



Canadian Health Care Professionals' Familiarity with Chronic Cough Guidelines and Experiences with Diagnosis and Management: A Cross-Sectional Survey

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Received: 4 December 2022 / Accepted: 1 February 2023 / Published online: 18 February 2023
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Abstract

Introduction Educational programs on chronic cough may improve patient care, but little is known about how Canadian physicians manage this common debilitating condition. We aimed to investigate Canadian physicians' perceptions, attitudes, and knowledge of chronic cough.

Methods We administered a 10-min anonymous, online, cross-sectional survey to 3321 Canadian physicians in the Leger Opinion Panel who managed adult patients with chronic cough and had been in practice for > 2 years.

Results Between July 30 and September 22, 2021, 179 physicians (101 general practitioners [GPs] and 78 specialists [25 allergists, 28 respirologists, and 25 ear/nose/throat specialists]) completed the survey (response rate: 5.4%). In a month, GPs saw a mean of 27 patients with chronic cough, whereas specialists saw 46. About one-third of physicians appropriately identified a duration of > 8 weeks as the definition for chronic cough. Many physicians reported not using international chronic cough management guidelines. Patient referrals and care pathways varied considerably, and patients frequently experienced lost to follow-up. While physicians endorsed nasal and inhaled corticosteroids as common treatments for chronic cough, they rarely used other guideline-recommended treatments. Both GPs and specialists expressed high interest in education on chronic cough.

Conclusion This survey of Canadian physicians demonstrates low uptake of recent advances in chronic cough diagnosis, disease categorization, and pharmacologic management. Canadian physicians also report unfamiliarity with guideline-recommended therapies, including centrally acting neuromodulators for refractory or unexplained chronic cough. This data highlights the need for educational programs and collaborative care models on chronic cough in primary and specialist care.

Keywords Chronic cough · Diagnosis · Treatment · Canada · Physician survey

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Introduction

Chronic cough is a prevalent and debilitating condition that increases in incidence with age [1]. Although chronic cough can be caused by underlying conditions—such as asthma, gastroesophageal reflux disease (GERD), or use of medications (i.e., angiotensin-converting enzyme inhibitors) [2–4]—in many patients, there remains no identifiable cause [5]. Due to the complex and often multifactorial etiology of chronic cough, its diagnosis and treatment span multiple medical specialties. Management of chronic cough can thus involve healthcare professionals ranging from general practitioners to medical and surgical subspecialists [6].

The 2020 European Respiratory Society (ERS) [7] and 2018 American College of Chest Physicians (CHEST) guidelines [8] define chronic cough as a cough that persists for > 8 weeks. These guidelines also include the terms “refractory chronic cough” (RCC)—coughing that persists despite optimal treatment of underlying conditions—and “unexplained chronic cough” (UCC)—coughing with no underlying cause despite thorough investigation [7–9]. Since many patients with chronic cough present with a sensitive cough reflex to low levels of thermal, chemical, and mechanical stimulation, guidelines now refer to this pathophysiological phenomenon as “cough hypersensitivity syndrome” (CHS) [7, 10].

Chronic cough can cause substantial burden on both patients and healthcare systems [11–16]. Approximately half of patients with RCC or UCC report more than 20 coughs/hour along with symptoms of hoarseness and chest/stomach pains [16]. In addition to these physical symptoms, chronic cough can have substantial impact on psychosocial well-being [12, 17]. Almost all chronic cough patients (96%) in a European survey reported that cough impacts their health-related quality of life [18]. Sleep loss/disruption and social embarrassment represent other common concerns [15]. In the Canadian Longitudinal Study on Aging, baseline or incident chronic cough was associated with an increased risk of depressive symptoms and psychological distress [19]. A recent U.S. survey also found that individuals with chronic cough had a two-fold increase in hospitalizations and emergency department visits compared to individuals without chronic cough [12].

Although recently published guidelines inform optimal management of chronic cough, diagnosis and treatment of this condition remains challenging [9, 20] and studies support the need for more educational resources [21]. To inform future education on chronic cough among Canadian physicians, we conducted a survey investigating Canadian physicians’ perceptions, attitudes, and knowledge of chronic cough.

Methods

Study Design

We administered a 10-min, online, cross-sectional survey to anonymous Canadian physicians. Without review of clinical data or patient registries, physicians responded based on their experience and perceptions of their clinical practice. The study, which did not collect patient or clinical data, did not require ethics board review.

We developed our survey from a prior Spanish questionnaire designed by allergists, general practitioners, and respirologists exploring perceptions and practices for the diagnosis and management of chronic cough [22]. Survey questions had pre-populated (closed) response options and employed different scales depending on the question. The survey, available in English and French, collected physicians’ demographics, their perceived diagnosis and management of chronic cough, their perceived impact of chronic cough on patients’ quality of life, and need for education on chronic cough (Supplementary Appendix).

Leger Marketing hosted the survey online and on mobile applications for smartphones and tablets. We made the survey available for 6 weeks between July 30 to September 22, 2021. All collected data were de-identified.

Survey Participants

To ensure broad Canadian physician representation, we recruited survey participants based on specialty and province of practice through the Leger Marketing LEO (Leger Opinion) panel. The Leger Opinion consumer panel consists of ~500,000 active Canadian members, among which 50,000 represent health care providers (HCPs). HCPs registered with LEO must undergo verification that includes manual confirmation from local colleges. We distributed our survey to 3321 HCPs in the Leger Opinion who potentially met eligibility to participate in the study. To enroll in the study, participants had to (1) be a general practitioner (GP), allergist, respirologist, or ear, nose, and throat (ENT) specialist who saw patients with chronic cough in their clinical practice; (2) be in active clinical practice for ≥ 2 years and spend $\geq 60\%$ of their time every week in direct patient care; (3) see ≥ 75 adult patients per month across all conditions; and (4) provide electronic informed consent.

Statistical Analysis

This exploratory study had no a priori sample size calculation. We enrolled a non-probability sample and performed descriptive statistics on complete data.

Results

Between July 30 and September 22, 2021, we invited 3321 potentially eligible Canadian HCPs to participate in the survey. Among those invited, 179 proved eligible and completed the full survey (response rate: 5.4%). The 179 HCPs included 101 GPs and 78 specialists (25 allergists, 28 respirologists, and 25 ENTs). Respondents were mostly male, based in Ontario, had been in practice for approximately 20 years, and saw over 250 adult patients per month (Table 1).

Use of Terms and Guidelines for Chronic Cough

Both GPs and specialists endorsed variable definitions for chronic cough (Fig. 1A). Seven percent of GPs and 12% of specialists did not have a set criterion for defining chronic cough. While diagnosing, over 65% of GPs and specialists used the terms RCC and UCC “often” or “sometimes”, but the other one-third “rarely” or “never” used these terms. Respondents used the term CHS less frequently (Fig. 1B). More specialists than GPs reported having high familiarity (8–10 on a 10-point scale ranging from “1 = not familiar at all” to “10 = very familiar”) with the CHEST (44% vs 8%) and ERS (27% vs 3%) guidelines for chronic cough (Fig. 1C). Few GPs chose “often” as the frequency with which they followed the guidelines. Higher proportions of specialists (21% [ERS] to 31% [CHEST]) often followed the guidelines, but another 24% (CHEST) to 31% (ERS) never followed them (Fig. 1D).

Perceptions of Chronic Cough

About one-quarter of specialists considered RCC (26%) and UCC (28%) to “often” represent a distinct disease compared with 5% and 7% of GPs (Fig. 2). Specialists, more frequently than GPs, perceived RCC and UCC to “often” represent a symptom of either a respiratory (26% RCC and 23% UCC) or non-respiratory (18% RCC and 22% UCC) disease (Fig. 2).

A smaller proportion of GPs (30%) than specialists (60%) endorsed chronic cough as a more frequent symptom in women than in men; 36% of GPs expressed uncertainty. GPs and specialists had similar perceptions about other aspects of chronic cough (Supplemental Fig. 1A).

Approximately half of the surveyed physicians (48% of GPs and 50% of specialists) highly agreed (8–10 on a 10-point scale ranging from “1 = not agree at all” to “10 = maximum agreement”) that chronic cough disappears when the underlying disease is treated (Supplemental Fig. 1B). A substantial proportion of physicians also highly

Table 1 Characteristics of physician respondents

Characteristic	GPs	Specialists
N	101	78
Gender		
Male	62%	79%
Female	36%	21%
Prefer not to answer	2%	0%
Years in practice		
2–5	4%	1%
6–10	9%	15%
11–15	16%	33%
16–30	50%	35%
> 30	21%	15%
Mean	21 years	18 years
Total adult patients per month (all conditions) ^a		
< 100	1%	11%
100–199	7%	26%
200–399	35%	39%
400–599	28%	15%
> 600	29%	9%
Mean	436 patients	282 patients
Hospital type		
Community	66%	48%
Academic	34%	52%
Average % of time spent in each setting		
Office	75%	53%
Community clinic	13%	11%
Hospital/health center	10%	36%
Other	2%	
Geographic location		
Alberta	13.9%	12.8%
Atlantic provinces	6.9%	6.4%
British Columbia	14.9%	12.8%
Manitoba	4.0%	5.1%
Ontario	37.6%	42.3%
Quebec	19.8%	25.6%
Saskatchewan	3.0%	0.1%

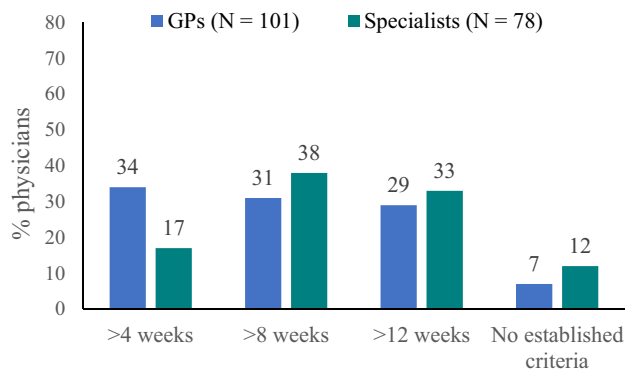
^aPhysicians had to see a ≥ 75 adult patients/month to participate in the survey

agreed that, after a while, chronic cough usually disappears by itself (26% of GPs and 26% of specialists) or that chronic cough does not usually disappear by itself but persists over time (20% of GPs and 29% of specialists).

Most physicians (54% of GPs and 65% of specialists) perceived chronic cough to have high impact (8–10 on a 10-point scale ranging from “1 = no impact” to “10 = very high impact”) on patients’ quality of life, while 44% of GPs and 33% of specialists considered this disease to have moderate impact. Sixty-five percent of GPs and 59% of specialists believed chronic cough to have high impact on sleep

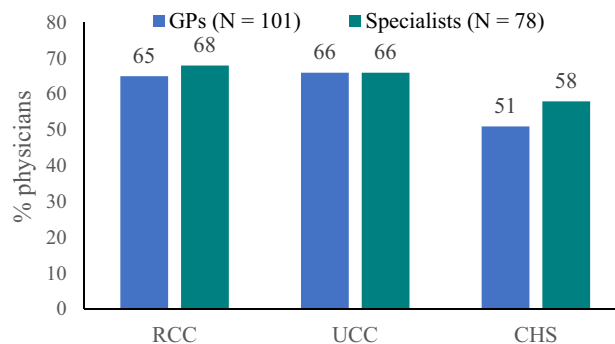
A Definition of chronic cough

Q: When do you use a diagnosis of chronic cough in a patient with cough?



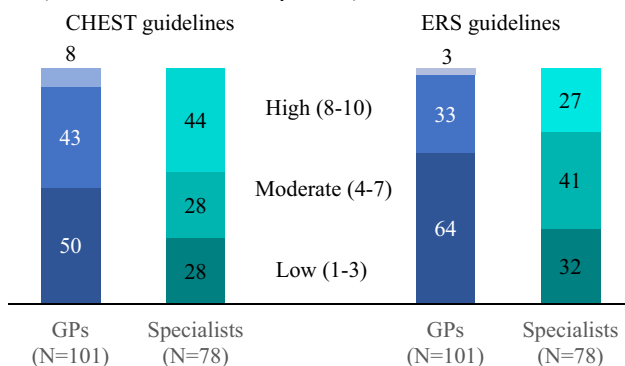
B Terms used often or sometimes

Q: In your experience treating patients with chronic cough, how frequently do you use the following terms for the diagnosis?



C Familiarity with guidelines (% physicians)

Q: How familiar are you with the following guidelines?
(1 = not familiar at all; 10 = very familiar)



D Frequency of following guidelines (% physicians)

Q: How often do you follow the chronic cough management guidelines?

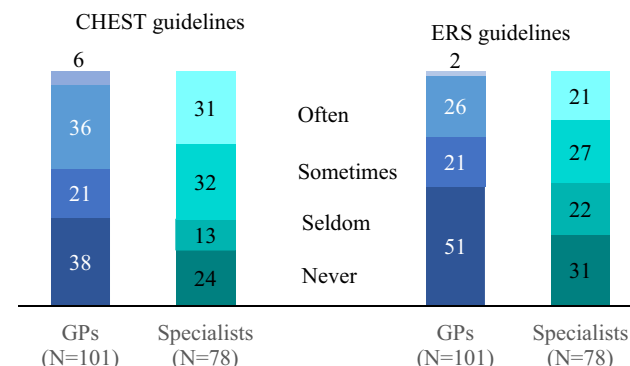


Fig. 1 Physicians' use of (A) definitions and (B) terminology for chronic cough, (C) familiarity with CHEST and ERS guidelines, and (D) use of CHEST and ERS chronic cough guidelines. *CHS* cough

hypersensitivity syndrome, *CHEST* American College of Chest Physicians, *ERS* European Respiratory Society, *GP* general practitioner, *RCC* refractory chronic cough, *UCC* unexplained chronic cough

(Supplemental Fig. 2). Other areas believed to be highly impacted included physical activity/exercise (56% of GPs and 41% of specialists) and social life (44% of GPs and 58% of specialists).

Chronic Cough in Physicians' Practices

Based on the definition of chronic cough as a cough lasting > 8 weeks, GPs reported seeing an average of 27 patients with chronic cough in a typical month (6% of their total monthly patients), while specialists reported seeing 46 patients (16% of their total monthly patients). To educate and answer chronic cough-related questions with patients, GPs reported spending an average of 17 min, whereas specialists reported 23 min. Both times are comparable to the average visit time for complex multi-system diseases, such as chronic obstructive pulmonary disease and type 2 diabetes. Physicians endorsed asthma, GERD, and rhinitis/upper

airway cough syndrome (UACS) as common etiologies for chronic cough (Supplemental Fig. 3).

GPs reported that they “often” or “sometimes” refer patients with chronic cough to a respirologist (86%), ENT specialist (81%), allergist (68%), gastroenterologist (53%), pharmacist (26%), or psychiatrist (10%). Specialists also reported frequent referrals to respirologists (74%), ENTs (77%), allergists (70%), gastroenterologists (56%), pharmacists (28%), and psychiatrists (28%).

Diagnosis of Chronic Cough

Fewer GPs (44%) than specialists (56%) had diagnostic protocols for chronic cough in their practices. Most physicians (66% of GPs and 71% of specialists) considered diagnostic protocols for chronic cough as “very necessary” or “necessary”; the remaining respondents considered the protocols “slightly necessary” or “not necessary”.

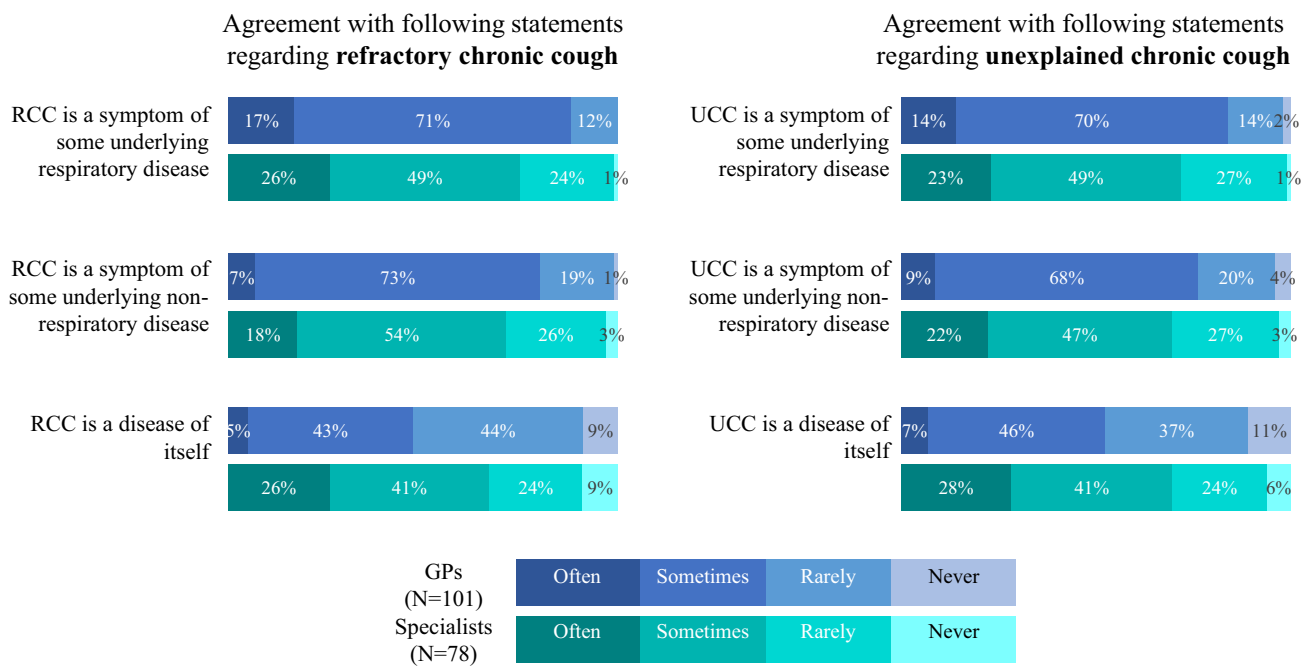


Fig. 2 GPs' and specialists' perceptions of the terms RCC and UCC. *GP* general practitioner, *RCC* refractory chronic cough, *UCC* unexplained chronic cough

Diagnostic tests frequently ordered by GPs and specialists (8–10 points on a 10-point scale ranging from “1 = never perform” to “10 = always perform”) included chest radiography (86% of GPs and 85% of specialists), followed by spirometry (52% of GPs and 67% of specialists) (Supplemental Fig. 4A). GPs estimated that 71% of their patients with chronic cough, versus 64% of those seen by specialists, received a diagnosis or had underlying causes ruled out in < 6 months. In a minority of patients (11% for GPs and 16% for specialists), physicians believed that a diagnosis of chronic cough could take > 1 year (Supplemental Fig. 4A).

Treatment and Follow-up of Chronic Cough

Sixty-three percent of GPs and 69% of specialists reported frequently prescribing nasal corticosteroids for chronic cough (Fig. 3). GPs and specialists also frequently prescribed inhaled corticosteroids, inhaled bronchodilators, and proton pump inhibitors. Fewer than 5% of GPs and < 25% of specialists prescribed neuromodulators, including pregabalin, gabapentin and morphine.

Over half of GPs (62%) and specialists (53%) reported that they “often” began treatment and assumed follow-up, but other care patterns involving follow-up by different specialists were also endorsed (Fig. 4A). Specialists frequently referred patients back to GPs; 15% reported that they “often” referred patients to a GP after beginning treatment, and another 15% indicated that they “often”

referred to a GP without prescribing treatment. Both GPs (17%) and specialists (41%) reported that patients were “often” lost to follow-up. Compared to specialists, more GPs perceived chronic cough as “usually controlled in primary care” than “usually controlled in pneumonology” (Fig. 4B).

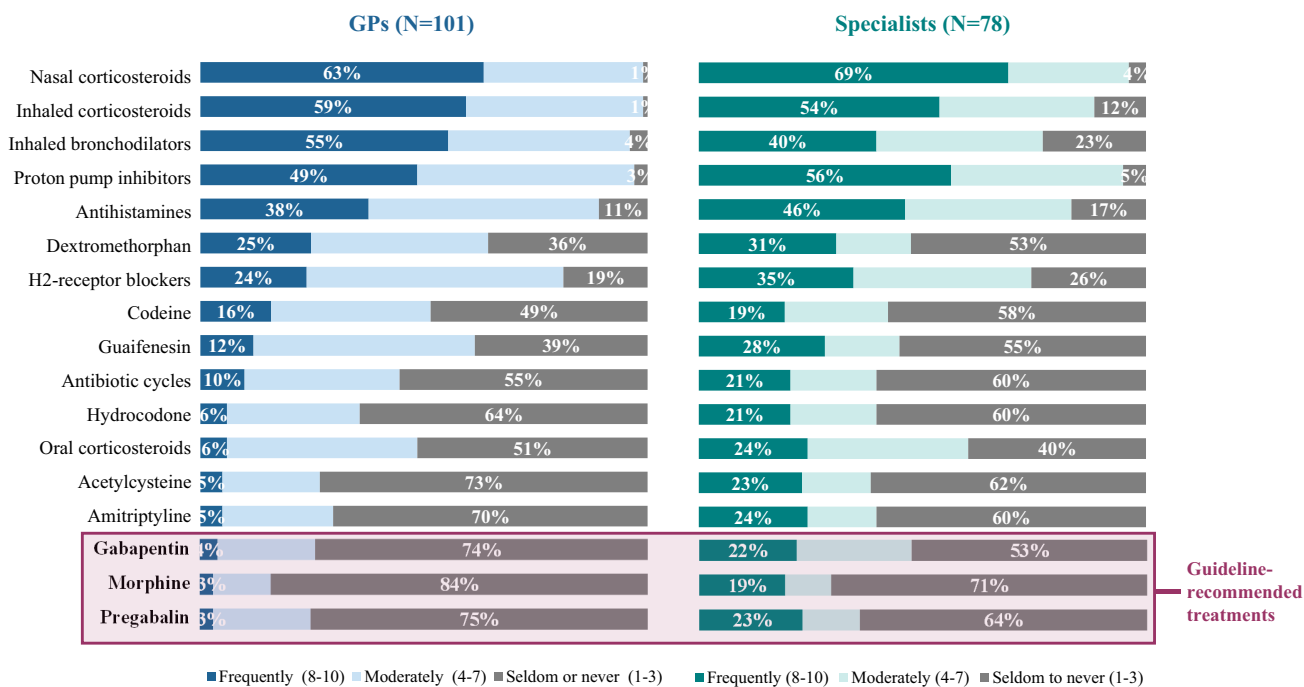
Education in Chronic Cough

Twelve percent of GPs and 36% of specialists reported attending a training course or activity related to chronic cough. Forty-nine percent of GPs and 60% of specialists indicated high interest in receiving additional training on the management of chronic cough (Supplemental Fig. 5).

Discussion

Summary of Findings

Our survey of Canadian physicians reveals that GPs and specialists lack familiarity with the definitions and guidelines in chronic cough; that most physicians do not consider RCC/UCC to represent distinct disease entities; that physicians estimate investigations of chronic cough to take > 6 months in about one-third of patients; that



Q: Based on your experience treating patients with chronic cough, please indicate how often do you prescribe each of the following drugs. (1=I never prescribe the drug; 10=I always prescribe the drug)

Fig. 3 Use of therapies for chronic cough. GP general practitioner

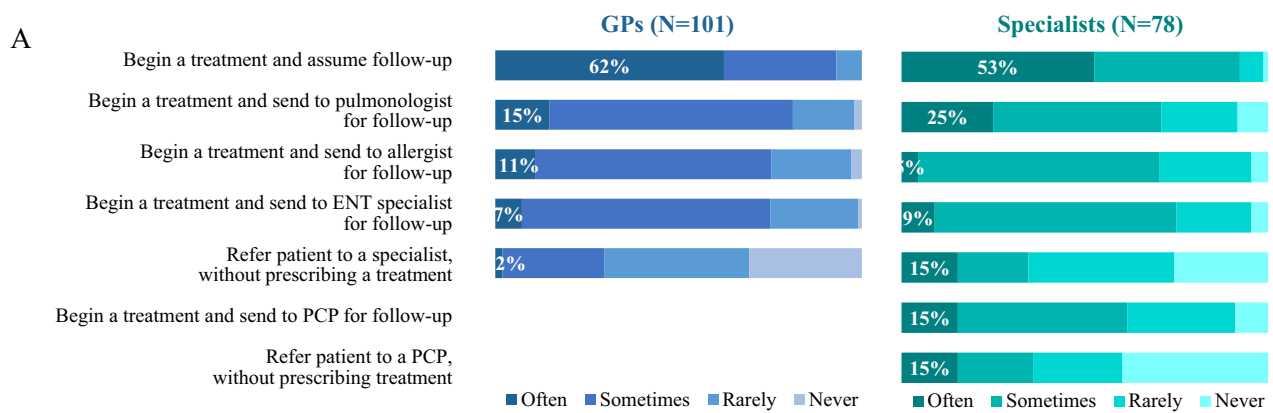
centrally acting neuromodulators remain rarely prescribed; and that many chronic cough patients are lost to follow-up.

Findings in Context

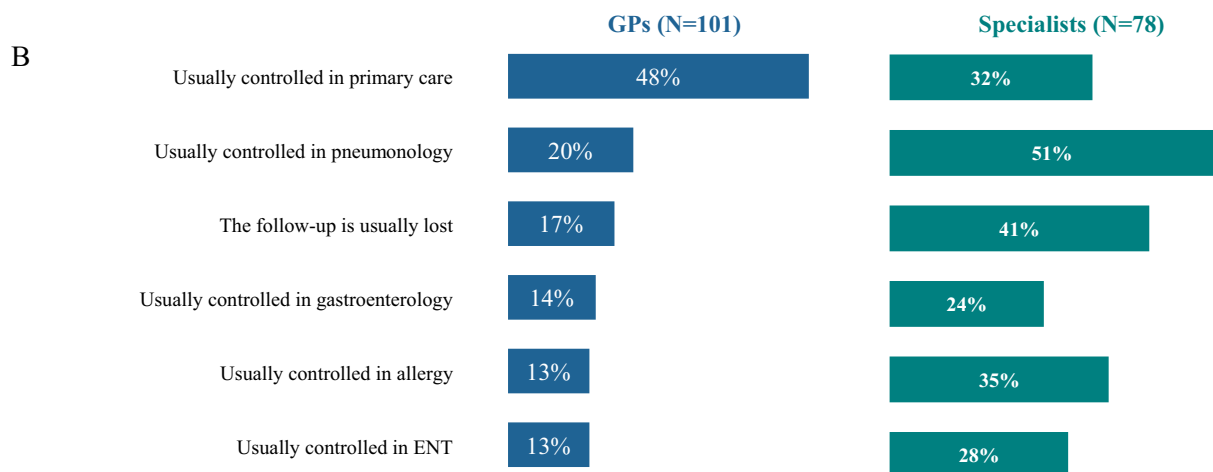
Although current guidelines define chronic cough as a cough lasting > 8 weeks [7, 8], the definition and nomenclature have changed over time. An acute post-viral cough usually self-limits within 3 weeks, so guidelines initially considered cough lasting > 3 weeks as an appropriate definition [23]. Longitudinal follow-up of post-viral coughs suggested, however, that they may take up to 8 weeks to resolve [24, 25]. In a systematic review examining prevalence of chronic cough, most primary studies conducted between 1980 and 2013 used the British Medical Research Council’s definition of chronic bronchitis—a cough duration of ≥ 3 months in 2 consecutive years—as the threshold duration for chronic cough [26]. Recent clinical trials in chronic cough have used a minimum duration of 12 months to allow time for adequate assessment, investigations, and treatment trials [27, 28] that more confidently render a diagnosis of RCC or UCC. Our finding of variable responses regarding diagnostic criteria for chronic cough are thus unsurprising and underscore the need for better education on recent guidelines and practice updates.

Although two-thirds of respondents used the terms RCC and UCC in their practice, they generally regarded these conditions as symptoms of underlying diseases rather than diseases of themselves. Clinical trials employ the terms RCC and UCC [27–30], but the terminology may not yet be fully integrated into clinical practice. ERS [7] and CHEST [8] guidelines suggest that the diagnosis of RCC or UCC requires appropriate testing and/or empirical trials of treatment. The results from this survey suggest that these diagnostic protocols may not be fully used in clinical practice. Physicians may avoid the term UCC, particularly when they suspect that neuronal dysregulation (i.e., CHS) is the underlying cause for cough and thus not truly “unexplained.” CHS provides a useful pathophysiological term, but there are no agreed upon diagnostic criteria or objective tests for this condition. This may explain the less frequent usage of CHS compared to RCC and UCC.

Although respondents estimated that around two-thirds of patients received a diagnosis or had underlying causes ruled out within the first 6 months of care, about one-third of patients had this process take more than 6 months. For some patients, delays in referrals and tests likely contribute to this extended time to diagnosis. The long time estimated to diagnose chronic cough supports the entry criterion of coughing for > 12 months employed in recent clinical trials [27, 28].



Q: After you have performed all diagnostic work-up and have evaluated the potential cause(s) of the chronic cough in a patient, what is your general approach?



Q: Thinking about the follow-up of patients with chronic cough, to what extent do you agree with each of these statements about who is usually the professional who assumes the follow-up and final control of patients with chronic cough after all diagnostic work-up has been done? (8 to 10 on a 10-point scale ranging from 1=not agree at all; 10=totally agree)

Fig. 4 Chronic cough care pathways perceived by respondents: **A** role of GPs and specialists in treatment and follow-up and **B** site of patient care. *ENT* ear/nose/throat, *GP* general practitioner, *PCP* primary care practitioner

Chronic cough management surveys from other countries [13, 22, 31] similarly demonstrate that, particularly among GPs, there remains low use of guideline-recommended therapies such as gabapentin, morphine, and pregabalin [7, 8, 32]. Low and delayed adoption of clinical guidelines can occur across multiple therapeutic areas [33, 34] and may relate to varying factors including lack of awareness/familiarity, guideline complexity, and organizational constraints [35]. Physician and/or patient fears, confirmed by qualitative research, represent major barriers to guideline uptake [36]. Related to chronic cough, patients and physicians may have concerns about well-known opiate-related toxicities, dependence [37], and neuromodulator adverse effects [38]. The treatment of chronic cough includes an off-label use of neuromodulators and the data to support their efficacy is primarily based on subjective cough assessments and low-quality

evidence from small studies [7, 39]. Surveys have found that neither patients nor physicians perceive neuromodulators to be effective therapies [14, 15, 21]. Other guideline-recommended therapies, such as speech therapy, are not well established across Canada, and their long-term effects on cough frequency requires further investigation [40]. These issues support the need for large randomized trials that provide evidence of additional treatment options for chronic cough.

Strengths and Limitations

Our study represents the first to investigate Canadian physicians' perceptions, attitudes, and knowledge of chronic cough. Limitations of our study include, however, restricted sampling of physicians in the Leger Opinion

panel; a low response rate; possible sampling bias toward physicians who have greater interest in or knowledge of chronic cough; low geographic representation in certain parts of Canada; potential self-report biases; and a small sample size.

Implications and Conclusions

Our survey findings highlight the need for better education on chronic cough and improved collaborative care models with clear referral and management paths between GPs and specialists. Future programs to address educational gaps may improve patient outcomes and reduce the substantial burden of chronic cough on physicians, patients, and the healthcare system.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s00408-023-00604-y>.

Acknowledgements The authors of the study would like to thank the survey participants. We also thank Fusion MD Medical Science Network, Inc. (Montreal, Canada) for providing manuscript support with funding from Merck Canada, Inc.

Author Contributions All authors made substantial contributions to the conception or design of the work and the acquisition, analysis, or interpretation of data for the work. All authors were involved in drafting the work or revising it critically for important intellectual content, and all authors approved the final version to be published.

Funding The study and medical writing support was funded by Merck Canada, Inc.

Declarations

Competing Interests EK, DB, and MW report no conflicts of interest. ND is currently supported by the Canadian Asthma Allergy and Immunology Foundation Type II Inflammation Sanofi Genzyme Award. TA and SS are employees of Merck Canada, Inc. KQ reports personal fees from Merck. PH reports grants from Boehringer Ingelheim, Cyclo-medica, Grifols, and Vertex, and speaker and/or consulting fees from Acceleron, AstraZeneca, Boehringer Ingelheim, GSK, Grifols, Janssen, Sanofi Genzyme, Takeda, and Valeo. MC reports payment or honoraria speaking from GSK, AstraZeneca, Respiplus, Valeo and Covis. Has received support for attending meetings by Sanofi. Participated in advisory boards for Novartis, GSK, AstraZeneca, Sanofi, Boehringer-Ingelheim, Respiplus, Trudell, Valeo, CMD and Covis. PL reports personal fees from AstraZeneca, Boehringer Ingelheim, and GSK. AE has participated in advisory boards for ALK Abello, AstraZeneca, Aralez, Bausch Health, LEO Pharma, Merck, Novartis, and Pfizer, has been a speaker for ALK Abello, AstraZeneca, Miravo, Medexus, and Mylan. Her institution has received research grants from ALK Abello, Aralez, AstraZeneca, Bayer LLC, Medexus, Novartis, and Regeneron. She has also served as an independent consultant to Bayer LLC and Regeneron. LPB has previously received research grants from Amgen, AstraZeneca, GSK, Merck, Novartis, and Sanofi-Regeneron and speaker and/or consulting fees from AstraZeneca, Covis, Novartis, GSK, Merck, and Sanofi-Regeneron. AK is a member of advisory boards/speaker's bureaus for AstraZeneca, Behring, Belus, Boehringer Ingelheim, Covis, Cipla, Eisai, GSK, Merck Frosst, Novo Nordisk, Pfizer, Novartis, Sanofi, Teva, Trudell, and Valeo. SKF served on an advisory board

for Merck and sponsored talks for GSK and Boehringer-Ingelheim. IS is currently supported by the E.J. Moran Campbell Early Career Award, McMaster University and reports grants from ERS Respire 3 Marie Curie fellowship, Merck, GSK and MITACS and speaker and/or consulting fees from Merck, GSK, AstraZeneca, Roche, Genentech and Respiplus.

Ethical Approval This survey did not collect patient or clinical data and therefore did not require ethics board review.

Consent to Participate Informed consent was obtained from all participants in the study.

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