National Institute for Health and Care Excellence

IP1779 Repetitive short-pulse transscleral cyclophotocoagulation for glaucoma

IPAC date: 10/12/2020

Com. no.	Consultee name and organisation	Sec. no.	Comments	Response Please respond to all comments
1	Consultee 1 NHS Professional	**1**	Documents are a reasonable description, more RCTs needed before widespread adoption can be supported.	Thank you for your comment. The consultee agrees with the main recommendations.
2	*Consultee 2* The Royal College of Ophthalmologists	***1***	*The RCOphth notes the evidence reviews and comments supplied and suggests there is a need for further RCTs to provide evidence of efficacy for this IP.*	Thank you for your comment. The consultee agrees with the main recommendations.
3	Consultee 3 The Royal College of Physicians	**1**	The RCP is grateful for the opportunity to respond to the above consultation. We would like to endorse the response submitted by the RCOphth. I would be grateful if you could confirm receipt.	Thank you for your comment. The consultee agrees with the main recommendations.
4	Consultee 4 Company Carleton Optical Equipment Ltd	**General**	Thank you for this opportunity to respond to IPAC's recommended guidance for the use of "Repetitive Short-Pulse Transscleral Cyclophotocoagulation (TSCPC) for Glaucoma". We have reviewed the draft guidance, and in our reply, will cite any factual inaccuracies, present additional clinical evidence requested by NICE and finally, summarise our comments on the draft recommendations.	Thank you for your comment.

5	Consultee 4 Company Carleton Optical Equipment Ltd	**Professional expert questionnaire**	**Information on Factual Inaccuracies** The expert questionnaire, submitted by Mr. Gus Gazzard, was completed with a review for **"High-intensity focused ultrasound for glaucoma"** (including corresponding clinical references in section 4.5 https://clinicaltrials.gov/ct2/show/NCT01908985?term=hifu&cond=glaucoma). High-intensity focused ultrasound for glaucoma is not related in any way to short-pulse TSCPC technology or its procedure under review.	Thank you for your comment and for spotting this inaccuracy. This professional expert questionnaire was not relevant to this procedure and was not considered by the committee in their deliberations. It will not be included in the overview.
6	Consultee 4 Company Carleton Optical Equipment Ltd	**Overview**	**Additional Clinical Evidence** In November 2017, cyclophotocoagulation was approved as part of NICE's recommended treatment guidelines for glaucoma. **https://www.nice.org.uk/guidance/ng81/chapter/Recommendations#treatment** Since this time, both the continuous-wave and repetitive short-pulse (micropulse) delivery of the 810nm laser wavelength have been used to manage challenging glaucoma patients, specifically those with increased ocular hypertension despite historical drug and surgical intervention. Due to the improved safety profile of short-pulse TSCPC over continuous-wave TSCPC (CW-TSCPC),[1-3] physicians also are treating patients earlier in the disease progression.[4-6]	Thank you for your comment. The NICE guideline 81 (2017) Glaucoma: diagnosis and management is listed in the overview in the 'Related NICE guidance' section and committee members were aware of this guideline in their deliberations.
7	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	We recognise NICE's acknowledgement that there is no safety concern for repetitive short-pulse TSCPC, but that more empirical RCT-based evidence is required prior to making a general usage recommendation. We would like to reiterate the importance of the RCT by Aquino, et al.[1] This RCT compared short-pulse TSCPC and CW-TSCPC in the	Thank you for your comment. The consultee reiterates what they see as the importance of the paper by Aquino et al. (2015) RCT which is

			treatment of advanced refractory glaucoma in patients with primary open-angle glaucoma, primary closed-angle glaucoma, neovascular glaucoma, and other secondary glaucomas. These patients were unresponsive to maximal tolerated medical therapy, with or without previous surgical intervention, and were poor candidates for a filtration procedure. A successful primary outcome was achieved in 75% of patients who underwent short-pulse TSCPC and 29% of patients who received CW-TSCPC after 12 months (P < 0.01); and at 18 months, successful outcome was 52% and 30%, respectfully. Treatment failures were comparatively less in short-pulse TSCPC eyes than CW-TSCPC eyes. There was a trend to lower-adjusted intraocular pressure (IOP) in the short-pulse TSCPC group in combination with lower complications, thus indicating that the lower complication rate is not experienced at the expense of IOP control. The authors summarize: 1) short-pulse TSCPC and CW-TSCPC lowers IOP in eyes with refractory glaucoma with similar efficacy, and sustained over 18 months; 2) short-pulse TSCPC was associated with a lower incidence of vision-threatening complications and provided a more predictable and consistent effect on IOP, and 3) short-pulse technology in glaucoma therapy has paved the way for efficient and safe treatment of glaucoma.	included in the main extraction table in the overview. This paper was considered by the committee in their deliberations. The Committee considered this comment but decided not to change the guidance.

			Aquino's RCT set the foundation upon which numerous other prospective[2, 7-16] and retrospective[3-6, 17-33] studies have been conducted, and clinical efficacy established.	
8	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	In NICE's review of the published literature on the efficacy and safety of short-pulse TSCPC, 37 publications were identified. However, only 14 publications were discussed by the committee. Of the remaining 23 publications, there are 4 prospective studies: Al Habash (2019),[10] Preda (2020),[16] Jammal (2019),[13] and Awoyesuku (2019).[11] Although these studies are not randomized, they do include enrollment criteria, a standardized treatment protocol, approval by an ethics committee, and patient consent.	Thank you for your comment. The committee receive the overview which summarises a rapid review of the key evidence in detail as well as identifying other papers in the Appendix. In their discussions the committee are therefore aware of the whole evidence base as identified in both the Table and the Appendix. The Al Habash et al. (2019), Preda et al. (2020), Jammal et al. (2019), and Awoyesuku et al. (2019) studies which the consultee identifies are included in the Appendix in the overview.
9	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Al Habash (2019)[10] evaluated the safety and efficacy of short-pulse TSCPC up to 24-months follow-up using a standardized fixed protocol in 71 eyes of 68 patients with various glaucoma types. This study demonstrated good efficacy and safety profiles, with minimal vision-threatening complications. The authors found short-pulse TSCPC as an encouraging treatment option for patients as a primary procedure in cases of high IOP or medication intolerance, and an ideal treatment option for patients with failed incisional surgeries and very high IOP, where additional	Thank you for your comment. The committee receive the overview which summarises a rapid review of the key evidence in detail as well as identifying other papers in the Appendix. In their discussions the committee are therefore aware of the whole evidence base as identified in both the Table and the Appendix.

			incisional surgery would have been too risky. [See Appendix: Study #1 Al Habash A (2019)]	The Al Habash et al. (2019) study is included in the Appendix.
10	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Preda (2020)[16] evaluated short-pulse TSCPC in 100 eyes of 97 patients with refractory glaucoma, and concluded it is a non-invasive, repeatable laser procedure that offers both good and stable results in lowering IOP and decreases the use of antiglaucoma medications for up to 18 months among patients who have failed to control their IOP values. [See Appendix: Study #2 Preda M (2020)]	Thank you for your comment. The committee receive the overview which summarises a rapid review of the key evidence in detail as well as identifying other papers in the Appendix. In their discussions the committee are therefore aware of the whole evidence base as identified in both the Table and the Appendix. The Preda et al. (2020) study is included in the Appendix.
11	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Jammal (2019)[13] conducted a prospective evaluation of short-pulse TSCPC in 21 eyes of 21 patients with refractory glaucoma. At 12 months follow-up, short-pulse TSCPC was found safe and effective in IOP reduction with reduced need for ocular antihypertensive medication. [See Appendix: Study #3 Jammal A (2019)]	Thank you for your comment. The committee receive the overview which summarises a rapid review of the key evidence in detail as well as identifying other papers in the Appendix. In their discussions the committee are therefore aware of the whole evidence base as identified in both the Table and the Appendix. The Jammal et al. (2019) study is included in the Appendix.
12	Consultee 4 Company	**3.1**	Awoyesuku (2019)[11] studied the IOP and visual acuity (VA) changes before and 6 months after short-pulse TSCPC in 13 eyes of 12 patients with open-angle glaucoma. The mean	Thank you for your comment.

	Carleton Optical Equipment Ltd		IOP change over 6 months was 38.20%. There was no remarkable change in the VA at 6 months post laser treatment and the median number of drugs needed by participants to achieve target IOP dropped from 3 to 1. The authors conclude short-pulse TSCPC provides consistent and predictable lowering of IOP with minimal ocular complications and is worth including in their armamentarium in treatment of glaucoma. [See Appendix: Study #4 Awoyesuku E (2019)]	The committee receive the overview which summarises a rapid review of the key evidence in detail as well as identifying other papers in the Appendix. In their discussions the committee are therefore aware of the whole evidence base as identified in both the Table and the Appendix. The Awoyesuku et al. (2019) study is included in the Appendix.
13	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	In addition, to NICE's 37 findings, 4 additional studies have been peer-review published. Logioco (2020),[5] Lee (2020),[29] Wong (2020),[33] Preda (2018).[9] Logioco (2020)[5] assessed the efficacy and safety of short-pulse TSCPC in 143 eyes of 110 patients with a variety of glaucoma types and range of severity from slight to severe. At 12 months follow-up, a 78% success rate and a mean 31% IOP reduction for any type of glaucoma (excluding NVG) was achieved. (In NVG, IOP diminished from 56.7 to 20 mmHg). The authors conclude that treatment with short-pulse TSCPC is a safe and efficient technique for use in glaucoma, attaining a reduction in IOP and decrease in need of antihypertensive medications within the first year following the procedure. [See Appendix: Study #5 Logioco C (2020)]	Thank you for your comment. The Logioco et al. (2020) study was retrieved by our post-consultation literature search update and is now suggested for inclusion in the main evidence table. It is a retrospective cohort study of 110 patients (143 eyes) with a 1-year follow-up.
14	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Lee (2020)[29] retrospectively examined the surgical outcomes and graft conditions in 30 eyes of 28 patients receiving short-pulse TSCPC to treat post-keratoplasty ocular hypertension. All eyes, (excluding 1 due to lost to follow-up) completed 12 months follow-up. Authors conclude short-pulse TSCPC	Thank you for your comment. The Lee et al. (2020) study was retrieved by our post-consultation

			achieved desirable IOP control (average 36.6% reduction) and success rates for post-keratoplasty patients while resulting in minimal complications and graft failure. Short-pulse TSCPC appears to be a safe and effective procedure in patients who received corneal transplant with one-year follow-up. [See Appendix: Study #6 Lee J (2020)]	literature search update and is now suggested for inclusion in the Appendix. It is a retrospective case series of 28 patients (30 eyes) with a 1-year follow-up.
15	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Wong (2020)[33] retrospectively evaluated the efficacy and safety of a modified short-pulse TSCPC treatment in 32 eyes of 29 patients with refractory glaucoma or failed standard short-pulse TSCPC treatment at 12 months follow-up. Eleven of the 32 eyes went on to have further glaucoma surgery during the study period. Although considered treatment failures in the analysis, modified short-pulse TSCPC reduced IOP in these cases and was used as an interim procedure to aid them toward safer incisional surgery. [See Appendix: Study #7 Wong K (2020)]	Thank you for your comment. The Wong et al. (2020) study was retrieved by our post-consultation literature search update and is suggested for inclusion in the Appendix. It is a retrospective case series of 29 patients (32 eyes) with a 1-year follow-up.
16	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Preda (2018)[9] prospectively evaluated the efficacy and safety of subconjunctival bevacizumab associated with short-pulse TSCPC versus short-pulse TSCPC alone in 6 eyes of 6 patients. At 6 months follow-up, they conclude that both procedures decrease IOP. The best corrected VA was unchanged throughout the entire evaluation period. [See Appendix: Study #8 Preda M (2018)]	Thank you for your comment. The Preda et al. (2018) study is a comparative study of 6 patients with neovascular glaucoma who had mTSCPC in combination with bevacizumab (n=3) or mTSCPC alone, with a 6-month follow-up. It was not previously identified and will now be included in the Appendix.

17	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Table 1 is a compilation of these 4 additional peer-reviewed published studies, 11/14 publications evaluated by NICE (excluding case reports and review studies), and 17 of the 23 publications from NICE's appendix (excluding case reports and review studies). In total, Table 1 represents 32 peer-reviewed published studies with ≥6 months follow-up conducted across 15 countries and includes 2,398 eyes. In addition, these data represent short-pulse TSCPC treatment in a range of patients (ethnicity, age, sex), types of glaucoma severity, and a broad range of primary and secondary glaucoma types, such as open-angle and closed-angle glaucoma, neovascular glaucoma, and several secondary glaucomas.	Thank you for your comment and for compiling this data. IPAC will consider this. Case reports and conference abstracts are usually only included in the main extraction table when they report a safety outcome that has not been reported in the other included studies. The IP programme method is one of rapid review whereby we select the evidence presented to the Committee to highlight the most valid and relevant studies in order to conduct rapid assessments of novel procedures. Typically, the number of studies included in the evidence table is 6–8. The main recommendations state that '*Evidence on efficacy is inadequate in quality'* not in quantity.
18	Consultee 4 Company Carleton Optical Equipment Ltd	**1.1**	Even though treatment techniques differed among surgeons, clinical efficacy and safety is consistently demonstrated throughout.	Thank you for your comment. The main recommendations state: '1.1 *Evidence on the safety of repetitive short-pulse transscleral cyclophotocoagulation for glaucoma shows no major safety concerns. Evidence on efficacy is inadequate in quality. Therefore, this procedure*

				should only be used in the context of research. Find out what only in research means on the NICE website.' The Committee considered this comment but decided not to change the guidance.
19	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Additionally, Aquino[34] conducted a retrospective review of 14 (61%) out of the 23 patients treated with short-pulse TSCPC in her prior RCT study (Aquino 2015). A significant IOP reduction was observed at all time points compared to pre-treatment IOP. After a mean of 78 months follow-up, 67% of the 14 patients had a mean 39% (range 31-68%) IOP reduction from baseline.	Thank you for your comment. The Aquino (2016) review the consultee refers to is a poster presentation. Efficacy data that are unpublished or not peer reviewed are not normally selected for presentation to the committee.
20	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	Lastly, short-pulse TSCPC can be safely repeated in patients. (In section 3.5 of the NICE summary report, the committee commented, "The committee was informed that the procedure may need to be repeated in some patients.") The need to retreat may be due to short treatment times and low energy levels in the initial treatment;[31] however, studies have demonstrated multiple retreatments are safe,[25, 31] enhance treatment effects[25, 31] and extends durability,[34] which can delay the need for more invasive surgeries.	Thank you for your comment. Reference 31 is the Tekeli et al. (2020) study that is included in the Appendix of the overview. Reference 25 is the Nguyen et al. (2019) study that is included in the evidence table of the overview. Reference 34 is the Aquino (2016) review which is not included in the overview because it is a poster presentation that does not report on a rare safety outcome.

				The Committee considered this comment but decided not to change the guidance.
21	Consultee 4 Company Carleton Optical Equipment Ltd	**1.1**	In November 2017, cyclophotocoagulation was approved as part of NICE recommended treatment guidelines for Glaucoma. Moreover, the 2 valid professional expert questionnaires completed (for short-pulse TSCPC) as part of the NICE review, both stated in section 2.2 of the questionnaire that; *"Repetitive short-pulse transscleral cyclophotocoagulation for glaucoma is a minor variation on an existing procedure, which is unlikely to alter the procedure's safety and efficacy".* The Iridex Cyclo G6® and MicroPulse P3® device are cleared by the FDA (K143154) and CE Marked (0086). There are 1,800 Cyclo G6 laser consoles installed worldwide, 42 of which are in UK hospitals. To date, over 140,000 short-pulse TSCPC procedures have been performed worldwide. CW-TSCPC is a high-energy, cyclo-destructive procedure. In contrast, short-pulse TSCPC is a low-energy procedure that delivers about one-third of the energy of CW-TSCPC. MicroPulse technology chops a continuous beam of laser light into a series of repetitive short pulses (ON time) separated by longer rest periods (OFF time). The rest periods allow heat to dissipate and reduce thermal buildup within the tissue, which is associated with a lower complication rate when compared to CW-TSCPC.[1, 2] By limiting the side effects of tissue damage, short-pulse TSCPC affords physicians the	Thank you for your comment. The NICE guideline 81 (2017) Glaucoma: diagnosis and management is listed in the overview in the 'Related NICE guidance' section and committee members were aware of this guideline in their deliberations. The Committee considered this comment but decided not to change the guidance.

			option to treat patients with advanced glaucoma as well as earlier in the disease progression; and before, during, and after other treatment interventions.	
22	Consultee 4 Company Carleton Optical Equipment Ltd	**1.1**	In summary, the 32 peer-reviewed published studies were conducted across 15 countries, which include 2,398 eyes and demonstrate Iridex's commitment to a clinical audit of short-pulse TSCPC treatment. These studies, using the Cyclo G6 laser system and MicroPulse P3 device, have been conducted across a range of patients (ethnicity, age, sex), types of glaucoma severity, and a broad range of primary and secondary glaucoma types, such as open-angle and closed-angle glaucoma, neovascular and other secondary glaucomas. The wide-spread global use of short-pulse TSCPC and robust library of peer-reviewed publications acknowledges short-pulse TSCPC as an efficacious, safer, and more versatile treatment option to the existing NICE-approved, and well-established, CW-TSCPC procedure. The draft guidance states, "Evidence on the safety of repetitive short-pulse transscleral cyclophotocoagulation for glaucoma shows no major safety concerns." However, the "Use Only in Research" recommendation will potentially restrict the use of short-pulse TSCPC in patients carefully selected by UK Glaucoma Specialists. It is important to reiterate that many of these patients have not responded to multiple combinations of drugs and have often had unsuccessful invasive stent or drainage surgery and are in danger of losing sight that cannot be reclaimed if the progression of glaucoma is not abated.	Thank you for your comment. The Committee considered this comment but decided not to change the guidance.

23	Consultee 4 Company Carleton Optical Equipment Ltd	**1.1**	We are committed to working with NICE and UK Glaucoma Specialists who have had direct input to the enhancement of a technology already approved for use. We request that in lieu of an additional RCT as a caveat to use short-pulse TSCPC, that the published clinical data of over 2,300 eyes support a recommendation of consent and audit, which would allow for the continuation of this effective and safe treatment option for a highly complex, volatile and sight-threatening condition. Thank you again for this opportunity to respond to NICE's draft recommendation. We appreciate your review and consideration of our request. With regards, Carleton Optical Equipment Ltd	Thank you for your comment. The Committee considered this comment but decided not to change the guidance.
24	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	References 1.Aquino MC, Barton K, Tan AM, Sng C, Li X, Loon SC, Chew PT. Micropulse versus continuous wave transscleral diode cyclophotocoagulation in refractory glaucoma: A randomized exploratory study. *Clin Exp Ophthalmol*, 2015;43(1):40-6. 2.Abdelrahman AM, El Sayed YM. Micropulse versus continuous wave transscleral cyclophotocoagulation in refractory pediatric glaucoma. *J Glaucoma*, 2018;27(10):900-905.	Thank you for your comment. 1. The Aquino et al. (2015) RCT is included in the evidence table in the overview. 2. The Abdelrahman et al. (2018) study is included in the evidence table in the overview. 3. The Magacho et al. (2019) study is included in the Appendix in the overview.

			3.Magacho L, Lima FE, Avila MP. Double-session micropulse transscleral laser (cyclo G6) for the treatment of glaucoma. *Lasers Med Sci*, 2019. 4.Kaba Q, Somani S, Tam E, Yuen D. The effectiveness and safety of micropulse cyclophotocoagulation in the treatment of ocular hypertension and glaucoma. *Ophthalmol Glaucoma*, 2020;3(3):181-189. 5.Logioco C, Perrone LD, Caruso D, Albertazzi R, Valvecchia G, Zanutigh V. Assessment of efficacy and safety of micropulse diode laser treatment in glaucoma: One year follow-up. *Arch Soc Esp Oftalmol*, 2020;95(7):327-333. 6.Varikuti VNV, Shah P, Rai O, Chaves AC, Miranda A, Lim BA, Dorairaj SK, Sieminski SF. Outcomes of micropulse transscleral cyclophotocoagulation in eyes with good central vision. *J Glaucoma*, 2019;28(10):901-905. 7.Gavris MM, Olteanu I, Kantor E, Mateescu R, Belicioiu R. Iridex MicroPulse P3: Innovative cyclophotocoagulation. *Rom J Ophthalmol*, 2017;61(2):107-111. 8.Barac R, Vuzitas M, Balta F. Choroidal thickness increase after micropulse transscleral cyclophotocoagulation. *Romanian J Ophthalmol*, 2018;62(2):144-148. 9.Preda MA, Popa G, Karancsi OL, Musat O, Popescu SI, Munteanu M, Popa Z. Effectiveness of subconjunctival bevacizumab associated with a laser-based procedure in the treatment of neovascular glaucoma. *FARMACIA*, 2018;66(4):621-626. 10.Al Habash A, AlAhmadi AS. Outcome of MicroPulse® transscleral photocoagulation in different types of glaucoma.	4. The Kaba et al. (2020) study is included in the evidence table in the overview. 5. The Logioco et al. (2020) study is a retrospective cohort study of 110 patients (143 eyes) with a 1-year follow-up. It was retrieved by our post-consultation literature search update and is suggested for inclusion in the main extraction table. 6. The Varikuti et al. (2019) study is included in the Appendix in the overview. 7. The Gavris et al. (2017) study is a case series of 7 patients (7 eyes) with a 1-month follow-up. It will be included in the Appendix in the overview. 8. The Barac et al. (2018) study is included in the Appendix in the overview. 9. The Preda et al. (2018) study is a comparative study of 6 patients with neovascular glaucoma who had mTSCPC in combination with bevacizumab (n=3) or mTSCPC alone, with a 6-month follow-up. It will be included in the Appendix. 10. The Al Habash et al. (2019) study is included in the Appendix in the overview. 11. The Awoyesuku et al. (2019) study is included in the Appendix in the overview.

			Clinical Ophthalmology (Auckland, N.Z.), 2019;(13):2353-2360. 11.Awoyesuku EA, Fiebai F. Outcome of micropulse laser in treatment of open angle glaucoma in a peripheral hospital in rivers state, nigeria: Our initial experience. *Journal of Advances in Medicine and Medical Research*, 2019;29(2):1-7. 12.Elhefney EM, Mokbel TH, Hagras SM, AlNagdy AA, Ellayeh AA, Mohsen TA, Gaafar WM. Micropulsed diode laser cyclophotocoagulation in recurrent pediatric glaucoma. *European Journal of Ophthalmology*, 0(0):1120672119858226. 13.Jammal AA, Costa DC, Vasconcellos JPC, Costa VP. Prospective evaluation of micropulse transscleral diode cyclophotocoagulation in refractory glaucoma: 1 year results. *Arq Bras Oftalmol*, 2019;82(5):381-388. 14.Zaarour K, Abdelmassih Y, Arej N, Cherfan G, Tomey KF, Khoueir Z. Outcomes of micropulse transscleral cyclophotocoagulation in uncontrolled glaucoma patients. *J Glaucoma*, 2019;28(3):270-275. 15.de Crom R, Slangen C, Kujovic-Aleksov S, Webers CAB, Berendschot T, Beckers HJM. Micropulse transscleral cyclophotocoagulation in patients with glaucoma: 1- and 2-year treatment outcomes. *J Glaucoma*, 2020. 16.Preda MA, Karancsi OL, Munteanu M, Stanca HT. Clinical outcomes of micropulse transscleral cyclophotocoagulation in refractory glaucoma-18 months follow-up. *Lasers Med Sci*, 2020. 17.Kuchar S, Moster MR, Reamer CB, Waisbourd M. Treatment outcomes of micropulse transscleral	12. The Elhefney et al. (2019) study is included in the evidence table in the overview. 13. The Jammal et al. (2019) study is included in the Appendix in the overview. 14. The Zaarour et al. (2019) study is included in the evidence table in the overview. 15. The de Crom et al. (2020) study is included in the evidence table in the overview. 16. The Preda et al. (2020) study is included in the Appendix in the overview. 17. The Kuchar et al. (2016) study is included in the Appendix in the overview. 18. The Toyos et al. (2016) study is included in the Appendix in the overview. 19. The Toyos et al. (2016) study is included in the Appendix in the overview. 20. The Lee et al. (2017) study is included in the Appendix in the overview. 21. The Sanchez et al. (2018) study is included in the Appendix in the overview. 22. The Williams et al. (2018) study is included in the evidence table in the overview. 23. The Yelenskiy et al. (2018) study is included in the evidence table in the overview.

			cyclophotocoagulation in advanced glaucoma. *Lasers Med Sci*, 2016;31(2):393-6. 18.Toyos MM, Toyos R. Clinical outcomes of micropulsed transcleral cyclophotocaogulation in moderate to severe glaucoma. *J Clin Exp Ophthalmol*, 2016;7(6):1-3. 19.Emanuel ME, Grover DS, Fellman RL, Godfrey DG, Smith O, Butler MR, Kornmann HL, Feuer WJ, Goyal S. Micropulse cyclophotocoagulation: Initial results in refractory glaucoma. *J Glaucoma*, 2017;26(8):726-729. 20.Lee JH, Shi Y, Amoozgar B, Aderman C, De Alba Campomanes A, Lin S, Han Y. Outcome of micropulse laser transscleral cyclophotocoagulation on pediatric versus adult glaucoma patients. *J Glaucoma*, 2017;26(10):936-939. 21.Sanchez FG, Lerner F, Sampaolesi J, Noecker R, Becerra N, Iribarren G, Grippo TM. Efficacy and safety of micropulse(r) transscleral cyclophotocoagulation in glaucoma. *Arch Soc Esp Oftalmol*, 2018;93(12):573-579. 22.Williams AL, Moster MR, Rahmatnejad K, Resende AF, Horan T, Reynolds M, Yung E, Abramowitz B, Kuchar S, Waisbourd M. Clinical efficacy and safety profile of micropulse transscleral cyclophotocoagulation in refractory glaucoma. *J Glaucoma*, 2018;27(5):445-449. 23.Yelenskiy A, Gillette TB, Arosemena A, Stern AG, Garris WJ, Young CT, Hoyt M, Worley N, Zurakowski D, Ayyala RS. Patient outcomes following micropulse transscleral cyclophotocoagulation: Intermediate-term results. *J Glaucoma*, 2018;27(10):920-925. 24.Garcia GA, Nguyen CV, Yelenskiy A, Akiyama G, McKnight B, Chopra V, Lu K, Huang A, Tan JCH, Francis BA. Micropulse transscleral diode laser cyclophotocoagulation in	24. The Garcia et al. (2019) study is included in the evidence table in the overview. 25. The Nguyen et al. (2019) study is included in the evidence table in the overview. 26. The Sarrafpour et al. (2019) study is included in the Appendix in the overview. 27. The Souissi et al. (2019) study is included in the Appendix in the overview. 28. The Subramaniam et al. (2019) study is included in the Appendix in the overview. 29. The Lee et al. (2020) study is a retrospective case series of 28 patients (30 eyes) with a 1-year follow-up. It was retrieved by our post-consultation literature search update and is suggested for inclusion in the Appendix. 30. The Magacho et al. (2020) study is included in the Appendix in the overview. 31. The Tekeli et al. (2020) study is included in the Appendix in the overview. 32. The Vig et al. (2020) study is included in the Appendix in the overview. 33. The Wong et al. (2020) study is a retrospective case series of 29 patients (32 eyes) with a 1-year follow-up. It was retrieved by our post-consultation literature search

			refractory glaucoma: Short-term efficacy, safety, and impact of surgical history on outcomes. *Ophthalmology Glaucoma*, 2019;2(6):402-412. 25.Nguyen AT, Maslin J, Noecker RJ. Early results of micropulse transscleral cyclophotocoagulation for the treatment of glaucoma. *Eur J Ophthalmol*, 2019;1120672119839303. 26.Sarrafpour S, Saleh D, Ayoub S, Radcliffe NM. Micropulse transscleral cyclophotocoagulation: A look at long term effectiveness and outcomes. *Ophthalmology Glaucoma*, 2019;2167-171. 27.Souissi S, Baudouin C, Labbe A, Hamard P. Micropulse transscleral cyclophotocoagulation using a standard protocol in patients with refractory glaucoma naive of cyclodestruction. *Eur J Ophthalmol*, 2019;1120672119877586. 28.Subramaniam K, Price MO, Feng MT, Price FW, Jr. Micropulse transscleral cyclophotocoagulation in keratoplasty eyes. *Cornea*, 2019;38(5):542-545. 29.Lee JH, Vu V, Lazcano-Gomez G, Han K, Suvannachart P, Rose-Nussbaumer J, Schallhorn J, Hwang D, Han Y. Clinical outcomes of micropulse transscleral cyclophotocoagulation in patients with a history of keratoplasty. *Journal of Ophthalmology*, 2020;20206147248. 30.Magacho L, Lima FE, Avila MP. Double-session micropulse transscleral laser (cyclo G6) as a primary surgical procedure for glaucoma. *J Glaucoma*, 2020;29(3):205-210. 31.Tekeli O, Kose HC. Outcomes of micropulse transscleral cyclophotocoagulation in primary open-angle glaucoma,	update and is suggested for inclusion in the Appendix. 34. The Aquino (2016) review is a poster presentation that does not report on a rare safety outcome. Therefore, it is not included in the overview.

			pseudoexfoliation glaucoma, and secondary glaucoma. *Eur J Ophthalmol*, 2020;1120672120914231. 32.Vig N, Ameen S, Bloom P, Crawley L, Normando E, Porteous A, Ahmed F. Micropulse transscleral cyclophotocoagulation: Initial results using a reduced energy protocol in refractory glaucoma. *Graefes Arch Clin Exp Ophthalmol*, 2020. 33.Wong KYT, Aquino CM, Macasaet AM, Suwandono ME, Chew PTK, Koh VTC. MP3 plus: A modified micropulse transscleral cyclophototherapy technique for the treatment of refractory glaucoma. *J Glaucoma*, 2020;29(4):264-270. 34.Aquino M, Chew P. Long-term efficacy of micropulse diode transscleral cyclophotocoagulation in the treatment of refractory glaucoma. European Glaucoma Society, 2016.	
25	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	TABLE 1: 32 peer-reviewed published studies with ≥ 6 months follow-up demonstrate safety and efficacy in treating patients with a variety of glaucoma types and severity. Studies include a combined total of 2,398 eyes, and were conducted in 15 countries. Summary Doc - Nice - Repetitive Short-Pt Reply to NICE Guidance on Repeti	Thank you for your comment. Please refer to comment 17.
26	Consultee 4 Company Carleton Optical Equipment Ltd	**3.1**	It has also come to our attention that a further Prospective Peer Reviewed Article; Micropulse Trans-scleral Cyclophotocoagulation in Patients With Glaucoma: 1- and 2-Year Treatment Outcomes, Ronald M.P.C. de Crom, University Eye Clinic Masstricht (reprint attached) has been published in the Journal of Glaucoma since our input to	Thank you for your comment. The de Crom (2020) study is already included in the evidence table in the

			NICE. This study, follows 141 eyes from 136 patients over 2 years with both continued reduction in IOP and the number of medications required by the cohort over the 2 year period of the follow-up. As this study adds further to the efficacy data requested by the committee, we would ask that the publication be considered and subsequently reviewed in addition to our earlier submission. The study conclusions are as follows: “Micropulse TSCPC is a safe and effective treatment for lowering both IOP and the number of IOP-lowering medications. Micropulse TSCPC can also be considered as a good alternative treatment option for patients after failed incisional glaucoma surgery or patients who are at high risk for incisional surgery”	overview and has therefore already been considered by the committee.

"Comments received in the course of consultations carried out by NICE are published in the interests of openness and transparency, and to promote understanding of how recommendations are developed. The comments are published as a record of the submissions that NICE has received, and are not endorsed by NICE, its officers or advisory committees."