.1	14.2

"Good" visual acuity state at 12 months

The proportion of eyes with "good" visual acuity (≥70 ETDRS letters) after the first year of treatment was 43.8%. "Good" visual acuity at 12 months was more common in eyes with better levels of acuity at baseline, in second treated eyes and in younger patients, **Table 8**.

For the eyes with a baseline acuity of ≥70 letters, 78.9% of eyes maintained this level of vision after one year of treatment. In contrast, for the eyes with baseline acuity ≤25 letters, only 4.4% achieved "good" visual acuity after 12 months of treatment, though almost half achieved some level of visual improvement.

For the second treated eyes, there was a higher proportion of eyes with vision ≥70 letters at one year (51.8%) compared to first treated eyes (42.4%) and ISBIVT eyes (38.2%).

For the eyes of people aged <70 years at the start of treatment, 56.9% had "good" vision at one year, compared to 33.1% of eyes of people aged 85 or older, **Table 8**.

Table 8: The percentage of eyes with visual acuity in specific categories after 12 months of treatment according to baseline visual acuity, treated eye status and age category

		One year ETDRS letter visual acuity				
Row %	**Number of eyes**	**≤25**	**26-35**	**36 – 55**	**56 – 69**	**≥70**
Baseline ETDRS visual acuity						
≤25	1,423	54.6	14.3	20.5	6.3	4.4
26 - 35	1,489	22.7	20.8	41.1	9.4	6.0
36 – 55	5,549	7.1	6.6	39.8	27.1	19.4
56 – 69	6,107	2.3	1.2	15.2	35.2	46.1
≥70	6,631	0.7	0.5	3.7	16.2	78.9
Treated eye						
First eyes	14,491	8.5	4.9	20.8	23.4	42.4
Second eyes	4,221	5.8	3.6	16.2	22.6	51.8
ISBIVT eyes	2,487	8.8	4.8	23.5	24.7	38.2
Age in years at first injection						
<70	2,658	6.1	3.5	15.7	17.8	56.9
70 – 74	2,626	5.7	4.0	17.6	20.6	52.2
75 – 79	4,624	6.4	4.2	18.8	22.7	47.8
80 – 84	4,893	8.3	4.8	20.2	23.9	42.3
≥85	6,398	10.6	5.6	23.8	26.9	33.1
Overall	**21,199**	**8.0**	**4.7**	**20.2**	**23.4**	**43.8**

Adjusted visual acuity outcomes

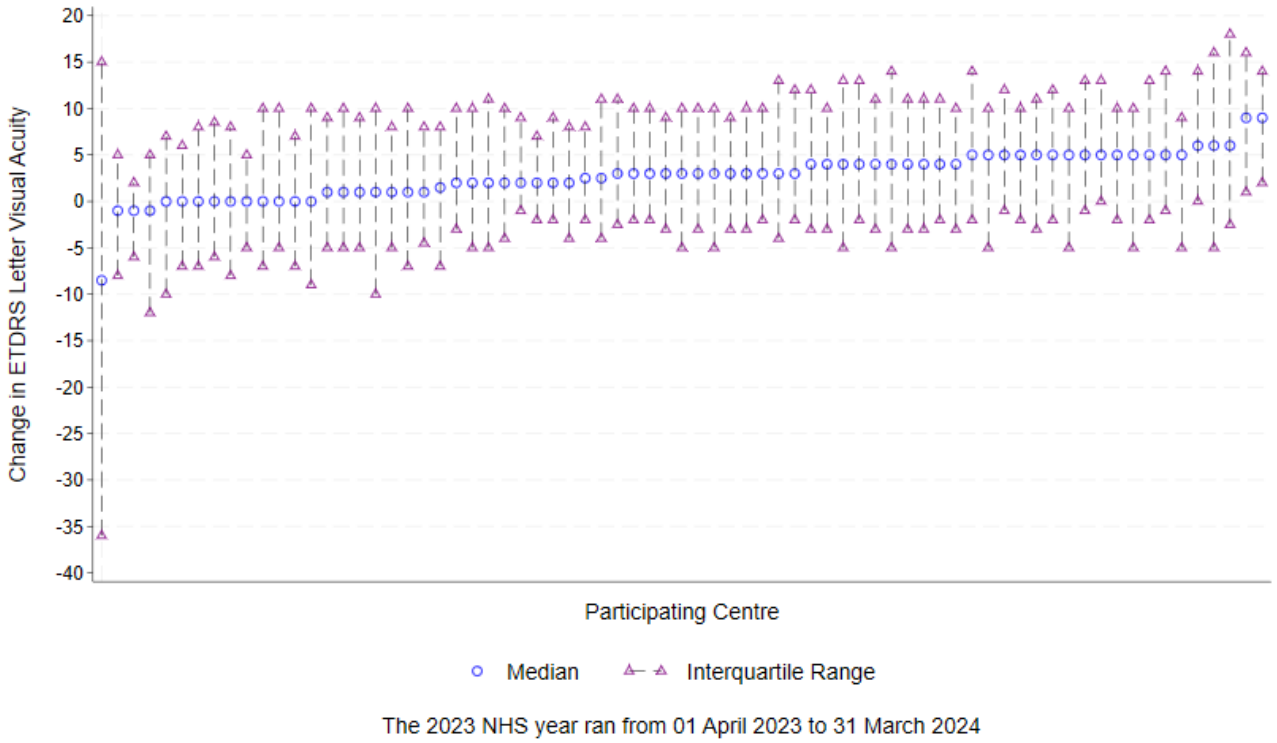
- **"Good" visual acuity state**
  The mean adjusted value for the proportion of eyes achieving a "good" acuity state was 41.9%. Performance against the relevant care pathway quality markers for "good" visual acuity state after 12 months of treatment has deteriorated with 57.7% and 28.2% of centres achieving the acceptable and desirable levels of performance, compared to 67.2% and 34.3% in the year 2022.

- **"Poor" visual acuity outcome**
  The mean adjusted value for the proportion of eyes having a "poor" acuity outcome was 13.5%. Performance against the relevant care pathway quality markers for "poor" visual acuity outcome after 12 months of treatment has deteriorated with 69.0% and 39.4% of centres achieving the acceptable and desirable levels of performance, compared to 82.1% and 55.2% in the year 2022.

Variation in performance

- Unadjusted visual acuity outcomes, including change and state, varied markedly between centres. See **Figure 7**. A single centre had median acuity at 12 months of ≤35 ETDRS letters but above 25% of centres had median acuities of ≥70 ETDRS letters.
- "Good" visual acuity after 12 months of treatment was more common both in second treated eyes than in first and ISBIVT eyes and in the eyes of patients who were younger at the start of treatment.
- Eyes with baseline acuity of 25 letters or lower rarely achieved a "good" visual acuity state after 12 months of treatment, although almost half experienced some increase in acuity.

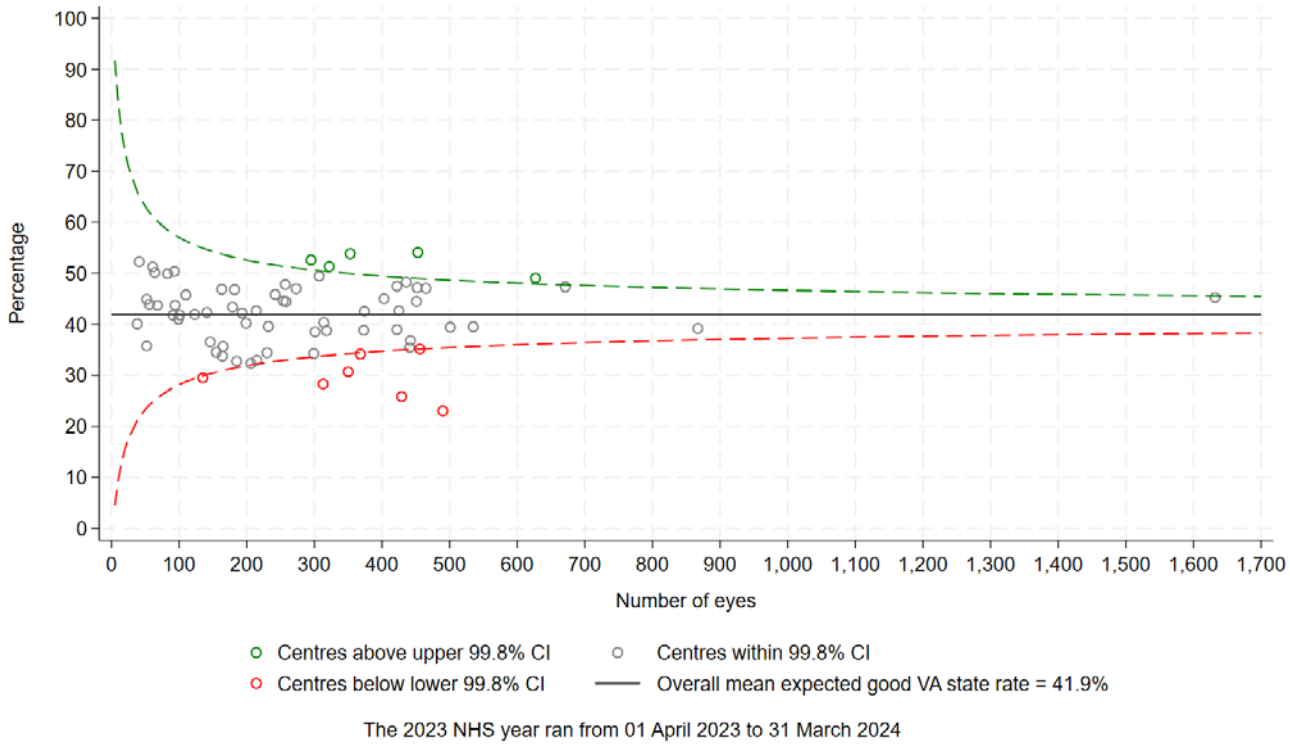
Figure 7: Median and IQR change in visual acuity from baseline to one year for participating centres, ordered by centre median visual acuity change



Adjusted Visual Acuity Outcomes

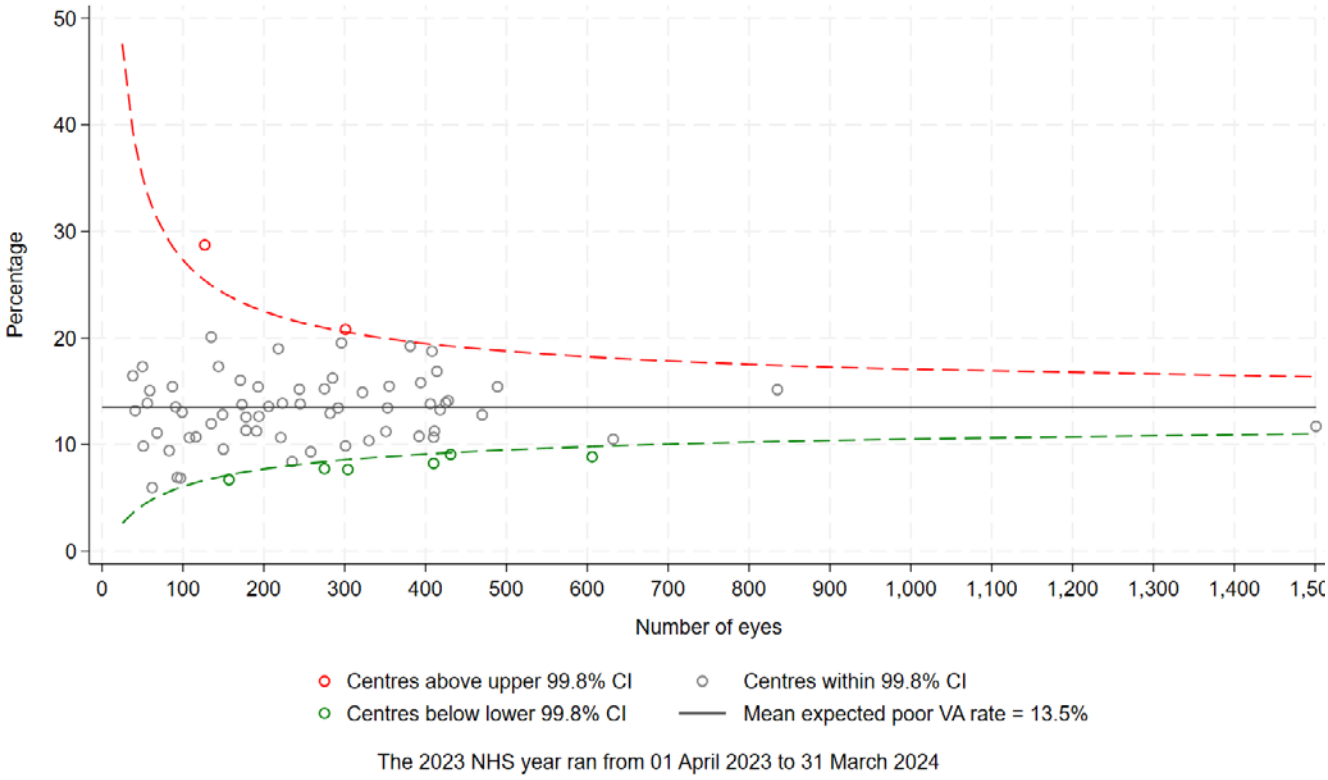
- **"Good" visual acuity state**
  After adjustment for differences in baseline characteristics and the care pathway, the percentage of eyes with "good" vision at month 12 varied between 71 centres, ranging from 23.0% to 54.1%, **Figure 8**. Five (7.0%) of centres achieved outcomes that were significantly better than (three standard deviations above) the mean score and seven (9.9%) had outcomes that were significantly worse (three standard deviations below) than the mean.

Figure 8: Adjusted percentage of eyes achieving a "good" acuity state for each participating centre for the 2023 NHS year



- **"Poor" visual acuity outcome**
  After adjustment, the percentage of eyes with "poor" visual acuity (≥10 ETDRS letter decrease) state at month 12 varied between 71 centres, ranging from 6.0% to 28.7%, **Figure 9**. Six (8.5%) centres achieved outcomes that were significantly better than (three standard deviations below) the mean score and two (2.8%) had a level of performance that was significantly worse than (three standard deviations above) the mean.

Figure 9: Adjusted percentage of eyes with a "poor" acuity outcome for each participating centre for the 2023 NHS year



Limitations

Analysis of VA at 12 months was possible for 88.7% of eyes, a significant improvement from 76.7% in the 2022 report. However, a notable data gap remains at both 12 and 24 months, largely attributable to EMR migration, missing 2023 data, and poor data quality rather than patients discontinuing treatment. As this loss reflects data capture issues rather than clinical attrition, reported outcomes are likely conservative. If data from all centres had been available, overall VA outcomes would probably be more favourable.

Interpretation

- 90.4% of eyes maintained stable vision (avoiding ≥15 ETDRS letter loss) at 12 months, and 85.8% at 24 months. This represents a substantial improvement compared to the natural history of untreated nAMD, where nearly 50% of eyes lose ≥15 letters within 12 months. In real-world practice, outcomes rarely match those observed in RCT treatment arms, most likely reflecting undertreatment, disrupted follow-up, and the development of structural damage like outer retinal atrophy and fibrosis.
- Eyes with low baseline acuity achieve larger relative gains but rarely reach "good" vision (≥70 ETDRS letters) whereas eyes with high baseline acuity generally maintain vision, with median VA stable from 12 to 24 months (66 to 65 letters).
- Second treated eyes and younger patients are more likely to achieve "good" vision, while older patients have a lower likelihood of reaching ≥70 letters.
- Whilst overall outcomes remain stable, adjusted analyses accounting for baseline characteristics indicate that fewer centres achieved acceptable or desirable thresholds for '"good"' visual acuity compared to the previous report, highlighting persistent variation in performance between centres.

Recommendations

- Clinicians should use the AMD Audit dataset and the updated **NHS England Decision Support Tool** to provide patients with accurate expectations of likely visual acuity outcomes before starting treatment, supporting informed consent and shared decision-making.
- Outcomes data should be used to set realistic expectations: 43.8% of eyes achieve good vision (≥70 ETDRS letters) at 12 months and 41.3% at 24 months. Clinicians should explain to patients that eyes with lower vision at the start of treatment may improve but rarely achieve '"good"' functional vision, whereas eyes with high baseline acuity generally maintain their level of function.
- In older patients (≥85 years), attendance may be affected by frailty, transport, or intercurrent illness. Follow-up plans should therefore be tailored pragmatically, with appropriate counselling to support shared decision-making.
- Providers are encouraged to compare their local care pathways with centres achieving better than expected adjusted outcomes and implement any necessary changes to bridge performance gaps.

5.7 How frequent are the most serious complications of intravitreal injections?

Introduction

The two most serious and sight-threatening complications of intravitreal injection are:

- Intra-ocular inflammation (IOI) whereby there is an inflammatory reaction to a drug or other agent introduced into the eye.
- Presumed infectious endophthalmitis (PIE) whereby an infection in the eye secondary to the introduction of bacteria or fungi into the vitreous cavity during treatment is suspected. The infection may or may not be confirmed by subsequent investigation.

Both IOI and PIE need to be identified and treated quickly to minimise the chance of a poor treatment outcome.

Why this is important?

- A high incidence of IOI may indicate issues with a specific drug and a high incidence of PIE may indicate poor adherence to standard aseptic practice.
- The new care pathway quality marker relating to the incidence of PIE states providers should record all cases of PIE within the EMR, review each case internally, disseminate learning outcomes and ensure the incidence is lower than one case for every 6,000 injections.

Aggregate results

- The 28,655 eyes starting treatment in the 2023 NHS year received 179,420 intravitreal injections. IOI was reported as a post-operative ocular complication in 77 eyes of 71 patients. This gives a rate of 2.8 IOI cases per 1,000 eyes per year and 2.7 IOI cases per 6,000 injections.
- In the same period, 37 cases of PIE were recorded in 37 eyes of 37 patients, giving a rate of 1.3 cases per 1,000 eyes per year of treatment. This equates to one case per 4,849 injections, failing to meet the acceptable performance threshold of one case per 6,000 injections, **Figure 10**.

Variation in performance

- Among the 75 participating centres, 31 (41.3%) had zero cases of IOI and the incidence of IOI ranged from 0 to 62 cases per 6,000 injections.
- Among the 75 participating centres, 53 (70.7%) had zero cases of PIE and the incidence of PIE ranged from 0 to 15 cases per 6,000 injections.
- Performance against the relevant quality marker for safety has deteriorated with 70.7% of providers achieving the acceptable level of performance relating to the incidence of PIE, compared to 82.2% in the third annual report.
- The incidence of IOI and PIE by drug injected is shown in **Table 9**. There were no clinically significant differences in the incidence of PIE by the profession of the injector.

Limitations

- To maximise sensitivity, PIE is counted when recorded in the EMR based on several triggers: documentation as a complication of prior treatment, as an indication for new treatment, performance of an anterior chamber tap or vitreous biopsy, or administration of intravitreal antibiotics within 42 days of a prior intravitreal injection. Whilst this approach maximises sensitivity, it may include cases that are not microbiologically confirmed. Conversely, cases may be missed where EMR technical limitations prevent direct linkage of a complication to a specific prior injection, or where inconsistent coding occurs. This is a known issue with EPIC systems and is currently being addressed.
- Case ascertainment is higher when treatment and complication management occur at the same centre. Complications arising after treatment at one centre but managed at another may not be recorded or linked to the original injection. It is currently not possible within the NOD AMD Audit to match records for patients treated across different organisations, although an application for exemption from Section 251 of the NHS Act 2006 has been approved. This would allow collection of identifiable information in the NOD dataset and linkage of patients attending more than one centre for treatment.
- For rare events such as IOI and PIE, incidence rates are highly sensitive to small absolute changes in case numbers, particularly in centres with lower injection volumes. In smaller centres, a single additional case can substantially affect the reported rate per 6,000 injections, contributing to apparent variation that may not reflect true differences in practice.

Figure 10: Safety outcomes

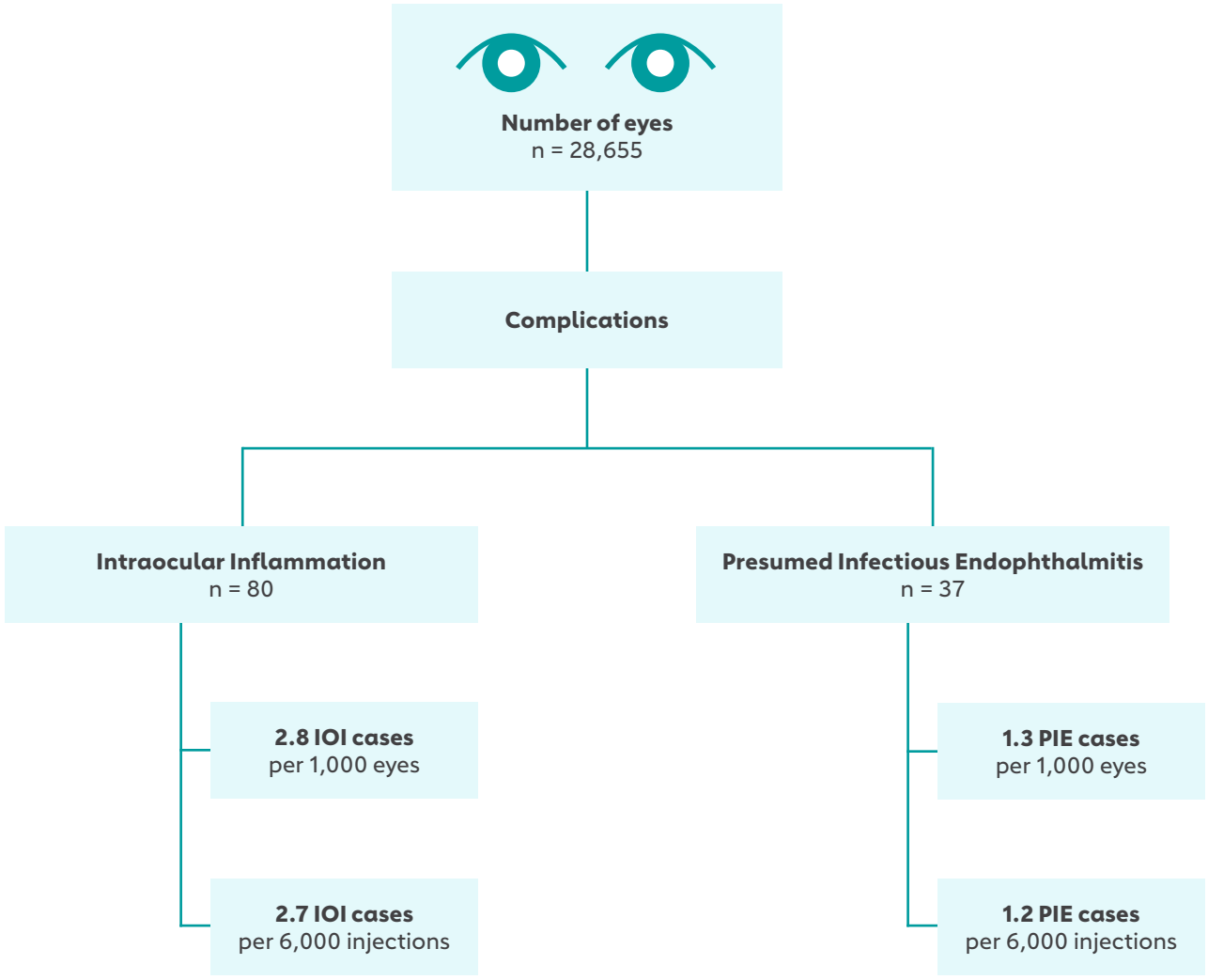


Table 9: Safety outcomes by injected drug

Drug	Number of injections	% of injections	Incidence of IOI (per 6,000 injections)	Incidence of PIE (per 6,000 injections)
Eylea	96,872	54.0	2.9	1.2
Vabysmo	53,102	29.6	2.6	1.1
Ongavia	17,437	9.7	0.7	1.7
Lucentis	5,320	3.0	4.5	2.3
Avastin	6,577	3.7	3.6	0.9
Beovu	74	<0.1	0.0	0.0
Ximluci	38	<0.1	0.0	0.0
Overall	**179,420**	**100**	**2.7**	**1.2**

Interpretation

- Intravitreal injection remains a low-risk procedure, with a low overall incidence of both IOI and PIE. Across 179,420 injections, the rates were 2.7 cases of IOI and 1.2 cases of PIE per 6,000 injections. This equates to approximately one IOI case per 2,000 injections and one PIE case per 5,000 injections. Performance against the PIE quality marker (<1 case per 6,000 injections) has deteriorated compared with the previous report. The overall PIE rate now exceeds the recommended threshold, and the proportion of centres meeting the acceptable standard has fallen from 82.2% to 70.7% in the first year of treatment. Nearly 30% of centres reported a PIE incidence exceeding the threshold, highlighting the importance of robust infection prevention protocols and a structured review of all cases.
- The observed variation in IOI rates between drugs is difficult to fully explain. Lower injection numbers for Lucentis (5,320) and Avastin (6,577), compared with Eylea (96,872), mean that rates are more sensitive to small absolute changes in case numbers in these groups. Observed differences are likely multifactorial, including variation in sample size, differences in reporting completeness, and potential reporting bias, particularly where newer agents may be subject to closer monitoring. Confounding factors not captured within the dataset may also contribute. Ongavia and Ximluci both require manual preparation from vials, unlike other pre-filled agents. Despite this shared characteristic, Ongavia shows a higher observed incidence of PIE (1.7 per 6,000 injections) compared to the overall rate (1.2), while Ximluci does not demonstrate the same pattern, suggesting preparation method alone is unlikely to be explanatory. In some published series the need for an additional compounding step to make Avastin suitable for intravitreal injection has been identified as a possible factor.
- No clinically significant differences in PIE incidence were observed by injector profession, which suggests that current training, governance, and supervision frameworks for multidisciplinary teams are broadly effective.

Recommendations

- Given the need for long-term therapy, patients should be informed of the risk both for each injection and the cumulative risk over the first year of treatment.
- Providers should ensure that all cases of IOI and PIE are accurately recorded within the EMR. Each case should undergo structured internal review, with learning disseminated locally and incidence tracked over time.
- Incidence rates should be benchmarked against the national quality marker for PIE (<1 case per 6,000 injections). Centres exceeding this threshold should undertake appropriate local review to ensure adherence to established aseptic and governance standards.

6. Summary and key points

Participation

Since the first report of the AMD Audit, the number of participating centres with data included in the analysis has increased from 63 to 75, suggesting widespread acceptance of the value of the audit and the validity of the findings. This year's dataset includes over 26,000 patients, making it one of the largest sources of real-world UK AMD data. Commissioners are encouraged to require all providers of nAMD treatment to use electronic medical records to collect clinical data as part of routine care, participate in national audit and demonstrate commitment to high quality care and good professional practice.

Data quality

Data quality in the 2023 NHS year remains generally high, though notable variation exists between centres and across data fields. Recording of patient sex has decreased slightly to 93.0%, while baseline visual acuity remains well documented at 94.5%. Ethnicity and referral dates continue to be inconsistently captured, with only 17.8% of eyes had a referral recorded within 90 days of starting treatment. Centres using custom or in-house EMRs generally captured referral data reliably, whereas some Medisoft, mediSIGHT, and older OpenEyes systems performed less consistently. Data extraction from EPIC represents a significant and ongoing challenge. To date, no meaningful data have been successfully extracted from EPIC systems for inclusion in the NOD AMD Audit. Given the increasing number of NHS sites adopting EPIC, this is an urgent priority. Dedicated work is needed to standardise data recording and establish reliable extraction pathways. Without this, a growing proportion of NHS patients will be excluded from national audit reporting, undermining the completeness and representativeness of future NOD datasets.

Loss to follow-up continues to be a concern. For eyes starting treatment in 2023, 16.8% did not have a recorded 12-month visit, with patient death accounting for 18.4% of those absences. Follow up rates varied markedly between centres, with some reporting more than 25% of eyes lost to follow up. Loss at month 24 was even higher at 38.0%. Factors contributing to missing follow up data are likely multifactorial and may include patient age, baseline acuity, comorbidity, caregiver support, perceived treatment burden, clinic capacity, and technical issues like EMR migration or replacement. When a new EMR is introduced or care is transferred between centres, prior treatment history should be recorded accurately to prevent treated eyes being misclassified as treatment naïve, and to ensure loading phase data remains accessible to the receiving provider.

Providers should ensure EMRs facilitate routine collection of relevant clinical data, work with EMR vendors to resolve data quality issues, and use the latest available commercial EMR versions. High quality EMR data underpins the credibility of visual acuity outcomes and enables meaningful benchmarking across centres.

Baseline characteristics

Median baseline visual acuity for eyes starting treatment in 2023 was 60 ETDRS letters (IQR: 45-70), unchanged from previous years. The majority of eyes (62%) fell within the standard NICE guideline range of 25-70 letters.

The proportion of patients presenting with "good" vision (≥70 letters) has increased to 29.6%, up from 27.1% in 2021 reflecting a positive national trend towards earlier presentation and initiation of treatment. Earlier identification and intervention increase the likelihood of favourable visual outcomes and long-term independence. A small proportion of eyes (~8-9%) still present with very poor acuity (≤25 letters), indicating a continued late presentation in a subset of patients.

First treated eyes had a median baseline acuity 6 letters lower than second treated eyes, suggesting later initiation of treatment in first eyes, while second eyes are typically identified and treated earlier in the disease course. The 'first eye gap' has narrowed from 10 letters in 2021 to 6 letters in 2023, providing further evidence of improved detection and earlier treatment initiation. ISBIVT eyes had similar baseline acuity to the overall cohort (60 letters).

Given the strong association between baseline vision and long-term outcomes, providers should continue working with commissioners and primary and secondary care colleagues to optimise referral pathways, ensuring rapid access to assessment and treatment. Dedicated referral pathways for patients with suspected nAMD should be promoted locally and be triaged daily.

Care pathway

Assessment of treatment initiation remains limited by poor referral data completeness, with data recorded for only 18.3% of eyes in 2023 (down from 22.0% in 2022) reflecting inconsistent recording and technical limitations in EMR data capture and extraction. The reported figure of 31.8% of patients starting treatment within 14 days should therefore be interpreted with caution and may underestimate true performance. Moreover, substantial variation exists between centres, with treatment within 14 days ranging from 5.7% to 78.3% and median time to treatment from 8 to 53 days, indicating that NICE guidance (NG82) for prompt treatment is not consistently achieved.

In contrast, performance during the initial loading phase has improved. Of the 28,655 eyes treated in the 2023 NHS year, 66.4% received their first three injections within ten weeks. National performance against this quality marker increased, with 52.0% of centres achieving the “acceptable” (≥75%) threshold (up from 41.1%) and 28.0% reaching the “desirable’’(≥83%) threshold (up from 19.2%). Despite this improvement, wide variation persists at centre level, with loading phase completion rates ranging from 2.8% to 95.5%. Completion rates were slightly lower for ISBIVT eyes (60.5%) and for patients aged ≥85 years (61.8%).

Timely initiation of treatment and completion of the loading phase have been associated with improved visual outcomes. Effective delivery of this care pathway requires sustained service capacity and a coordinated multidisciplinary workforce to support both new and existing patients.

Data on delayed follow-up visits were available for 46.0% of patients. Among those with data available, 58.6% experienced two or more treatment delays of at least two weeks. As with referral data, recording completeness remains a significant limitation, and improved documentation of planned versus actual appointment dates is needed to support reliable national audit reporting.

Visual acuity outcomes

Vision typically improves following initiation of treatment and then stabilises. Median visual acuity was 66 ETDRS letters at 12 months and 65 letters at 24 months. Compared to the natural history of untreated eyes, treatment successfully maintained stable vision (avoiding a loss of ≥15 letters) in 90.4% of eyes at one year.

At 12 months, the proportion of eyes with "good" visual acuity (≥70 letters) was 43.8%, meeting the acceptable performance threshold. However, adjusted outcomes indicate a deterioration in performance, with fewer centres achieving both acceptable and desirable quality markers compared to the previous year, alongside increasing variation between providers.

These outcomes remain highly dependent on baseline visual acuity. While 78.9% of eyes starting with good vision maintained this level, only 4.4% of eyes with very poor baseline acuity (≤25 letters) reached a "good" visual acuity state. Patient demographics also influence prognosis, with younger patients (<70 years) more likely to achieve good visual acuity (56.9%) than those aged ≥85 years (33.1%). These findings highlight the importance of early detection and timely treatment, enabling patients to start therapy while visual potential is highest.

A decrease of ≥15 letters at one year occurred in 9.6% of eyes, often reflecting disease progression, irreversible structural damage, or limited treatment response. This should prompt an open and honest discussion with patients regarding prognosis, including the potential benefits of continuing, pausing, or stopping treatment.

Safety

Intravitreal injection for nAMD remains a low-risk procedure, though aggregate safety performance has deteriorated this year. The incidence of PIE increased to 1.2 cases per 6,000 injections, failing to meet the quality marker threshold, and the number of centres failing to meet this benchmark rose from 13 to 22 (29.3%).

Given the need for ongoing treatment, patients should be counselled on the risk of serious complications both per injection and cumulatively over the course of treatment. Centres should monitor IOI and PIE incidence and engage with infection prevention colleagues when rates appear higher than expected. Providers failing to meet the quality marker should prioritise an internal audit of aseptic protocols and EMR coding accuracy to ensure all sight-threatening events are identified and reviewed.

Variation between centres

There is considerable variation between providers in data quality, baseline characteristics, care pathway performance and visual acuity outcomes. Some variation is expected due to differences in case mix and service configuration; however, unwarranted variation from established standards risks reducing efficiency and adversely affecting patient outcomes.

Performance against quality markers remains mixed. The proportion of centres achieving the "acceptable" threshold for completing the loading phase within ten weeks has improved to 52.0%, compared with 41.0% the previous year. However, performance has deteriorated for both adjusted "good" and "poor" visual acuity outcomes at 12 months, as well as for the incidence of PIE.

Risk adjusted modelling of visual outcomes (≥70 ETDRS letters for "good" vision and a loss of ≥10 ETDRS letters for "poor" outcome) enables comparison between centres after adjustment for baseline patient and ocular characteristics. Five centres were high outliers for "good" outcomes and six for "poor" outcomes, indicating better than expected performance. In contrast, seven centres were low outliers for "good" outcomes and two for "poor" outcomes, indicating worse than expected performance.

Providers are encouraged to review local performance as a department with colleagues from Clinical Audit, Clinical Effectiveness, or Quality Improvement, benchmarking against peers, national results, and the new quality markers. High-quality practices should be recognised, shared, and celebrated. For areas needing improvement, nominated leads should engage with stakeholders and apply quality improvement methodology, focusing on "Just one thing," implementing the change, and remeasuring performance over six to 12 months.

When more than one provider is commissioned to provide treatment, commissioners are encouraged to meet with them as a group, compare performance between providers against benchmarks, adopt best practice and reduce variation in the quality and outcomes of care.

Sustainability and Net Zero

On 1 July 2022, the NHS in England became the first health system to embed net zero into legislation, through the Health and Care Act 2022. Supporting the NHS response to climate change is a shared responsibility across all clinical services. Providers delivering nAMD treatment should utilise available published and online resources, including the Sustainability section of the Royal College of Ophthalmologists **website** and through Eye Sustain **website**. Clinical centres are encouraged to adopt sustainable delivery models, which focuses on high-volume, lean, and environmentally conscious pathways.

With 179,420 injections administered in 2023 alone, even small process changes can deliver meaningful environmental impact reducing in waste and emissions. Centres should review intravitreal injection packs to ensure all components are necessary, removing unused items to reduce waste and procurement costs. Collaboration with suppliers to reduce single-use plastics and increase recyclable or biodegradable materials is encouraged. Correct segregation of waste into clinical (yellow), domestic (black) and mixed recycling (clear) waste bags will deliver financial savings and maximise successful recycling.

Service design also plays an important role in reducing environmental impact. One-stop clinics and same-day assessment and treatment pathways reduce patient and carer travel, while bilateral treatment where clinically appropriate can further reduce appointments and associated emissions.

From a system perspective, the choice between biosimilars and longer-acting anti-VEGF therapies has both economic and environmental implications. Biosimilars are now recommended as first-line therapy under current commissioning guidance and offer lower drug acquisition costs. Longer acting agents may reduce injection frequency and clinic attendances, easing burden on patients, staff, and services while supporting adherence, reducing travel, and lowering environmental impact. The economic case remains complex: biosimilars offer lower upfront costs, whereas longer acting therapies may offset these through fewer clinic visits and reduced treatment burden. Comparative cost effectiveness and real-world outcomes remain under evaluation, and future NOD data will help determine the optimal balance between clinical outcomes, patient benefit, and value for money. Where clinically appropriate, longer acting therapies may improve service efficiency, support adherence, and enhance patient experience.

Commissioners and providers are encouraged to meet and agree local policies to support efficient, low carbon service delivery while maintaining high quality patient outcomes.

7. Acknowledgements

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The NOD AMD Audit is supported and advised by a multi-disciplinary advisory group. The members of the advisory group are listed below, and their invaluable help is acknowledged.

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Romi Chhabra	Chair	Royal College of Ophthalmologists
Matt Broom	Lay Group Representative	Royal College of Ophthalmologists
Geraldine Hoad	Patient Representative	The Macular Society
Samer Elsherbiny	Consultant Ophthalmologist	Royal College of Ophthalmologists
Hemal Mehta	Consultant Ophthalmologist	Royal College of Ophthalmologists
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8. Appendices

Appendix 1: Data for participating centres

The following provider-level results from year 4 of the UK AMD Audit are available on the NOD **website**.

1. Participating AMD treatment providers, including ICB details for England, and the Electronic Medical Record used at each location
2. The number of eligible patients and eyes per centre
3. Data quality: The proportion of eyes with referral data and visual acuity measurements at both baseline and after 12 months of treatment
4. Baseline visual acuity
5. Key care processes: proportion of eyes starting treatment within 14 days of referral, completing the first 3 planned monthly injections <10 weeks, median number of injections and the percentage of injections given by different professional groups
6. Crude visual acuity outcomes at 12 and 24 months
7. Adjusted visual acuity outcomes at 12 months
8. Complications

Appendix 2: Visual acuity conversion table

Visual acuity is traditionally measured by the ability to distinguish letters or numbers at a given distance according to a fixed standard. In this report, visual acuity is reported using ETDRS letters. A "normal" visual acuity would be 85 ETDRS letters, with the number of letters read increasing when visual acuity improves. A visual acuity of 70 ETDRS letters would be at the boundary for driving a car in the UK and is described here as 'good' vision. A visual acuity of 35 or fewer ETDRS letters in the better-seeing eye would be at the level of certification as having sight impairment, when combined with a central field defect, and is described in the report as "poor" vision.

ETDRS Letters	LogMAR Value	Snellen	VA Interpretation
100	-0.30	6/3	"Good" VA
95	-0.20	6/3.75	
90	-0.10	6/5	
85	0.00	6/6	
80	0.10	6/7.5	
75	0.20	6/9	
70	0.30	6/12	
65	0.40	6/15	
60	0.50	6/18	
55	0.60	6/24	
50	0.70	6/30	
45	0.80	6/36	
40	0.90	6/48	
35	1.00	6/60	"Poor" VA
30	1.10	5/60 or 6/76	
25	1.20	4/60 or 6/96	
20	1.30	3/60 or 6/120	
15	1.40	6/152	
10	1.50	6/192	
5	1.60	6/240	
0	1.70	6/304	

Appendix 3: Glossary

Abbreviation	Description
AMD	Age-related Macular Degeneration
Anti-VEGF	Drug blocking the action of vascular endothelial growth factor
CI	Confidence Interval
EMR	Electronic Medical Record
ETDRS	Early Treatment Diabetic Retinopathy Study
IMD	Index of Multiple Deprivation
IOI	Intraocular Inflammation
IQR	Inter Quartile Range
ISBIVT	Immediate Sequential Bilateral Intravitreal Treatment
LogMAR	Logarithm of the Minimum Angle of Resolution
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NOD	National Ophthalmology Database
nAMD	Neovascular Age-related Macular Degeneration
OCT	Optical Coherence Tomography
PIE	Presumed Infectious Endophthalmitis
RCOphth	The Royal College of Ophthalmologists
UK	United Kingdom
VA	Visual acuity
VEGF	Vascular Endothelial Growth Factor

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