Macular Degeneration Treatment Procedures

Policy Number: VISION 024.25
Effective Date: July 1, 2024

➲ Instructions for Use

Table of Contents **Page**

Related Policies

- Outpatient Surgical Procedures – Site of Service
- Proton Beam Radiation Therapy

Related UnitedHealthcare Drug Policy

- Ophthalmologic Policy: Vascular Endothelial Growth Factor (VEGF) Inhibitors

Coverage Rationale

The following is proven and medically necessary:

- The Implantable Miniature Telescope (IMT) when used according to U.S. Food and Drug Administration (FDA) for treating individuals with end-stage, age-related macular degeneration

Home visual field monitoring (e.g., ForeseeHome) for detection of age-related macular degeneration (AMD)-associated choroidal neovascularization (CNV) is proven and medically necessary when all of the following criteria are met:

- The individual is at risk for developing CNV with one of the following:
  - Bilateral large drusen; or
  - Large drusen in one eye and advanced AMD in the fellow eye

  and
- Best corrected visual acuity of 20/60 or better in the affected eye(s); and
- The individual is able to operate the device; and
- The individual does not have any of the following:
  - Medial opacities that prevent quality fundus photographs
  - Other retinal disorders (e.g., diabetic retinopathy)

Home visual field monitoring is unproven and not medically necessary due to insufficient evidence of efficacy for all other indications not listed as proven.

The following are unproven and not medically necessary due to insufficient evidence of efficacy:

- Conjunctival incision with posterior extrascleral placement of a pharmacologic agent for treating ocular disorders including age-related macular degeneration
- Laser photocoagulation for treating macular drusen
- Radiation therapy for AMD (i.e., epimacular and/or epiretinal brachytherapy and stereotactic radiotherapy and/or radiosurgery)

Applicable Codes

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by the member specific benefit plan document and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies may apply.

CPT Code	Description
0308T	Insertion of ocular telescope prosthesis including removal of crystalline lens or intraocular lens prosthesis
0378T	Visual field assessment, with concurrent real time data analysis and accessible data storage with patient initiated data transmitted to a remote surveillance center for up to 30 days; review and interpretation with report by a physician or other qualified health care professional
0379T	Visual field assessment, with concurrent real time data analysis and accessible data storage with patient initiated data transmitted to a remote surveillance center for up to 30 days; technical support and patient instructions, surveillance, analysis, and transmission of daily and emergent data reports as prescribed by a physician or other qualified health care professional
67036	Vitrectomy, mechanical, pars plana approach
67299	Unlisted procedure, posterior segment
92499	Unlisted ophthalmological service or procedure

Description of Services

Age-related macular degeneration (AMD) is caused by deterioration of retinal photoreceptors in the central portion of the retina. As AMD progresses, it develops into a "dry" form or a "wet" form. Dry AMD is the most common form and is non-exudative and non-neovascular. Wet AMD is characterized by the growth of new blood vessels across the posterior of the eye, a process known as choroidal neovascularization (CNV). These blood vessels are fragile and often leak blood and serum, damaging the macular area of the retina and interfering with central vision.

The Implantable Miniature Telescope (IMT) (VisionCare Ophthalmic Technologies, Inc.) is a device used for individuals who are age 65 years or older who suffer from end-stage AMD. During the short outpatient procedure, a surgeon inserts the device into the posterior chamber of only one eye. Although the device eliminates peripheral vision in the affected eye, the untreated eye allows for peripheral vision. Due to the risk of corneal endothelial cell loss which may lead to the need for corneal transplant, an individual must meet specific criteria, including adequate peripheral vision before surgery and willingness to enroll in a visual training or rehabilitation program. The IMT is the only telescope system that is FDA approved for treatment of macular degeneration.

Conjunctival incision with posterior juxtascleral placement of a pharmacologic agent has been proposed to treat ocular disorders such as age-related macular degeneration. During this procedure, a small incision into the superior temporal quadrant of the orbit is made posterior to the limbus between the superior and lateral rectus muscle insertions.

A blunt tipped, curved cannula is inserted into the posterior area of the globe through the tenon's space and positioned with the tip near the macula. The medication is injected, and the cannula is removed. Advantages to the posterior juxtascleral placement of a pharmacologic agent may include reduced risk for retinal detachment and other safety issues associated with repeated intravitreal injections (a common route of administration for pharmaceutical agents in the treatment of ocular disorders).

Ocular home monitoring devices are devices intended to be used as an aid in detecting, monitoring progression and characterizing lesions in individuals with AMD.

A common early sign of dry AMD is macular drusen, yellow deposits under the retina. Although drusen do not usually cause vision loss directly, the presence of many or large drusen is associated with elevated risk of progression to advanced dry or wet AMD. Based on this association, some investigators believed that destroying drusen with low-intensity laser light, a treatment known as photocoagulation, would slow the development of AMD and/or prevent the progression from dry AMD to wet AMD. Subthreshold laser therapy is a type of laser photocoagulation that uses a segmented low duty cycle pulse instead of a continuous wave.

Epiretinal radiation therapy also known as epiretinal brachytherapy or epimacular brachytherapy is the intraocular placement or administration of radioactive material to vessels in the retina. The Vidion Anti-Neovascular Epimacular Brachytherapy (EMBT) System formally known as the Epi-Rad90 Ophthalmic System™ (NeoVista, Inc.) is an epiretinal radiation delivery device developed to treat wet AMD. The Vidion System delivers radiation (strontium 90) directly to the neovascular lesion in a single treatment therapy session.

Stereotactic radiotherapy is a nonsurgical procedure performed in an office setting. It uses a robotically controlled device to deliver radiation beams through the inferior sclera to overlap at the macula.

Clinical Evidence

Implantable Miniature Telescope

Boyer et al. (2015) evaluated the long-term results of an implantable miniature telescope (IMT) in patients with bilateral, end-stage, age-related macular degeneration (AMD). This prospective, open-label, multicenter clinical trial with fellow eye controls enrolled 217 patients (mean age 76 years) with AMD and moderate-to-profound bilateral central visual acuity loss (20/80-20/800) resulting from untreatable geographic atrophy, disciform scars, or both. A subgroup analysis was performed with stratification for age [patient age 65 to < 75 years (group 1; n = 70) and patient age ≥ 75 years (group 2; n = 127)], with a comparative evaluation of change in best-corrected distance visual acuity (BCDVA), quality of life, ocular complications from surgery, adverse events, and endothelial cell density (ECD). Follow-up in an extension study was 60 months. Long-term results show substantial retention of improvement in BDCVA. Chronic ECD loss was consistent with that reported for conventional intraocular lenses. The IMT performed as well in group 1 (the younger group) as it did in group 2 through month 60. Younger patients retained more vision than their older counterparts and had fewer adverse events.

In a prospective open-label clinical trial, called the IMT-002 clinical trial, Hudson et al. (2006) evaluated the safety and efficacy of an implantable visual prosthetic device (IMT; VisionCare Ophthalmic Technologies) in patients with bilateral, end-stage AMD. A total of 217 patients (mean age, 76 years) with AMD and moderate to profound bilateral central visual acuity loss (20/80 - 20/800) resulting from bilateral untreatable geographic atrophy, disciform scars, or both were implanted with the IMT device. Fellow eyes were not implanted to provide peripheral vision and served as controls. At 1 year, 67% of implanted eyes achieved a 3-line or more improvement in BCDVA versus 13% of fellow eye controls. Fifty-three percent of implanted eyes achieved a 3-line or more improvement in both BCDVA and best-corrected near visual acuity (BCNVA) versus 10% of fellow eyes. Eleven eyes did not receive the device because of an aborted procedure. ECD was reduced by 20% at 3 months and 25% at 1 year. The decrease in ECD was correlated with postsurgical edema, and there was no evidence that endothelial cell loss is accelerated by ongoing endothelial trauma after implantation. The authors concluded that the IMT visual prosthesis can improve visual acuity and quality of life in patients with moderate to profound visual impairment caused by bilateral, end-stage AMD. At two years, data from the IMT-002 clinical trial that included 174 available patients were analyzed (Hudson et al. 2018). Overall, 103 (59.5%) of 173 telescope-implanted eyes gained three lines or more of BCVA compared with 18 (10.3%) of 174 fellow control eyes. One telescope-implanted eye lost 3 lines of BCVA compared with 13 in the control eyes. Mean ECD stabilized through two years, with 2.4% mean cell loss occurring from one to two years. There was no significant change in coefficient of variation or percentage of hexagonal endothelial cells from within six months to two years after surgery. The most common complication was inflammatory deposits. The authors concluded that long-term results of the IMT prosthesis show the substantial BCVA improvement at one year is maintained at two years. Key indicators of corneal health demonstrate ECD change that reflects remodeling of the endothelium associated with the implantation procedure. The authors state that ECD stabilizes over time, and there is no evidence of any ongoing endothelial trauma.

Clinical Practice Guidelines

American Academy of Ophthalmology (AAO)

The 2019 AAO Preferred Practice Patterns guidelines on AMD state that an implantable miniature telescope (IMT) is an FDA-approved device that may be effective for screened, phakic, motivated patients with end-stage AMD.

National Institute for Health and Care Excellence (NICE)

A National Institute for Health and Care Excellence (NICE) guidance for miniature lens system implantation for advanced age-related macular degeneration (AMD) states that evidence on the efficacy of miniature lens system implantation for advanced AMD shows that the procedure can improve both vision and quality of life in the short term. Data on short-term safety are available for limited numbers of patients. According to NICE, there is currently insufficient long-term evidence on both efficacy and safety. NICE guidance states that this procedure should only be used with special arrangements for clinical governance, consent and audit or research. (NICE 2016)

Home Visual Field Monitoring

Mathia et al. (2022) conducted the ALOFT study, which was a retrospective study to evaluate long-term visual acuity (VA) and performance of the ForeseeHome home monitoring device in conjunction with standard care for early detection of neovascular age-related macular degeneration (nAMD). The study population included patients with dry AMD from 5 referral clinics who used the ForeseeHome device from August 2010 to July 2020. Outcomes measures included VA at

baseline, VA at diagnosis of nAMD for eyes that converted while monitored, and VA from the final study follow-up, weekly frequency of use, duration of monitoring, modality of conversion diagnosis (ForeSeeHome notification vs. detection by other standard care means), and duration and number of treatments since conversion to final study follow-up were reviewed. There were 3334 eyes of 2123 patients with a mean [standard deviation (SD)] age of 74(8) years, monitored for a mean (SD) duration of 3.1 (2.4) years, with a total of 1 706 433 tests in 10 474 eye-monitoring years. The mean (SD) weekly use per patient was 5.2 (3.4), and it was persistent over the usage period. Two hundred eighty-five eyes converted while monitored at an annual rate of 2.72% and were treated with a mean (SD) 17.3 (16.5) injections over a mean (SD) 2.7 (2.0) years, with 6.4 (3.1) injections per year for eyes treated for > 1 year. The median VA at baseline and at final follow-up for eyes that did not convert were 20/27 and 20/34 with a median change of 0.0 letters. The median VA at baseline, conversion, and final follow-up for eyes that converted during the monitoring period were 20/30, 20/39, and 20/32 with a median change from baseline to conversion, baseline to recent, and conversion to recent of -4, -4, and 0 letters, respectively. Fifty-two percent of conversions detected had a system alert before conversion. Forty-eight percent of patients were detected by symptoms or routine visit. Patients experienced a non-nAMD notification on average every 4.6 years. At conversion and at final follow-up, the proportion (95% CI) of eyes that maintained ≥ 20/40 was 84% (78% to 88%) and 82% (76% to 86%), respectively. This was the first study that provided evidence related to the long-term outcomes. The authors indicate the patients who participated in the ForeSeeHome program showed excellent VA at the time of conversion to nAMD, were treated consistently, and maintained good vision long term, reinforcing the importance of early detection and treatment in this condition that can lead to central vision loss. The study is limited by lack of comparison group undergoing usual care.

Ho et al. (2021) performed a retrospective study to evaluate the real-world performance of an at-home monitoring system, ForeseeHome in combination with standard care. They reported on the participants with intermediate AMD who converted to nAMD while using the at-home monitoring device. Inclusion criteria was diagnosis of intermediate dry AMD along with best corrected visual acuity of 20/60 or better. All participants received the ForeSeeHome device with instructions and training. All participants also established a baseline visual acuity. Out of 8991 enrolled participants, 306 eyes were reported to have converted from intermediate AMD to nAMD during the study period. Of the 306 eyes with confirmed progression of disease, 211 (69%) were identified via the at-home device and 95 eyes (31%) were identified during a routine office visit or symptom-driven visit. Mean weekly frequency of testing per eye was 3.7 ±1.9 and mean weekly frequency of testing per participant was 5.6 ±3.2. The main limitation of this study is the retrospective design. Not all visual acuities were available at baseline or at conversion. Some of the visual acuity values were reported telephonically which may have led to some bias. The authors reported they did not collect information about the outcomes from alerts issued by the at-home monitoring device that didn't indicate an immediate identification of conversion to AMD. This study suggest that consistent long-term use of an at-home monitoring system provides a significant benefit in the early detection of nAMD which leads to preservation of vision loss. The authors indicate that this at-home testing approach was similar to that reported for the device arm of the AREDS2-HOME study. (Chew, 2014 included below)

Yu et al. (2020) performed a retrospective study evaluating the real-world utility of the ForeseeHome monitoring device (Notal Vision, Ltd., Tel Aviv, Israel) for the detection of conversion from intermediate age-related macular degeneration (iAMD) to nAMD and to compare with results published by the Home Monitoring of the Eye (HOME) study (Chew, 2014 included below). There were 448 participants (775 eyes) who were prescribed an electronic home visual field monitoring device. The purpose analysis is to determine compliance among prescribed use of the ForeseeHome device, and to describe clinical experience with this home monitoring system in 4 large retina practices across the United States. The report was to include compliance of usage of the device by frequency and length of use, determination of a baseline measurement, number of eyes that converted to nAMD, and the number of alerts. There were 126 eyes that never had use of the device after prescription. There were 478 eyes able to have established baseline measurement, while 171 eyes were unsuccessful at establishing baseline. Of the eyes which had established baseline, the mean frequency of use was 3.44 ±1.86 tests per week. The device was used at least once by 649 eyes. In the group which established a baseline measurement, there were 126 eyes in which the test was used greater than or equal to 2 times per week and 250 eyes which did have use of the device for greater than or equal to 3 times per week. The device was discontinued most frequently within the first year. Over a mean period of 20.35 months, 106 eyes with an established baseline measurement had at least 1 alert with a total accumulation of 152 alerts. There were 125 test score change alerts and 27 unreliable pattern alerts. Conversion to nAMD was identified in 3, and 47 had false positives with the alerts. A major limitation is the retrospective design which made it difficult to determine how compliance and user ability of the device was determined. The lack of compliance and difficulty in establishing baseline measurements make it difficult to determine improvement in overall health outcomes. While the outcomes are beneficial, additional studies are needed to assess the compliance using the device and ability to operate the device properly in order to obtain results related to the limitation.

Chew et al. (2014) conducted the HOME study, an unmasked, controlled, randomized clinical trial evaluating whether home-monitoring with the ForeseeHome device allowed for early detection of CNV in patients with AMD and better visual acuity outcomes at detection compared to control patients receiving standard care. The study included 1520 participants

with non-neovascular AMD with a mean age of 72.5 years who were considered high risk for developing CNV with either bilateral large drusen (potentially 2 study eyes) or large drusen in one eye (study eye) and advanced AMD in the fellow (non-study) eye, and best corrected visual acuity of 20/60 or better in the study eye(s). Participants were screened in at least one eye using a brief lesson on the home monitoring device to ensure they could operate the device and did not have visual field defects that would prevent upcoming device monitoring. Participants could not have media opacities that prevented quality fundus photography, other retinal disorders such as diabetic retinopathy that might misperceive the evaluation of the outcome, or a follow-up plan that required examinations or treatments more frequent than every 4 months. Participants in the standard care group were provided instructions by their ophthalmologists covering standard parameters for notifying the clinic of vision changes. In the ForeseeHome group, patients were provided the device at home and instructed to test daily, with results communicated remotely to clinical centers that would in turn notify patients and instruct them to present to the clinic for an examination for evaluation. At baseline, all participants had testing for best-corrected visual acuity and color fundus photos of three stereographic fields in both eyes. Participants were followed for a mean of 1.4 years. In the device arm, 728 participants used the device during part of the study period while 156 participants returned the device, stopped using it before CNV developed, study termination, or were lost to follow-up. For those who continued using the device during the study period, the average weekly usage was 4.4 times per week and in 70 participants was less than twice a week. Among those randomized to the device arm, 88 participants failed to establish baseline values during the initial home testing. This was due to visual field defects not identified during the office screening. Of these 88 participants, 17 did not establish baseline values in either study eye. There were 16 participants who continued in the study with 1 participant dropping out. Initially, participants in the device arm accumulated events at a higher rate with the standard care arm lagging behind, however the events rate became virtually identical in each of the monitoring arms later in the study. At the pre-specified interim analysis, 51 participants progressed to CNV in the device arm with 31 participants progressing to CNV in the standard care arm. The primary analysis showed that at the time of CNV detection, the decrease in visual acuity score was at least 5 letters less in the median decrease in best-corrected visual acuity in the device arm compared to the standard arm. Findings for the secondary visual acuity outcomes generally favored the device arm, but did not meet statistical significance. The Data and Safety Monitoring Committee reviewed study results at a pre-planned interim and recommended stopping the trial early. The participants in the standard care arm were able to use aids to check vision such as Amsler grids, but the study was not designed to compare the home device to another monitoring device. Authors conclude, in contrast to other home monitoring approaches, those with intermediate AMD (bilateral large drusen), or advanced AMD in one eye would benefit from home monitoring with this device to detect the progress of CNV at an earlier stage with better preservation of their visual acuity to maximize visual acuity results following intravitreal therapy with anti-VEGF agents.

Conjunctival Incision With Placement of a Pharmacologic Agent

Conjunctival incision with posterior extrascleral placement of a pharmacologic agent has not been demonstrated to be as effective as standard therapy for ocular disorders including macular degeneration. Further studies with larger sample sizes are needed to demonstrate the efficacy of this treatment.

Geltzer et al. (2013) conducted a Cochrane review to examine the effects of steroids with antiangiogenic properties in the treatment of neovascular AMD. The authors searched electronic databases for randomized controlled clinical trials of intra- and peri-ocular antiangiogenic steroids in people diagnosed with neovascular AMD. Three trials with a total of 809 participants met review specifications and were included in the review. One trial compared different doses of acetonide anecortave acetate with placebo, a second trial compared juxtascleral placement of triamcinolone acetonide versus placebo, and the third trial compared juxtascleral placement of anecortave acetate against photodynamic therapy (PDT). A meta-analysis was not conducted owing to heterogeneity of interventions and comparisons. The risk ratio for loss of 3 or more lines of vision at 12 months follow-up was 0.8 with 3 mg anecortave acetate, 0.45 with 15 mg anecortave acetate, 0.91 with 30 mg anecortave acetate, 0.97 with triamcinolone acetonide, all compared to placebo and 1.08 with anecortave acetate compared with PDT. Overall, the review found limited evidence regarding the benefits of posterior juxtascleral placement of steroids for treating neovascular AMD.

Laser Photocoagulation for Macular Drusen

Results of available studies suggest that laser photocoagulation treatment does not show benefits in individuals who have macular drusen.

Eng et al. (2019) evaluated the published literature on subthreshold retinal laser therapy as prophylactic treatment of nonexudative AMD. Studies were analyzed based upon study design, laser parameters, drusen reduction, changes in VA, and the development of CNV and/or geographic atrophy (GA). Twelve studies involving 2,481 eyes treated with subthreshold retinal laser therapy were included in the review. Treatment led to increased drusen reduction, and studies with significant VA improvement were associated with significant drusen reduction. There was no significant change in the risk of developing CNV or GA. The investigators concluded that subthreshold retinal laser therapy is effective for reducing

drusen and potentially improving vision in patients with nonexudative AMD. This therapy does not show benefits in reducing development of CNV or GA. Thus, its long-term efficacy to prevent progression to advanced AMD cannot yet be recommended.

A Cochrane review examined the effectiveness and adverse effects of laser photocoagulation of drusen in AMD. The review included 11 studies that randomized 2159 participants (3580 eyes) and followed them up to two years, of which six studies (1454 participants) included people with one eye randomized to treatment and one to control. Overall, the risk of bias in the included studies was low, particularly for the larger studies and for the primary outcome development of CNV. Photocoagulation did not reduce the development of CNV at two years' follow-up (high quality evidence). This estimate means that, given an overall occurrence of CNV of 8.3% in the control group, an absolute risk reduction by no more than 1.4% was estimated in the laser group. Only two studies investigated the effect on the development of geographic atrophy and could not show a difference, but estimates were imprecise. The CAPT Trial Research Group (2016) included in this review, indicated that despite the influence of laser therapy on drusen, at 5 years follow-up, there were no statistically significant differences between treated and untreated eyes in VA, CNV, geographic atrophy, contrast threshold, or critical print size. Among secondary outcomes, photocoagulation led to drusen reduction but was not shown to limit loss of 3 or more lines of visual acuity (moderate quality evidence). In a subgroup analysis, no difference could be shown for conventional visible (eight studies) versus subthreshold invisible (four studies) photocoagulation for the primary outcomes. The effect in the subthreshold group did not suggest a relevant benefit. No other adverse effects (apart from development of CNV, geographic atrophy or visual loss) were reported. According to the authors, the trials included in this review confirm the clinical observation that laser photocoagulation of drusen leads to their disappearance. However, treatment does not result in a reduction in the risk of developing CNV and was not shown to limit the occurrence of geographic atrophy or visual acuity loss. The authors indicated that ongoing studies are being conducted to assess whether the use of extremely short laser pulses (i.e., nanosecond laser treatment) can not only lead to drusen regression but also prevent neovascular AMD. (Virgili et al. 2015)

Mojana et al. (2011) evaluated the long-term effect of subthreshold diode laser treatment for drusen. Eight eyes of four consecutive patients with AMD and bilateral drusen previously treated with subthreshold diode laser were imaged with spectral domain optical coherence tomography/scanning laser ophthalmoscope. Based on the study results, the investigators concluded that subthreshold diode laser treatment causes long-term disruption of the retinal photoreceptor layer. They state further that the concept that subthreshold laser treatment can achieve a selected retinal pigment epithelium effect without damage to rods and cones may be flawed.

The results of three additional randomized controlled trials (Friberg, 2006; Maguire, 2003; Owens, 2006) suggest that current prophylactic laser treatment protocols do not benefit patients who have macular drusen.

Clinical Practice Guidelines

National Institute for Health and Care Excellence (NICE)

A National Institute for Health and Care Excellence (NICE) guidance for age-related macular degeneration recommends that thermal laser therapy (for example, argon, diode) should not be offered for treating drusen in people with early AMD. According to NICE, the evidence presented demonstrated that laser treatment reduces drusen size; however, there was no evidence of an associated effect on AMD progression or vision and that noted that patient-relevant benefits have never been demonstrated. (NICE 2018)

Radiation Therapy for Age-Related Macular Degeneration

There is insufficient evidence to support the use of radiation therapy including epiretinal/epimacular brachytherapy and stereotactic radiotherapy for AMD. Controlled trials with larger populations are needed to establish safety, efficacy and long-term outcomes of this procedure.

Jackson et al. (2023) reviewed the MERLOT trial at 36-months to assess the long-term safety and efficacy of epimacular brachytherapy (EMB) for chronic, active nAMD. This 36-month visit was intended to monitor the safety and to examine the effects of EMB in relationship to the standard of care in addition to assessing the long-term efficacy. This pivotal, randomized, controlled surgical device trial recruited patients with chronic nAMD receiving intravitreal ranibizumab from 24 UK hospitals. Participants were randomized to either pars plana vitrectomy with 24 Gray EMB and *pro re nata* (PRN) ranibizumab (n = 224) or PRN ranibizumab monotherapy (n = 119). While masking was not feasible, masked clinicians measured best-corrected visual acuity (BCVA) and imaging. After month 24, participants proceeded with standard care, with either ranibizumab or aflibercept, returning for a month 36 study visit. Of 363 participants, 309 (85.1%) completed month 36. The number of injections was 12.1 ±8.1 in the EMB group versus 11.4 ±6.1 in the ranibizumab group (difference 0.7, 95% CI of difference -0.9 to 2.3, p = 0.41) between months 1 and 36, and 3.6 ±3.3 (n = 200) versus 3.9 ±2.7 (n = 102) (difference -0.3, 95% CI of difference -1.0 to 0.4, p = 0.43) between months 25 and 36 (standard care).

Over 36 months, BCVA change was -19.7 ±18.5 letters in the EMB group and -4.8 ±12.5 in the ranibizumab group (difference -14.9, 95% CI of difference -18.5 to -11.2, p < 0.0001). The month 36 BCVA of 20 EMB-treated participants with microvascular abnormalities (MVAs) at month 24 was similar to EMB-treated participants without MVAs (-21.8 vs -19.4 letters, p = 0.65). Study limitations included lack of masking of both the participants and investigators since it was not possible to mask both the participant and provider to vitrectomy. The authors conclude that EMB is associated with worse vision at 36 months than that of the standard of care, it does not decrease the number of anti-vascular endothelial growth factor (anti-VEGF) injections, either within or outside of a trial setting. They indicate their findings do not support the use of EMB for chronic, active nAMD. (MERLOT trial is included in the below Cochrane review)

Evans et al. (2020) examined the effects of radiotherapy on nAMD in a Cochrane review. The authors searched Central, MEDLINE, Embase, Lilacs and three trial registers thru May 4, 2020. They included all randomized controlled trials that compared radiotherapy to another treatment, sham, low dose radiation or no treatment at all in people with CNV secondary to AMD. There were 18 studies included, three of these studies investigated brachytherapy (plaque and epimacular), the rest were studies of external beam radiotherapy (EBM) including one trial of stereotactic radiotherapy. Four studies compared radiotherapy combined with anti-VEGF with anti-VEGF alone. Eleven studies gave no radiotherapy treatment to the control group; five studies used sham irradiation; and one study used very low-dose irradiation (1 Gy). One study used a mixture of sham irradiation and no treatment. Results notes that there may be little or no difference in loss of 3 lines of vision at 12 months in eyes treated with radiotherapy compared with no radiotherapy [risk ratio (RR) 0.82, 95% confidence interval (CI) 0.64 to 1.04, 811 eyes, 8 studies, I2 = 66%, low-certainty evidence]. Low-certainty evidence suggests a small benefit in change in visual acuity [mean difference (MD) -0.10 logMAR, 95% CI -0.17 to -0.03; eyes = 883; studies = 10] and average contrast sensitivity at 12 months (MD 0.15 log units, 95% CI 0.05 to 0.25; eyes = 267; studies = 2). Growth of new vessels (largely change in CNV size) was variably reported and it was not possible to produce a summary estimate of this outcome. The studies were small with imprecise estimates and there was no consistent pattern to the study results (very low-certainty evidence). Quality of life was only reported in one study of 199 people; there was no clear difference between treatment and control groups (low-certainty evidence). Low-certainty evidence was available on adverse effects from eight of 14 studies. Seven studies reported on radiation retinopathy and/or neuropathy. Five of these studies reported no radiation-associated adverse effects. One study of 88 eyes reported one case of possible radiation retinopathy. One study of 74 eyes graded retinal abnormalities in some detail and found that 72% of participants who had radiation compared with 71% of participants in the control group had retinal abnormalities resembling radiation retinopathy or choroidopathy. Four studies reported cataract surgery or progression: events were generally few with no consistent evidence of any increased occurrence in the radiation group. One study noted transient disturbance of the precorneal tear film but there was no evidence from the other two studies that reported dry eye of any increased risk with radiation therapy. None of the participants received anti-VEGF injections. Radiotherapy combined with anti-VEGF versus anti-VEGF alone: People receiving radiotherapy/anti-VEGF were probably more likely to lose 3 or more lines of BCVA at 12 months compared with anti-VEGF alone (RR 2.11, 95% CI 1.40 to 3.17, 1050 eyes, 3 studies, moderate certainty). Most of the data for this outcome come from two studies of epimacular brachytherapy (114 events) compared with 20 events from the one trial of EBM. Data on change in BCVA were heterogenous (I2 = 82%). Individual study results ranged from a small difference of -0.03 logMAR in favor of radiotherapy/anti-VEGF to a difference of 0.13 logMAR in favor of anti-VEGF alone (low-certainty evidence). The effect differed depending on how the radiotherapy was delivered (test for interaction p = 0.0007). Epimacular brachytherapy was associated with worse visual outcomes (MD 0.10 logMAR, 95% CI 0.05 to 0.15, 820 eyes, 2 studies) compared with EBM (MD -0.03 logMAR, 95% CI -0.09 to 0.03, 252 eyes, 2 studies). None of the included studies reported contrast sensitivity or quality of life. Growth of new vessels (largely change in CNV size) was variably reported in three studies (803 eyes). It was not possible to produce a summary estimate and there was no consistent pattern to the study results (very low-certainty evidence). For adverse outcomes, variable results were reported in the four studies. In three studies reports of adverse events were low and no radiation-associated adverse events were reported. In one study of epimacular brachytherapy there was a higher proportion of ocular adverse events (54%) compared to the anti-VEGF alone (18%). Most of these adverse events were cataract. Overall, 5% of the treatment group had radiation device-related adverse events (17 cases); 10 of these cases were radiation retinopathy. There were differences in average number of injections given between the four studies (1072 eyes). In three of the four studies, the anti-VEGF alone group on average received more injections (moderate-certainty evidence). In conclusion, the authors indicate that the evidence is uncertain around the use of radiotherapy for neovascular AMD. Overall vision with epimacular brachytherapy is likely to be worse, with an increased risk of adverse events, probably related to vitrectomy. The role of stereotactic radiotherapy combined with anti-VEGF is currently uncertain. Further research on radiotherapy for neovascular AMD is needed [CABERNET (Jackson, 2013, Dugel 2013), INTREPID (Jackson 2015) and MERLOT (Jackson 2016) which were previously cited in this policy are included in this Cochrane review].

Freiberg et al. (2019) assessed the features of retinal microvascular abnormalities (MVAs) occurring secondary to stereotactic radiotherapy (SRT) analyzing data from a randomized double-masked sham-controlled clinical trial at 21 European sites (INTREPID Trail). The study included two hundred and thirty participants with nAMD treated with at least

three intravitreal anti-VEGF injections prior to enrolment and demonstrating a continuing need for re-treatment. Interventions included 16 Gy, 24 Gy or sham SRT. All three groups received as needed anti-VEGF injections if the lesion was judged to be active at review visits. Color fundus images from baseline and 6 months and fluorescein angiograms from baseline and annual visits were graded for measures of morphological outcome and safety using a prespecified protocol with accompanying definitions to distinguish RT-related MVA from non-specific retinal vessel abnormalities that are known to occur in nAMD. The main outcome measure was MVA detected by months 12, 24 and 36 after enrollment. The frequency of MVAs in the combined SRT arms was 0% in year 1, 13.1% in year 2 and 30.3% in year 3. The area of MVA was small and the mean change in visual acuity in year 2 was similar in a subset of SRT eyes with MVAs, versus those without MVAs. MVA was considered to have possibly contributed to vision loss in 2 of 18 cases with MVA in year 2, and 5 of 37 cases in year 3. The authors concluded that SRT is associated with development of subtle MVAs that have little or no impact on visual outcome and that these findings can help clinicians recognize that retinal MVAs can occur in response to SRT. Additional studies are needed to further evaluate microvascular abnormalities following SRT therapy related to AMD treatment.

Zur et al. (2015) evaluated the clinical feasibility, safety, and efficacy of epiretinal strontium-90 brachytherapy in subfoveal CNV due to AMD in eyes unresponsive to repeated anti- VEGF injections. Twenty-two patients were treated, and 20 completed 12 months of follow-up. Ten patients maintained stable vision, eight gained vision, and two lost more than three Snellen lines. The mean best corrected visual acuity change from baseline was -8 ±5.7 letters. A mean of 5.5 ±4.4 anti-VEGF injections were administered throughout 12 months. The authors found that while some patients benefit from the treatment and need significantly fewer as-needed injections, others appear not to react to irradiation treatment after 1 year of follow-up. According to the authors, larger numbers of patients are needed to evaluate therapeutic efficacy and to determine which patients can benefit from combined radiation and anti-VEGF therapy.

Twelve and 24-month results have been reported from the multicenter macular epiretinal brachytherapy in treated AMD (MERITAGE) study, which is a prospective, interventional, non-controlled clinical trial. The results of this study were reported in 2013 and 2014. Petrarca et al. (2013) reported the optical coherence tomography (OCT) and fundus fluorescein angiography (FFA) results of 53 eyes of 53 participants with chronic, active nAMD. Participants underwent pars plana vitrectomy with a single 24-gray dose of epimacular brachytherapy (EMB). The main outcome measures for the study were change in OCT center-point thickness and angiographic lesion size 12 months after EMB. Based on the results of the study, the authors concluded that in chronic, active, neovascular AMD, EMB is associated with nonsignificant changes in center-point thickness and FFA total lesion size over 12 months. Petrarca et al. (2014) reported that over 24 months, 68.1% lost less than 15 letters with a mean of 8.7 ranibizumab retreatments. The authors concluded that the apparent reduction in ranibizumab retreatment was less evident in Year 2 than Year 1, with the moderate reduction in visual acuity extending into the second year. Although radiation retinopathy occurred in one case, it was not vision threatening and safety remained acceptable. Limitations of the MERITAGE study includes a lack of controls and a small sample size.

Clinical Practice Guidelines

American Academy of Ophthalmology (AAO)

The 2019 AAO Preferred Practice Patterns guidelines on age-related macular degeneration indicate that there is insufficient data to demonstrate the clinical efficacy of radiation therapy for treating age-related macular degeneration. Therefore, radiation therapy is not recommended for treating this condition.

National Institute for Health and Care Excellence (NICE)

A National Institute for Health and Care Excellence (NICE) guidance for epiretinal brachytherapy for wet AMD states that evidence on the efficacy of epiretinal brachytherapy for wet AMD is inadequate and limited to small numbers of patients. Regarding safety, vitrectomy has well-recognized complications and there is a possibility of subsequent radiation retinopathy. NICE guidance states that this procedure should only be used in the context of research. (NICE 2011)

U.S. Food and Drug Administration (FDA)

This section is to be used for informational purposes only. FDA approval alone is not a basis for coverage.

Implantable Miniature Telescope

The Implantable Miniature Telescope (IMT) received FDA approval, effective July 1, 2010. This device is indicated for monocular implantation to improve vision in patients greater than or equal to 75 years of age with stable severe to profound vision impairment (best corrected distance visual acuity 20/160 to 20/800) caused by bilateral central scotomas

associated with end-stage age-related macular degeneration. In October 2014, the FDA expanded the age limit for IMT to 65 years of age or older.

According to the FDA's indications for use of the Implantable Miniature Telescope, patients must:

- Have retinal findings of geographic atrophy or disciform scar with foveal involvement, as determined by fluorescein angiography
- Have evidence of visually significant cataract (greater or equal to Grade 2)
- Agree to undergo pre-surgery training and assessment (typically 2 to 4 sessions) with low vision specialists (optometrist or occupational therapist) in the use of an external telescope sufficient for patient assessment and for the patient to make an informed decision
- Achieve at least a 5-letter improvement on the Early Treatment Diabetic Retinopathy Study (ETDRS) chart with an external telescope
- Have adequate peripheral vision in the eye not scheduled for surgery
- Agree to participate in postoperative visual training with a low vision specialist

According to the FDA approval letter, a post-approval requirement indicates that the manufacturer must 1) continue follow-up on the patients from its long-term cohort study to provide additional long-term (up to 8 years) safety data and 2) must conduct an additional study of 770 newly enrolled patients to evaluate adverse events for 5 years after implantation. Refer to the following website for more information: http://www.accessdata.fda.gov/cdrh_docs/pdf5/P050034a.pdf. (Accessed February 27, 2024)

According to the FDA's Summary of Safety and Effectiveness Data (2010), the IMT is contraindicated in patients with any of the following:

- Stargardt's macular dystrophy
- Central anterior chamber depth (ACD) < 3.0 mm; measurement of the ACD should be taken from the posterior surface of the cornea (endothelium) to the anterior surface of the crystalline lens
- The presence of corneal guttata
- The minimum age and endothelial cell density requirements are not met
- Cognitive impairment that would interfere with the ability to understand and complete the Acceptance of Risk and Informed Decision Agreement or prevent proper visual training/rehabilitation with the device
- Evidence of active choroidal neovascularization (CNV) on fluorescein angiography or treatment for CNV within the past six months
- Any ophthalmic pathology that compromises the patient's peripheral vision in the fellow eye
- Previous intraocular or cornea surgery of any kind in the operative eye, including any type of surgery for either refractive or therapeutic purposes
- Prior or expected ophthalmic related surgery within 30 days preceding intraocular telescope implantation
- A history of steroid-responsive rise in intraocular pressure, uncontrolled glaucoma, or preoperative intraocular pressure greater than 22 mm Hg, while on maximum medication
- Known sensitivity to post-operative medications
- A history of eye rubbing or an ocular condition that predisposes them to eye rubbing
- The planned operative eye has:
    - Myopia greater than 6.0 diopters
    - Hyperopia greater than 4.0 diopters
    - Axial length less than 21 mm
    - A narrow angle (i.e., less than Schaffer grade 2)
    - Cornea stromal or endothelial dystrophies, including guttata
    - Inflammatory ocular disease
    - Zonular weakness/instability of crystalline lens, or pseudoexfoliation
    - Diabetic retinopathy
    - Untreated retinal tears
    - Retinal vascular disease
    - Optic nerve disease
    - A history of retinal detachment
    - Intraocular tumor
    - Retinitis pigmentosa

Refer to the following website for more information at: http://www.accessdata.fda.gov/cdrh_docs/pdf5/P050034b.pdf. (accessed February 27, 2024)

Home Visual Field Monitoring

In 2009, the FDA granted 510(k) premarket approval for the ForeseeHome™ device (Notal Vision Ltd.) (K091579). The device is intended for use in the detection and characterization of central and paracentral metamorphopsia (visual distortion) in patients with age-related macular degeneration as an aid in monitoring progression of disease factors causing metamorphopsia including, but not limited to choroidal neovascularization (CNV). It is intended to be used at home for patients with stable fixation. Product code: HPT. Refer to the following website for more information at: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm?ID=K091579. (Accessed February 27, 2024)

Laser Photocoagulation

Laser photocoagulation for macular drusen is a procedure and, as such, is not subject to regulation by the FDA. However, laser devices used to perform this therapy are regulated by the FDA. They are classified under two product codes, HQB (Ophthalmic Photocoagulator) and HQF (Ophthalmic Laser), incorporating more than 100 approved devices. Refer to the following website for more information at (use product codes HQB or HQF): https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmn.cfm. (Accessed February 27, 2024)

Epiretinal Radiation Therapy

There are no devices specifically approved by the FDA for epiretinal radiation therapy. The Epi-Rad90™ System (NeoVista) [now known as Vidion Anti-Neovascular Epimacular Brachytherapy (EMBT) System] is accepted by the FDA under the provisions of an Investigational Device Exemption (IDE) which allows the investigational device to be used to collect safety and effectiveness data required to provide data for a device application to the FDA.

References

The foregoing Oxford policy has been adapted from an existing UnitedHealthcare national policy that was researched, developed and approved by UnitedHealthcare Medical Technology Assessment Committee. [2024T0404AA]

American Academy of Ophthalmology. Preferred practice pattern Guidelines. Age-related macular degeneration. 2019. https://www.aao.org/preferred-practice-pattern/age-related-macular-degeneration-ppp. Accessed February 27, 2024.

AREDS2-HOME Study Research Group; Chew EY, Clemons TE, et al. Randomized trial of a home monitoring system for early detection of choroidal neovascularization home monitoring of the Eye (HOME) study. Ophthalmology. 2014 Feb;121(2):535-44.

Boyer D, Freund KB, Regillo C, et al. Long-term (60-month) results for the implantable miniature telescope: efficacy and safety outcomes stratified by age in patients with end-stage age-related macular degeneration. Clin Ophthalmol. 2015 Jun 17;9:1099-107.

Complications of Age-Related Macular Degeneration Prevention Trial (CAPT) Research Group. Laser treatment in patients with bilateral large drusen: the complications of age-related macular degeneration prevention trial. Ophthalmology. 2006; 113(11):1974-1986.

Dugel PU, Bebchuk JD, Nau J, et al.; CABERNET Study Group. Epimacular brachytherapy for neovascular age-related macular degeneration: a randomized, controlled trial (CABERNET). Ophthalmology. 2013 Feb;120(2):317-27.

Eng VA, Wood EH, Boddu S, et al. Preventing progression in nonexudative age-related macular degeneration with subthreshold laser therapy: a systematic review. Ophthalmic Surg Lasers Imaging Retina. 2019 Mar 1;50(3):e61-e70.

Evans JR, Igwe C, Jackson TL, Chong V. Radiotherapy for neovascular age-related macular degeneration. Cochrane Database Syst Rev. 2020 Aug 26;8:CD004004.

Evans JR, Sivagnanavel V, Chong V. Radiotherapy for neovascular age-related macular degeneration. Cochrane Database Syst Rev. 2010 May 12;(5):CD004004.

Freiberg FJ, Michels S, Muldrew A, et al. Microvascular abnormalities secondary to radiation therapy in neovascular age-related macular degeneration: findings from the INTREPID clinical trial. Br J Ophthalmol. 2019 Apr;103(4):469-474.

Friberg TR, Musch DC, Lim JI, et al. PTAMD Study Group. Prophylactic treatment of age-related macular degeneration report number 1: 810-nanometer laser to eyes with drusen. Unilaterally eligible patients. Ophthalmology. 2006;113(4):612.e1.-622.e1.

Geltzer A, Turalba A, Vedula SS. Surgical implantation of steroids with antiangiogenic characteristics for treating neovascular age-related macular degeneration. Cochrane Database Syst Rev. 2013 Jan 31;1:CD005022.

Ho AC, Heier JS, Holekamp NM, Garfinkel RA, et al. Real-world performance of a self-operated home monitoring system for early detection of neovascular age-related macular degeneration. J Clin Med. 2021 Mar 25;10(7):1355.

Hudson HL, Lane SS, Heier JS, et al. IMT-002 Study Group. Implantable miniature telescope for the treatment of visual acuity loss resulting from end-stage age-related macular degeneration: 1-year results. Ophthalmology 2006 Nov; 113(11):1987-2001.

Hudson HL, Stulting RD, Heier JS, et al. IMT002 Study Group. Implantable telescope for end-stage age-related macular degeneration: long-term visual acuity and safety outcomes. Am J Ophthalmol 2008 Nov;146(5):664-673.

Jackson TL, Chakravarthy U, Kaiser PK, et al; INTREPID Study Group. Stereotactic radiotherapy for neovascular age-related macular degeneration: 52-week safety and efficacy results of the INTREPID study. Ophthalmology. 2013 Sep;120(9):1893-900.

Jackson TL, Desai R, Simpson A, et al. Macular Epiretinal Brachytherapy versus Ranibizumab (Lucentis) Only Treatment (MERLOT) Study Group. Epimacular brachytherapy for previously treated neovascular age-related macular degeneration (MERLOT): A phase 3 randomized controlled trial. Ophthalmology. 2016 Jun;123(6):1287-96.

Jackson TL, Dugel PU, Bebchuk JD, et al. CABERNET Study Group. Epimacular brachytherapy for neovascular age-related macular degeneration (CABERNET): fluorescein angiography and optical coherence tomography. Ophthalmology. 2013 Aug; 120(8):1597-603.

Jackson TL, Soare C, Petrarca C, et al. MERLOT Study Group. Epimacular brachytherapy for previously treated neovascular age-related macular degeneration: month 36 results of the MERLOT randomised controlled trial. Br J Ophthalmol. 2023 Jul;107(7):987-992.

Maguire MG, Sternberg P, Aaberg TM, et al. Choroidal Neovascularization Prevention Trial (CNVPT) Research Group. Laser treatment in fellow eyes with large drusen: updated findings from a pilot randomized clinical trial. Ophthalmology. 2003; 110(5):971-978.

Mathai M, Reddy S, Elman MJ, et al; ALOFT study group. Analysis of the long-term visual outcomes of Foreseehome remote telemonitoring: The ALOFT Study. Ophthalmol Retina. 2022 Oct;6(10):922-929.

Mojana F, Brar M, Cheng L, et al. Long-term SD-OCT/SLO imaging of neuroretina and retinal pigment epithelium after subthreshold infrared laser treatment of drusen. Retina. 2011 Feb;31(2):235-42.

National Institute for Health and Care Excellence (NICE). Age-related macular degeneration: diagnosis and management. NICE interventional procedure guidance [NG82]. Publication date: January 2018.

National Institute for Health and Care Excellence (NICE). Epiretinal brachytherapy for wet age-related macular degeneration. NICE interventional procedure guidance 415. Publication date: December 2011.

National Institute for Health and Care Excellence (NICE). Miniature lens system implantation for advanced age-related macular degeneration. NICE interventional procedure guidance 565. Publication date: September 2016.

Owens SL, Bunce C, Brannon AJ, et al. Drusen Laser Study Group. Prophylactic laser treatment hastens choroidal neovascularization in unilateral age-related maculopathy: results of the drusen laser study. Am J Ophthalmol. 2006; 141(2):276-281.

Petrarca R, Dugel PU, Bennett M, et al. Macular epiretinal brachytherapy in treated age-related macular degeneration (MERITAGE): month 24 safety and efficacy results. Retina. 2014 May;34(5):874-9.

Petrarca R, Dugel PU, Nau J, et al. Macular epiretinal brachytherapy in treated age-related macular degeneration (MERITAGE): month 12 optical coherence tomography and fluorescein angiography. Ophthalmology. 2013 Feb;120(2):328-33.

Virgili G, Michelessi M, Parodi MB, et al. Laser treatment of drusen to prevent progression to advanced age-related macular degeneration. Cochrane Database Syst Rev. 2015 Oct 23;10:CD006537.

Yu HJ, Kiernan DF, Eichenbaum D, et al. Home monitoring of age-related macular degeneration: Utility of the ForeseeHome Device for detection of neovascularization. Ophthalmol Retina. 2021 Apr;5(4):348-356.

Zur D, Loewenstein A, Barak A. One-year results from clinical practice of epimacular strontium-90 brachytherapy for the treatment of subfoveal choroidal neovascularization secondary to AMD. Ophthalmic Surg Lasers Imaging Retina. 2015 Mar; 46(3):338-43.

Policy History/Revision Information

Date	Summary of Changes
04/01/2025	**Related Policy** • Removed reference link to the Clinical Policy titled *Transpupillary Thermotherapy* (retired Apr. 1, 2025)

Date	Summary of Changes
07/01/2024	**Supporting Information** • Updated *Description of Services*, *Clinical Evidence*, *FDA*, and *References* sections to reflect the most current information • Archived previous policy version VISION 024.24

Instructions for Use

This Clinical Policy provides assistance in interpreting UnitedHealthcare Oxford standard benefit plans. When deciding coverage, the member specific benefit plan document must be referenced as the terms of the member specific benefit plan may differ from the standard plan. In the event of a conflict, the member specific benefit plan document governs. Before using this policy, please check the member specific benefit plan document and any applicable federal or state mandates. UnitedHealthcare Oxford reserves the right to modify its Policies as necessary. This Clinical Policy is provided for informational purposes. It does not constitute medical advice.

The term Oxford includes Oxford Health Plans, LLC and all of its subsidiaries as appropriate for these policies. Unless otherwise stated, Oxford policies do not apply to Medicare Advantage members.

UnitedHealthcare may also use tools developed by third parties, such as the InterQual® criteria, to assist us in administering health benefits. UnitedHealthcare Oxford Clinical Policies are intended to be used in connection with the independent professional medical judgment of a qualified health care provider and do not constitute the practice of medicine or medical advice.