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GUIDELINE

Follow-up and transition of care for low recurrence risk thyroid cancer patients in Canada

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Abstract

The incidence of differentiated thyroid cancer (DTC) has increased significantly in recent decades. Following initial diagnosis, DTC patients are classified according to the American Thyroid Association (ATA) as low, intermediate, and high risk for recurrence. Patients in the ATA low recurrence-risk category have a recurrence risk of ≤5%, with 20-year disease-specific mortality of <1%. Accordingly, there has been a shift to de-escalating initial treatment, including the relaxation of thyroid-stimulating hormone suppression. In addition, fewer low-risk patients undergo total thyroidectomy or radioactive iodine therapy. However, the optimal long-term surveillance strategy remains unclear, with many patients continuing follow-up in speciality clinics for many years. In addition, emerging evidence suggests that long-term surveillance can be effectively managed in primary care settings. To enhance understanding among Canadian thyroid practitioners and to improve care for Canadian patients diagnosed with low-risk DTC, we developed this consensus statement by collecting feedback from a multidisciplinary team led by one chairperson (endocrinologist), an additional eight endocrinologists, two surgeons, and one patient partner. This consensus statement reflects current evidence and expert opinion regarding initial management and long-term surveillance of low-risk DTC patients. This work is valuable to Canadian thyroid practitioners as it provides standardized guidelines to ensure optimal care and improved outcomes for low-risk DTC patients.

Keywords: low risk of recurrence; thyroid nodule; follow-up; differentiated thyroid cancer; radioactive iodine therapy; thyroid-stimulating hormone; total thyroidectomy; hemithyroidectomy

Introduction

In 2023, 6,300 new cases of thyroid cancer were diagnosed in Canada, with an age-standardized incidence rate of 15.9 per 100,000 people (1). After the initial diagnosis and management, patients with differentiated thyroid cancer (DTC) may be categorized into low-, intermediate-, and high-recurrence risk groups

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following a system developed by the American Thyroid Association (ATA). Individuals diagnosed with low-risk DTC have an excellent prognosis, with 20-year disease-specific mortality of <1% (2) and a risk of recurrence of ≤10% (3). Because of this excellent prognosis, there has been a trend towards de-escalation of treatment of low-risk DTC patients. Options for initial management have expanded from total thyroidectomy to hemithyroidectomy, ablative techniques (where available), and active surveillance for appropriately selected patients (4, 5, 6). Furthermore, low-risk DTC patients are not routinely treated with radioactive iodine therapy (RAI) (7) or aggressive thyroid-stimulating hormone (TSH) suppression (5).

Following this de-escalation of treatment, the non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP) was described in 2016 (8) and is considered a pre-malignant RAS-like lesion with an excellent long-term prognosis. While the initial management of low-risk DTC has become less aggressive, it is unclear how these patients should be surveilled over time. Many patients continue to receive follow-up in speciality clinics led by thyroid cancer experts (endocrinologists, radiation oncologists, or nuclear medicine physicians) for years, and there is a lack of consensus on how to transition them to primary care. Several studies have shown that long-term follow-up by primary care is cost-effective and does not lead to delays in diagnosis of disease recurrence (9, 10, 11). A recent review of this topic concluded that most low-risk DTC patients are suitable for early discharge from tertiary care centres (12).

This consensus statement aims to guide Canadian practitioners regarding initial management and long-term surveillance of low-risk DTC patients. This collective work was based on a review of the current literature, guidelines issued by other organisations (13), and the expert opinion of our Canadian panellists. This statement does not provide guidance on managing intermediate and high-risk DTC. It is only intended for ATA low-recurrence risk patients, considering the medical team, health care system, and patient-specific factors.

Method and grading of evidence

This consensus statement was developed by the Canadian Society of Endocrinology and Metabolism (CSEM). CSEM held an open call for faculty from November 20 to December 5, 2023. The call was posted on the CSEM website and emailed to all CSEM members. Nominations were considered by a selection committee as per our faculty selection policy. All nominations that we received were accepted and a multidisciplinary team led by one chairperson (RP), an additional eight endocrinologists (SG, SAI, JJ, HL, MM, DM, VM, and AZ), two surgeons (EM and SW), and one patient partner (MS) was formed. Contrary to many European countries, in Canada, nuclear medicine specialists are not involved in the follow-up of low-recurrence risk thyroid cancer patients.

Each section of the statement was assigned to one panellist who conducted a literature review, draughted the recommendation(s) with supporting text, and created a bibliography. A description and grading of all the references used to inform this consensus statement are present in Table 1. The entire panel then reviewed and edited the initial draft through regular video conferences and emails. The call for input by CSEM members on the draft statement was open from December 12, 2024 to January 6, 2025. The draft statement was also reviewed independently by CSEM's Guidelines Committee.

The Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) framework was used to grade the quality of evidence and make recommendations (14). The quality of evidence is rated as high (ØØØØ), moderate (ØØØO), low (ØØOO), or very low (ØOOO), while the strength of a recommendation is categorized as either strong (recommended for all or almost all patients), indicated by (1), or weak (different choices may be appropriate for some patients and settings), indicated by (2). The statements considered worthy of being presented but inappropriate for rating the evidence were described as 'ungraded good practice statements'.

Consensus on the recommendations was reached following a modified Delphi process involving one round of voting using an online survey tool (Survey Monkey Inc., USA). Panellists rated each recommendation on a 5-point scale: strongly agree, agree, neutral, disagree, or strongly disagree. The consensus was defined as >80% of voters (a minimum of 10 of 12 voters) strongly agreeing or agreeing with a recommendation. To reach consensus, four recommendations required a second round of voting after rediscussion of the respective recommendations. The survey data, including the total number of individuals who agreed with each recommendation in voting rounds 1 and 2, are reported in Appendix S1 (A and B) in supplementary data (see section on Supplementary materials given at the end of the article).

The final draft of the manuscript was posted on the CSEM website for 3 weeks for critical evaluation by the CSEM members. The final draft was also reviewed by the CSEM Guidelines Committee. The final draft of the manuscript was also sent to all members of the Canadian Collaborative Network for Cancer of the Thyroid (CANNECT) for critical evaluation. All proposed changes and comments were considered within the guideline task force, and the resulting changes were incorporated into the final document submitted to the European Thyroid Journal after approval by the CSEM Guidelines Committee and endorsement by CANNECT.

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Table 1 Grading of references.

Reference	Grade and description
Adam *et al.* (46)	Grade 2, retrospective large observational study, moderate quality
Barranco *et al.* (62)	Retrospective observational single-centre study, low quality evidence
Bedi *et al.* (47)	Grade 2, systematic review, moderate quality
Bender *et al.* (82)	Survey study, low quality evidence
Bi *et al.* (42)	Retrospective, low quality of evidence
Biondi & Cooper (60)	Review article, low quality evidence
Canadian Cancer Statistics (1)	NA
Chereau *et al.* (25)	Retrospective, low to moderate quality of evidence
Chou *et al.* (4)	Systematic review, low quality evidence
Chou *et al.* (56)	Systematic revies, low quality evidence
Cranshaw & Carnaille (26)	Review, NA
De Napoli *et al.* (49)	Grade 3, case series, low quality evidence
Deng *et al.* (28)	Retrospective, low quality of evidence
Diker-Cohen *et al.* (24)	Meta-analysis, low to moderate quality of evidence
Ding *et al.* (41)	Retrospective, low quality of evidence
Durante *et al.* (77)	Low quality evidence (for section on nodule size cutoff for biopsy)
Frates *et al.* (72)	Low quality evidence (retrospective cohort study)
Geron *et al.* (20)	Retrospective, low to moderate quality of evidence
Ghossein *et al.* (15)	Retrospective, low quality of evidence
Giovanella *et al.* (75)	Low quality evidence (all retrospective observational studies)
Grani *et al.* (63)	Mini-review, low quality evidence
Grani *et al.* (71)	Low quality evidence (retrospective observational study)
Haugen *et al.* (5)	Guidelines, NA
Haymart *et al.* (57)	Survey study, low quality evidence
Horiguchi *et al.* (36)	Position paper, NA
Hovens *et al.* (58)	Single centre retrospective observational study, low quality evidence
Imran *et al.* (10)	Retrospective multicentre real-world study, low-to-moderate quality evidence
Issav *et al.* (43)	Meta-analysis, low quality of evidence
Ito *et al.* (16)	Retrospective, low-to-moderate quality of evidence
Janmohamed *et al.* (81)	Survey of 70 MDs, low quality evidence
Jeong *et al.* (69)	High quality evidence (accuracy study – few limitations)
Kim *et al.* (18)	Retrospective, low-to-moderate quality of evidence
Kim *et al.* (19)	Meta-analysis, moderate quality of evidence
Koot *et al.* (39)	Position paper, NA
Kovatch *et al.* (38)	Guidelines statement – NA
Lamartina & Handkiewicz-Junak (12)	Opinion paper, NA
Lang *et al.* (22)	Retrospective, low quality of evidence
Latrofa *et al.* (70)	Retrospective and *in vitro* study, low quality evidence
Leboulleux *et al.* (27)	Retrospective, low-to-moderate quality of evidence
Leboulleux *et al.* (7)	Prospective RCT, high quality of evidence
Leboulleux *et al.* (52)	Randomised clinical trial, high quality of evidence
Lee *et al.* (64)	Randomised control study protocol of evidence not applicable
Leenhardt *et al.* (73)	Low quality evidence
Mallick *et al.* (51)	Randomised control study protocol description – NA
Matsuura *et al.* (33)	Retrospective, low quality of evidence
Matsuzu *et al.* (66)	Low quality evidence (retrospective observational)
McDow, 2019 (54)	Retrospective observational study, low quality evidence
Meyer *et al.* (61)	Retrospective observational single-centre study, low quality evidence
Miccoli *et al.* (48)	Grade 4, review article, very low quality
Miyauchi *et al.* (40)	Retrospective, low quality of evidence
Momesso *et al.* (67)	Low quality evidence (retrospective observational)
Neha 2021	Low quality evidence (survey data)
Nguyen *et al.* (9)	Retrospective observational study, low quality evidence
Nikiforov *et al.* (8)	Retrospective, moderate quality of evidence
Orloff *et al.* (6)	Consensus statement – NA
Park *et al.* (79)	Retrospective observational study, low quality evidence
Park *et al.* (65)	Retrospective observational study, low quality evidence
Pitoia *et al.* (3)	Retrospective single centre review, low quality evidence
Rios *et al.* (44)	Observational study, low quality evidence

(Continued)

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Table 1 Continued.

Reference	Grade and description
Ryoo *et al.* (80)	Retrospective cohort study, 10-year follow-up, moderate quality evidence
Sanabria *et al.* (21)	Meta-analysis, moderate quality of evidence
Satapathy *et al.* (53)	Retrospective observational study, low quality evidence
Schumm *et al.* (50)	Grade 3, case series, low quality evidence
Seejore *et al.* (11)	Retrospective single centre study, low quality evidence
Sek *et al.* (83)	Moderate quality evidence
Shin *et al.* (17)	Retrospective, low-to-moderate quality of evidence
Signore *et al.* (55)	Retrospective observational study, low quality evidence
Torlontano *et al.* (68)	Moderate evidence (accuracy study, but some ROB in relatively short follow-up period of 32 months to define risk of recurrence)
Tran *et al.* (2)	National database analysis, moderate quality evidence
Tuttle *et al.* (76)	Retrospective observational study, low quality of evidence
Tuttle *et al.* (23)	AJCC classification, NA
Tuttle *et al.* (13)	Consensus joint statement paper, NA
Tuttle *et al.* (37)	Retrospective, low quality of evidence
WHO classification of tumours (35)	WHO classification, NA
Wu *et al.* (45)	Grade 2, prospective large observational study, moderate quality of evidence
Wu *et al.* (74)	Low quality evidence (prospective cohort study)
Xie *et al.* (29)	Retrospective, low quality of evidence
Xu *et al.* (59)	Single centre retrospective observational study, low quality evidence
Xu *et al.* (32)	Retrospective, low quality of evidence
Yamazaki *et al.* (34)	Retrospective, low quality of evidence
Yang *et al.* (84)	Moderate quality evidence
Zhao *et al.* (31)	Meta-analysis, low-to-moderate quality of evidence
Zhang *et al.* (78)	Large retrospective cohort study, long follow-up, moderate
Zhang *et al.* (30)	Retrospective, low quality of evidence

Definition of low-risk thyroid cancers

The risk of recurrence of DTC is determined by specific clinical, pathological and biochemical factors that represent a continuum of risk (5). Low-recurrence risk DTC (low-risk DTC) characteristics are discussed below and listed in Table 2.

Intrathyroidal tumours ≤4 cm (pT1 and pT2) are at low risk of recurrence. While DTCs >4 cm without aggressive characteristics (vascular invasion, extrathyroidal extension (ETE), etc.) were shown to have a low risk of recurrence (15); they were also reported to have a significantly higher recurrence rate (16, 17). Therefore, intrathyroidal tumours >4 cm (pT3a), without other risk factors, could be considered in a low–intermediate risk category.

Unifocal tumours are classified as low-risk DTCs. Tumour multifocality is associated with an increased incidence of metastatic lymph nodes (MLN) and ETE, but its significance as an independent risk factor of recurrence remains a subject of debate in the literature (18, 19, 20).

In addition, a meta-analysis of 7,696 patients found that microscopically positive margins (MPMs) did not have a significant impact on recurrence (21). Lang *et al.* demonstrated that posterior, but not anterior MPM, was an independent risk factor for recurrence (22), thus supporting that tumours with negative margins or anterior MPMs can be considered low-risk DTC.

Minimal ETE (mETE) is defined as microscopic tumour invasion into perithyroidal tissues detected only by histologic examination, whereas gross or extensive ETE is defined as macroscopic tumour invasion into local structures (5). The latter has a clear impact on recurrence and mortality, but mETE was removed from the 8th American Joint Committee on Cancer (AJCC) classification because its impact on mortality was refuted (23). Nevertheless, its role in the risk of recurrence is worth discussing. A meta-analysis of 23,816 patients revealed that mETE was associated with a 3.5% risk of recurrence in patients with negative lymph nodes (N0) (24), while another study demonstrated a risk of recurrence of 6 and 18% in tumours with mETE measuring, respectively, ≤1 cm and 1–4 cm (25). When considering the heterogeneity observed in the literature, mETE could be considered as a low-risk factor in pT1a tumours and as a low–intermediate risk factor in pT1b and pT2 tumours.

The number and size of MLN impact the risk of DTC recurrence. According to ATA guidelines, clinical N0 and ≤5 pathologic central compartment MLN of <0.2 cm confers a low risk of recurrence (26, 27). Unfortunately, many patients do not fit these criteria and thus cannot be classified into the ATA risk of recurrence paradigm (e.g. one MLN of 0.4 cm).

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Table 2 The characteristics of low recurrence risk DTC.

Low recurrence risk DTC characteristics*	SOR	QOE	ROR <10%
All of the following:			1–8%
• *Tumour of ≤4 cm (pT1, pT2)*	1	ØØOO	1–2% for pT1; ≈5% for pT2
• *Unifocal*	2	ØØØO	2–4%
• All macroscopic tumour have been resected			
• Negative margins *or only microscopic positive anterior margin*	2	ØØOO	1–5%
• No tumour invasion of loco-regional tissues or structures			
• *With the exception of minimal extrathyroidal extension in papillary thyroid microcarcinoma (pT1a)*	2	ØØØO	3–6%
• Pathological N0 or clinical N0 and presence of ≤5 pathologic central compartment N1(pN1a) of <0.2 cm, without extranodal extension			≈5%
• *A size of < 0.5 cm instead of <0.2 cm (ATA guidelines criterion) could confer a low risk of recurrence, with inconsistent data (see text)*	2	ØØOO	7.8%
• No local or distant metastases			
• If radioactive iodine (RAI) is given, there are no RAI-avid foci outside the thyroid bed on the posttreatment whole-body RAI scan			
Specific for PTC:			1–6%
• No aggressive histology (e.g. diffuse sclerosing, tall cell, hobnail variant, columnar cell carcinoma)			
• No molecular mutation identified (if known)			
• *BRAFv600E mutation in intrathyroidal carcinoma ≤2 cm (pT1), in the absence of other mutations, does not appear to result in an elevated risk of recurrence*	1	ØØØO	
• No vascular invasion			3–6%
Specific for follicular and oncocytic thyroid carcinoma†:			2–5.5%
• Minimally invasive (capsular invasion only)			2–3%
• Encapsulated angioinvasive with minimal vascular invasion (<4 foci)			5%
• *A number of <2 foci instead of <4 foci (ATA guidelines criterion) could be considered to establish a low risk of recurrence, with inconsistent data (see text)*	2	ØØOO	5.5% (vs 24.6% with ≥2 foci)‡

PTC, papillary thyroid carcinoma; ATA, American Thyroid Association; DTC, Differentiated thyroid cancer; RAI, radioactive iodine therapy; SOR, strength of recommendation; QOE, quality of evidence; ROR, risk of recurrence.
*Adapted from the 2015 ATA guidelines (5). In italic, proposed deviations from the 2015 ATA guidelines risk stratification based on more recent literature with corresponding quality of evidence and strength of recommendation. †Histology nomenclature according to the WHO classification of tumours, 5th edition (35). ‡Risk of recurrence according to Yamasaki *et al.* 2022 (34).

While the criterion of ≤5 MLN seems to be well-established, there is significant inconsistency in the literature to determine the optimal size of MLN that impacts cancer prognosis. The cutoff of <0.2 cm is an empiric criterion based on observations made in other solid tumours, and two studies established a different cutoff in well-characterized DTC patient cohorts. One study found that a diameter of metastatic focus in MLN of ≥0.536 cm was significant in predicting structural incomplete response (28), and another study predicted a low risk of recurrence using a cutoff of 0.4 cm (29). While emphasizing the uncertainty in this area, the criteria of ≤5 pathologic central compartment MLN of <0.5 cm without extranodal extension (ENE) could be considered for low-risk DTCs to stratify a larger number of patients.

Access to molecular testing (MT) remains inconsistent across Canada. $BRAF^{V600E}$ is the most frequent mutation found in papillary thyroid carcinoma (PTC) (40–60%) and is associated with more aggressive clinicopathological characteristics. However, its isolated presence in low-risk DTC does not seem to worsen clinical outcomes (7). In contrast, *TERT* promoter mutations, whether isolated or in combination with *BRAF*, *RET/PTC* or *RAS* mutations, confer tumour aggressiveness and a poorer prognosis (30, 31).

The impact of focal vascular invasion in encapsulated angioinvasive follicular thyroid carcinoma (eaFTC) on recurrence risk remains a subject of debate. Tumours exhibiting <4 foci are considered to carry a low risk of recurrence (32, 33). Conversely, Yamasaki *et al.* demonstrated that patients with ≥2 foci of vascular invasion had a significantly worse prognosis than those with only a single focus (34). This suggests that a cutoff of <2 instead of <4 foci could be considered to indicate a low risk of eaFTC recurrence and highlights the fact that even a minimal number of vascular foci can be a significant concern for risk stratification.

Stratification criteria for determining the risk of recurrence remains an area with many uncertainties and a low level of evidence. Clinical judgement always applies, and practice patterns favour a less aggressive approach, including consideration for hemithyroidectomy.

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Initial management: what is the role of active surveillance or thermal ablation in the management of low-risk DTC?

Strategies of active surveillance and the use of thermal ablation techniques (e.g. radiofrequency ablation) have been introduced as viable alternatives to standard surgical therapy for the treatment of low-recurrence risk papillary thyroid carcinomas (LRR-PTC). Over the past two decades, many retrospective and prospective randomised studies have shown that most patients diagnosed with papillary thyroid microcarcinomas (PTMCs) do not demonstrate disease progression during active surveillance (6, 36). However, only retrospective studies have shown the safety and efficacy of minimally invasive ablative techniques for patients deemed unfit for surgery, or who decline both surgery and active surveillance (6, 37). International guidelines and consensus statements have concluded that both active surveillance and minimally invasive ablative techniques are considered safe and feasible alternatives in carefully selected patients with LRR-PTC, although the quality of evidence remains low (4, 36, 38, 39).

When considering active surveillance or minimally invasive thermal ablation techniques as treatment options, it is crucial to carefully select patients and classify them as ideal, appropriate, or inappropriate candidates (37, 39). Surveillance can be considered based on various patient and tumour characteristics (Table 3). In addition, a fine-needle aspiration biopsy of suspicious tumours should be performed to risk stratify LRR-PTC and help guide therapeutic management (39, 40). Appropriate communication with the patient in the context of shared decision-making is key for its successful implementation (39). Similar factors with some minor variations exist when deciding upon an ablative technique for treating PTMC (6, 37). Ablative techniques have just been introduced in Canada and remain under research protocol at a single Canadian centre in Toronto, currently limiting their option for LRR-PTC in other Canadian provinces.

There are some circumstances where caution must be exercised. Studies are currently investigating size thresholds to determine at what point surgery versus active surveillance becomes more beneficial with respect to overall and disease-specific survival (41, 42). In addition, tumour progression occurs in up to 15% of LRR-PTC without any clinicopathological predictors, indicating that one size fits all treatment models does not apply (43). Similarly, the biology of LRR-PTC in familial papillary thyroid cancer behaves more aggressively than its sporadic counterparts, making immediate surgery the preferred management strategy in this patient population (44).

Lack of uniform access to MT, procedural costs, and expertise required for adopting ablative techniques may limit the ubiquitous adoption of these treatment options within the Canadian healthcare system. Currently, a pan-Canadian prospective observational clinical trial is recruiting patients to examine the outcomes between active surveillance and immediate surgery to manage LRR-PTC (Clinicaltrials.gov identifier: NCT04624477).

Tumour reassessment and risk stratification must be reevaluated continuously so that salvage surgery can be planned and offered accordingly (45).

Extent of thyroid surgery: which patients should be treated with hemithyroidectomy versus total thyroidectomy

Which patients need total/near-total thyroidectomy?

Thyroidectomy represents the critical cornerstone of thyroid cancer treatment. The decision to perform a total/near-total (TT) versus hemithyroidectomy/isthmusectomy (HT) for the initial treatment of PTC and/or follicular thyroid carcinoma is based on the estimated risk of cancer recurrence and/or death. This decision is shared between the patient and their

Table 3 Factors favouring active surveillance.

Factor	Criteria favouring active surveillance
Tumour characteristics (6, 37, 39)	≤1.0 cm (expansion towards T1b tumours (up to 2 cm)) No aggressive cytology
Sonographic features/tumour location (6, 37, 39)	Tumour location away from the trachea and recurrent laryngeal nerve (39) No cervical lymphadenopathy
Patient age (6, 37, 39)	Older age ideal (>60 years old)
Education and communication (6, 37, 39)	Experienced thyroid treating team
Informed consent (37, 39)	Education regarding rationale, benefits and risks when choosing active surveillance
Shared decision-making (37, 39)	Preferences, values, and expectations are aligned between the patient and treating team. Strength of recommendation: 2; quality of evidence: (ØØOO)

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multidisciplinary care team and is best arrived at through education and discussion, which includes careful consideration of both the patient's wishes and cancer characteristics. Effective communication between care team members, including the surgeon and endocrinologist, and in some cases, input from a multidisciplinary thyroid cancer tumour board, is crucial in determining the appropriate extent of thyroid surgery. Important considerations that will influence the extent of thyroid surgery (TT vs HT) for the treatment of DTC include patient and disease characteristics:

Patient characteristics

- A personal history/diagnosis of a familial thyroid cancer genetic predisposition syndrome (recommend TT) – (strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (11/12); round: 1).
- A personal history of neck radiation exposure (recommend TT) – (strength of recommendation: 1; quality of evidence: (ØØØØ); agreement (10/12); round: 1).
- A significant family history of thyroid cancer (defined as three or more first-degree relatives in the absence of other known associated syndromes) (recommend TT) – (strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (10/12); round: 1).
- Patient/family preference for TT is based on the outcome of shared decision-making between the surgeon/multidisciplinary care team and the patient – (strength of recommendation: 2; quality of evidence: (ØØØO); agreement: (12/12); round: 1).

Important points for the healthcare provider to discuss with the patient when deciding the extent of surgery:

- Review of potential short-term and long-term surgical risks/complications (postoperative haemorrhage; negative impact on voice, swallowing and breathing related to injury of the recurrent laryngeal nerve(s) and/or superior laryngeal nerve(s); hypoparathyroidism due to injury/inadvertent removal of the parathyroid gland(s). (Strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (12/12); round: 1).
- An understanding that there is a high probability of requiring levothyroxine regardless of the extent of surgery. (Strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (10/12); round: 1).
- Recognition that long-term thyroid cancer surveillance will be required regardless of the extent of the initial operation. (Strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (11/12); round: 1).
- There is an increased risk of recurrence after HT compared with TT, although the risk of thyroid cancer-related mortality is equivalent. (Strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (12/12); round: 1).
- That subsequent completion of hemithyroidectomy may be recommended if the final surgical pathology reveals features suggesting an intermediate or high risk of cancer recurrence that could not be predicted before the initial operation, usually to allow for adjuvant radioactive iodine treatment. (Strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (12/12); round: 1).

Disease characteristics based on preoperative assessment

- Primary cancer characteristics (favour TT).
  - Size larger than 4 cm (strength of recommendation: 1; quality of evidence: (ØØØO); agreement: (11/12); round: 1).
  - Has evidence of gross extra-thyroidal extension/ invasion (strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (12/12); round: 1).
  - Is multifocal (strength of recommendation: 1; quality of evidence: (ØØØØ); agreement: (11/12); round: 1).
  - Has clinical evidence of associated lymph node metastasis (within central and/or lateral neck compartments) (strength of recommendation: 1; quality of evidence: (ØØØO); agreement: (12/12); round: 1).
  - Has clinical evidence of associated distant metastasis (strength of recommendation: 1; Quality of evidence: (ØØØØ); agreement: (12/12); round: 1).
- Thyroid gland characteristics (favour TT).
  - The thyroid lobe and neck contralateral to the primary tumour have been evaluated (e.g. with the standard approach using ultrasound (US) +/– fine-needle aspiration biopsy (FNAB) as appropriate) and had clinically significant lesions (benign, malignant, or indeterminate) requiring surgery (5, 45, 46) (strength of recommendation: 2; quality of evidence: (ØØØO); agreement: (12/12); round: 1).

Who should perform thyroid surgery and where should it be conducted?

Regardless of training background, the surgeon should have an adequate annual volume of thyroid operations (e.g. 25–50 per year) (47). (Agreement: (12/12); round: 1).

- These procedures should be carried out at centres where thyroid operations are commonly performed and where anaesthesia and nursing expertise are needed to manage these patients. (Strength of recommendation: 2; quality of evidence: (ØØØO); agreement: (12/12); round: 1).

Extent of surgery impacted by molecular prognosticators?

- Molecular prognostic markers have more recently been utilised alone or in combination with

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ultrasound characteristics to help guide the extent of surgery for DTC patients (48, 49).
- Early reports suggest that the impact of adopting such molecular prognostic markers on surgical practice could lead to a de-escalation of initial thyroid surgery (50).
- While the availability of MT across Canada for diagnosis, or better yet, prognostication, has been limited, it will likely become more commonplace in the future.

Post-operative management

Indications for remnant ablation

RAI is not recommended for patients undergoing partial thyroidectomy or hemithyroidectomy only. The goals of RAI therapy include remnant ablation, adjuvant therapy, and treatment of known disease.

A definitive benefit of RAI in low-risk DTC has not been conclusively demonstrated through larger randomised trials. Two prospective studies are currently underway (7, 51), and the preliminary 3-year follow up data from one comparing low-dose (30 mCi) RAI with no RAI in low-risk (T1a/T1b, N0/Nx) papillary, follicular, or oncocytic/Hurthle cell carcinoma without ETE, regardless of multifocality, RAS, or $BRAF^{V600E}$ mutation status, reported no differences in tumour related outcomes (7). A subgroup analysis of the pathology demonstrated that approximately 25% of participants had advanced pathological features, including tall or columnar cells, which did not meet the initial inclusion criteria for low-risk DTC. A subsequent analysis of these data at 5 years essentially confirmed the initial findings (52). These results support the growing consensus that RAI does not appear to improve the already excellent survival rates in low-risk DTC patients. Notably, a greater risk of disease recurrence was observed in patients with post-operative serum thyroglobulin (Tg) above 0.5–1.0 ng/mL, thus suggesting the need for tailoring RAI based on early response to therapy. Another non-randomised retrospective study compared more advanced stage DTC (T1-T3a, N0/N1 with <5 lymph nodes, all <0.2 cm) with or without RAI and a median follow-up of 8 years. This study reported that RAI did not confer any survival benefit (53); however, a detailed pathological review was not reported. Up to 3% of patients subsequently developed a cervical or distant recurrence, in keeping with the expected rate of disease recurrence from low-risk DTC.

The role of post-operative Tg (post-op Tg) in determining the need for RAI is particularly challenging and depends upon several factors, such as the extent of surgery, Tg assay, presence of anti-Tg antibody, and serum TSH level. While there is a paucity of robust, long-term data, a retrospective study showed no early cancer recurrence in patients managed without RAI who had achieved an unstimulated Tg of <0.2 ng/mL post-op with low Tg antibody titre (54). Another study reported that a post-op unstimulated serum Tg cutoff of 1.3 ng/mL reliably predicted the absence of nodal disease (55). A recent systematic review suggested that a post-op serum Tg cutoff of 1–2.5 ng/mL might identify patients at low risk of persistent or metastatic disease (56). While an exact serum Tg cutoff value remains elusive, it is reasonable to assume that low-risk DTC patients with undetectable or very low (<1–2.5 ng/mL) post-op serum Tg do not require RAI, whereas in patients who have higher than expected Tg, RAI for remnant ablation or adjuvant therapy may be considered. It is also crucial to evaluate the surgical variations, including the intent of surgery and the patient's pre-operative risk, when interpreting post-surgical Tg to avoid unnecessary surgical complications and ensure appropriate management decisions.

TSH target and thyroid hormone replacement

The evidence for defining the appropriate TSH target in low-risk DTC is lacking (57). TSH has the potential to act as a growth factor for follicular thyroid tissue and, therefore, could promote the growth of recurrent or persistent DTC. TSH suppression can reduce the progression of recurrent or persistent DTC and the recurrence of high-risk DTC (58). No convincing evidence suggests that TSH suppression below the normal reference range prevents recurrence of low-risk DTC (59). Levothyroxine replacement resulting in subclinical hyperthyroidism due to over-replacement may result in adverse effects, even when the target TSH is within the normal reference range (e.g. lower bone density and development of arrhythmias) (60). Many patients, after initial therapy for DTC with HT, will not require thyroid hormone replacement to maintain TSH levels in the normal reference range (61, 62). An unanswered question is whether there is a benefit to maintaining TSH within the lower part of the normal reference range (e.g. ATA recommendation of the lower limit of normal (LLN) to 2.0 mIU/L) versus tolerating a higher TSH, (e.g. up to the upper limit of normal (ULN) or even some degree of subclinical hypothyroidism (SCH)) (63).

We summarised our recommendations regarding post-op serum Tg and TSH target levels for patients after HT and those after TT +/− RAI with an excellent response to therapy in Table 4.

Frequency, modality, and duration of follow-up for total thyroidectomy and hemithyroidectomy

Duration of DTC follow-up remains unclear as late recurrence, even 20 years after the initial diagnosis, has been documented (66). However, most patients (73–85%) achieve excellent responses to therapy with

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Table 4 Summary of recommendations on post-operative management of low-risk DTC patients.

Recommendation	SOR	QOE	Agreement
Serum Tg and RAI			
A baseline serum Tg (along with Tg antibody) should be obtained at least 4 weeks post-surgery in patients with TT to determine the need for RAI in all low-risk DTC patients undergoing TT. Serum TSH must be normalised before testing to ensure a true baseline level	1	ØØØO	11/12; round: 1
RAI for low-risk DTC patients is not routinely recommended	1	ØØØØ	12/12; round 1
RAI for remnant ablation or adjuvant therapy may be considered in low-risk DTC patients who have higher than expected (>1–2.5 ng/mL after TT) post-op serum Tg levels	2	ØØØO	10/12; round 1
What is the TSH target range for patients with low-risk DTC?			
There is insufficient evidence to suggest a specific target TSH range for all patients with low-risk DTC (57, 59). However, there is evidence to suggest that targeting a TSH level below the normal range may cause harm (60). A prospective randomised control trial is being conducted to address this question (64)	2	ØØØO	12/12; round 1
What is the TSH target for patients with TL?			
TSH should be monitored periodically post TL starting at 2–3 months post-operatively. Elevated TSH mildly above the target range should be confirmed with a second test. We recommend targeting a TSH within the normal laboratory reference range for patients with low-risk DTC treated with hemithyroidectomy (59)	2	ØØOO	10/12; round 1
What is the TSH target for those with TT +/− RAI and excellent response to therapy?			
We recommend a TSH within the normal reference range. The benefit of targeting a TSH between the LLN and 2.0 in low-risk DTC patients is unknown. We recommend against targeting a TSH below the LLN. Any possible benefit of TSH suppression to ≤2.0 on recurrence risk likely diminishes over time as the absolute risk of recurrence declines (65)	2	ØØOO	11/12; round: 1

DTC, differentiated thyroid cancer; LLN, lower limit of normal; RAI, radioactive iodine therapy; Tg, thyroglobulin; TL, hemithyroidectomy; TSH, thyroid-stimulating hormone; TT, total thyroidectomy; SOR, strength of recommendation; QOE, quality of evidence.

recurrence rates <2% (45). Follow-up for low-risk DTC needs to be balanced with the cost and psychological burden of ongoing surveillance. Dynamic risk stratification (67) provides a better prediction of recurrence when applied to patients 12–18 months after treatment, and this approach has been adapted to guide the follow-up process (Table 5). An algorithm for follow-up is summarised in Fig. 1.

Follow-up in patients after total thyroidectomy

Diagnostic 131-iodine whole-body scans (WBS) do not contribute to routine follow-up of low-risk DTC patients. Uptake on diagnostic WBS correlates with residual thyroid tissue rather than true disease (68). This residual tissue may produce Tg, which underscores the importance of evaluating post-operative Tg levels. While low Tg post-HT is encouraging, elevated Tg does not always indicate increased risk, but rather highlights the need for individualised monitoring. Adopting high-sensitivity thyroglobulin assays has also rendered it unnecessary to perform recombinant human thyrotropin (rhTSH) stimulation (69).

The mainstay of monitoring low-risk DTC is unstimulated Tg and neck ultrasound, with initial evaluation 6–12 months after therapy. Undetectable or stable and low levels of Tg (<1 ng/mL) have a high negative predictive value for recurrence. However, it should be noted that elevated thyroglobulin antibodies, even at low concentrations, may interfere with Tg assays, resulting in falsely low Tg measurement (70). Therefore, Tg levels should always be interpreted in context of Tg antibody levels. In patients with low Tg (<1 ng/mL) and low Tg (<1 ng/mL) and low Tg antibody titre, routine ultrasounds may not be required (71). However, no prospective studies have evaluated the optimal frequency of ultrasound monitoring. Neck ultrasound should ideally be interpreted by radiologists or other clinicians experienced in thyroid imaging as post-operatively thyroid bed lesions are frequently detected by ultrasound (~40%) and are usually benign (72). The use of standardised reporting (73) can improve the quality of reports and assist with physician interpretation of non-specific results (74).

Follow-up in patients after hemithyroidectomy

The utility of Tg monitoring after hemithyroidectomy is being called into question; there is a significant overlap in Tg levels in those individuals with and without recurrence (56, 75). Tg levels can slowly rise after hemithyroidectomy, even without recurrence, so caution must be made when trending levels (75). Very high Tg levels (>100 ng/mL) may suggest distant metastatic disease, warranting further investigation (75), but this scenario is rare, and the use of Tg as a screening test for distant metastatic disease has not been validated. Given the lack of utility of Tg to detect disease recurrence, monitoring after hemithyroidectomy should rely on neck ultrasound. No studies have identified the ideal frequency of US monitoring in this patient population.

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Table 5 Dynamic risk stratification. Adapted from (67, 76), and (56).

Category	Treatment received	Definition	QOE	SOR	Agreement, round
Excellent response	Total thyroidectomy with RAI	Negative imaging AND Suppressed Tg < 0.2 ng/mL OR TSH-stimulated Tg < 1 ng/mL AND Negative TgAb	ØØOO	1	11/1, 1
	Total thyroidectomy without RAI	Negative imaging AND Suppressed Tg < 2.5 ng/mL AND Negative TgAb	ØOOO	1	11/12, 1
	Hemithyroidectomy	Negative imaging	ØOOO	1	10/12, 1
Indeterminate response	Total thyroidectomy with RAI	Non-specific findings on imaging; faint uptake in thyroid bed on RAI scanning; suppressed Tg: 0.2–1 ng/mL; stimulated Tg: 1–10 ng/mL; TgAb present but stable or declining (in absence of structural disease)	ØØOO	1	11/12, 1
	Total thyroidectomy without RAI	Non-specific findings on imaging; suppressed Tg: 2.5–5 ng/mL; TgAb present but stable or declining (in absence of structural disease)	ØOOO	1	10/12, 1
	Hemithyroidectomy	Non-specific findings on imaging	ØOOO	1	8/11, 1
Biochemically incomplete response	Total thyroidectomy with RAI	Negative imaging AND Suppressed Tg > 1 ng/mL OR TSH-stimulated Tg > 10 ng/mL OR rising TgAb levels	ØØOO	1	9/12, 1
	Total thyroidectomy without RAI	Negative imaging and suppressed Tg > 5 ng/mL OR rising TgAb levels	ØOOO	1	10/12, 1
	Hemithyroidectomy	N/A	N/A	N/A	10/11, 1
Structural incomplete response	Total thyroidectomy with RAI	Structural or functional evidence of disease	ØØOO	1	11/12, 1
	Total thyroidectomy without RAI		ØØOO	1	11/12, 1
	Hemithyroidectomy		ØØOO	1	10/12, 1

N/A, not applicable; QOF, quality of evidence; RAI: radioactive iodine; SOR, strength of recommendation; Tg, thyroglobulin; TgAb, thyroglobulin antibodies.

Optimal care settings and transitions of care

Despite the excellent prognosis of patients with low-risk DTC, the ATA guidelines recommend lifelong follow-up of low-risk DTC patients due to the possibility of disease recurrence greater than 10 years after diagnosis (5). Several studies have shown that 50–67% of disease recurrences occur in the first 2 years of post-operative follow-up, and 75–90% occur in the first 5 years of post-operative follow-up (78, 79, 80). Patients exhibiting a persistent excellent response to therapy (see Table 5 for definition) during the first 2 years of post-op follow-up are unlikely to experience later disease recurrence (11). However, most patients are indefinitely followed by endocrinologists or other specialists with expertise in thyroid cancer management, regardless of their response to therapy status, which can limit the capacity of these specialists to manage new patients.

While there are limited data on the transition of low-risk DTC patients from speciality clinics into primary care provider (PCP) settings, few studies suggest that long-term follow-up of low-risk DTC patients under PCP care is cost-effective and does not lead to delays in diagnosis of disease recurrence (9, 10). However, a survey of Canadian endocrinologists revealed that the main barriers to discharge of low-risk DTC patients were concerns regarding PCPs' ability to follow management recommendations and adjust levothyroxine dosing, and the perception of low patient confidence in their PCP to manage their thyroid cancer long-term (81). Mirroring this concern, a survey of 202 DTC patients found that 68% agreed with shared care between specialists and PCP, but only 15% were accepting of the transition to PCP alone due to concerns regarding whether they would receive adequate care (82). However, the rising incidence of thyroid cancer, excellent prognosis of low-risk DTC patients, and limited capacity of specialist care necessitate education and engagement of PCPs and/or nurse practitioners (NPs) in the long-term follow-up of low-risk DTC patients.

We present a three-part framework to ensure the successful transition of low-risk DTC patients from specialist to PCP/NP care. The optimal long-term follow-up strategy for low-risk DTC patients should

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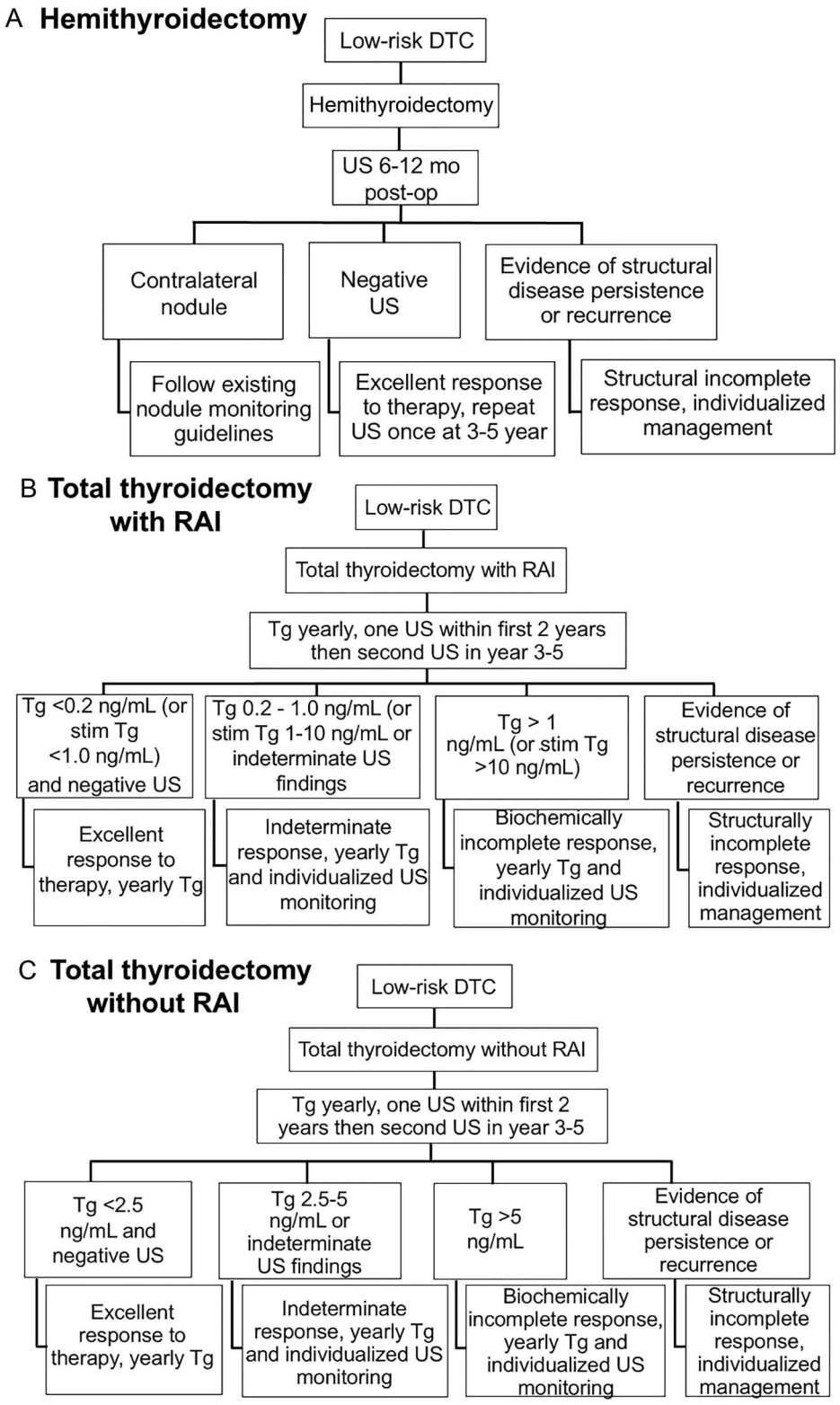

Figure 1

Initial evaluation of response to therapy. (A) Is the response to therapy for total thyroid lobectomy, (B) is for total thyroidectomy with RAI, and (C) is for total thyroidectomy without RAI. Abbreviation: DTC, differentiated thyroid cancer; RAI, radioactive iodine therapy. Tg, thyroglobulin; US, ultrasound.

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balance health outcomes, healthcare costs, and physician and patient comfort and preferences.

Recommendation: Appropriately selected low-risk DTC patients should be transitioned from specialist to PCP/NP care for their long-term follow-up. The timing of the transition should be based on clinical factors, including response to therapy, patient and physician preference, and availability of PCP providers. (Strength of recommendation: 1; quality of evidence: (ØØØO); agreement (12/12); round 1).

Framework for the successful transition of low-risk DTC patients from specialist to PCP/NP care

Selecting the appropriate patient and timing for transition of care

We classify low-risk DTC patients as appropriate for transition at year 2 (see section titled 'Appropriate for transition at year 2'), appropriate for transition between 3 and 5 years (see section titled 'Appropriate for transition at year 3–5'), and appropriate for continued specialist care (see section titled 'Appropriate for continued specialist care') based on several clinical factors described below and summarised in Fig. 2.

Specialists may choose to transition patients to PCP later than recommended due to patient or physician preference, lack of availability of PCP, or other special circumstances such as challenging thyroid hormone replacement or pregnancy plans. It is important to note that this section applies only to ATA low-risk patients and does not address ATA intermediate- or high-risk patients, which are outside the scope of this manuscript.

Appropriate for transition at year 2

To be eligible for transition from specialist to PCP care after 2 years of post-operative follow-up, patients must meet alL of the following criteria:

- Initial treatment: hemithyroidectomy, total thyroidectomy, or total thyroidectomy with radioactive iodine
- ATA risk of recurrence: low risk (see Table 2 for definition of ATA low risk)
- Response to therapy: excellent response to therapy for a minimum of 2 consecutive years of post-operative follow-up, including at the time of discharge (see Table 5 for definition of excellent response to therapy) (strength of recommendation: 1; quality of evidence: (ØØØO); agreement (11/12); round 1).

Appropriate for transition at year 3–5

To be eligible for transition from specialist to PCP care between 3 and 5 years of post-operative follow-up, patients must meet alL of the following criteria:

- Initial treatment: hemithyroidectomy, total thyroidectomy, or total thyroidectomy with radioactive iodine.
- ATA risk of recurrence: low risk (see Table 2 for definition of ATA low risk).
- Response to therapy: indeterminate response to therapy based on:

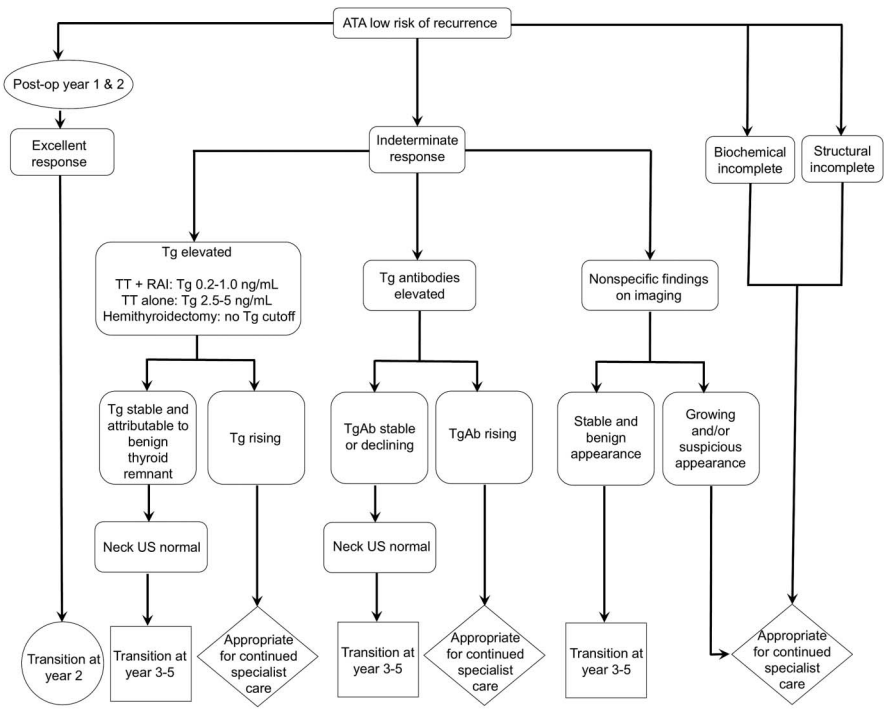

Figure 2

Schematic representation of patient selection and timing for transition of care of low-risk DTC patients. ATA, American Thyroid Association; Tg, thyroglobulin; TgAb, thyroglobulin antibody; TT, total thyroidectomy; RAI, radioactive iodine therapy; US, ultrasound.

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- Elevated but stable thyroglobulin level attributable to benign thyroid remnant:
  (i) Hemithyroidectomy: non-stimulated Tg is not used to define indeterminate response.
  (ii) Total thyroidectomy with RAI: non-stimulated Tg 0.2–1.0 ng/mL.
  (iii) Total thyroidectomy without RAI: non-stimulated Tg 2.5–5 ng/mL.
- Elevated but stable or declining thyroglobulin antibody in the absence of structural disease. Elevated thyroglobulin antibodies are presumed to be due to thyroid autoimmunity, as opposed to potential disease recurrence.
  (i) This criteria applies to hemithyroidectomy, total thyroidectomy without RAI, and total thyroidectomy with RAI patients.
- Presence of an indeterminate lesion (e.g. nonspecific thyroid bed lesion or prominent but morphologically normal lymph node) on imaging with an overall low clinical suspicion of disease recurrence due to interval stability and/or benign radiographic appearance. Up to two-thirds of low-risk DTC patients have nonspecific thyroid bed lesions on neck ultrasound during follow-up, representing benign postoperative changes (83, 84).
  (i) This criteria applies to hemithyroidectomy, total thyroidectomy without RAI, and total thyroidectomy with RAI patients.

(Strength of recommendation: 2; quality of evidence: low (ØØOO); agreement (9/12); round: 1).

Appropriate for continued specialist care

Patients that meet ANY of the following criteria are appropriate for, and may be best served, under continued specialist care:

- Active surveillance of unresected PTC.
- Low-risk DTC patient with indeterminate response to therapy based on:
  - Elevated and rising thyroglobulin level on two or more consecutive measurements:
    (i) Despite stable TSH within the reference range.
    (ii) Tg rise is not attributable to the growth of benign thyroid remnant.
  - Elevated thyroglobulin antibodies that are rising on two or more consecutive measurements.
  - Presence of indeterminate lesion (nonspecific thyroid bed lesion or prominent but morphologically normal lymph node), with an overall moderate-to-high clinical suspicion of disease recurrence due to interval growth and/or suspicious radiographic appearance.
- Low-risk DTC patient with biochemical incomplete response to therapy (see Table 6).
- Low-risk DTC patient with structural incomplete response to therapy (see Table 6) (strength of recommendation: 1; quality of evidence: (ØØOO); agreement (12/12); round 1).

Long-term management recommendations for low-risk DTC patients

Specialists should provide community practitioners (PCP/NP) with written documentation to aid in long-term management of low-risk DTC patients. Documentation should include recommendations for the following three variables:

- TSH target recommendation.
- Surveillance frequency, modality, and duration.
- Criteria for re-referral.

Table 6 Follow-up recommendations in patients with total thyroidectomy and hemithyroidectomy.

Follow-up recommendations	SOR	QOE	Agreement	Round
Follow-up in patients with total thyroidectomy				
We recommend against using rhTSH-stimulated Tg testing or diagnostic 131-iodine WBS in routine follow-up	1	ØØØO	12/12	1
Optimal frequency or duration of Tg testing has not been studied. We recommend Tg (with Tg antibody) testing every 12 months	1	ØOOO	11/12	1
We recommend one ultrasound in the first 2 years of post-operative follow-up and one additional ultrasound 3–5 years after surgery. Further ultrasound in those with excellent response to therapy is unnecessary; however, in those with biochemical incomplete or indeterminate response to therapy, additional imaging should be guided by Tg or TgAb trends	1	ØØOO	11/12	1
Follow-up in patients with hemithyroidectomy				
We recommend monitoring Tg (with Tg antibody) once in the immediate post-op (6–8 weeks), then no further monitoring is required. If Tg is > 100 ng/mL, then consideration for further workup and monitoring is recommended to be tailored to the individual patient	1	ØØOO	12/12	2
We recommend an initial ultrasound 6–12 months after surgery. In patients with nodules in the remaining lobe, clinicians should follow existing nodule guidelines (77). We suggest repeating the ultrasound 3–5 years after surgery for those with a clear initial ultrasound. Once an excellent response to therapy has been reached at 5 years, routine ultrasound monitoring may not be warranted, but could be considered every 5 years according to patient factors	1	ØOOO	10/12	1

Tg, thyroglobulin; TgAb, thyroglobulin antibodies; rhTSH, recombinant human thyroid-stimulating hormone; WBS, whole-body scans; SOR, strength of recommendations; QOE, quality of evidence.

Table 7 Recommended long-term surveillance of low-risk DTC exhibiting an excellent response to therapy. (Strength of recommendation: 2; quality of evidence: (ØØOO).

	Hemithyroidectomy			TT with or without RAI		
		Agreement	Round		Agreement	Round
Year 0–2 (specialist care)						
TSH	Annual agreement	12/12	1	Annual agreement	11/12	1
	Target TSH within RR	12/12	1	Target TSH: 0.5–2.0 mIU/L	10/12	1
Tg/TgAb	Recommended against measurement	9/12	1	Annual agreement	10/12	1
Neck US	Once or as dictated by contralateral lobe nodule (if present)	12/12	1	Once agreement	11/12	1
Year 3–5 (specialist or PCP care)						
TSH	Annual agreement	12/12	1	Annual agreement	11/12	1
	Target TSH within RR	12/12	1	Target TSH: 0.5–2.0 mIU/L	11/12	1
Tg/TgAb	Recommended against measurement	10/12	1	Annual agreement	11/12	1
Neck US	Once or as dictated by contralateral lobe nodule (if present)	11/12	1	Once agreement	12/12	1
Year 6+ (PCP/NP care)						
TSH	Annual agreement	12/12	1	Annual agreement	12/12	1
	Target TSH within RR	12/12	1	Target TSH within RR	11/12	1
Tg/TgAb	Recommended against measurement	10/12	1	Annual until year 10 Agreement	12/12	2
Neck US	Consider every 5 years or as dictated by contralateral lobe nodule (if present)	10/12	1	Not routinely recommended	12/12	2

NP, nurse practitioner; PCP, primary care provider; RAI, radioactive iodine therapy; Tg, thyroglobulin TgAb, thyroglobulin antibody; TSH, thyroid-stimulating hormone; TT, total thyroidectomy US, ultrasound.

(Strength of recommendation: 1; quality of evidence: (ØØØO); agreement (12/12); round: 1).

We have provided an example of a discharge letter in supplementary information (Appendix S2).

The 2015 ATA management guidelines for adult patients with thyroid nodules and DTC ('2015 ATA guidelines') do not provide specific guidance on the frequency and duration of thyroglobulin testing and neck ultrasounds for low-risk DTC patients, given the lack of evidence to support any particular approach (5). Thus, monitoring practices vary widely based on local practice patterns, patient and physician preference, and availability of testing. The long-term surveillance for low-risk DTC patients exhibiting an excellent response to therapy should aim to balance the detection of disease recurrence, which is rare, with the detection of false positive tests, which is common. Over-surveillance of low-risk DTC patients has been shown to increase unnecessary downstream imaging and biopsies, healthcare costs, and patient anxiety (83, 84). We provide Table 7 below, outlining a recommended surveillance strategy based on available data and expert consensus.

Concluding remarks

This document provides Canadian thyroid practitioners with a guide to the rational management and follow-up of low-risk DTC patients. It aims to standardise DTC care across Canada, ensuring consistent, high-quality management. The guidelines offer evidence-based recommendations for initial treatment, including surgery and RAI, and define criteria for assessing recurrence risk.

We emphasise a personalised approach, advocating for tailored follow-up strategies based on risk stratification. Long-term surveillance protocols are detailed, with specific recommendations on the use of thyroglobulin testing, neck ultrasound, and other imaging modalities to monitor for disease recurrence. While these guidelines serve as a general framework, we encourage individualised patient care based on clinical judgement and patient-specific factors.

Supplementary materials

This is linked to the online version of the paper at https://doi.org/10.1530/ETJ-25-0072.

Declaration of interest

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the work reported.

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Author contribution statement

All authors contributed to the writing of the manuscript except M S who provided patient advice during the discussions and H L who participated in the discussion and manuscript revision. R P conceived the initial consensus outline.

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