# CIGNA MEDICAL COVERAGE POLICY

*The following Coverage Policy applies to all plans administered by CIGNA Companies including plans administered by Great-West Healthcare, which is now a part of CIGNA.*

**Subject** **Computer-Assisted Corneal Topography**

**Effective Date ..........................12/15/2008**
**Next Review Date……………….5/15/2010**
**Coverage Policy Number ................. 0361**

**Table of Contents**

Coverage Policy .................................................1
General Background ...........................................1
Coding/Billing Information ...................................3
References ..........................................................4
Policy History......................................................7

**Hyperlink to Related Coverage Policies**

Corneal Pachymetry
Corneal Remodeling
Corneal Transplant

***INSTRUCTIONS FOR USE***
*Coverage Policies are intended to provide guidance in interpreting certain **standard** CIGNA HealthCare benefit plans as well as benefit plans formerly administered by Great-West Healthcare. Please note, the terms of a participant's particular benefit plan document [Group Service Agreement (GSA), Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a participant's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a participant's benefit plan document **always supercedes** the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable group benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. Proprietary information of CIGNA. Copyright ©2008 CIGNA*

## Coverage Policy

**CIGNA covers computer-assisted corneal topography as medically necessary for the following indications:**

- assessment of postoperative complications associated with refractive surgery, post-traumatic corneal scarring or complications of a transplanted cornea
- diagnosis and management of keratoconus, bullous keratopathy or corneal dystrophy
- postoperative management of penetrating keratoplasty or of kerato-refractive or cataract surgery
- preoperative evaluation for phototherapeutic keratectomy

**Many benefit plans specifically exclude coverage for refractive surgery. Corneal topography would be excluded from coverage under these plans for the routine preoperative or postoperative evaluation of the cornea associated with refractive surgeries (e.g., LASIK, radial keratotomy). Please refer to the applicable benefit plan document to determine benefit availability for this indication.**

## General Background

Computer-assisted corneal topography, also known as videokeratography, is a process for mapping the surface curvature of the cornea. The procedure involves the projection of a series of illuminated rings onto the corneal surface. The Placido disk, which contains 15–38 rings, is commonly used. A video camera captures

measurements of the reflected light rings, which are computer-digitized to create a three-dimensional map of the cornea. Algorithms then compute the curvature of the cornea at each point.

The cornea, a clear, dome-shaped membrane that covers the front of the eye, is a key refractive element of the eye. For optimal vision, all layers of the cornea must be of normal shape and curvature and free of any cloudy or opaque areas. Comprehensive data on the prevalence of corneal disease are not available, but it is estimated that more than two million patients are affected by corneal disorders every year. While many corneal disorders can be managed medically, more than 45,000 corneal transplants are performed annually. The main indications for corneal transplant are keratoconus, bullous keratopathy, Fuch's dystrophy, and failure of a prior corneal transplant. Scarring from infection or trauma may also cause corneal changes that may require surgical intervention (American Academy of Ophthalmology [AAO], 2001).

Conventional techniques used for evaluating the topography of the cornea are keratometry and keratoscopy. Keratometry is a reasonably accurate and reliable method for measuring corneal contours when the surface is spherical. However, keratometry does not provide data from the central or peripheral cornea and is inaccurate for aspheric corneas. In keratoscopy, multiple concentric rings called "mires" are projected on the anterior corneal surface. This technique involves the direct visual inspection of the mires and can provide topographic information from a relatively large area of the cornea. A permanent record of the corneal curvature can be made using a photokeratoscope, which is a keratoscope that has been mounted with a still-film camera. The record is helpful in monitoring changes in a corneal condition over time and in diagnosing disorders such as keratoconus, assessing postoperative astigmatism, and selectively removing corneal or limbal sutures. However, most photokeratoscopes primarily evaluate the intermediate zone of the cornea and provide little or no information about the central zone or periphery. Furthermore, since the keratoscope provides largely qualitative data, it may not detect subtle, but clinically significant, alterations of the corneal curvature (Hayes, 2001).

Computer-assisted corneal topography provides both qualitative and quantitative information about the corneal surface. The purpose of corneal topography is to produce a detailed description of the shape and power in diopters of the cornea. Three types of systems are used to measure corneal topography: Placido-based, elevation-based and inferometric. The systems vary in many ways, making comparison of the different instruments difficult. Placido-based videokeratoscopes are more commonly used in clinical practice than other systems are. All systems contain a transilluminated disk (modified Placido) or cone, as well as an imaging system consisting of an objective lens, camera, a video frame grabber, and a computer system. Accuracy and precision have been tested by comparing these systems to the keratometer. This comparison may not be appropriate because keratometry cannot quantify a large area of the cornea or read corneas with significant distortion. While similar in concept, keratometry and topography have different clinical applications. The accuracy of corneal topography systems varies when compared to keratometry in normal corneas. Specific testing to determine accuracy in abnormal corneas is lacking, but clinical correlation is good. Most studies have shown that topography is less reproducible on normal corneas than standard keratometry. In general, the evaluation of different tests is difficult, because there is no appropriate standard by which to measure the human cornea. However, topography has proven its usefulness for assessing changes in the cornea after refractive surgery and penetrating keratoplasty, as well as in diagnosing keratoconus (AAO, 2001).

**Literature Review**

Many of the studies evaluating computerized corneal topography are based on the assumption that corneal topography is an accurate diagnostic tool, and therefore do not specifically assess the safety or efficacy of this technology. In one prospective, controlled, randomized trial, Karabatsas and colleagues (1998) compared the effectiveness of videokeratography with keratometry in 31 eyes with high postkeratoplasty astigmatism. It was concluded that presurgical videokeratography altered patient management and resulted in better outcomes than patient management based on keratometry.

Rabinowitz et al. (1998) compared the accuracy of ultrasonic pachymetry measurements with those of videokeratography in a cross-sectional study. Both techniques were performed on patients with normal corneas (n=142) and with keratoconus (n=99). Videokeratography data yielded a 97.5% correct classification rate of keratoconus versus 86% accuracy from data provided by pachymetry ($p<0.01$). The study results suggested that keratoconus is more accurately distinguished by videokeratography measurements than by pachymetry.

**Professional Societies/Organizations**

According to the AAO, applications for corneal topography include (AAO, 1999):

- preoperative screening for irregular astigmatism, corneal warpage, and keratoconus prior to refractive surgery
- evaluation of the cornea after refractive or cataract surgery
- postoperative management of penetrating keratoplasty
- planning for astigmatic surgery
- fitting contact lenses in patients with irregular astigmatism
- evaluation of unexplained visual loss
- evaluation of visual complications from corneal dystrophies, scars, pterygia, recurrent erosions and chalazia

**Summary**
Corneal topography may aid in the diagnosis, monitoring, and treatment of a variety of visual disorders. The diagnostic technique is typically a component of the preoperative evaluation for phototherapeutic keratectomy and may be used following cataract surgery to assess the effect of cataract incision placement and size. Few randomized clinical trials were identified to compare the effectiveness of this technology with keratoscopic imaging or keratometric analysis. Although definitive patient selection criteria have not been well established, some evidence and professional society support exists for using computer-assisted corneal topography in specific clinical situations. Standardization of videokeratographic systems is needed to facilitate validation of the accuracy and reproducibility of this technology.

---

## Coding/Billing Information

**Note:** This list of codes may not be all-inclusive.

**Covered when medically necessary:**

| CPT®* Codes | Description |
|---|---|
| 92025 | Computerized corneal topography, unilateral or bilateral, with interpretation and report |

| HCPCS Codes | Description |
|---|---|
| | No specific codes |

| ICD-9-CM Diagnosis Codes | Description |
|---|---|
| 371.00 | Corneal opacity, unspecified |
| 367.20 – 367.22 | Astigmatism |
| 371.23 | Bullous keratopathy |
| 371.50 – 371.58 | Hereditary corneal dystrophies |
| 371.60 – 371.62 | Keratoconus |
| 372.40 – 372.45 | Pterygium |
| 996.51 | Mechanical complication of other specified prosthetic device, implant, due to corneal graft |
| V42.5 | Organ or tissue replaced by transplant, cornea |
| V45.69 | Other states following surgery of eye and adnexa |

***Current Procedural Terminology (CPT®) ©2007 American Medical Association: Chicago, IL.**

## References


1. Adams AJ. The role of research, evidence and education in optometry: a perspective. Clin Exp Optom. 2007 Jul;90(4):232-7.

2. Ambrosio R Jr, Klyce SD, Wilson SE. Corneal topographic and pachymetric screening of keratorefractive patients. J Refract Surg. 2003 Jan-Feb;19(1):24-9.

3. American Academy of Ophthalmology (AAO). Corneal topography. Ophthalmology. 1999 Aug;106(8):1628-38.

4. Ayres BD, Rapuano CJ. Refractive power of the cornea. Compr Ophthalmol Update. 2006 Sep-Oct;7(5):243-51; discussion 253-5.

5. Cairns G, McGhee CN. Orbscan computerized topography: attributes, applications, and limitations. J Cataract Refract Surg. 2005 Jan;31(1):205-20.

6. Caprioli J, Bronwyn Bateman J, Gaasterland DE, Mandelbaum S, Masket S, Matoba AY, et al. (Preferred Practice Patterns Committee, American Academy of Ophthalmology [AAO]). Comprehensive adult medical eye evaluation. Preferred Practice Pattern. 2000. Accessed Apr 6, 2005. Available at URL address: http://www.aao.org/education/library/ppp/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=1275

7. CIGNA HealthCare Medicare Administration. Computer corneal topography (L6151). Medicare Part B Carrier—Tennessee Local Medical Review Policy. Accessed Apr 8, 2005. Available at URL address: http://www.cignamedicare.com/partb/lmrp_lcd/tn/cms_fu/9621-02.html

8. Goggin M, Alpins N, Schmid LM. Management of irregular astigmatism. Curr Opin Ophthalmol. 2000 Aug;11(4):260-6.

9. Guarnieri FA, Guarnieri JC. Comparison of Placido-based, rasterstereography, and slit-scan corneal topography systems. J Refract Surg. 2002 Mar-Apr;18(2):169-76.

10. HAYES Medical Technology Directory™. Computerized Corneal Topography Systems. Lansdale, PA: HAYES, Inc.; ©2001 Winifred S. Hayes, Inc. 2001 Feb.

11. Iskander DR, Collins MJ. Applications of high-speed videokeratoscopy. Clin Exp Optom. 2005 Jul;88(4):223-31.

12. Karabatsas CH, Cook SD, Figueiredo FC, Diamond JP, Easty DL. Surgical control of late postkeratoplasty astigmatism with or without the use of computerized video keratography: a prospective, randomized study. Ophthalmology. 1998 Nov;105(11):1999-2006.

13. Konstantopoulos A, Hossain P, Anderson DF. Recent advances in ophthalmic anterior segment imaging: a new era for ophthalmic diagnosis? Br J Ophthalmol. 2007 Apr;91(4):551-7.

14. Lebow KA, Grohe RM. Differentiating contact lens induced warpage from true keratoconus using corneal topography. CLAO J. 1999 Apr;25(2):114-22.

15. Lembach RG. Use of contact lenses for management of keratoconus. Ophthalmol Clin North Am. 2003 Sep;16(3):383-94, vi.

16. Linsenmayer T, Mondino B, Agre P, Barr JT, Candia O, Greene M, et al. (Corneal Diseases Panel, National Eye Institute [NEI]). Report of the Corneal Diseases Panel. Updated 2004 Oct. Accessed Apr

6, 2005. Available at URL address:
http://www.nei.nih.gov/resources/strategicplans/neiplan/frm_corneal.asp

17. Mandelbaum S, de Luise VP, Driebe, W Jr, Groden LR, McLeod SD, Sher NA, et al. (Refractive Errors Panel, Preferred Practice Patterns Committee, American Academy of Ophthalmology [AAO]). Refractive errors. Released 1997 Sep. Revised 2002. Verified 2003 Apr 2. Accessed Apr 1, 2005. Available at URL address: http://www.guideline.gov/summary/pdf.aspx?doc_id=3545&stat=1&string=

18. Masket S, Fine IH, Kidwell TP, Koch DD, Lane SS, Miller KM, et al. (Anterior Segment Panel, American Academy of Ophthalmology [AAO]). Cataract in the adult eye. Preferred Practice Pattern. 2001. Accessed Apr 4, 2005. Available at URL address:
http://www.aao.org/education/library/ppp/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=1247

19. Matoba AY, Harris DJ Jr, Mark DB, Meisler DM, Pflugfelder SC, Rapoza PA, et al. (Cornea/External Disease Panel, Preferred Practice Patterns Committee, American Academy of Ophthalmology [AAO]). Corneal opacification and ectasia. Preferred Practice Pattern. 2000. Accessed Apr 1, 2005. Available at URL address:
http://www.aao.org/education/library/ppp/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=1277

20. National Eye Institute (NEI). Facts about the cornea and corneal disease. Updated 2004 Oct. Accessed Apr 6, 2005. Available at URL address: http://www.nei.nih.gov/health/cornealdisease/index.asp

21. Owens H, Gamble GD, Bjornholdt MC, Boyce NK, Keung L. Topographic indications of emerging keratoconus in teenage New Zealanders. Cornea. 2007 Apr;26(3):312-8.

22. Pflugfelder SC, Liu Z, Feuer W, Verm A. Corneal thickness indices discriminate between keratoconus and contact lens-induced corneal thinning. Ophthalmology. 2002 Dec;109(12):2336-41.

23. Rabinowitz YS, Rasheed K, Yang H, Elashoff J. Accuracy of ultrasonic pachymetry and videokeratography in detecting keratoconus. J Cataract Refract Surg. 1998 Feb;24(2):196-201.

24. Rao SK, Padmanabhan P. Understanding corneal topography. Curr Opin Ophthalmol. 2000 Aug;11(4):248-59.

25. Rasheed K, Rabinowitz YS, Remba D, Remba MJ. Interobserver and intraobserver reliability of a classification scheme for corneal topographic patterns. Br J Ophthalmol. 1998 Dec;82(12):1401-6.

26. Read SA, Collins MJ, Carney LG, Franklin RJ. The topography of the central and peripheral cornea. Invest Ophthalmol Vis Sci. 2006 Apr;47(4):1404-15.

27. Seitz B, Behrens A, Langenbucher A. Corneal topography. Curr Opin Ophthalmol. 1997 Aug;8(4):8-24.

28. Szczotka LB. Corneal topography and contact lenses. Ophthalmol Clin North Am. 2003 Sep;16(3):433-53.

29. Vincent AL, Weiser BA, Cupryn M, Stein RM, Abdolell M, Levin AV. Computerized corneal topography in a paediatric population with Down syndrome. Clin Experiment Ophthalmol. 2005 Feb;33(1):47-52.

30. Wagner H, Barr JT, Zadnik K. Collaborative Longitudinal Evaluation of Keratoconus (CLEK) Study: methods and findings to date. Cont Lens Anterior Eye. 2007 Sep;30(4):223-32. Epub 2007 May 3.

31. Ward MA. Contact lens management following corneal refractive surgery. Ophthalmol Clin North Am. 2003 Sep;16(3):395-403.

32. Wilson SE, Ambrosio R. Computerized corneal topography and its importance to wavefront technology. Cornea. 2001 Jul;20(5):441-54.

33. Wolffsohn JS, Peterson RC. Anterior ophthalmic imaging. Clin Exp Optom. 2006 Jul;89(4):205-14.

34. Yanoff M, Duker JS, Augsburger JJ, Azar DT, Diamond GR, Dutton JJ, editors. Ophthalmology. 2nd ed. St. Louis, MO: Mosby International; 2003.

## Policy History

| Pre-Merger Organizations | Last Review Date | Policy Number | Title |
|---|---|---|---|
| CIGNA HealthCare | 5/15/2008 | 0361 | Computer-Assisted Corneal Topography |

"CIGNA" and the "Tree of Life" logo are registered service marks of CIGNA Intellectual Property, Inc., licensed for use by CIGNA Corporation and its operating subsidiaries. All products and services are provided exclusively by such operating subsidiaries and not by CIGNA Corporation. Such operating subsidiaries include Connecticut General Life Insurance Company, CIGNA Behavioral Health, Inc., Intracorp, and HMO or service company subsidiaries of CIGNA Health Corporation and CIGNA Dental Health, Inc. In Arizona, HMO plans are offered by CIGNA HealthCare of Arizona, Inc. In California, HMO plans are offered by CIGNA HealthCare of California, Inc. and Great-West Healthcare of California, Inc. In Connecticut, HMO plans are offered by CIGNA HealthCare of Connecticut, Inc. In North Carolina, HMO plans are offered by CIGNA HealthCare of North Carolina, Inc. In Virginia, HMO plans are offered by CIGNA HealthCare Mid-Atlantic, Inc. All other medical plans in these states are insured or administered by Connecticut General Life Insurance Company.

Connecticut General Life Insurance Company has acquired the business of Great-West Healthcare from Great-West Life & Annuity Insurance Company (GWLA). Certain products continue to be provided by GWLA (Life, Accident and Disability, and Excess Loss). GWLA is not licensed to do business in New York. In New York, these products are sold by GWLA's subsidiary, First Great-West Life & Annuity Insurance Company, White Plains, N.Y.