Title: Diagnostic Tests for Glaucoma

Date: 03 August 2007

Context and policy issues:

Glaucoma is a group of diseases that affect the structure and function of the optic nerve.\(^1\) It is characterized by atrophic changes of the optic nerve, irreversible loss of optic nerve fibres, visual field defects and, possibly, blindness if left untreated.\(^1,2\) The most predominant form of glaucoma is primary open-angle glaucoma (POAG), which accounts for about 90% of cases in Canada.\(^3\) Increased intraocular pressure, advanced age, race and family history are all risk factors for the disease.\(^2\) As glaucoma is often a silent disease, many individuals do not seek treatment until extensive, irreversible damage has occurred.\(^2\) As such, glaucoma is a leading cause of blindness and visual impairment worldwide and is the second leading cause of blindness in Canadians over the age of 50.\(^2\) The prevalence of self-reported glaucoma in the Canadian population increased from 1.1% in 1994 to 1.8% in 2003 and is anticipated to continue rising with population aging.\(^4\)

The diagnosis of POAG is based on a number of clinical findings which include changes in the optic disc (cupping), retinal nerve fibre layer (RNFL) defects, and visual field loss.\(^3\) Automated perimetry is used to analyze visual fields for loss, i.e. functional damage to the optic nerve. It is used in the clinical diagnosis of glaucoma and to follow disease progression, but has some limitations.\(^5\) Automated perimetry is time consuming and burdensome for those undergoing the procedure in terms of the time and concentration required.\(^6\) Further, an individual who has not previously undergone perimetry may require more than five examinations to obtain useful results.\(^7\) Moreover, perimetry is subjective in that the procedure requires input from the individual being assessed, which reduces its reliability.\(^5\) Importantly, there is recent evidence that structural abnormalities in the optic disc and RNFL precede any functional loss in the visual fields.\(^5\) Up to 35% of nerve fibres may be damaged before any visual field defects are observed.\(^2\)
Structural damage to the optic disc and RNFL is also evaluated to diagnose glaucoma. The optic disc and RNFL can be assessed using sequential stereographic images or direct or indirect ophthalmoscopy; however, these techniques are limited in that they are somewhat subjective. Over the past several decades, a number of technologies, referred to as scanning laser glaucoma tests, have been developed to assess the optic disc and RNFL for glaucomatous damage in a more objective and reproducible manner. Confocal scanning laser ophthalmoscopy (CSLO), scanning laser polarimetry (SLP), and optical coherence tomography (OCT) are three such technologies that are available in Canada.

CSLO produces three dimensional images of the optic disc using a laser light source. A series of sequential two dimensional scans are captured, from which a three dimensional image is constructed. A number of different topographic measurements are taken from the image and compared to a normative database to categorize the measurements as within or outside of normal limits. A mathematical combination of the measured parameters (e.g. Moorfields regression analysis or a discriminant function) can also be used to distinguish between individuals with and without glaucoma. A number of CSLO devices are licensed in Canada, including the Heidelberg Retina Tomograph, the most current version of which is the HRT3. The HRT3 has a number of advantages over previous versions which have required the operator to draw a contour line tracing the optic disc margin. The need for operator input is a disadvantage as it introduces variability in measurement. The most current HRT3 software has reduced the need for operator input and also has the advantage of producing a glaucoma probability score.

SLP is an imaging technique that provides quantitative measurements of the RNFL. A scanning laser ophthalmoscope and polarimeter direct polarized light at the retina which then reflects light back. The change in polarization or retardation of the reflected light is proportional to the thickness of the RNFL, which is then mapped. Similar to CSLO, measurements of the RNFL generated from SLP are compared to a normative database and categorized as within or outside of normal limits. The GDx VCC and GDX Access are two SLP devices that are licensed in Canada. In addition to measuring 13 different parameters, GDx also produces a probability of glaucoma score, known as ‘the number’.

OCT uses low coherence near-infrared light from a laser to generate high-resolution, cross-sectional images of the RNFL and optic disc. Light from a laser is directed at the retina, which reflects the light back to the instrument. Information about the thickness of the RNFL is generated by comparing the amount of time it takes for reflected light from the RNFL and from a reference mirror to reach the instrument. As well, the layers of the retina can be differentiated as the time delay is longer when light is reflected back from deeper layers of the retina. OCT produces an extensive number of measurements that are compared to a normative database to categorize them as within normal limits, borderline or outside of normal limits. Currently, there are several OCT devices licensed in Canada, including the OCT1, OCT2 and Stratus OCT (OCT3).

Research questions:

1. What is the clinical effectiveness of scanning laser glaucoma tests (confocal scanning laser ophthalmoscopy, scanning laser polarimetry and optical coherence tomography) compared to automated perimetry for diagnosing glaucoma?
2. What is the cost-effectiveness of scanning laser glaucoma tests (confocal scanning laser ophthalmoscopy, scanning laser polarimetry and optical coherence tomography) compared to automated perimetry for diagnosing glaucoma?

3. What is the Canadian standard of care in diagnosing glaucoma?

Methods:

A limited literature search was conducted on key health technology assessment resources, including PubMed, the Cochrane Library (Issue 2, 2007), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, EuroScan, international HTA agencies, and a focused Internet search. Results include articles published between 2002 and the present, and are limited to English language publications only. Internet links are provided, where available.

Summary of findings:

1. What is the clinical effectiveness of scanning laser glaucoma tests (confocal scanning laser ophthalmoscopy, scanning laser polarimetry and optical coherence tomography) compared to automated perimetry for diagnosing glaucoma?

The literature search did not identify any health technology assessments, systematic reviews or meta-analyses that compared the clinical effectiveness of scanning laser glaucoma tests to automated perimetry. Several narrative reviews of scanning laser glaucoma tests were identified from a search of the grey literature. The conclusions of these reviews are outlined in Table 1.

Table 1: Narrative Reports on Scanning Laser Glaucoma Tests

<table>
<thead>
<tr>
<th>Title</th>
<th>Organization, Year of Publication</th>
<th>Conclusion</th>
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<tbody>
<tr>
<td>Confocal Scanning Laser Ophthalmoscopy and Scanning Laser Polarimetry for Early Diagnosis of Glaucoma</td>
<td>Alberta Heritage Foundation for Medical Research, 2006</td>
<td>“The value of CSLO and SLP as diagnostic tools for the detection of early glaucoma remains unclear, although the HRT and GDx methods hold considerable promise for the detection of glaucoma-associated structural change. The available evidence showed that HRT and GDx are able to differentiate between normal individuals and those with glaucoma. However, whether these devices have the sensitivity and specificity to detect the early onset of glaucoma, before the onset of visual field loss, remains to be determined. The available CSLO and SLP devices still await prospective validation against accepted measures of structural and functional change in terms of whether the use of a test results improves patient outcomes and is helpful in patient management and obviates unnecessary treatment.”</td>
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</table>
### Title

**Optical Coherence Tomography for Diagnosing Retinal Disease**

**Organization, Year of Publication**

Alberta Heritage Foundation for Medical Research, 2003

**Conclusion**

"While OCT appears promising as a tool for diagnosing retinal disease, there are many questions relating to its clinical utility that are not likely to be answered by a cross-sectional study. Longitudinal studies are needed to determine the temporal relationship between OCT RNFL thickness measurements and visual field defects, and to identify any changes in RNFL thickness that could predict future visual deterioration.

It is clear that OCT in its current state of development is ineffective as a stand alone diagnostic test, but a study has not yet been conducted to assess its value as part of a serial testing strategy."

### Title

**Optical coherence tomography for the diagnosis of eye disorders**

**Organization, Year of Publication**

National Horizon Scanning Centre, the University of Birmingham, 2002

**Conclusion**

**Impact on government policy** – The introduction of OCT may impact on the diagnosis and monitoring of diabetic eye disease and many of the other disorders such as macular degeneration that occur in the elderly. Hence, this may impact on both the National Service Frameworks for Diabetes and Older People.

**Impact on patient care** – OCT has the potential to make a significant impact on patient care as it allows accurate diagnosis and monitoring of a variety of eye disorders. OCT may be preferable to some of the current diagnostic procedures, as it is less invasive and considerably quicker.

**Impact on service provision** – Some staff training in the use of OCT will be needed. This is currently provided by Carl Zeiss as each system is purchased.

**Impact on NHS resources** – An OCT system costs £45,000 and has an annual service and maintenance fee of £2,000. However, due to the wide range of diseases that OCT is able to diagnose and monitor, one system may replace several pieces of diagnostic equipment."

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**RNFL:** Retinal nerve fibre layer

The literature search identified seven observational studies that assessed the ability of one or more scanning laser glaucoma tests to discriminate between eyes with and without glaucoma, relative to automated perimetry alone (Table 2). Studies that compared the performance of a scanning laser glaucoma test to a clinical diagnosis of glaucoma were excluded. The use of a clinical diagnosis of glaucoma does not allow for a direct comparison between the two techniques since automated perimetry is just one test in the battery of tests used. Further, many of these studies included characteristics of the optic disc and RNFL as part of the clinical diagnosis which would be a source of bias given that the scanning laser glaucoma tests also assess these structures.

In the seven studies, one eye from each participant was randomly selected for inclusion and then underwent a number of assessments including visual field analysis using automated perimetry and imaging with CSLO, SLP or OCT. Generally multiple individual parameters, in many cases 15 or more, were measured and assessed for each scanning laser glaucoma test. Studies of the HRT and one study of the GDx VCC also assessed the performance of mathematical combinations of the individual parameters. The range in performance of the
individual parameters or combination of parameters is reported in Table 2. The area under the receiver operating characteristic curve (AROC) (See Appendix), where reported, is presented in Table 2 and provides an overall summary of test performance by taking into account both sensitivity and specificity.

The performance HRT was assessed in six of the seven studies (Table 2), although different hardware and software versions were used.\textsuperscript{7,8,16,17,19,20} The HRT3 was assessed in only one study.\textsuperscript{16} The AROC for the HRT3 using Moorfields Regression Classification was 0.934, which translates to a discriminant accuracy of 0.87 (i.e., HRT3 Moorfields Regression Classification would correctly categorize 87\% of eyes as glaucomatous or not relative to automated perimetry).\textsuperscript{22} A similar AROC was observed for HRT2 Moorfields Regression Classification in this study (AROC=0.927), demonstrating that similar results can be obtained with and without operator input. In the two studies that compared HRT2 to GDx VCC and the Stratus OCT, the AROC\s for HRT2 Moorfields Regression Classification and Linear Discriminant Function were lower than that of the best performing parameters for the GDx VCC and the Stratus OCT.\textsuperscript{8,19}

In interpreting the results of these studies, a number of limitations should be considered. Over the past decade, technological advances in the hardware and software of scanning laser glaucoma tests have been made. The majority of these studies did not evaluate the current version of the HRT3.\textsuperscript{7,8,17,19,20} Further, within a single study whose objective was to compare the performance of a number of scanning laser glaucoma tests, the most current hardware and software versions of all instruments may not have been used. Thus, it cannot be concluded, based on this evidence, that the current version of the HRT performs better or worse than the current version of the OCT or GDx VCC, relative to perimetry.

An issue with all studies that evaluate the diagnostic performance of tests for glaucoma is that there truly is no gold standard that can be used to identify glaucoma, given that the diagnosis of glaucoma is clinical and somewhat subjective.\textsuperscript{23} A clinical diagnosis of glaucoma is often considered the best available gold standard, but it is imperfect.\textsuperscript{23,24} The use of an imperfect gold standard can potentially reduce the observed sensitivity and specificity of a diagnostic test.\textsuperscript{23} Further, the use of a clinical diagnosis of glaucoma would introduce bias if it included images of the optic disc or RNFL and visual field defects using perimetry. As such, Table 2 only includes studies in which automated perimetry was considered the standard. This approach is also somewhat limited, however, in that the scanning laser glaucoma tests will always be less accurate than perimetry (the reference standard) discriminating between individuals with and without glaucoma.\textsuperscript{24} Finally, spectrum bias, a type of selection bias, is a concern in these studies as they were based on select clinical samples that may not be representative of patients seen in routine practice.\textsuperscript{23}
Table 2: Observational Studies Comparing Scanning Laser Glaucoma Tests to Automated Perimetry in Identifying Glaucomatous Eyes*

<table>
<thead>
<tr>
<th>Author and year</th>
<th>Population</th>
<th>Perimetry System</th>
<th>Device and Version</th>
<th>Performance†</th>
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<tbody>
<tr>
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<td>Individual Parameter Range</td>
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<td>Moorfields Regression Classification</td>
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<td>Moorfields Regression Classification</td>
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Burgansky-Eliash et al, 2007\textsuperscript{16}

- Glaucoma: One eye of 50 individuals with glaucoma
- Controls: One eye from 71 individuals without glaucoma

- Perimetry System: Swedish Interactive thresholding algorithm, 24-2 VF
- Device and Version: HRT 3
- Performance: AROC: 0.615 – 0.897

- Moorfields Regression Classification: AROC: 0.934
- Moorfields Regression Classification: AROC: 0.927

Iester et al, 2007\textsuperscript{17}

- Glaucoma: One eye of 20 individuals with POAG from a university-based glaucoma centre
- Controls: 20 individuals without glaucoma that were recruited as volunteers

- Perimetry System: Humphrey Field Analyzer; 30-2 full threshold program
- Device and Version: HRT 2.01S
- Performance: AROC: 0.615 – 0.897

- Optic Nerve Head Topographic Maps
  - Sensitivity: 0.80
  - Specificity: 0.75
  - Diagnostic Probability: 0.775

Shah et al, 2006\textsuperscript{8}

- Glaucoma: One eye of 43 individuals with POAG enrolled in the Diagnostic Innovations in Glaucoma Study at a university-based glaucoma centre
- Controls: One eye from 58 individuals without glaucoma enrolled in the Diagnostic Innovations in Glaucoma Study at a university-based glaucoma centre

- Perimetry System: 24-2 Swedish Interactive thresholding algorithm
- Device and Version: HRT 2 acquisition software version 1.7.0.2
- Performance: AROC: 0.59 – 0.74

- Moorfields Regression Classification: AROC: 0.75
- Moorfields Regression Classification: AROC: 0.75

- GDx VCC, software version 5.5.0.14
- Stratus OCT, software version 4.0

- Nerve fibre indicator: AROC: 0.90
- Inferior Thickness: AROC: 0.88
<table>
<thead>
<tr>
<th>Author and year</th>
<th>Population</th>
<th>Perimetry System</th>
<th>Device and Version</th>
<th>Performance†</th>
<th>Best Performing Parameter or Combination of Parameters</th>
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<tbody>
<tr>
<td>Kwartz et al 2005&lt;sup&gt;7&lt;/sup&gt;</td>
<td>Glaucoma: One eye from 152 individuals with glaucoma recruited from hospital-based glaucoma clinics Controls: One eye form 98 individuals without glaucoma recruited from hospital-based clinics</td>
<td>Humphrey Field Analyzer Model 740; 24-2 full threshold program GDx, software version 2.0.0.9</td>
<td>HRT 1</td>
<td>AROC: 0.620 – 0.815 AROC: 0.494 – 0.763</td>
<td>Discriminant Function Analysis: AROC: 0.83 The Number: AROC: 0.84</td>
</tr>
<tr>
<td>Chen et al, 2005&lt;sup&gt;18&lt;/sup&gt;</td>
<td>Glaucoma: One eye from 62 individuals with POAG from a hospital-based glaucoma clinic Controls: One eye from 62 individuals without glaucoma who volunteered for the study</td>
<td>30-2 Mode, Humphrey Field Analyzer</td>
<td>OCT-3, version A 2.0</td>
<td>AROC: 0.556 – 0.793</td>
<td>Average RNFL Thickness: AROC: 0.793</td>
</tr>
<tr>
<td>Medeiros et al, 2004&lt;sup&gt;19&lt;/sup&gt;</td>
<td>Glaucoma: One eye from 107 individuals with glaucoma enrolled in the Diagnostic Innovations in Glaucoma Study at a university-based glaucoma centre Controls: One eye from 76 individuals without glaucoma enrolled in the Diagnostic Innovations in Glaucoma Study at a university-based glaucoma centre</td>
<td>24-2 Swedish Interactive thresholding algorithm</td>
<td>HRT 2 Stratus OCT GDx VCC; software version 5.0.1</td>
<td>AROC: 0.54 – 0.83 AROC: 0.35 – 0.92 AROC: 0.50 – 0.91</td>
<td>Linear Discriminant Function: AROC: 0.86 Inferior Thickness: AROC: 0.92 Nerve fibre indicator: AROC: 0.91</td>
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</tbody>
</table>
2. What is the comparative cost-effectiveness of scanning laser glaucoma tests (confocal scanning laser ophthalmoscopy, scanning laser polarimetry and optical coherence tomography) compared to automated perimetry for diagnosing glaucoma?

The literature search did not identify any economic analyses that compared scanning laser glaucoma tests to automated perimetry. A United Kingdom based study included a cost comparison of the Heidelberg Retinal Tomograph, GDx and the Humphrey Visual Field Analyzer, a device used in perimetric evaluation of visual fields. Costs included capital and maintenance, labour, consumables (paper, print cartridges, and removal back-up media), and overhead. Costs of purchasing and operating the Heidelberg Retinal Tomograph and GDx were similar. The purchasing and maintenance costs of a basic Humphrey Visual Field Analyzer were about half that of the other devices, but the Humphrey Visual Field Analyzer was far less efficient in terms of examination time. In the same amount of time, over twice the number of patients was examined with the Heidelberg Retinal Tomograph or GDx than with the Humphrey Visual Field Analyzer. Total costs were not reported, so it was not clear whether the gain in efficiency balanced out the higher capital costs of the Heidelberg Retinal Tomograph and GDx. Further, it is not clear if these acquisition and operating costs are generalizable to Canada.

3. What is the Canadian standard of care in diagnosing glaucoma?

The Canadian Glaucoma Strategy Forum recently published a series of algorithms for managing POAG. The diagnosis of POAG is based upon a number of clinical findings, combined with an assessment of the likelihood that an individual has the disease (i.e., a risk assessment). The guidelines do not, however, formally address risk assessment as it was felt that this should be left to the clinician's judgment.
The guidelines recommend a complete eye exam to investigate for glaucomatous damage, specifically RNFL defects, increased vertical disc to cup ratio, presence of optic disc hemorrhage, peripapillary atrophy and other signs of optic nerve atrophy. Components of the complete eye exam include assessment of vision, refraction, anterior and posterior segments, central corneal thickness, intraocular pressure, and optic disc exam and documentation. Gonioscopy, examination of the angle of the anterior chamber of the eye with a gonioscope, is also recommended. Unfortunately, these guidelines do not explicitly state which technology should be used to carry out the remaining assessments. The guidelines do state that “imaging of the optic nerve and nerve fibre layer with photography or other automated devices is appropriate, as it may help in the diagnosis and is a promising technology to monitor progression.” It is not clear from these guidelines whether CLSO, SLP and OCT would all be regarded as appropriate devices to use or which is device is preferred.

Results from the eye exam are then combined with a risk assessment to arrive at a working diagnosis of POAG (i.e., an individual either does not have glaucoma, is a glaucoma suspect or has POAG). From this point, other staging algorithms are used to categorize individuals with POAG as having early, moderate or advanced glaucoma disease based on optic disc features and visual field defects. Again, the guidelines do not specify what device should be used to examine the optic disc.

Several American guidelines25-27 (Table 3) include more specific recommendations for the use of automated perimetry and retinal imaging techniques in individuals with glaucoma and glaucoma suspects (individuals with clinical findings or a number risk factors that increase the probability of developing open-angle glaucoma).26 A number of insurers in the United States do consider the use of CLSO, SLP, and OCT to image the RNFL and optic disc appropriate for evaluating glaucoma suspects and for managing individuals with the disease.28-30

<table>
<thead>
<tr>
<th>Practice Guideline or Position Statement</th>
<th>Organization, Year of Publication</th>
<th>Recommendation</th>
</tr>
</thead>
</table>
| Primary open-angle glaucoma26            | American Academy of Ophthalmology, 2005 | **Initial Physical Exam (Key elements)**  
• Visual acuity [A:III]  
• Pupils [B:II]  
• Slit-lamp biomicroscopy of anterior segment [A:III]  
• Measurement of IOP [A:I]  
  - Time of day recorded because of diurnal variation[B:III]  
• Central corneal thickness [A:II]  
• Gonioscopy [A:III]  
• Evaluation of optic nerve head and retinal nerve fiber layer with magnified stereoscopic visualization [A:III]  
• Documentation of the optic disc morphology, best performed by color stereophotography or computer based image analysis [A:II]  
• Evaluation of the fundus (through a dilated pupil whenever feasible) [A:III]  
• Visual field evaluation, preferably by automated static threshold perimetry [A:III] |
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<th>Physical Exam (Follow-up)</th>
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<tbody>
<tr>
<td>• Visual acuity [A:III]</td>
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<tr>
<td>• Slit-lamp biomicroscopy [A:III]</td>
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<tr>
<td>• Measurement of IOP and time of day of measurement [A:III]</td>
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<tr>
<td>• Evaluation of optic nerve and visual fields [A:III]</td>
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<tr>
<td>• Pachymetry should be repeated after any event that may alter central corneal thickness. [A:II]</td>
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</table>

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<th>Initial Physical Exam (Key elements)</th>
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<td>• Visual acuity [A:III]</td>
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<tr>
<td>• Pupils [B:II]</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>• Evaluation of the fundus (through a dilated pupil whenever feasible) [A:III]</td>
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<tr>
<td>• Visual field evaluation, preferably by automated static threshold perimetry [A:III]</td>
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<tr>
<th>American Academy of Ophthalmology, 2005</th>
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<tr>
<td>Primary open-angle glaucoma suspect</td>
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<tr>
<th>Care for the Patient with Open Angle Glaucoma, 2002</th>
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<tr>
<td>American Optometric Association</td>
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<tr>
<th>Ocular Examination</th>
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<tbody>
<tr>
<td>• Visual Acuity</td>
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<td>• Pupils</td>
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<tr>
<td>• Bimicroscopy</td>
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<tr>
<td>• Tonometry</td>
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<tr>
<td>• Gonioscopy</td>
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<tr>
<td>• Optic Nerve Assessment:</td>
</tr>
<tr>
<td>Examination of the ON requires procedures that provide stereoscopic visualization with adequate magnification, through a dilated pupil if clinically appropriate. Use of a biomicroscope with an ancillary lens is the preferred procedure.</td>
</tr>
<tr>
<td>• Nerve fiber layer assessment.</td>
</tr>
<tr>
<td>The NFL is best visualized using stereo photographic techniques with red-free illumination and high-resolution black and white film.</td>
</tr>
<tr>
<td>• Peripapillary Area Assessment</td>
</tr>
<tr>
<td>• Fundus Photography</td>
</tr>
<tr>
<td>• Visual Fields (VF): Measurement of threshold levels in areas of the VF likely to be affected by glaucomatous damage of the ON should be made by perimetry through a pupil of adequate size.</td>
</tr>
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A:1 – Ranked as most important in improving the quality of the patient’s care in a meaningful way with strong evidence in support of the statement (randomized controlled trials).
A:II – Ranked as most important in improving the quality of the patient’s care in a meaningful way with substantial evidence in support of the statement.
A:III – Ranked as most important in improving the quality of the patient’s care in a meaningful way with consensus of expert opinion as the evidence to support the statement.
Conclusions and implications for decision or policy making:

Glaucoma is a disease that affects both the structure and function of the optic nerve and, as such, is diagnosed by means of a constellation of clinical findings. Conventional disc photography is considered the current standard for detecting structural change and automated perimetry the current standard for detecting functional change related to glaucoma. Scanning laser glaucoma tests to image the optic disc or RNFL generally perform well in discriminating between normal and glaucomatous eyes, relative to perimetry. However, given that scanning laser glaucoma tests evaluate structural changes and automated perimetry evaluates functional changes in glaucoma, it is possible that these may be complementary, rather than competing technologies. While Canadian guidelines do not specifically recommend scanning laser tests to diagnose glaucoma, the guidelines consider imaging of the optic nerve appropriate and promising for monitoring disease progression. Evidence of cost-effectiveness of CSLO, SLP and OCT, relative to perimetry or disc photography is, however, lacking.

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References:


Appendices:

Definitions\textsuperscript{31}

**Sensitivity:** Proportion of people with the target disorder who have a positive test (true positives).

**Specificity:** Proportion of people without the target disorder who have a negative test (true negatives).

**Positive Predictive Value:** Proportion of people with a positive test who have the target disorder.

**Negative Predictive Value:** Proportion of people with a negative test who do not have the target disorder.

**Area under the receiver operating characteristic curve (AROC):** measure of the accuracy of a diagnostic test in terms of discrimination or the ability of the test to correctly classify those with and without the disease. A value of 1 would mean that the test is perfect.

**Diagnostic Accuracy or Probability:** The proportion of all tests that have given the correct result.