

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Tomography in Eye Examinations: Guidelines

Service Line: Rapid Response Service
Version: 1.0
Publication Date: November 29, 2019
Report Length: 12 Pages

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Cite As: *Tomography in Eye Examinations: Guidelines*. Ottawa: CADTH; 2019 Nov. (CADTH rapid response report: summary of abstracts).

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Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

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Research Questions

1. What are the evidence-based guidelines for administration of a tomography exam in conjunction with a regular eye examination in individuals aged 0 to 19, 20 to 64, or ≥65 years?
2. What are the evidence-based guidelines for administration of a tomography exam in conjunction with a regular eye examination in individuals with a family history of diabetes, hypertension, ocular hypertension, cataract(s), glaucoma, and/or age-related macular degeneration?
3. What are the evidence-based guidelines for administration of a tomography exam in conjunction with a regular eye examination in individuals diagnosed with diabetes, hypertension, ocular hypertension, cataract(s), glaucoma, and/or age-related macular degeneration?

Key Findings

Five evidence-based guidelines were identified relating to the administration of tomography examinations in conjunction with regular eye exams for relevant patient populations.

Methods

A limited literature search was conducted on key resources including MEDLINE (via Ovid), the Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. A methodological filter was applied to limit retrieval guidelines. The search was also limited to English language documents published between January 1, 2014 and April 2, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Q1: Individuals aged 0 to 19, 20 to 64, or 65 years or older Q2: Individuals with a family history of diabetes, hypertension, ocular hypertension, cataract(s), glaucoma, and/or age-related macular degeneration Q3: Individuals diagnosed with diabetes, hypertension, ocular hypertension, cataract(s), glaucoma, and/or age-related macular degeneration
Intervention	Tomography (i.e., Heidelberg retinal tomography or optical coherence tomography) in combination with a standard eye examination
Comparator	Not applicable
Outcomes	Guidelines
Study Designs	Guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. However, due to the nature and scope of the report, only guidelines were included in the main body of the report.

Five evidence-based guidelines¹⁻⁵ were identified in the literature search pertaining to tomography examinations in conjunction with regular eye exams for various patient populations. Upon further review of the identified literature, five guidelines⁷⁻¹¹ included in the main body of the CADTH previous report were moved to the appendix as they did not meet all of the selection criteria.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Five guidelines¹⁻⁵ were identified in the literature search pertaining to tomography examinations in conjunction with regular eye exams for various patient populations. The five identified guidelines¹⁻⁵ suggested the use of tomography examinations in conjunction with eye examinations for adult, pediatric, diabetic retinopathy, and glaucoma patients. Detailed guideline characteristics are included in Table 2, and summaries of relevant recommendations are included in Table 3.

Table 2: Characteristics of Included Guidelines

First Author, Year	Intended Users, Target Population	Relevant Outcomes Considered	Evidence Collection	Evidence Quality Assessment	Recommendations Development and Evaluation	Guideline Validation
Adult Population						
American Optometric Association Evidence-based Optometry Guideline Development Group, 2015¹	<p>Intended Users: Eye doctors providing an eye and vision examination.</p> <p>Target Population: Adults aged 18 years or older.</p>	Supplemental testing procedures used to interpret data, which may include OCT	<p>Clinical questions were identified by the AOA Evidence-Based Optometry Guideline Development group.</p> <p>A systematic review of the literature using PubMed, Medline Plus, Google Scholar, Cochrane Library as well as numerous other electronic databases from January 2005</p>	<p>Quality of Evidence:</p> <ul style="list-style-type: none"> • A = well-designed RCTs, SRs, meta-analyses, or diagnostic studies of relevant populations with a validated reference standard • B = RCTs with weaker designs, cohort studies or Grade B diagnostic studies. 	<p>Each selected article was independently reviewed and graded for quality by two clinicians.</p> <p>Evidence-Based Optometry Guideline Development Reading Group reviewed all the evidence and clinical recommendations were developed.</p>	Final draft was made available for peer and public review by numerous stakeholders (individuals and organizations).

First Author, Year	Intended Users, Target Population	Relevant Outcomes Considered	Evidence Collection	Evidence Quality Assessment	Recommendations Development and Evaluation	Guideline Validation
			to December 2014 was completed.	<ul style="list-style-type: none"> • C = studies of strong design, but with substantial uncertainty about conclusions (in including nonrandomized studies, case control studies or Grade C diagnostic studies) • D = cross sectional studies, case reports/series, reviews, position papers, expert opinion, or reasoning from principal. <p>Strength of Clinical Recommendations:</p> <ul style="list-style-type: none"> • Strong recommendation • Recommendation • Consensus recommendation 		
Pediatric Population						
American Optometric Association Evidence-based Optometry Guideline	Intended Users: Optometrists and ophthalmologists	Supplemental testing procedures used for imaging of ocular structures.	Clinical questions were identified by the AOA Evidence-Based Optometry Guideline	Quality of Evidence: <ul style="list-style-type: none"> • A • B • C • D 	Each selected article was independently reviewed and graded for quality by two clinicians.	Final draft was made available for peer and public review by numerous stakeholders

First Author, Year	Intended Users, Target Population	Relevant Outcomes Considered	Evidence Collection	Evidence Quality Assessment	Recommendations Development and Evaluation	Guideline Validation
Development Group, 2017²	<p>who provide eye and vision examinations to the pediatric population.</p> <p>Target population: Patients from 0 to 18 years of age.</p>		<p>Development group.</p> <p>A systematic review of the literature using PubMed, Medline Plus, Google Scholar, Cochrane Library as well as numerous other electronic databases from January 2005 to October 2016 was completed.</p>	<p>(See American Optometric Association Evidence-based Optometry Guideline Development Group, 2015¹ for quality of evidence descriptions)</p> <p>Strength of Clinical Recommendations:</p> <ul style="list-style-type: none"> • Strong recommendation • Recommendation • Option 	<p>Evidence-Based Optometry Guideline Development Reading Group reviewed all the evidence and clinical recommendations were developed.</p>	<p>(individuals and organizations).</p>
Patients with Diabetic Retinopathy						
Wong, 2018³	<p>Intended Users: Ophthalmologists, physicians and public health professionals interested in screening, referral, follow-up, and treatment related to DR.</p> <p>Target Population: Patients with severe stages of DR, including proliferative DR and DME.</p>	<p>Screening, referral, follow-up, and timely treatment to DR.</p>	<p>A task force was established to review the 2014 guidelines and make recommendation for new evidence.</p>	NR	<p>Specific sections on epidemiology of DR, classification of DR and DME, screening guidelines, referral guidelines, detailed ophthalmic assessment of DR, treatment of DR, treatment of DME, indications for vitrectomy, list of suggested indicators for evaluation of DR programs, and equipment were assigned</p>	<p>Revised drafts were reviewed for comments and the committee reached a unanimous concurrence for finalizing guidelines.</p>

First Author, Year	Intended Users, Target Population	Relevant Outcomes Considered	Evidence Collection	Evidence Quality Assessment	Recommendations Development and Evaluation	Guideline Validation
					to specific members of the task force.	
American Optometric Association Evidence-based Optometry Guideline Development Group, 2014⁴	<p>Intended Users: Optometrists and Ophthalmologists providing an ocular examination of a person with diabetes.</p> <p>Target Population: Individuals with diagnosed diabetes mellitus.</p>	Supplemental testing procedures for diagnosing and evaluating DR.	<p>Clinical questions were identified by the AOA Evidence-Based Optometry Guideline Development group.</p> <p>A systematic review of the literature using numerous electronic databases from 2009 to 2012 was completed.</p>	<p>Grade of Evidence:</p> <ul style="list-style-type: none"> • A • B • C • D <p>(See American Optometric Association Evidence-based Optometry Guideline Development Group, 2015¹ for quality of evidence descriptions)</p> <p>Strength of Recommendation:</p> <ul style="list-style-type: none"> • A = Clinicians should follow this recommendation unless clear and compelling rationale for an alternative approach is present • B = Clinicians should generally follow this recommendation, but should remain alert to new information • C = Clinicians should be 	<p>Each selected article was independently reviewed and graded for quality by two readers.</p> <p>Evidence-Based Optometry Guideline Development Reading Group reviewed all the evidence and clinical recommendations were developed.</p>	Final draft was made available for peer and public review by numerous stakeholders (individuals and organizations).

First Author, Year	Intended Users, Target Population	Relevant Outcomes Considered	Evidence Collection	Evidence Quality Assessment	Recommendations Development and Evaluation	Guideline Validation
				aware of this recommendation, and remain alert for new information <ul style="list-style-type: none"> • D = Clinicians should be aware of this recommendation 		
Patients with Glaucoma						
National Institute for Health Care and Excellence, 2019⁵	Intended Users: Healthcare professionals; commissioners and providers of eye care services; and adults with or at risk of developing glaucoma, their families and care givers. Target Population: Patients with glaucoma aged 18 years and over.	Recommendations before referral for further investigation and diagnosis of COAG and related conditions.	Evidence collection for NICE guidelines includes: tailoring the search approach to the eligibility/inclusion criteria of the review question; selecting appropriate sources according to the eligibility/inclusion criteria of the review question; using supplementary search techniques; and continuous review of how best to find evidence and where.	NR	Recommendation development includes: structured review questions agreement; literature search; call for evidence from stakeholders if needed; evidence reviews and economic analysis prepared; committee discusses evidence reviews and expert testimony and develops draft recommendations.	An equality impact assessment is completed by the developer and committee chair. The equality impact assessment is signed off by a member of NICE staff and published in the NICE website with the draft guidelines.

AOA = American Optometric Association; COAG = chronic open angle glaucoma; DME = diabetic macular edema; DR = diabetic retinopathy; NICE = National Institute of Health Care and Excellence; NR = not reported; OCT = optical coherence tomography

Table 3: Summary of Relevant Recommendations in Included Guidelines

Recommendations	Strength of Evidence and Recommendations
American Optometric Association Evidence-based Optometry Guideline Development Group, 2015¹	
<p><i>“The interpretation of subjective and objective data may indicate the need for additional testing, either performed or ordered by the eye care provider. Supplemental procedures (e.g. optical coherence tomography [OCT]...) may be performed at the initial examination or during subsequent examinations. If supplemental tests are performed, an interpretation and report may be required.” (p 20)¹</i></p>	NR
American Optometric Association Evidence-based Optometry Guideline Development Group, 2017²	
<p><i>“Supplemental procedures may be performed immediately or during subsequent examinations. Supplemental testing for infants and children may include:</i></p> <p><i>B) Imaging</i></p> <ul style="list-style-type: none"> • Optical coherence tomography (OCT) provides cross-sectional, high resolution imaging of the anterior and posterior segments” (p 26)² 	NR
Wong, 2018³	
<p><i>“A screening examination theoretically could include a complete ophthalmic examination with best-corrected visual acuity after refraction, pupil dilation, and latest retinal imaging, such as with wide-field retinal photography and OCT.” (p.1610)³</i></p>	NR
American Optometric Association Evidence-based Optometry Guideline Development Group, 2014⁴	
<ol style="list-style-type: none"> 1. OCT is an important tool in assessing DME and for monitoring the efficacy of treatment.⁴ 2. Clinicians should be aware of discrepancies between OCT results and the clinical examination of DME.⁴ 3. Central macular thickness measured by OCT is not indicated to identify central CSME or to make treatment decisions for individuals with DME.⁴ 4. For patients with DME, spectral domain OCT provides easier observation of normal and abnormal findings compared to time domain OCT.⁴ 	<ol style="list-style-type: none"> 1. Evidence/Recommendation Grade: C/B 2. Evidence/Recommendation Grade: B/B 3. Evidence/Recommendation Grade: B/B 4. Evidence/Recommendation Grade: C/B
National Institute for Health Care and Excellence, 2019⁵	
<p><i>“Before the referral for further investigation and diagnosis of COAG and related conditions, offer the follow tests:</i></p> <ul style="list-style-type: none"> • <i>optic nerve assessment and fundus examination using stereoscopic slit lamp biomicroscopy (with pupil dilatation if necessary), and optic coherence tomography (OCT) or optic nerve head image if available</i> • <i>peripheral anterior chamber configuration and depth assessments using gonioscopy or if not available of the patients prefers, the van Herick test of OCT.” (p 5)⁵</i> 	NR

COAG = chronic open angle glaucoma; CSME = clinical significant macular edema; DME = diabetic macular edema; NR = not reported; OCT = optical coherence tomography

References Summarized

Guidelines and Recommendations

Adult Population

1. AOA Evidence-Based Optometry Guideline Development Group. Comprehensive adult eye and vision examination. (Evidence-based clinical practice guideline). St. Louis (MO): American Optometric Association; 2015:
<http://aoa.uberflip.com/i/578152-aoa-clinical-practice-guidelines-adult-eye-exam>
Accessed 2019 Nov 28.
See: Section g. Supplemental Testing, Page 20

Paediatric Population

2. AOA Evidence-Based Optometry Guideline Development Group. Comprehensive pediatric eye and vision examination. (Evidence-based clinical practice guideline). St. Louis (MO): American Optometric Association; 2017:
<http://aoa.uberflip.com/i/807465-cpg-pediatric-eye-and-vision-examination>
Accessed 2019 Nov 28.
See: Section b. Imaging, Page 25

Patients with Diabetic Retinopathy

3. Wong TY, Sun J, Kawasaki R, Ruamviboonsuk P, Gupta N, Lansingh VC, et al. Guidelines on diabetic eye care: The International Council of Ophthalmology recommendations for screening, follow-up, referral, and treatment based on resource settings. *Ophthalmol.* 2018 Oct;125(10):1608-1622.
[https://www.aaojournal.org/article/S0161-6420\(17\)33523-6/fulltext](https://www.aaojournal.org/article/S0161-6420(17)33523-6/fulltext). Accessed 2019 Nov 28.
See: Screening, Referral, Follow-up, Page 1610
4. AOA Evidence-Based Optometry Guideline Development Group. Eye care of the patient with diabetes mellitus. (Evidence-based clinical practice guideline). St. Louis (MO): American Optometric Association; 2014:
<http://aoa.uberflip.com/i/374890-evidence-based-clinical-practice-guideline-diabetes-mellitus>. Accessed 2019 Nov 28.
See: Supplemental Testing, Page 29

Patients with Glaucoma

5. National Institute for Health Care and Excellence. Glaucoma: diagnosis and management (*Clinical Practice Guideline NG81*). London (GB): NICE; 2017 Nov:
<https://www.nice.org.uk/guidance/ng81/resources/glaucoma-diagnosis-and-management-pdf-1837689655237>. Accessed 2019 Nov 28.
See: Section 1.1.1 Case-finding, Page 5

Appendix — Further Information

Previous CADTH Reports

6. Nohra M, Picheca L. Optical coherence tomography for the calculation of intraocular lens power: clinical and cost-effectiveness and guidelines. (*CADTH Rapid response report: reference list*). Ottawa (ON): CADTH; 2017:
<https://www.cadth.ca/sites/default/files/pdf/htis/2017/RA0909%20Optical%20Biometry%20Final.pdf> Accessed 2019 Nov 28.

References Included in Main Body of Previous CADTH Report

Patients with Age-Related Macular Degeneration

7. Ontario Health Technology Advisory Committee (OHTAC). Optical coherence tomography monitoring strategies for A-VEGF–treated age-related macular degeneration: OHTAC recommendation. Toronto (ON): Health Quality Ontario; 2014 Aug:
<https://www.hqontario.ca/Portals/0/Documents/evidence/reports/recommendation-oct-monitoring-1408-en.pdf> Accessed 2019 Nov 28.

Patients with Diabetic Retinopathy

8. Grauslund J, Andersen N, Andresen J, et al. Evidence-based Danish guidelines for screening of diabetic retinopathy. *Acta Ophthalmol.* 2018 Dec;96(8):763-769.
[PubMed: PM30311394](#)

Patients with Glaucoma

9. MacIver S, MacDonald D, Prokopich CL. Screening, diagnosis, and management of open angle glaucoma: an evidence-based guideline for Canadian optometrists. *Can J Optom.* 2017;79(Suppl 1):1-71.
https://opto.ca/sites/default/files/resources/documents/cjo_glaucoma_lores.pdf.
 Accessed 2019 Nov 28.
See: Pachymetry, Page 16
10. Glaucoma Preferred Practice Pattern Panel. Primary open-angle glaucoma (*Preferred Practice Pattern*). San Francisco (CA): American Academy of Ophthalmology; 2016:
[https://www.aaojournal.org/article/S0161-6420\(15\)01276-2/pdf](https://www.aaojournal.org/article/S0161-6420(15)01276-2/pdf). Accessed 2019 Nov 28.
See: Population Screening for Glaucoma, Page 17
11. Glaucoma referral and safe discharge: a national clinical guideline (*SIGN publication no. 144*). Edinburgh (GB): Scottish Intercollegiate Guidelines Network (SIGN); 2015:
<https://www.sign.ac.uk/assets/sign144.pdf>. Accessed 2019 Nov 28.
See: Section 4.4 Assessment of Anterior Chamber Angle, Page 17

Clinical Practice Guidelines – Methodology Not Specified

Patients with Diabetic Retinopathy

12. Diabetes Canada Clinical Practice Guidelines Expert Committee, Altomare F, Kherani A, Lovshin J. Retinopathy. *Can J Diabetes.* 2018 Apr;42(Suppl 1):S210-S216.
[https://www.canadianjournalofdiabetes.com/article/S1499-2671\(17\)30837-7/pdf](https://www.canadianjournalofdiabetes.com/article/S1499-2671(17)30837-7/pdf).
 Accessed 2019 Nov 28.
13. Lisa Little Consulting. Meeting the eye health and vision care needs of Canadians: a workforce analysis. Ottawa (ON): Canadian Association of Optometrists; 2018:
https://opto.ca/sites/default/files/resources/documents/workforce_analysis_final_april_2018.pdf. Accessed 2019 Nov 28.
See: Diabetic Retinopathy, Page 6