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Table of Contents

Introduction	4
Issue	4
Objective	4
Method	5
Survey.....	5
Literature Search Strategy	5
Strengths and Limitations	6
Results	6
Family Physicians	6
Insomnia Therapy	7
Prescribing Influencers	8
Information Sources.....	9
Interventions for Insomnia Disorder.....	10
Prescribing Sedative-Hypnotics for Insomnia	10
Follow-Up Treatment	12
Prescribing and Treatment Practices.....	12
Nurse Practitioners	14
Insomnia Therapy	14
Prescribing Influencers	15
Information Sources.....	16
Interventions for Insomnia Disorder.....	16
Prescription of Sedative-Hypnotics for Insomnia	17
Follow-Up Treatment	18
Prescribing and Treatment Practices.....	19
Pharmacists	20
Information Sources.....	20
Interventions for Insomnia Disorder.....	21
Prescribing Sedative-Hypnotics for Insomnia	22
Behavioural Therapy Counselling.....	23
Prescribing and Treatment Practices.....	23
Discussion	23
Appendix 1: Survey of Family Physicians and Nurse Practitioners	26
Appendix 2: Survey of Pharmacists	30
Appendix C: Literature Search Strategy	33

Introduction

CADTH studied the use of interventions to treat insomnia disorder (acute and chronic) in Canadian primary care practice. The study investigated current practices and trends in drug and non-drug therapies for patients with insomnia disorder from the perspective of family physicians, nurse practitioners, and pharmacists. The findings are based on a targeted literature review as well as on the results of qualitative research from surveys of primary care practitioners. This report presents a summary of findings.

Issue

Insomnia disorder is a common complaint in the primary care setting.¹ The most common symptoms of insomnia are difficulty in initiating sleep and/or maintaining sleep, and are associated with daytime impairment.¹ Insomnia is also a common symptom of a number of psychiatric and medical conditions, including depression, anxiety, and pain.² Insomnia can be acute or chronic. Acute insomnia is characterized by a sudden onset and short course of insomnia, generally lasting less than three months.¹

For chronic insomnia, treatment of the underlying causes and non-pharmacological therapies is recommended.^{1,3} However, the use of prescription sedative-hypnotic medications for these indications, in particular benzodiazepines (e.g., lorazepam) and benzodiazepine receptor agonists or “z-drugs” (e.g., zopiclone), remains widespread and often extends beyond the indicated short time frame.⁴

The use of benzodiazepines and z-drugs may be associated with dependence, rebound anxiety, and memory impairment. Elderly patients may be particularly susceptible to these drugs and experience more falls due to psychomotor impairment.⁵ In light of these effects and widespread use, concerns have been raised regarding the potential inappropriate use, overuse, and misuse of these drugs.^{4,6}

Non-pharmacological alternatives for treating insomnia are of particular interest as they might prove safer and more effective than drugs in the long term. Non-pharmacologic therapies usually combine behavioural and cognitive techniques. Behavioural techniques include sleep hygiene, sleep consolidation, stimulus control, and relaxation therapies. Cognitive techniques include cognitive behavioural therapy for insomnia (CBT-I).^{1,7} Psychotherapies may be used in combination with pharmacotherapy for enhanced effectiveness.⁸

Objective

The objective of this study was to explore current trends across Canada in the use of interventions for the treatment of insomnia disorder. We surveyed primary care providers for their opinions and prescribing preferences when treating insomnia disorder, and conducted a scan of relevant literature. We captured provider demographic information —

including years of practice, practice location, and practice setting (urban, rural, remote) — to determine if these had any influence on treatment. This study was not intended to represent all primary care clinicians across Canada, but rather to provide an indication of practices to consider trends in prescribing and opinions.

Method

Survey

Ipsos Public Affairs conducted an online survey of primary health care providers to better understand their prescribing practices and opinions on interventions in the treatment of patients with insomnia disorder.

In total, 202 health care providers participated. This group was composed of 100 family physicians (FPs), 50 nurse practitioners (NPs), and 52 pharmacists across the 10 provinces in urban, rural, and remote practice settings. (There were no participants from Nunavut or the Territories.) Table 1 provides the breakdown of all providers by practice setting and years of practice.

Table 1: Survey Participant Specialty, Practice Setting, and Years of Practice

	Total Respondents	Urban Practice	Rural/Remote Practice	Years of Practice		
				1 to 10	11 to 25	More than 25
All FPs	100	82	20	22	37	41
All NPs	50	38	12	27	20	3
All Pharmacists	52	44	10	13	25	14

FP = family physician; NP = nurse practitioner.

Primary care practitioners were contacted through a market research panel that includes health care professionals who have opted into being contacted for market research studies. The online survey, available in English and French, took approximately 10 minutes to complete. All survey participants were offered monetary recognition for their time and effort. Based on the length of the survey, FPs received a \$60 honorarium; NPs and pharmacists received \$65.

Literature Search Strategy

An information specialist performed the literature search using a peer-reviewed search strategy.

Published literature was identified by searching the following bibliographic databases: MEDLINE (1946–) with in-process records and daily updates through Ovid; Embase.

(1974–) through Ovid; the Cochrane Library through Wiley; and PubMed. The search strategy comprised both controlled vocabulary — such as the National Library of Medicine’s Medical Subject Headings (MeSH) — and keywords. The main search concepts were insomnia and Canada.

A search filter was applied to limit retrieval to citations dealing specifically with Canada. Retrieval was not limited by publication year.

A focused Internet search was also performed using pertinent portions of the CADTH Grey Matters Checklist. We also solicited expert input to identify international literature that would be relevant to a Canadian context.

Strengths and Limitations

This study’s main strength lies in the quality and richness of the survey participants’ responses and comments. Participants were willing to share their reasons for choosing different insomnia therapies and their opinions on prescribing benzodiazepines and z-drugs.

This study’s limitations stem from the relatively small number of participants (particularly NPs and pharmacists) as well as inherent self-selection bias. Participants were invited and remunerated for their participation.

At the time of the survey, NPs in Ontario were not able to prescribe controlled substances, which may have influenced their responses.⁹ Pharmacists participating in the survey may not always be aware of the indication for a prescription for a drug or aware of non-drug therapies that may have been prescribed to patients. This survey did not include psychiatrists or psychologists, who may also prescribe drugs (e.g., benzodiazepines and z-drugs) or behavioural therapies for patients with insomnia-related disorders.

We also note that not all provinces were represented in the three sample groups, and there were no participants from Nunavut or the Territories. Practice and prescribing patterns may vary across regions for reasons such as access, age of population, prescribing, etc.

The literature search included the topics of insomnia and Canada, with retrieval limited to resources and studies published within Canada or regarding populations or situations within Canada.

Results

Family Physicians

Of the 100 FPs surveyed, 41% were from Ontario, 20% were from Quebec, 15% were from British Columbia, 13% were from Alberta, 7% were from the Atlantic provinces, and 4% were from Manitoba and Saskatchewan (combined). There were no FP respondents from Nunavut or the Territories (Table 2). The majority of FPs said their

practices served urban populations (82%), while 19% reported serving rural populations and 1% reported serving remote populations (Table 3).

Table 2: Family Physician Practice Location

Total FPs	British Columbia	Alberta	Manitoba and Saskatchewan	Ontario	Quebec	Atlantic Canada
100	15	13	4	41	20	7

FP = family physician.

Table 3: Family Physician Practice Setting

Total FPs	Urban	Rural	Remote
100	82	19	1

FP = family physician.

The majority of FPs surveyed (56%) indicated that they had been practising in primary care for more than 21 years. Fourteen per cent had been in practice 16 to 20 years; 8% had been practising for 11 to 15 years; 10% had been in practice for six to 10 years; and 12% had been practising for one to five years (Table 4).

Table 4: Family Physician Years in Practice

Total FPs	< 1 year	1 to 5 years	6 years to 10 years	11 years to 15 years	16 years to 20 years	21 years to 25 years	25+ years
100	0	12	10	8	14	15	41

FP = family physician.

More than half of FPs (55%) said they usually treated between 40 and 100 adults with acute or chronic insomnia disorder per month. Twenty-eight per cent indicated they treated 15 to 30 insomnia patients per month; 11% said they treated one to 10 insomnia patients per month; and 6% said they treated more than 120 patients per month.

Insomnia Therapy

We asked survey respondents about their preferred therapies for treating patients with insomnia disorder. The majority said their preferred therapies included combined drug and behaviour therapies (85%). Twelve per cent said they preferred behaviour therapy alone, while 3% preferred drug therapy alone (Table 5).

Table 5: Family Physician-Reported Preferred Therapy for Patients with Insomnia Disorder

Total FPs	Combined Drug and Behavioural Therapy	Behavioural Therapy Only	Drug Therapy Only
100	85	12	3

FP = family physician.

We asked survey participants how they choose therapy for insomnia disorder patients, including any standard therapeutic routine they might have. We received a range of responses, with 43% of respondents indicating that drug therapy for insomnia was not their preferred option. Responses included:

- “It depends on whether insomnia is acute or chronic and whether it is initial, mid, terminal, or a combination of these.”
- “Depends if it is acute or chronic. If acute I tend to use a benzo.”
- “Sleep hygiene measures first, then add drugs as late and as little as possible.”
- “Typically start with less addictive and covered meds.”
- “Start with mindfulness, hypnosis, sleep hygiene, then add meds.”
- “Always start with behaviour.”
- “Based on age.”
- “Varies on history of patient and comorbidities, risks of dependence.”
- “For acute insomnia (stress, jet lag) I might consider medications, but I would not prescribe medications to those on opiates or who have a history of addiction or are very old.”

Generally, FPs commented that they start with behavioural therapy and add drug therapy only when required (31%). They may consider drug therapy for acute insomnia rather than chronic insomnia (14%), and consider the risks associated with benzodiazepines (9%). The patient’s age also seemed to be a factor (12%).

In the literature, the approach to insomnia treatment also included both drug and behavioural therapies. Similar to some of the survey comments, FPs from one study used a step-wise approach to treating insomnia, starting with behavioural therapies (typically sleep hygiene), followed by considering whether medication was needed.¹⁰ Regarding drug therapies, physicians from these studies tended to view benzodiazepines and z-drugs negatively and were reluctant to prescribe them.¹⁰⁻¹³ This may be due to addiction fears.¹⁰⁻¹² In one study, a small number of physicians (17%, n = 24) prescribed antidepressants with sedative qualities, as these were perceived to be safer than sedative-hypnotics.¹³

Results suggested that the initial behavioural therapies are primarily limited to sleep hygiene,^{10,11,13} as opposed to more intensive behavioural therapies like CBT-I. One study suggested that FPs really only consider two interventions: sleep hygiene and hypnotics.¹⁰ There may be a lack of awareness of CBT-I; or FPs may be uncertain about its effectiveness.^{10,12} Knowing about the availability and efficacy of non-drug approaches made it easier for physicians to prescribe hypnotics less often.¹² One Australian study reported that practitioners did refer patients to psychologists for sleep problems.¹³

Prescribing Influencers

FPs surveyed were asked about what influences them to recommend or prescribe an alternative to their preferred option. Patient comorbidities were cited by the greatest number of FPs (74%); 72% cited patient preference and potential side effects (also 72%). These were followed by cost to patient (60% of FPs) and availability of resources for referral for behavioural interventions (56%). A number of respondents also indicated being influenced by the perceived effectiveness of treatment

(51%) and their knowledge of behavioural interventions to treat insomnia (50% of FPs) (Table 6).

Table 6: Prescribing Influencers Reported by Family Physicians for the Treatment of Insomnia Disorder

Influencer	# FPs	Influencer	# FPs
Patient comorbidities	74	Availability of resources for referral for behavioural interventions	56
Patient preference	72	Perceived effectiveness of the intervention	51
Potential side effects	72	Own knowledge of behavioural interventions for insomnia	50
Cost to patient	60	Cost to health care system	20

FP = family physician.

Of note, among respondents in urban practice settings, availability of resources for referral to behavioural interventions (61% of urban FPs) and patient preference (78% of urban FPs) were a greater factor versus their rural or remote counterparts (42% and 47% of rural FPs respectively). Patient preference was also less of an influencer for FPs who had practised for more than 25 years (40% among this group) versus those who had practised for 11 to 25 years (73%) or less than 10 years (86%).

We found several influencers for drug-prescribing practices in the literature. Examples included severity of insomnia;¹¹ how long a patient has experienced insomnia symptoms;¹¹ the perceived cause of insomnia (e.g., anxiety or depression);^{10,13} lack of awareness of non-drug options for treatment;^{10,12} the perception that the patient wants pharmacotherapy;¹³ and the desire to avoid confrontation with patients or due to patient pressure for prescriptions.^{10,12}

One study found that practitioner age may influence prescribing practices, with younger practitioners (under 34 years old) having a more favourable attitude toward benzodiazepines and z-drugs compared with their older counterparts; practitioner sex and clinical designation (i.e., Royal College of General Practitioners membership) did not influence attitudes.¹¹

Information Sources

Respondents were asked where they seek information about insomnia disorder (Table 7). Nearly three-quarters of all FPs surveyed (74%) reported using websites or Web applications, with the most popular ones being UptoDate,¹⁴ Medscape,¹⁵ and WebMD.¹⁶ Many FPs cited their previous clinical experience (73%) and continuing professional development (68%) as key sources of insomnia information. Slightly more than a third of those surveyed cited advice from a specialist or expert (35%); 31% cited internal or local treatment guidelines as key information sources.

Table 7: Family Physician-Reported Information Sources for Insomnia Disorder

Information Source	# FPs	Information Source	# FPs
Applications (mobile, Web)	74	Internal/organizational or local treatment guidelines	31
Previous clinical experience	73	National or international clinical practice guidelines	2
Continuing professional development material	68	Other clinical decision-making tools	1
Specialist or expert advice	35	Other	3

FP = family physician.

Interventions for Insomnia Disorder

We asked FPs which interventions they routinely prescribe or recommend for patients with insomnia disorder (Table 8). All FPs surveyed (100%) indicated that they would prescribe behavioural therapies for their patients. Of these behavioural therapies, sleep hygiene (98%) and relaxation training (73%) were the most popular choices. Mindfulness (43%), CBT-I (29%), and sleep restriction were also cited.

Drug therapies were the second most popular intervention overall for patients with insomnia among 99% of FPs surveyed. FPs indicated that they had experience prescribing antidepressants (94%), z-drugs (88%), over-the-counter medication (81%), benzodiazepines (65%), and antipsychotic drugs (54%) to treat patients with insomnia disorder.

Slightly more than two-thirds of FPs surveyed (68%) also reported prescribing a combination of drug and behavioural therapies for patients with insomnia disorder.

Table 8: Family Physician-Reported Interventions Routinely Prescribed for Patients with Insomnia Disorder

Intervention	# FPs
Behavioural therapies	100
Drug therapies	99
Combination therapies (drug and behavioural interventions)	68
Other	2

FP = family physician.

In one UK study of preferred treatments for insomnia therapy, the therapies used from most to least preferred were: verbal advice (i.e., sleep hygiene advice), z-drug, sedative antidepressant, sleep hygiene advice, benzodiazepine, sedative antihistamines, sleep restriction, non-sedative antidepressants, and phenothiazines.¹¹

Prescribing Sedative-Hypnotics for Insomnia

Survey participants were asked if they had any specific comments regarding the prescribing of sedative-hypnotics, including benzodiazepines and z-drugs, for patients with insomnia disorder. Their responses included:

- “Addictive. Not appropriate therapy.”
- “Side effects in elderly population can be significant.”

- “Effective for short-term use only.”
- “Risk of addiction and tolerance is an issue.”
- “I have seen too many people addicted to them and abusing them.”
- “Overused, I believe. Trying to get patients off them.”
- “Addictive. Better for acute situations in short-term use.”
- “I don’t use them.”

With respect to prescribing sedative-hypnotics (i.e., benzodiazepines, z-drugs) to treat patients with insomnia disorder, many FPs expressed addiction concerns (40%). Several (32%) indicated that they don’t recommend these drugs or avoid them altogether for treatment of insomnia disorder. FPs also stated that they tend to prescribe these drugs for a short duration, and for acute rather than chronic insomnia (31%). Some commented on the side effects of these drugs, particularly for elderly populations (22%).

In the literature, we observed a perception among practitioners that most patients tend to try numerous non-pharmacological self-help methods (like sleep hygiene) before they consult their FPs.¹² With this assumption came the perception that prescribing medication fulfilled patients’ expectations and indicated to them that the practitioner was taking their complaints seriously.¹² Some practitioners were even reluctant to offer non-drug alternatives, as this could be interpreted by the patient that their doctor was not taking their sleep issues seriously.¹² Others were reluctant to discuss non-drug options due to a perception that patients would be reluctant to participate in time-intensive therapy.¹³

Regarding prescription length, survey respondents were asked how long they typically prescribe sedative or hypnotic medication for a patient with insomnia disorder (Table 9). Almost half of all FPs surveyed (49%) reported treating patients with sedatives or hypnotic medications for seven days to 14 days. More than a third (37%) said they prescribe these drugs to their patients for up to 30 days, while 22% would recommend them for up to 90 days. Eleven per cent of FPs surveyed cited a six-month duration, while 34% indicated they would prescribe for a year or more.

Table 9: Family Physician-Reported Length of Time Prescribing Sedative or Hypnotic Medication for Patients with Insomnia Disorder

Prescription Duration	# FPs
7 days to 14 days	49
30 days	37
90 days	22
6 months	11
1 year or more	34

FP = family physician.

Regarding the length of prescriptions in the literature, short-term prescriptions of drugs were seen as legitimate,^{10,12,13} especially in cases of stressful life events, like bereavement.^{10,12} One study reported that while FPs wanted to prescribe hypnotics for only a short time, this was often different than what happened in clinical practice, where

prescriptions were typically ongoing.¹⁰ It was suspected that patients who had prescriptions for hypnotics often returned for more.¹⁰ Another study found that physicians were more likely to prescribe both benzodiazepines and z-drugs for more than four weeks when patients had severe or disabling chronic insomnia versus mild or moderate chronic insomnia.¹¹

FPs participating in the survey were also asked about the length of time they typically recommend behavioural therapy for a patient with insomnia disorder (Table 10). Seven per cent reported treating with behavioural therapy for seven to 14 days; 26% for up to 30 days; 22% for up to 90 days; 11% for six months; and 34% for a year or more.

Table 10: Family Physician-Reported Length of Time Recommending Behavioural Therapy for Patients with Insomnia Disorder

Therapy duration	# FPs
7 days to 14 days	7
30 days	26
90 days	22
6 months	11
1 year or more	34

FP = family physician.

Follow-Up Treatment

All FPs surveyed reported on a follow-up routine for patients with insomnia disorder (Table 11). Most indicated that they would follow up with patients every two to four weeks until the patient was stable (41%), with 23% reporting follow-up every six to 12 weeks until stable, and 7% following up three months after initiating treatment. For 28% of FPs, follow-up is determined by the patient on an as-required basis.

Table 11: Family Physician-Reported Standard Follow-Up Routine for Patients with Insomnia Disorder

Follow-Up Time Frame	# FPs
Every 2 weeks to 4 weeks until they are stable	42
Every 6 weeks to 12 weeks until they are stable	23
3 months after initiating treatment	7
6 months after initiating treatment	0
Annually	0
No follow-up booked (patient advised to follow-up as needed)	28

FP = family physician.

Prescribing and Treatment Practices

Respondents were asked for their opinions on what would improve their ability to recommend or prescribe the most appropriate intervention for patients with insomnia disorder (Table 12). FPs in this study indicated that they would like to receive continuing medical education on insomnia disorder (74%) and have access to Canadian guidelines on it (72%). Participants also suggested that better availability of both psychological and behavioural therapies (60%) and insomnia programs at the local level (for patient referrals) (55%) would improve their ability to

recommend the most appropriate treatment. Patient education (48%) and decision-making tools (26%) were also cited as helpful.

Table 12: Family Physician Opinion on Improving Prescribing Practices for Patients with Insomnia Disorder

FP Intervention/Tool	# FPs
Continuing medical education	74
Canadian guidelines on insomnia disorder	72
Availability of psychological or behavioural therapies	60
Local availability of insomnia disorder program for referral	55
Patient education	48
Decision-making tools	26

FP = family physician.

FP survey respondents provided additional comments regarding prescribing and treatment practices for insomnia disorder. Comments included:

- “Always a tough problem coming up with the right combo, especially in the elderly.”
- “It is one of the commonest symptoms and most difficult to treat. The reason being CBT [cognitive behavioural therapy] is private pay and most patients don’t want to pay.”
- “Would be good to have standardized guidelines.”
- “Such a common problem. Would like to have more available, effective solutions than sedatives.”
- “Not many effective options and fear of benzo addiction limit prescription.”

From the literature, approaches to improving insomnia treatment often focused on strategies to reduce the prescribing of drug therapies. Some strategies involved physician efforts, such as recommending patients stop their medications, gradually weaning patients off, or switching patients to an alternative drug.¹¹ For some clinicians, a reduction in hypnotics prescriptions was the result of peer pressure or professional guilt.¹² Organizational strategies to reduce sedative prescribing included guidelines, physician audit and feedback, letters to patients from physicians, recommendations from FPs, and clinic-based methods (no further details provided).¹¹

Some physicians expressed a desire for practice policies on this topic¹² or highlighted the need for clear treatment guidelines.¹³ They also expressed a need for reliable, simple sleep assessment tools.¹³ Successful approaches may involve collaboration by interdisciplinary care teams^{12,17} and an investment of time and interest in the patient.¹² In addition, the Australian study highlighted the need to increase public awareness of sleep disorders.¹³

There may also be a role for online or electronic therapies for insomnia. However, one study reported that to improve uptake and adherence to online CBT-I programs, both patients and practitioners must perceive the program to be effective; the doctor-patient relationship must already be established; and the program must be presented in an accessible format.¹⁸

Nurse Practitioners

Of the 50 NPs surveyed, 62% were from Ontario, 10% were from British Columbia, 8% were from Alberta, 8% were from the Atlantic provinces, 6% were from Manitoba and Saskatchewan, and 6% were from Quebec. There were no NP respondents from Nunavut or the Territories (Table 13). The majority of NPs said their practice served an urban population (76%), while 24% reported serving a rural population (Table 14). Of note, at the time of the survey, NPs in Ontario were not authorized to prescribe controlled substances.⁹

Table 13: Nurse Practitioner Practice Location

Total NPs	British Columbia	Alberta	Manitoba and Saskatchewan	Ontario	Quebec	Atlantic Canada
50	5	4	3	31	3	4

NP = nurse practitioner.

Table 14: Nurse Practitioner Practice Setting

Total NPs	Urban	Rural
50	38	12

NP = nurse practitioner.

Most NP survey respondents indicated that they had been practising in primary care for between six years and 10 years (32%). Twenty per cent reported being in practice 16 years to 20 years; another 20% indicated practising 11 years to 15 years. Fourteen per cent of NPs indicated practising one to five years; 8% had been in practice for less than one year; and 6% had been practising for more than 25 years (Table 15).

Table 15: Nurse Practitioner Years in Practice

Total NPs	< 1 year	1 year to 5 years	6 years to 10 years	11 years to 15 years	16 years to 20 years	21 years to 25 years	25+ years
50	4	7	16	10	10	0	3

NP = nurse practitioner.

Of the NPs surveyed, most (44%) reported treating between one and 10 adult patients with insomnia disorder (acute and chronic) per month.

No relevant literature was identified that reported on NPs' views of treating insomnia; this may have been due to the nature of the limited search strategy. Two studies did include nurses, but these individuals' views were not reported separately from those of other health care practitioners.^{10,12}

Insomnia Therapy

Survey respondents were asked about their preferred therapies for treating patients with insomnia disorder. The majority of NPs (76%) indicated that they usually prescribe a combination of drug and behavioural therapy. Twenty per cent indicated a preference for behavioural therapy, only while one cited drug therapy alone as preferred (Table 16).

Table 16: Nurse Practitioner-Reported Preferred Therapy for Patients with Insomnia Disorder

Total NPs	Combined Drug and Behavioural Therapy	Behavioural Therapy Only	Drug Therapy Only	Other
50	38	10	1	1

NP = nurse practitioner.

Survey participants were asked how they choose therapy for insomnia disorder, including any standard therapeutic routine they might have. Responses included:

- “If the patient presents with long-standing insomnia and tried a good 3 months of behavioural therapy, then I would add drug therapy.”
- “Will depend on the cause of insomnia. I like to start with behavioural therapy first and, if really needed, add drug therapy.”
- “I always begin with sleep hygiene discussions to correct negative influences on sleep patterns.”
- “Limited options for behaviour therapy — therefore, little choice but medication.”
- “Initiate melatonin or tryptophan if available as a start. If ineffective, start with low-dose trazodone or Imovane and titrate as necessary.”
- “Will try antidepressants, Imovane, try to stay away from benzos.”

Many respondents (42%) indicated that a discussion with the patient about sleep hygiene would be a first step, with a number stating they would also consider the patient’s medical history (22%).

Many NPs (40%) cited behavioural therapy as a first choice and said only if this did not work would they consider drug therapy. Discussions about lifestyle modifications (e.g., exercise), job stress, mental health issues, and anxiety management were also noted as considerations within the therapeutic routine (16%). A few NPs (8%) stated that a sleep analysis or clinic would be part of their therapy.

While most respondents indicated that they would consider drug therapy only when other non-pharmacologic therapies failed, a few NPs (10%) indicated that medication (both prescription and over-the-counter) was their preferred routine.

Prescribing Influencers

NPs were asked about what influences them to recommend an alternative to their preferred option. The greatest number cited both potential side effects and patient comorbidities (66% each). Sixty-two per cent cited availability of resources for referral to behavioural interventions. Patient preference and cost were cited by an equal number of respondents (60%), while 58% of NPs indicated that perceived effectiveness of the intervention would influence their recommendations. Respondents also mentioned their own knowledge of behavioural interventions for insomnia (46%) and costs to the health care system (24%) (Table 17).

Table 17: Nurse Practitioner-Reported Insomnia Disorder Prescribing Influencers

Influencer	# NPs	Influencer	# NPs
Potential side effects	33	Cost to patient	30
Patient comorbidities	33	Perceived effectiveness of the intervention	29
Availability of resources for referral for behavioural interventions	31	Own knowledge of behavioural interventions for insomnia	23
Patient preference	30	Cost to health care system	12

NP = nurse practitioner.

Of note, availability of resources for referral to behavioural interventions was a more significant influencer for respondents in rural practice settings than for their urban counterparts.

Information Sources

Respondents were asked where they seek information about insomnia disorder (Table 18). Nearly all NPs surveyed (96%) indicated that they accessed online applications or websites; the applications *UptoDate*,¹⁴ *Medscape*,¹⁵ and *WebMD*¹⁶ were the most popular. Many NPs (80%) cited previous clinical experience and continuing professional development (68%) as sources of information. Approximately half also cited internal or local treatment guidelines (52%) and advice from a specialist or expert (50%).

Table 18: Nurse Practitioner-Reported Information Sources for Insomnia Disorder

Information Source	# NPs	Information Source	# NPs
Applications (mobile, Web)	48	Specialist or expert advice	25
Previous clinical experience	40	National or international clinical practice guidelines	4
Continuing professional development material	34	Other clinical decision-making tools	1
Internal/organizational or local treatment guidelines	26	Other	2

NP = nurse practitioner.

Interventions for Insomnia Disorder

NPs were asked about interventions they routinely prescribe or recommend for patients with insomnia disorder. All NPs surveyed indicated that they prescribe behavioural therapies for their patients. Among these behavioural therapies, sleep hygiene was cited most frequently (94%), followed by relaxation training (80%), mindfulness (64%), and CBT-I (40%).

Drug therapies were the second most popular intervention (94%). Among drug therapies, 82% of NPs cited antidepressants as their choice, while 80% indicated over-the-counter medications, 74% cited z-drugs, 40% cited antipsychotic drugs, and 30% indicated benzodiazepines.

Combination drug and behavioural therapies were cited by 70% of respondents (Table 19).

Table 19: Nurse Practitioner-Reported Interventions Routinely Prescribed for Patients with Insomnia Disorder

Intervention	# NPs
Behavioural therapies	50
Drug therapies	47
Combination therapies (drug and behavioural interventions)	35
Other	4

NP = nurse practitioner.

Prescription of Sedative-Hypnotics for Insomnia

NP survey participants were asked if they had any specific comments regarding the prescribing of sedative-hypnotics, including benzodiazepines and z-drugs, for patients with insomnia disorder.

Responses included:

- “High dependence. Avoid if at all possible.”
- “I like them for short-term use.”
- “Benzodiazepines can cause side effects and patients may rely on these without considering sleep hygiene strategies.”
- “Avoid due to addictive potential and cognitive impairment risk.”
- “This is usually a very last resort if all else fails or if patient was inherited on the drug and has been on for a substantial number of years.”
- “We know that they will work but they have a high abuse potential. I view them as a band-aid solution to a deeper issue.”

Surveyed NPs frequently expressed concerns about the known addiction, dependency, and abuse issues associated with sedative-hypnotics (50%). Many (48%) indicated that they don’t recommend these drugs, or that they avoid them completely in treating insomnia disorder. For some (20%), these drugs were considered an option for the short-term but usually not for longer-term therapy. A few NPs (4%) noted that in their province (Ontario), narcotics are a controlled substance; therefore, they were unable to prescribe them.

Respondents were asked about the durations for which they typically prescribe sedative or hypnotic medication for patients with insomnia disorder (Table 20). Approximately two-thirds of NPs (66%) said they would prescribe these drugs for between seven days and 14 days. Nearly a third (30%) said they prescribe them for 30 days, while some cited up to six months (4%).

Table 20: Nurse Practitioner-Reported Prescription Durations for Sedative or Hypnotic Medications for Patients with Insomnia Disorder

Prescription Duration	# NPs
7 days to 14 days	33
30 days	15
90 days	0
6 months	2
1 year or more	0

NP = nurse practitioner.

We also asked NPs about the duration for which they typically recommend behavioural therapy for patients with insomnia disorder (Table 21). Of those surveyed, 42% indicated they recommend 90 days, while almost a quarter (24%) said they recommend up to 30 days. An equal number of NPs recommend six months (16%) or one year or more (16%) for behavioural therapy.

Table 21: Nurse Practitioner-Reported Behavioural Therapy Durations for Patients with Insomnia Disorder

Therapy Duration	# NPs
7 days to 14 days	1
30 days	12
90 days	21
6 months	8
1 year or more	8

NP = nurse practitioner.

Follow-Up Treatment

All NPs surveyed reported on a follow-up routine for patients with insomnia disorder (Table 22). More than half indicated that they would follow up every two to four weeks until the patient was stable (54%). Nearly a quarter (24%) indicated they would follow up every six to 12 weeks until the patient was stable. A minority (8%) indicated that they do not routinely book follow-ups, but advise patients to follow up as needed.

Table 22: Nurse Practitioner-Reported Standard Follow-Up Routine for Patients with Insomnia Disorder

Follow-Up Time Frame	# NPs
Every 2 weeks to 4 weeks until they are stable	27
Every 6 weeks to 12 weeks until they are stable	12
3 months after initiating treatment	1
6 months after initiating treatment	1
Annually	0
No follow-up booked (patient advised to follow up as needed)	4
Other	5

NP = nurse practitioner.

Prescribing and Treatment Practices

We asked respondents for their opinions on what would improve their ability to recommend or prescribe the most appropriate interventions for their patients with insomnia disorder (Table 23). The majority of NPs (88%) mentioned the availability of Canadian insomnia disorder guidelines. Nearly three-quarters (72%) indicated that continuing medical education would help. Slightly more than two-thirds (68%) felt that better availability of psychological or behavioural therapies would improve their prescribing.

The availability of insomnia programs at the local level for referring patients was cited by 62% of NPs surveyed. An equal number (58%) indicated that both patient education and decision-making tools would also help improve their ability to recommend or prescribe the most appropriate intervention for patients.

Table 23: Nurse Practitioner Opinion on Interventions to Improve Prescribing for Patients with Insomnia Disorder

NP Intervention/Tool	# NPs
Canadian guidelines on insomnia disorder	44
Continuing medical education	36
Availability of psychological or behavioural therapies	34
Local availability of insomnia disorder program for referral	31
Patient education	29
Decision-making tools	29

NP = nurse practitioner.

Respondents provided additional comments about their prescription and treatment practices for insomnia disorder. Comments included:

- “I wish more providers were educated on the dangers of benzodiazepines and z-drugs, particularly in the elderly, so that they would decrease the use of them.”
- “There are limited resources. Long wait times for sleep study referrals are a big hindrance. Educate primary care providers to do sleep disorder screening and sleep study interventions.”
- “Guidelines would be useful.”
- “Insomnia is a term for a host of sleep disorders. A treatment clinic with reasonable wait times would be valuable. This would enable specific holistic patient assessments and treatment planning.”
- “Standardized decision tools would be beneficial.”
- “After completing the survey, I now realize that I need to read more about the appropriate treatment for insomnia disorder. I would like to also look into local psychological/counselling services available.”
- “Main issue with successful therapy is lack of access to cognitive therapy resources.”
- “Insomnia appears to be an increasing ailment within the first world population. Perhaps instead of slapping on a band-aid, more needs to be done to identify the causes and recommend policies and interventions.”

Pharmacists

Of the 52 pharmacists surveyed, 38% were from Ontario, 19% were from Quebec, 15% were from British Columbia, 13% were from Alberta, 8% were from the Atlantic provinces, and 6% were from Saskatchewan. There were no respondents from Manitoba, Nunavut, or the Territories (Table 24). The majority of pharmacists reported that their practice served an urban population (85%), while 19% reported serving a rural population (Table 25). Pharmacists were surveyed with the understanding that they may not always be privy to the indication for which a drug is prescribed, and may not be aware of behavioural interventions prescribed as therapy for patients with insomnia disorder.

Table 24: Pharmacist Practice Location

Total Pharmacists	British Columbia	Alberta	Saskatchewan	Ontario	Quebec	Atlantic Canada
52	8	7	3	20	10	4

Table 25: Pharmacist Practice Setting

Total	Urban	Rural	Remote
52	44	10	0

The largest groups of pharmacists surveyed indicated that they had been practising in primary care for six years to 10 years (25%) or 11 years to 15 years (21%). Among the remaining respondents, 17% had been in practice for 16 years to 20 years, 10% for 21 years to 25 years, and 8% for more than 25 years (Table 26).

Table 26: Pharmacist Years in Practice

Total	< 1 year	1 year to 5 years	6 years to 10 years	11 years to 15 years	16 years to 20 years	21 years to 25 years	25+ years
52	0	0	13	11	9	5	4

We asked respondents approximately how many adults they typically saw each month, on average, who had been diagnosed and treated by a health care provider for insomnia disorder. More than a third (37%) indicated seeing between 30 and 100 adults with insomnia disorder (acute or chronic) per month. Slightly more than a quarter (27%) saw approximately 120 to 300 insomnia patients monthly, while 21% saw 12 to 25 patients, 10% saw 10 or fewer, and six saw more than 400.

Information Sources

Pharmacist respondents were asked where they seek information about insomnia disorder (Table 27). More than two-thirds (67%) indicated that they accessed websites and online applications. The websites and applications most cited were *UptoDate*,¹⁴ *RxTx*,¹⁹ *Medscape*,¹⁵ and *WebMD*.¹⁶ Sixty-seven per cent of pharmacists cited continuing professional development as a main source of insomnia information, while 65% cited previous clinical experience. Just under a third (31%) also cited internal or local treatment guidelines as information sources.

Table 27: Pharmacist-reported Information Sources for Insomnia Disorder

Information Source	# of Pharmacists	Information Source	# of Pharmacists
Applications (mobile, Web)	35	Specialist or expert advice	7
Continuing professional development material	35	National or international clinical practice guidelines	2
Previous clinical experience	34	Other clinical decision-making tools	3
Internal/organizational or local treatment guidelines	16	Other	2

Interventions for Insomnia Disorder

We asked survey respondents about the most common interventions they saw prescribed or recommended by health care providers for treating patients with insomnia disorder. The majority of (94%) indicated that drug therapy alone was the intervention they most commonly saw. Among drug therapies prescribed by physicians, pharmacists indicated that z-drugs (94%), benzodiazepines (88%), and antidepressants (83%) were the ones they saw most frequently. They also cited antipsychotic drugs (75%) and over-the-counter medications (52%).

Sixty-seven per cent of pharmacists mentioned behavioural therapy alone as an intervention prescribed by health care providers for insomnia patients, with sleep hygiene (57%) and relaxation training being the more common therapies recommended within this particular intervention. Thirty-five per cent reported observing a combination therapy that included both drug and behavioural interventions (Table 28).

Table 28: Pharmacist-Reported Common Therapies Prescribed by Physicians for Patients with Insomnia Disorder

Intervention	# of Pharmacists
Drug therapies only	49
Behavioural therapies only	35
Combination therapies (drug and behavioural interventions)	18

From the literature, few studies reported on the views and experiences of pharmacists.^{10,20}

One study from Nova Scotia studied the outcomes of a training program (More Than Meds) designed to improve how community pharmacists address mental illness and mental health needs.²⁰ A simulated patient phone call, where the caller requested something to help her sleep, assessed how those who had undergone this training handled the call compared with those who had not. Pharmacists who had participated in the More Than Meds program more often suggested non-pharmacological therapies, and were better at communicating with patients about symptom duration and potential triggers for sleep problems.²⁰

Prescribing Sedative-Hypnotics for Insomnia

Survey participants were asked if they had any specific comments about prescribing sedative-hypnotics, including benzodiazepines and z-drugs, for patients with insomnia disorder. Responses included:

- “I feel these are overprescribed...almost every other patient is on one.”
- “Patients never seem to stop using them.”
- “Highly overprescribed for too long and without adjunct counselling.”
- “Risk of addiction and tolerance is an issue.”
- “I find my patients who are on long-term zopiclone become addicted to it and cannot sleep without taking a high dose.”
- “Very commonly prescribed. Most prescribers prescribe it on an ongoing basis — not needed.”
- “It’s getting better. MDs are prescribing more trazodone than benzos.”
- “They are overprescribed and overused. Zopiclone is the drug we have the most issues with in terms of early refills, more so than narcotics.”

With respect to prescribing sedative-hypnotics (i.e., benzodiazepines, z-drugs) to treat patients with insomnia disorder, many pharmacists (68%) expressed concerns about over-prescribing and drug dependency. They emphasized the side effects associated with these drugs, particularly among elderly patients (12%). Respondents also had concerns about the long-term use of these drugs (20%) and the lack of discontinuation they observed (16%).

Survey respondents were asked about the durations they commonly saw for sedative or hypnotic prescriptions for patients with insomnia disorder (Table 29). Almost half of all pharmacists surveyed (48%) reported observing a duration of one year or more. More than a third (36%) stated that they saw patients prescribed these drugs for up to 30 days, while 10% reported seeing patients prescribed these medications for up to 90 days.

Table 29: Pharmacist-Observed Length of Time Patients with Insomnia Disorder Are Prescribed Sedative or Hypnotic Medication

Prescribing Duration	# of Pharmacists
7 days to 14 days	2
30 days	19
90 days	5
6 months	1
1 year or more	25

In the literature, similarly to the survey responses, pharmacists reported seeing long-term, repeat prescribing of hypnotics, which they found concerning.¹⁰ It is possible that these long-term prescriptions originated as short-term prescriptions for intense life events, like bereavement; however, pharmacists stated a perceived need to discontinue the long-

term use of hypnotics.¹⁰ These long-term prescriptions reported by pharmacists were found to be more common and less contextually dependent than FPs had suggested.¹⁰

Behavioural Therapy Counselling

Of the pharmacists surveyed, 62% indicated that in addition to counselling on medications, they routinely discuss behavioural therapies with all or most patients diagnosed with insomnia disorder. Of these respondents (32 pharmacists), sleep hygiene was the most commonly discussed therapy (cited by 100%), with relaxation training being the second most popular (50%). Pharmacists also cited discussing stimulus control therapy (31%) and mindfulness (22%). In the literature, pharmacists may be unaware of the efficacy of CBT-I.¹⁰

Conversely, 38% of pharmacists surveyed indicated that they do not discuss any behavioural therapies with their insomnia disorder patients.

Prescribing and Treatment Practices

Responding pharmacists were asked to comment on prescribing and treatment practices for insomnia disorder. Comments included:

- “Too often, medications are used as the only tool for insomnia. If not used in conjunction with other interventions, it is more difficult to withdraw the medications.”
- “It is nice to see a lot of physicians getting the elderly off or reducing doses of benzos and zopiclone. Also nice to see new treatments like low-dose doxepin.”
- “More guidelines would be nice or funding for counsellors.”
- “Cognitive behavioural, sleep hygiene, and other mindfulness practices are underutilized.”
- “Medications are overprescribed. Doctors rarely speak about behavioural or non-pharmaceutical treatments. Majority of patients have underlying anxiety issues that are not well treated.”
- “I believe most people expect to take a pill and automatically have better sleep without heeding non-drug measures to improve sleep.”

Discussion

This study sought to better understand trends in prescribing therapies — both drug and psychological or behavioural therapies — for the treatment of patients with insomnia disorder. Overall, the study found that primary care practitioners share similar opinions regarding the various available interventions. Prescribing practitioners surveyed tended to agree that starting with behavioural therapy and incorporating drug therapy as necessary is the preferred approach.

The majority of primary care practitioners surveyed indicated that sedative-hypnotics (including benzodiazepines and z-drugs) should be avoided due to their addictive nature; that they should not be prescribed to elderly patients; and that they should only be used in the short term (for acute insomnia). Practitioners indicated that among the available drug therapies, antidepressants, z-drugs, and over-the-counter

medications are preferred. There was also relative agreement by all primary care providers that sleep hygiene and relaxation training are the preferred behavioural therapies.

It is evident that many factors affect which interventions are prescribed for patients with insomnia disorder — in particular, the patient's age and the availability and cost of behavioural therapies in a region or community. While respondents noted variation in prescribing practices and issues related to access to services and availability of drugs, there were no marked differences across provinces, practice settings (urban and rural), or practitioner years of practice.

This study was not intended to represent all primary care clinicians across Canada, but rather to provide an indication of practices in order to consider trends in prescribing and opinions. However, it is clear that opportunities exist for improving providers' abilities to recommend appropriate interventions. In particular, national clinical practice guidelines for insomnia, continuing medical education on the disorder, and the availability of psychosocial and behavioural therapies at the local level for referring patients may be considered for future improvements in encouraging the appropriate use of interventions when treating insomnia disorder.

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Appendix 1: Survey of Family Physicians and Nurse Practitioners

CADTH developed the questions in the survey of family physicians (FPs) and nurse practitioners (NPs). The survey was designed to gather information about primary care practitioners' views and experiences regarding prescribing therapies (both drug and behavioural or psychological) for treating patients with insomnia disorder.

Primary Care Practitioner Practice

1. Please identify your specialty:

- Family physician Nurse practitioner Pharmacist

2. In which province or territory do you practice/are you located?

- Alberta Newfoundland and Labrador Ontario Yukon
- British Columbia Northwest Territories Prince Edward Island
- Manitoba Nova Scotia Quebec
- New Brunswick Nunavut Saskatchewan

3. Which populations does your practice serve? (*check all that apply*)

- Urban Rural Remote Other (please specify)

4. How many years have you been practising in primary care? (please specify)

5. Approximately how many adults with insomnia disorder (acute and chronic) do you treat per month, on average? (please specify)

Insomnia Disorder Therapies

A1. What is your preferred therapy for patients with insomnia disorder?

- Drug therapy only
- Behavioural therapy only
- Combined drug and behavioural therapy
- Other (please specify)

A2. Please comment on how you choose therapy for insomnia disorder, including any standard therapeutic routine you might have.

A3. What influences you to recommend or prescribe an alternate to your preferred option?

(check all that apply)

- Cost to patient
- Cost to health care system
- Availability of resources for referral for behavioural interventions
- Patient preference
- My own knowledge of behavioural interventions for insomnia
- Patient comorbidities
- Perceived effectiveness of the intervention
- Potential side effects
- Other (please specify)

A4. Please select the intervention you routinely prescribe or recommend for patients with insomnia disorder. *(check all that apply)*

Drug therapies

- Benzodiazepines (e.g., clonazepam, temazepam, lorazepam)
- Z-drugs (e.g., zopiclone, zolpidem)
- Antidepressants (e.g., trazodone, amitriptyline, doxepin)
- Antipsychotic drugs (e.g., quetiapine)
- Over-the-counter medications (e.g., melatonin, antihistamines)
- Other (please specify)

Behavioural therapies

- Sleep hygiene
- Relaxation training
- Cognitive behavioural therapy for insomnia (CBT-I)
- CBT-I books
- CBT-I electronic programs (e.g., SHUTI or Sleepio)
- CBT-I for anxiety
- Sleep restriction therapy
- Stimulus control therapy
- Mindfulness
- Combination therapy (drug and behavioural intervention)
- Other (please specify)

A5. Do you have any specific comments regarding the prescription of sedative-hypnotics (i.e., benzodiazepines and z-drugs) for insomnia disorder?

- Yes (*please provide details*)
- No

A6. How long do you typically prescribe sedative or hypnotic medication for a patient with insomnia disorder?

- 7 to 14 days
- 30 days
- 90 days
- 6 months
- 1 year or more

A7. How long do you typically recommend behavioural therapy for a patient with insomnia disorder?

- 7 to 14 days
- 30 days
- 90 days
- 6 months
- 1 year or more

A8. What is your standard follow-up routine for patients with insomnia disorder?

- Every 2 to 4 weeks until they are stable
- Every 6 to 12 weeks until they are stable
- 3 months after initiating treatment
- 6 months after initiating treatment
- Annually
- No follow-up is booked (the patient is advised to follow-up as needed)
- Other (please specify)

A9. Where do you seek information about insomnia disorder? (*check all that apply*)

- Internal/organizational or local treatment guidelines
- Continuing professional development material
- Previous clinical experience
- Other (please specify)
- National or international clinical practice guidelines
- Specialist or expert advice
- Other clinical decision-making tools
- Apps (check all that apply)
 - UptoDate
 - Dynamed
 - RxTx
 - WebMD
 - Medscape
 - Other (please specify)

A10. In your opinion, what would improve your ability to recommend or prescribe the most appropriate intervention for your patients with insomnia disorder? *(check all that apply)*

- Continuing medical education
- Canadian guidelines on insomnia disorder
- Local availability of insomnia disorder program for referral
- Availability of psychological or behavioural therapies
- Patient education
- Decision aid tools
- Other (please specify)

QE1. Do you have any other comments you would like to share regarding prescribing and treatment practices for insomnia disorder?

QE2. Thank you for completing the survey. Would you be interested in participating in further research about the prescribing and treatment practices for insomnia disorder in the form of a telephone interview?

- Yes *(please provide details)*
- No

QE3. What is your gender?

- Male
- Female
- Prefer not to answer

Appendix 2: Survey of Pharmacists

CADTH developed the questions for the survey of pharmacists. The survey was designed to gather information about primary care practitioners' views and experiences with prescribing therapies (both drug and behavioural or psychological) to treat patients with insomnia disorder.

Pharmacist Practice

1. Please identify your specialty:

- Family physician Nurse practitioner Pharmacist

2. In which province or territory do you practice/are you located?

- Alberta Newfoundland and Labrador Ontario Yukon
- British Columbia Northwest Territories Prince Edward Island
- Manitoba Nova Scotia Quebec
- New Brunswick Nunavut Saskatchewan

3. Which populations does your practice serve? (*check all that apply*)

- Urban Rural Remote Other (please specify)

4. How many years have you been practising as a pharmacist? (please specify)

Insomnia Disorder Therapies

B1. Approximately how many adults diagnosed and treated by a physician for insomnia disorder (acute and chronic) do you see, on average, per month in your pharmacy? (please specify)

B2. Please select the most common interventions you see prescribed or recommended by physicians for patients with insomnia disorder. (*check all that apply*)

Drug therapies

- Benzodiazepines (e.g., clonazepam, temazepam, lorazepam)
- Z-drugs (e.g., zopiclone, zolpidem)
- Antidepressants (e.g., trazodone, amitriptyline, doxepin)
- Antipsychotic drugs (e.g., quetiapine)
- Over-the-counter medications (e.g., melatonin, antihistamines)
- Other (please specify)

Behavioural therapies

- Sleep hygiene
- Relaxation training
- Cognitive behavioural therapy for insomnia (CBT-I)
- CBT-I books
- CBT-I electronic programs (e.g., SHUTI or Sleepio)
- CBT-I for anxiety
- Sleep restriction therapy
- Stimulus control therapy
- Mindfulness
- Combination therapy (drug and behavioural intervention)
- Other (please specify)

B3. How long a period do you most commonly see sedative or hypnotic medications prescribed for patients with insomnia disorder?

- 7 to 14 days
- 30 days
- 90 days
- 6 months
- 1 year or more

B4. Do you have any specific comments regarding the prescription of sedative-hypnotics (i.e., benzodiazepines and z-drugs) for insomnia disorder?

- Yes (*please provide details*)
- No

B5. In addition to counselling on medications, which of the following best describes your interaction with patients diagnosed with insomnia disorder?

- I routinely discuss behavioural therapies with all or most patients diagnosed with insomnia disorder
- I do not routinely discuss behavioural therapies with patients diagnosed with insomnia disorder

B6. Which of the following behavioural therapies do you typically discuss? (*check all that apply*)

- Sleep hygiene
- Relaxation training
- Cognitive behavioural therapy for insomnia (CBT-I)
- CBT-I books
- CBT-I electronic programs (e.g., SHUTI or Sleepio)
- CBT-I for anxiety
- Sleep restriction therapy
- Stimulus control therapy
- Mindfulness
- Other (please specify)

B7. Where do you seek information about insomnia disorder? *(check all that apply)*

- Internal/organizational or local treatment guidelines
- Continuing professional development material
- Previous clinical experience
- Other (please specify)
- National or international clinical practice guidelines
- Specialist or expert advice
- Other clinical decision-making tools
- Apps (check all that apply)
 - UptoDate
 - Dynamed
 - RxTx
 - WebMD
 - Medscape
 - Other (please specify)

QE1. Do you have any other comments you would like to share regarding prescribing and treatment practices for insomnia disorder?

QE2. Thank you for completing the survey. Would you be interested in participating in further research about prescribing and treatment practices for insomnia disorder in the form of a telephone interview?

- Yes *(please provide details)*
- No

QE3. What is your gender?

- Male
- Female
- Prefer not to answer

Appendix C: Literature Search Strategy

OVERVIEW

Interface:	Ovid
Databases:	Embase Ovid MEDLINE In-Process & Other Non-Indexed Citations Note: Subject headings have been customized for each database. Duplicates between databases were removed in Ovid.
Date of Search:	December 13, 2016
Study Types:	All study types
Limits:	Canadian filter applied

SYNTAX GUIDE

/	At the end of a phrase, searches the phrase as a subject heading
.sh	At the end of a phrase, searches the phrase as a subject heading
MeSH	Medical Subject Heading
fs	Floating subheading
exp	Explode a subject heading
*	Before a word, indicates that the marked subject heading is a primary topic; or, after a word, a truncation symbol (wildcard) to retrieve plurals or varying endings
#	Truncation symbol for one character
?	Truncation symbol for one or no characters only
adj#	Adjacency within # number of words (in any order)
.ti	Title
.ab	Abstract
.hw	Heading Word; usually includes subject headings and controlled vocabulary
.kf	Author keyword heading word (MEDLINE)
.kw	Author keyword (Embase)
.pt	Publication type
.rn	CAS registry number

MULTI-DATABASE STRATEGY

Line #	Search Strategy
1	exp Canada/
2	(canadian* or canada* or british columbia* or alberta* or saskatchewan* or manitoba* or ontario* or quebec* or new brunswick* or prince edward island* or nova scotia* or labrador* or newfoundland* or nunavut* or northwest territor* or yukon* or toronto* or montreal* or vancouver* or ottawa* or calgary* or edmonton* or winnipeg* or first nation* or metis).ti,ab,hw,kf,kw.
3	(canadian* or canada* or british columbia* or alberta* or saskatchewan* or manitoba* or ontario* or quebec* or new brunswick* or prince edward island* or nova scotia* or labrador* or newfoundland* or nunavut* or northwest territor* or yukon* or toronto* or montreal* or vancouver* or ottawa* or calgary* or edmonton* or winnipeg* or first nation* or metis).jw,jx.
4	canada.lo.
5	(canadian* or canada* or british columbia* or alberta* or saskatchewan* or manitoba* or ontario* or quebec* or new brunswick* or prince edward island* or nova scotia* or labrador* or newfoundland* or

MULTI-DATABASE STRATEGY

Line #	Search Strategy
	nunavut* or northwest territor* or yukon* or toronto* or montreal* or vancouver* or ottawa* or calgary* or edmonton* or winnipeg* or first nation* or metis).sd,ss,if,cr.
6	or/1-5
7	*insomnia/ use oemezd
8	exp "Sleep Initiation and Maintenance Disorders"/ use ppez
9	(Insomnia* or sleeplessness* or Sleep Initiation Dysfunction* or agrypnia* or hyposomnia*).ti,kf,kw.
10	insomnia*.ab. /freq=2
11	(disorder* adj5 sleep adj5 initiat*).ti,ab,kf,kw.
12	(disorder* adj5 sleep adj5 (maintenance or maintain*).ti,ab,kf,kw.
13	or/7-12
14	6 and 13
15	remove duplicates from 14

OTHER DATABASES

PubMed	A limited PubMed search was performed to capture records not found in MEDLINE. Same MeSH, keywords, limits, and study types used as per MEDLINE search, with appropriate syntax used.
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Grey Literature

Dates for Search:	To April 2017
Keywords:	Insomnia
Limits:	Canadian; English

Relevant websites from the following sections of the CADTH grey literature checklist *Grey Matters: a practical tool for searching health-related grey literature* (<https://www.cadth.ca/grey-matters>) were searched:

- Health Technology Assessment Agencies
- Health Economics
- Clinical Practice Guidelines
- Databases (free)
- Internet Search