Title: Corneal Topography/Computer-Assisted Corneal Topography/Photokeratoscopy

**Professional**
Original Effective Date: January 1, 2007
Revision Date(s): December 9, 2011; July 12, 2013
Current Effective Date: December 9, 2011

**Institutional**
Original Effective Date: December 20, 2010
Revision Date(s): December 9, 2011; July 12, 2013
Current Effective Date: December 9, 2011

### Description
Corneal topography describes measurements of the curvature of the cornea. An evaluation of corneal topography is necessary for the accurate diagnosis and follow-up of certain corneal disorders, such as keratoconus, difficult contact lens fits, and pre- and postoperative assessment of the cornea, most commonly after refractive surgery. Various techniques and instruments are available to measure corneal topography:

- The keratometer (also referred to as an ophthalmometer), the most commonly used instrument, projects an illuminated image onto a central area in the cornea. By measuring the distance between a pair of reflected points in both of the cornea’s two principal meridians, the keratometer can estimate the radius of curvature of two meridians. The fact that the keratometer can only estimate the corneal curvature over a small percentage of its surface, and that estimates are based on...
the frequently incorrect assumption that the cornea is spherical, are limitations of this technique.

- The keratoscope is an instrument that reflects a series of concentric circular rings off the anterior corneal surface. Visual inspection of the shape and spacing of the concentric rings provides a qualitative assessment of topography. A photokeratoscope is a keratoscope equipped with a camera that can provide a permanent record of the corneal topography.
- Computer-assisted photokeratoscopy is an alternative to keratometry or keratoscopy in measuring corneal curvature. This technique uses sophisticated image analysis programs to provide quantitative corneal topographic data. Early computer-based programs were combined with keratoscopy to create graphic displays and high-resolution color-coded maps of the corneal surface. Newer technologies measure both curvature and shape, enabling quantitative assessment of corneal depth, elevation, and power.

A number of devices have received clearance for marketing through the Food and Drug Administration (FDA) 510(k) mechanism. The Orbscan® (manufactured by Orbtek and distributed by Bausch and Lomb) received FDA clearance in 1999. The second generation Orbscan II is a hybrid system that uses both projective (slit scanning) and reflective (Placido) methods. The Pentacam® (Oculus) is one of a number of rotating Scheimpflug imaging systems produced in Germany.

POLICY
I. Non-Computer-Assisted Corneal Topography
   Non-computer-assisted corneal topography is considered part of the evaluation/management services of general ophthalmological services, and therefore this service should not be billed separately. There is no separate CPT code for this type of corneal topography.

II. Computer-Assisted Corneal Topography
   A. Routine computer-assisted corneal topography is considered not medically necessary to detect or monitor diseases of the cornea.
   
   B. Computer-assisted corneal topography may be medically necessary for any of the following conditions:
      1. Pre- and post-penetrating keratoplasty and pre- and post kerato-refractive surgery for irregular astigmatism, or
      2. Corneal dystrophy and complications of transplanted cornea; or
      3. Diagnosing and monitoring disease progression in keratoconus; or
      4. Post-traumatic or post infectious corneal scarring
      5. Refractive surgery only for symptomatic anisometropia
C. Computer-assisted corneal topography is **non covered** for the following indications:
1. When used in conjunction with preoperative evaluation for cataract surgery including refractive intraocular lens (IOL) exchange and premium channel IOL cataract surgery.
2. For difficult fitting of contact lens not associated with refractive surgery.
3. Refractive surgery, except when medically necessary for anisometropia.

D. Initial and repeat computer-assisted corneal topography that is not clearly medically indicated will be denied **not medically necessary.**

**RATIONALE**

Detection and Monitoring Diseases of the Cornea
Assessing corneal topography has been done for many years and is a part of the standard ophthalmologic examination of some patients. (1, 2) However, corneal topography can be evaluated and determined in multiple ways. Computer-assisted corneal topography has been used for early identification and quantitative documentation of the progression of keratoconic corneas, and evidence is sufficient to indicate that computer-assisted topographical mapping can detect and monitor disease. However, the question that is pertinent to this policy is whether quantitative measurement results in an intervention change that improves health outcomes.

Contact Lens Fitting in Patients with Keratoconus
A 2010 study was identified on computer-assisted corneal topography for the design of gas-permeable contact lens in 30 patients with keratoconus, who were recruited for the study in 2005-2006. (3) The report indicates that the subjects were consecutive, although patients whose topographical plots could not be used were excluded (number not described). The fit of the new lens was compared with the fit of the patient's habitual lens (randomized order on the same day). Clinical evaluation showed a good fit (no or minor modification needed) for over 90% of the computer-designed lens. However, progression of keratoconus causes a bias favoring the most recently fitted lens, confounding the comparison between the new computer-designed lens and the patient's habitual lens. This study has substantial limitations in both design and reporting.

Corneal Astigmatism Measurements for Toric Intraocular Lens Implantation
In 2012, Lee et al. reported a prospective comparative study of 6 methods of measuring corneal astigmatism for the purpose of toric intraocular lens implantation. (4) Astigmatism was evaluated in 257 eyes (141 patients) using manual keratometry, autokeratometry, partial coherence interferometry (IOLMaster®), ray-tracing aberrometry (iTrace™), scanning-slit topography (Orbscan), and Scheimpflug imaging (Pentacam). All measurements were masked to the results for the other instruments. The
study found no significant difference between the different instruments, indicating no advantage to computerized corneal topography compared to manual keratometry.

Summary
With the exception of refractive surgery, a service not generally covered as a health insurance benefit, no studies have shown clinical benefit (e.g., a change in treatment decisions) from a quantitative rather than qualitative evaluation of corneal topography. Therefore, based on a lack of scientific evidence from appropriately constructed clinical trials that confirm improved health outcomes, quantitative evaluation of corneal topography, including evaluation with computer assistance, is considered not medically necessary.

Practice Guidelines and Position Statements
A 1999 American Academy of Ophthalmology (AAO) assessment indicates that computer-assisted corneal topography evolved from the need to measure corneal curvature and topography more comprehensively and accurately than keratometry and that corneal topography is used primarily for refractive surgery. (5) The AAO indicates several other potential uses: 1) evaluate and manage patients following penetrating keratoplasty, 2) plan astigmatic surgery, 3) evaluate patients with unexplained visual loss and document visual complications, and 4) fit contact lenses. However, the AAO assessment noted that data are lacking to support the use of objective measurements, as opposed to subjective determinants (subjective refraction) of astigmatism.

CODING
The following codes for treatment and procedures applicable to this policy are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement. Please refer to the member’s contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

CPT/HCPCS
92025 Computerized corneal topography, unilateral or bilateral, with interpretation and report

DIAGNOSIS
These diagnoses are otherwise subject to medical policy as stated above
367.22 Irregular astigmatism
367.31 Anisometropia
371.00 Corneal opacity, unspecified
371.02 Peripheral opacity of cornea
371.03 Central opacity of cornea
371.50- Hereditary corneal dystrophies code range
371.58
371.60- Keratoconus code range
371.62
743.41 Anomalies of corneal size and shape

Contains Public Information
996.51 Mechanical complication of other specified prosthetic device, implant, and graft; due to corneal graft
V42.5 Organ or tissue replaced by transplant; cornea

ICD-10 Diagnosis (Effective October 1, 2014)
H17.11 Central corneal opacity, right eye
H17.12 Central corneal opacity, left eye
H17.13 Central corneal opacity, bilateral
H17.821 Peripheral opacity of cornea, right eye
H17.822 Peripheral opacity of cornea, left eye
H17.823 Peripheral opacity of cornea, bilateral
H17.89 Other corneal scars and opacities
H18.51 Endothelial corneal dystrophy
H18.52 Epithelial (juvenile) corneal dystrophy
H18.53 Granular corneal dystrophy
H18.54 Lattice corneal dystrophy
H18.55 Macular corneal dystrophy
H18.59 Other hereditary corneal dystrophies
H18.601 Keratoconus, unspecified, right eye
H18.603 Keratoconus, unspecified, bilateral
H18.611 Keratoconus, stable, right eye
H18.612 Keratoconus, stable, left eye
H18.613 Keratoconus, stable, bilateral
H18.621 Keratoconus, unstable, right eye
H18.622 Keratoconus, unstable, left eye
H18.623 Keratoconus, unstable, bilateral
H52.211 Irregular astigmatism, right eye
H52.212 Irregular astigmatism, left eye
H52.213 Irregular astigmatism, bilateral
H52.31 Anisometropia
Q13.4 Other congenital corneal malformations
T85.318A Breakdown (mechanical) of other ocular prosthetic devices, implants and grafts, initial encounter
T85.328A Displacement of other ocular prosthetic devices, implants and grafts, initial encounter
T85.398A Other mechanical complication of other ocular prosthetic devices, implants and grafts, initial encounter
T86.840 Corneal transplant rejection
T86.841 Corneal transplant failure
Z94.7 Corneal transplant status
REVISIONS

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<td>12-09-2011</td>
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<td>• Item B, #5, added “symptomatic” to read “Refractive surgery only for</td>
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REFERENCES


Other References:

1. Blue Cross and Blue Shield of Kansas Optometry consultant (#320), May 6, 2009.
2. Blue Cross and Blue Shield of Kansas Ophthalmology consultant (#604), March 2, 2010.
6. Blue Cross and Blue Shield of Kansas Optometry Liaison Committee, June 2010.
7. Blue Cross and Blue Shield of Kansas Ophthalmology Liaison Committee CB, August 2010.
8. Blue Cross and Blue Shield of Kansas Ophthalmology Liaison Committee, May 2011; May 2012.
9. Blue Cross and Blue Shield of Kansas Optometry Liaison Committee, June 2011; May 2012; May 2013.