Mass General Brigham
Health Plan

Medical Policy
Corneal Collagen Cross-linking

Policy Number: 015

	Commercial and Qualified Health Plans	Mass General Brigham ACO	Medicare Advantage	OneCare	Senior Care Options (SCO)
Authorization required	X	X	X	X	X
Authorization not required					
Not payable		X (0402T)			

Overview

The purpose of this document is to describe the guidelines Mass General Brigham Health Plan utilizes to determine medical appropriateness for corneal collagen cross-linking**.** The treating specialist must request prior authorization for the procedure.

Coverage Guidelines

Mass General Brigham Health Plan covers corneal collagen cross-linking for the treatment of progressive corneal thinning caused by progressive keratoconus or corneal ectasia following refractive surgery. Mass General Brigham Health Plan will **only authorize the epithelium-off corneal collagen cross-linking protocol**, as it is currently the only corneal collagen cross-linking approved by the Food and Drug Administration (FDA).

Mass General Brigham Health Plan covers medically necessary corneal collagen cross-linking treatment in the following instances:

1. For members with **progressive keratoconus** corneal collagen cross-linking is considered medically necessary when all of the following conditions are met:
    a. Diagnosis of keratoconus based on keratometry and corneal mapping; and
    b. Any of the following changes have occurred within 24 months:
        i. increase of 1.00 diopters (D) or more in the steepest keratometry measurement; or
        ii. increase of 1.00 D or more in manifest cylinder; or
        iii. increase of 0.50 D or more in manifest refraction spherical equivalent (MRSE); and
    c. Member is age 14 years or older; and
    d. Corrected distance visual acuity (CDVA) worse than 20/20 with properly fitted spectacles or contact lenses; and
    e. Corneal thickness 300 microns or more; and
    f. No history of corneal or systemic disease that would interfere with healing post-procedure.
2. For members with a diagnosis of **corneal ectasia following refractive surgery,** corneal collagen cross-linking is considered medically necessary when all of the following conditions are met**:**
    a. Member is age 14 years of age or older; and

b. Consistent axial topography pattern, including relative inferior steepening with inferior-superior difference of at least 1.5 diopters; and

c. Corrected distance visual acuity worse than 20/20; and

d. Corneal thickness of at least 300 micrometers at the thinnest area; and

e. No history of corneal or systemic disease that would interfere with healing post-procedure.

Exclusions
Mass General Brigham Health Plan does not provide coverage for corneal collagen cross-linking for conditions that do not meet the criteria noted above.

Medicare Variation
Mass General Brigham Health Plan uses guidance from the Centers for Medicare and Medicaid Services (CMS) for medical necessity determinations for its Medicare Advantage plan members. National Coverage Determinations (NCDs), Local Coverage Determinations (LCDs), Local Coverage Articles (LCAs), and documentation included in the Medicare manuals are the basis for medical necessity determinations. When there is no guidance from CMS for the requested service, Mass General Brigham Health Plan's medical policies are used for medical necessity determinations. **At Mass General Brigham Health Plan's most recent policy review, Medicare has no NCD or LCD for corneal collagen cross-linking.**

MassHealth Variation
Mass General Brigham Health Plan uses guidance from MassHealth for medical necessity determinations for its Mass General Brigham ACO members. When there is no guidance from MassHealth for the requested service, Mass General Brigham Health Plan's medical policies are used for medical necessity determinations. **At the time of Mass General Brigham Health Plan's most recent policy review, MassHealth did not have medical necessity guidance for corneal collagen cross-linking.**

OneCare and SCO Variation
Mass General Brigham Health Plan uses guidance from CMS for medical necessity determinations for its OneCare and SCO plan members. NCDs, LCDs, LCAs, and documentation included in the Medicare manuals are the basis for medical necessity determinations. When there is no guidance from CMS for the requested service, Mass General Brigham Health Plan uses medical necessity guidelines from MassHealth. When there is no guidance from CMS or from MassHealth, Mass General Brigham Health Plan's medical policies are used for medical necessity determinations.

Definitions
Corneal Collagen Cross-linking: A procedure used that uses riboflavin drops, ultraviolet light, and a photosensitizer to strengthen bonds in the cornea. Ultraviolet (UV) light is combined with riboflavin eye drops to create new collagen crosslinks in the cornea, strengthening and stabilizing the cornea. The viscous riboflavin solution is applied to the eye topically before and during UV irradiation using the KXL System.

Ectasia: A serious long-term complication of laser in situ keratomileusis (LASIK) surgery and photorefractive keratectomy. It is similar to keratoconus but occurs postoperatively and primarily affects older populations.

Keratoconus**:** A bilateral dystrophy characterized by progressive ectasia (paracentral steepening and stromal thinning) that impairs visual acuity. While frequently diagnosed at a young age, the progression of keratoconus is variable.

Codes

The following codes are included below for informational purposes only; inclusion of a code does not constitute or imply coverage or reimbursement.

Authorized CPT/HCPCS Codes	Code Description
0402T	Collagen cross-linking of cornea (including removal of the corneal epithelium and intraoperative pachymetry when performed)
J2787	Riboflavin 5'-phosphate, ophthalmic solution, up to 3 mL
66999 **(Mass General Brigham ACO only)**	Other procedures of the anterior segment of the eye

Summary of Evidence

Corneal collagen cross-linking (CXL) has been extensively studied for its efficacy and safety in treating keratoconus and corneal ectasia. For treatment of progressive keratoconus, Alnawaiseh et al. (2015) observed that corneal densitometry peaks within 1–3 months post-CXL and returns to preoperative levels by one year, achieving clarity comparable to healthy corneas by two years. Poli et al. (2015) demonstrated six-year effectiveness of epithelium-off CXL in individuals with both progressive keratoconus and corneal ectasia following refractive surgery, stabilizing ectasia in 89% of cases, improving visual acuity, and maintaining keratometry stability. Hersh et al. (2011, 2017) conducted a multicenter RCT of CXL for treatment of corneal ectasia following refractive surgery and concluded that CXL improved visual acuity and maximum keratometry compared with sham control. Enders et al. (2023) confirmed that improvements of visual outcomes can persist for 13 years following CXL treatment of keratoconus.

Multiple studies have compared accelerated and conventional CXL protocols (Eissa and Yassin, 2019; Madeira et al., 2019; Marafon et al., 2020; Shajari et al., 2019), finding both approaches to be safe and effective, with accelerated CXL offering the benefit of shorter treatment times.

Pediatric-specific protocols were reviewed by Fard et al. (2020), Tian et al. (2017), and Turhan et al. (2020)

Craig et al. (2014) highlighted the effectiveness of epithelium-off CXL using riboflavin and UV-A in their systematic review that included patients with both progressive keratoconus and post-Lasik ectasia. Meta-analyses by Kobashi and Rong (2017) and Meiri et al. (2016) have confirmed the ability of CXL to halt keratoconus progression and improve visual function. Meta-analysis by Wan et al. (2017) concluded that CXL effectively stabilized ectasia and improved visual function in patients following refractive surgery.

A Cochrane review by Sykakis et al (2015) highlighted the generally low quality of evidence, including the high risk of bias in available RCTs. Reviews by NICE (2013) and Hayes Inc. (2018) offered guidance on clinical practice, underscoring CXL's broad applicability. While CXL is generally safe and effective, potential complications such as haze formation and the possibility of recurrence in some cases should be considered.

Criteria in this policy are based primarily on inclusion criteria from the major trials demonstrating safety and efficacy, including Hersh (2017). Mass General Brigham Health Plan finds that evidence of safety and efficacy are lacking for patients who do not meet these criteria.

Effective

January 2026: Annual update. Updated prior authorization table and added variation for OneCare and SCO members. Fixed code disclaimer and typos.
March 2025: Ad hoc update. Summary of evidence added. References updated.

November 2024: Annual update. Code table updated. Clarified Medicare Variation language. Added MassHealth Variation.
November 2023: Annual update. Medicare Advantage added to table.
December 2022: Annual update. Criteria changed under both #1 and #2 to include list of conditions.
November 2021: Annual update. References updated.
November 2020: Annual update. References updated.
November 2019: Annual update. References updated.
January 2019: Ad hoc update. Code update.
October 2018: Effective date.

References

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