Clinical Policy Title: Glaucoma testing

Clinical Policy Number: 10.01.04

Effective Date: February 1, 2017
Initial Review Date: January 18, 2017
Most Recent Review Date: January 18, 2017
Next Review Date: January 2018

Related policies:

CP# 10.03.03 Canaloplasty and viscocanalostomy in treatment of glaucoma
CP# 18.01.02 Telehealth

ABOUT THIS POLICY: Prestige Health Choice has developed clinical policies to assist with making coverage determinations. Prestige Health Choice’s clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of “medically necessary,” and the specific facts of the particular situation are considered by Prestige Health Choice when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. Prestige Health Choice’s clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. Prestige Health Choice’s clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, Prestige Health Choice will update its clinical policies as necessary. Prestige Health Choice’s clinical policies are not guarantees of payment.

Coverage policy

Prestige Health Choice considers the use of glaucoma testing to be clinically proven and, therefore, medically necessary when the following criteria are met:

- There is concern for the presence of glaucoma based on concurrent disease, family history or ethnicity and age (e.g., diabetes, a family history of glaucoma, African American age 50 years or older, or Hispanic American age 65 years or older).
- The covered person presents to an eye-care professional for specialty evaluation and management of eye-related complaints (e.g., visual field defect).
- The covered person carries an eye-related diagnosis (e.g., glaucoma) requiring periodic follow-up and management.

Limitations:

Policy contains:
- Glaucoma testing
- Tonometry
- Optical coherence tomography
- Genetic testing
Coverage determinations are subject to benefit limitations and exclusions as delineated by the state Medicaid authority. The Florida Medicaid website can be accessed at http://ahca.myflorida.com/Medicaid/.

Prestige Health Choice considers the use of routine glaucoma screening of the general population to be investigational and not medically necessary.

Prestige Health Choice considers the use of glaucoma testing to be investigational and not medically necessary where the following apply:

- Testing is conducted with an unproven instrument of measurement (e.g., genetic testing for glaucoma).
- Testing is conducted with an unproven technique or clinical art (e.g., corneal hysteresis, multi-focal visual evoked potentials, ocular blood flow tonometry, ocular Doppler blood flow analysis, continuous monitoring of intraocular pressure [IOP]).

All other uses of glaucoma testing are not medically necessary.

**Alternative covered services:**

Routine in-network primary and eye-specialty healthcare provider evaluation and management.

**Background**

Glaucoma is a painless, symptomless condition that can cause blindness. With one exception, narrow-angle glaucoma, it is associated with increased IOP within the eye. Inside the eye, fluid is constantly being manufactured and has to drain from inside the eye. High eye pressure is always related to some increased resistance or obstruction of the normal outflow of the intraocular fluid. The chronic sustained high eye pressure leads to degenerative optic neuropathy, loss of retinal ganglion cells and axons, and ultimately to blindness if not treated.

In general, glaucoma testing is performed with hand-held instruments or during a slit-lamp examination in the outpatient setting. Traditional approaches to glaucoma testing include:

- Tonometry.
- Gonioscopy.
- Ophthalmoscopy.
- Visual field testing.
- Pachymetry.

A more recent technology to perform glaucoma testing is optical coherence tomography, or OCT. OCT is a digital-imaging technique that produces accurate and detailed reproductions of the retina and optic nerve. It is very useful for assessing retinal nerve fiber layers and evaluating the optic nerve. With OCT, eye
specialists can determine the severity of damage from glaucoma and monitor treatment. Similar useful technologies include scanning laser ophthalmoscopy and scanning laser polarimetry.

It has been suggested that the causes of glaucoma may be related to defects in the genome, and a body of information is emerging to support this theory. Genetic linkage reports have acknowledged a common gene mutation which explains a tiny segment of glaucoma incidence. Genome-wide association studies (GWAS) are finding on a daily basis more genes associated with glaucoma but even when incorporated into rigorous family history analyses still can explain no more than a fraction of the heritable cases of the condition.

**Searches**

Prestige Health Choice searched PubMed and the databases of:
- UK National Health Services Centre for Reviews and Dissemination.
- Agency for Healthcare Research and Quality’s National Guideline Clearinghouse and other evidence-based practice centers.
- The Centers for Medicare & Medicaid Services (CMS).

We conducted searches on November 5, 2016. Search terms were: “glaucoma testing.”

We included:
- **Systematic reviews**, which pool results from multiple studies to achieve larger sample sizes and greater precision of effect estimation than in smaller primary studies. Systematic reviews use predetermined transparent methods to minimize bias, effectively treating the review as a scientific endeavor, and are thus rated highest in evidence-grading hierarchies.
- **Guidelines based on systematic reviews**.
- **Economic analyses**, such as cost-effectiveness, and benefit or utility studies (but not simple cost studies), reporting both costs and outcomes — sometimes referred to as efficiency studies — which also rank near the top of evidence hierarchies.

**Findings**

Guidelines for glaucoma testing are bound to the traditional methods of diagnosis (Ou, 2011). The American Academy of Ophthalmology (AAO, 2010) and South East Asia Glaucoma Interest Group (SEAGIG, 2008) guidelines require direct visualization of pathologic findings to unilateral or bilateral optic disc/retinal nerve fiber layers and the visual fields to have defects for a confirming diagnosis. The European Glaucoma Society (EGS, 2008) guidelines are less rigid, with more options on a menu that includes but is not limited to optic disc or retinal nerve fiber layer defects, and glaucomatous visual field defects. It is also the only guideline to define a quantitative threshold for diagnosis (i.e., an untreated peak IOP >21 mmHg). The AAO and the EGS both endorse computer-based image analysis (e.g., OCT).

A contemporary assessment of the value of screening of the general population for glaucoma from the U.S. Preventive Services Task Force (USPSTF, 2013) found no direct evidence on the benefits of screening. The
USPSTF found convincing evidence that treatment of IOP and early glaucoma detection reduces the number of persons who develop small, clinically unnoticeable visual field defects and that treatment of early asymptomatic primary open-angle glaucoma (POAG) decreases the number of persons whose visual field defects worsen. However, the USPSTF found inadequate evidence that screening for or treatment of increased IOP or early asymptomatic POAG reduces the number of persons who will develop impaired vision or health-related quality of life.

There is no conclusive medical evidence that genetic testing for glaucoma is impactful in influencing treatment outcomes or reducing glaucoma-related blindness yet. The scientific research for a link between genetics and glaucoma is an emerging body of work (Mauri, 2016; Liu, 2016; Al-Sharahni, 2016; Khawaja, 2016; Verma, 2016) with numerous threads that may be interwoven into a coherent diagnostic and treatment approach in the future, but are not sufficiently understood at present to create hard and fast statements regarding their diagnostic utility or therapeutic potential. As such, these methods are not included in any contemporary specialty-society or international health-body guidelines on the diagnosis and treatment of glaucoma.

**Summary of clinical evidence:**

<table>
<thead>
<tr>
<th>Citation</th>
<th>Content, Methods, Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key points:</strong></td>
<td>All published guidelines on glaucoma testing recommend slit-lamp biomicroscopy with stereoscopic visualization of the optic nerve, as well as direct ophthalmoscopy.</td>
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<td></td>
<td>EGS defines a threshold of 21 mm IOP peak in the untreated eye as diagnosis of POAG.</td>
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<td>AAO and SEAGIG guidelines do not define an IOP requirement in the diagnosis of POAG.</td>
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<td>AAO and EGS guidelines address age of onset, SEAGIG does not.</td>
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<td>AAO and SEAGIG guidelines specify that POAG can only be diagnosed in the absence of other causes.</td>
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<td>AAo, EGS and SEAGIG require different descriptions of optic nerve findings:</td>
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<td>o AAO requires only minimal documentation of neuropathy.</td>
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<td>o The EGS guidelines illustrate various optic nerve findings with drawings and detailed text.</td>
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<tr>
<td></td>
<td>o SEAGIG guidelines not only provide descriptive guidelines on detecting glaucomatous optic neuropathy but also include an appendix with illustrative optic nerve photographs (non-stereoscopic).</td>
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<td>AAO and EGS recommend stereoscopic disc photography or computer-based image analysis (e.g., OCT) of the optic nerve and retinal nerve fiber layer.</td>
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<tr>
<td><strong>USPSTF (2013)</strong></td>
<td>Screening for glaucoma: U.S. Preventive Services Task Force recommendation</td>
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<tr>
<td><strong>Key points:</strong></td>
<td>Statement on the value of screening for glaucoma.</td>
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<tr>
<td></td>
<td>USPSTF found no direct evidence on the benefits of screening.</td>
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<td>Although treatment of IOP and early glaucoma detection reduce visual field defects, and early treatment of POAG decreases the number of persons whose visual field defects</td>
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<td>Citation</td>
<td>Content, Methods, Recommendations</td>
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<td>statement.</td>
<td>worsen, the USPSTF found inadequate evidence that screening for or treatment of increased IOP or early asymptomatic POAG reduces the number of persons who will develop impaired vision or quality of life.</td>
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| Mauri (2016) | **Key points:**  
  - Study of primary congenital glaucoma (PCG) and early onset glaucoma.  
  - Autosomal recessive and dominant inheritance have been described with involvement of several genes including CYP1B1, FOXC1, PITX2, MYOC and PAX6.  
  - Whole exome sequencing (WES) identified compound heterozygous variants in COL1A1 (p.Met264Leu; p.Ala1083Thr).  
  - Molecular modeling predicted that the heterozygous variants are dominant in effect and affect protein stability and thus the amount of available protein, while the compound heterozygous variants act as recessive alleles and impair binding affinity to two main COL1A1 binding proteins, Hsp47 and fibronectin. |
| Liu (2016) | **Key points:**  
  - Randomized controlled trial of 3853 cases against 33,480 controls to identify common variants in miRNA coding genes (MIR) associated with POAG.  
  - Subtype-specific analyses were performed in high-tension glaucoma (HTG) and normal-tension glaucoma subsets.  
  - Only rs76481776 in MIR182 gene was associated with POAG after adjustment for multiple comparisons (odds ratio [OR] = 1.23, 95% confidence interval [CI]: 1.11–1.42, P = 0.0002).  
  - Subtype analysis indicated that the association was primarily in the HTG subset (OR = 1.26, 95% CI: 1.08–1.47, P = 0.004). |
| Al-Shahrani (2016) | **Key points:**  
  - RCT of 210 primary glaucoma cases studied for methylenetetrahydrofolate reductase (MTHFR) C677T polymorphism and compared with 280 controls taken from the healthy population.  
  - The MTHFR gene differed significantly between cases and controls:  
    - The frequencies of allele T and genotype CT were significantly higher.  
    - The frequencies of allele C and genotype CC were lower in primary glaucoma patients as compared to controls (p <0.05).  
    - Significantly higher frequencies of allele T (19.44 %) and genotype CT (38.89 %) were found in POAG patients compared to controls (12.5 % and 25 % respectively).  
    - The frequencies of alleles and genotypes were most similar in PACG and controls (p = 0.8).  
  - The authors concluded that the allele T and genotype CT of MTHFR C677T polymorphism are significantly associated with POAG while allele C and CC genotype may be protective for it. |
Citation | Content, Methods, Recommendations
---|---
Khawaja (2016) | **Key points:**
Assessing the Association of Mitochondrial Genetic Variation With Primary Open-Angle Glaucoma Using Gene-Set Analyses. |
- RCT studied 3430 POAG cases, and 3108 controls, and identified 22 KEGG pathways with significant mitochondrial protein-encoding gene enrichment, belonging to six general biological classes.
- Among the pathway classes, mitochondrial lipid metabolism was associated with POAG overall (P = 0.013) and with normotensive glaucoma (NTG) (P = 0.0006), and mitochondrial carbohydrate metabolism was associated with NTG (P = 0.030).
- Examining the individual KEGG pathway mitochondrial gene-sets, fatty acid elongation and synthesis and degradation of ketone bodies, both lipid metabolism pathways, were significantly associated with POAG (P = 0.005 and P = 0.002, respectively) and NTG (P = 0.0004 and P < 0.0001, respectively).
- Butanoate metabolism, a carbohydrate metabolism pathway, was significantly associated with POAG (P = 0.004), NTG (P = 0.001), and HTG (P = 0.010).

Verma (2016) | **Key points:**
Epistatic Gene-Based Interaction Analyses for Glaucoma in eMERGE and NEIGHBOR Consortium. |
- Retrospective study identified several gene-gene interactions associated with glaucoma and showed that most of the genes are expressed in the eye.
- Several genes were involved in cell adhesion, axonal guidance and signaling pathways.
- Expression analysis from the ocular tissue database also showed that three genes in particular GNG7, RYR3 and CTNND2 show high expression in the optic nerve and optic nerve head.

**References**

**Professional society guidelines/other:**


**Peer-reviewed references:**


**CMS National Coverage Determinations (NCDs):**

No NCDs identified as of the writing of this policy; however, coverage of glaucoma testing is covered by Medicare Part B when:

- The covered person is at high risk (e.g., diabetes, a family history of glaucoma, are African American and 50 or older, or are Hispanic American and 65 or older).


**Local Coverage Determinations (LCDs):**

No LCDs identified as of the writing of this policy; however, a local coverage article regarding glaucoma screening states:

- Medicare coverage of glaucoma screenings was implemented with the Benefits Improvement and Protection Act of 2000 (BIPA).

- A glaucoma screening is defined to include:
  - A dilated eye examination with an intraocular pressure (IOP) measurement.
  - A direct ophthalmoscopy examination or a slit-lamp biomicroscopic examination.
Medicare covers glaucoma screening for the following persons considered to be at high risk for developing this disease:
- Individuals with diabetes mellitus.
- Individuals with a family history of glaucoma.
- African-Americans age 50 or over.
- Hispanics-Americans 65 or older.

Glaucoma screening frequency limitations and payment information:
- Medicare pays for this service annually (i.e., at least 11 full months must have passed following the month in which the last Medicare-covered glaucoma screening examination was performed).

Services rendered more frequently than allowed under this screening benefit may require that the beneficiary be given an Advance Beneficiary Notice (ABN)
- The beneficiary will pay 20 percent as the co-payment or coinsurance after meeting the yearly Part B deductible.

Medical record documentation requirements:
- Medical record documentation to support that the beneficiary is a member of one of the high risk groups, as defined above.

Documentation must support one of the screening defined:
- A dilated eye examination with IOP measurement and direct ophthalmoscopic examination, or a slit-lamp biomicroscopic examination.

Commonly submitted codes

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy. This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
<th>Comments</th>
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<tbody>
<tr>
<td>81479</td>
<td>Unlisted molecular pathology procedure</td>
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<tr>
<td>92100</td>
<td>Serial tonometry with multiple measurements of ocular pressure over an extended period of time, with interpretation and report the same day</td>
<td>Single episode tonometry is a component of the ophthalmological service or E/M service</td>
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<tr>
<td>CPT Code</td>
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<tr>
<td>92133</td>
<td>Scanning computerized ophthalmic diagnostic imaging, posterior segment, with interpretation and report unilateral or bilateral; optic nerve</td>
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<tr>
<td>92134</td>
<td>Scanning computerized ophthalmic diagnostic imaging, posterior segment, with interpretation and report unilateral or bilateral; retina</td>
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<tr>
<td>92140</td>
<td>Provocative tests for glaucoma, with interpretation and report, without tonography</td>
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<tr>
<th>ICD 10 Code</th>
<th>Description</th>
<th>Comments</th>
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<tbody>
<tr>
<td>E08-E13.9</td>
<td>Diabetes mellitus</td>
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<tr>
<td>H40.00-H42</td>
<td>Glaucoma</td>
<td></td>
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<tr>
<td>Z83.511</td>
<td>Family history of glaucoma</td>
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<thead>
<tr>
<th>HCPCS Level II Code</th>
<th>Description</th>
<th>Comments</th>
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<tbody>
<tr>
<td>G0117</td>
<td>Glaucoma screening for high risk patients furnished by an optometrist or ophthalmologist</td>
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<tr>
<td>G0118</td>
<td>Glaucoma screening for high risk patient furnished under the direct supervision of an optometrist or ophthalmologist</td>
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