A Pan-Canadian Practice Guideline: Prevention, Screening, Assessment and Treatment of Sleep Disturbances in Adults with Cancer

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Abstract

Objective

The objective of this practice guideline is to inform Canadian health authorities, program leaders, administrators and health care providers about the optimal strategies and interventions for the prevention, screening, assessment and management of cancer-related sleep disturbances (insomnia and chronic insomnia) in adult cancer populations. Initial screening for sleep disturbances can be done using either the Edmonton Symptom Assessment System (ESAS) or ESAS Revised (ESAS-r) and the Canadian Problem Checklist.

Methods

A systematic search of the published health literature and targeted search of the grey literature was conducted to identify randomized controlled trials, clinical practice guidelines, systematic reviews and other guidance documents. The report was distributed to members of the Sleep Expert Panel (which is composed of nurses, psychologists, primary care physicians, oncologists, physicians who specialize in sleep disturbances, researchers and guidelines methodologists) who reviewed, discussed and approved the final version of the guideline. Health care professionals from across Canada who provide care to adult cancer patients were asked to provide feedback through an external review process.

Data Sources: The search of the health literature included MEDLINE, EMBASE, HealthStar, the Cochrane Library and other data sources to June 2012.

Keywords used to search data sources included: sleep, cancer, insomnia, chronic insomnia, sleep disturbance, oncology

Results

Three clinical practice guidelines and 12 randomized controlled trials were identified as the evidence base for this practice guideline. A number of other supporting documents were reviewed to ensure that the recommendations were consistent with evidence-based guideline recommendations for insomnia in the general population. Overall, the evidence suggests that it is important to screen adult cancer patients for sleep disturbances using standardized screening tools on a routine basis. Cognitive behavioural therapies are effective in improving sleep outcomes.

Conclusions

Sleep difficulty, a prevalent problem in cancer patient populations, needs greater recognition by health professionals and health administrators. Prevention, screening, assessment and treatment strategies supported by the best available evidence are required. Recommendations and care path algorithms for practice are offered.

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Question

What are the optimal prevention, screening, assessment and intervention strategies for adults with cancer or survivors who are identified as experiencing symptoms of sleep disturbance? Outcomes of interest include reducing sleep disturbance and improving sleep quality.

Objective

The objective of this practice guideline is to inform Canadian health authorities, program leaders, administrators and health care providers about the optimal strategies and interventions for the prevention, screening, assessment and management of cancer-related sleep disturbances (insomnia and chronic insomnia) in adult cancer populations. Initial screening for sleep disturbances can be done using the Edmonton Symptom Assessment System Revised (ESAS-r) and the Canadian Problem Checklist.

Target Population

This practice guideline pertains to adults with cancer (age 18 years or older) of any type, disease stage or treatment modality. Applicability to patients at an advanced stage of disease may be limited since little research has been conducted in this population. The identification, assessment and treatment of those with sleep disturbances who are at risk of, or have, insomnia symptoms or insomnia syndrome are the focus of this report. It is recognized that a significant proportion of cancer patients who report sleep disturbance will likely develop chronic insomnia.

Target Users

This practice guideline is intended to inform professional health care providers engaged in the care of adults with cancer. It is also intended to support Canadian health authorities, program leaders and administrators in developing policies and procedures related to survivorship care for individuals with cancer. The guideline is interprofessional in focus, and the recommendations are applicable to direct care providers (e.g., nurses, social workers and family practitioners) in diverse care settings. The scope of practice for different professions may vary according to governmental or professional regulatory standards, and users of this guideline are expected to exercise skill and judgement to determine if the application of the recommendations is within their scope of practice. It is not the intent of this guideline to make recommendations for specialist practitioners (i.e., respirologists,

psychologists, psychiatrists and sleep medicine experts). Depending on the factors associated with the sleep disturbance, additional guidance documents should be accessed for further information on specific conditions (e.g., fatigue, pain or depression guidelines). Users may wish to adapt this guideline to fit their local health care processes, resources and context as part of knowledge translation and evidence implementation.

Scope

The present document addresses sleep disturbances that extend from initial sleep disturbance to insomnia syndrome in adults with cancer. ***Other sleeping disorders that require management by sleep medicine specialists, such as sleep apnea or movement disorders in sleep, are not within the scope of this guideline*** with the exception of their identification as part of initial screening to ensure the immediacy of referral to specialists for these problems.

Definitions of Sleep Disturbances

Sleepiness and Drowsiness: While sleepiness and drowsiness are important issues faced by patients with cancer, they relate more to the tendency to fall asleep in inappropriate situations rather than difficulty with nocturnal sleep. These problems may indicate a sleep disorder and are not considered in this guideline.

Fatigue: Though fatigue is related to sleep problems,[1] and fatigue and insomnia often co-occur in cancer patients,[2,3] sleep disturbance is considered a distinct state from fatigue and requires specific management strategies.[4] A separate guideline is available to help practitioners manage the symptom of fatigue.[5,6]

Sleep Disturbance and Insomnia Symptoms: Patients with cancer often complain of sleep problems as a result of the stress of dealing with cancer. These sleep problems are labelled situational, acute or adjustment insomnia. Situational insomnia usually resolves when the stressor is removed. Insomnia is characterized by subjective complaints about dissatisfaction with sleep quality or duration, trouble falling asleep at bedtime, disrupted sleep (night-time waking), waking too early and waking un-refreshed (non-restorative sleep). These problems occur despite adequate opportunity and circumstances for sleep.[7-9] Daytime symptoms of fatigue or low energy and difficulties with cognitive functions (e.g., attention, concentration and memory) usually accompany these subjective complaints. An individual experiencing symptoms of insomnia three or more times per week for greater than one month would be considered to have chronic insomnia.[9]

Insomnia Syndrome: Diagnostic criteria for insomnia derived from the International Classification of Sleep Disorder and the DSM-IV are as follows:

- difficulty initiating and/or maintaining sleep, whereby sleep onset latency is greater than 30 minutes, or frequent or prolonged nocturnal awakenings last greater than 30 minutes;
- sleep efficiency (ratio of total sleep to time spent in bed) is lower than 85%;
- difficulties occur at least three times per week;
- difficulties occur for at least one month; and
- difficulties cause distress or daytime impairment in social, occupational or other important domains of functioning.[10]

Most cancer patients who report sleep disturbance likely have chronic insomnia or insomnia syndrome. The terms chronic insomnia and insomnia syndrome are often used interchangeably since both have similar presentations in terms of diagnostic criteria.

Other Sleep Disorders: The guideline authors recognize the importance of screening for and identifying risk factors for other sleep disorders, such as sleep apnea or movement disorders in sleep, in order to trigger a referral to a sleep specialist if appropriate. While the other sleep disorders are not the focus of this report, an indication of drowsiness (identified on ESAS screening) or loud snoring — core symptoms of obstructive sleep apnea for example — could suggest a sleep disorder other than insomnia. In this case, the patient should be referred for specialized assessment by a sleep medicine professional.

Screening and Assessment Process Definitions

The following operational definitions further clarify the scope of this guideline and the screening and assessment processes.

Screening: Screening is a process that provides a snapshot of a patient's problems or concerns. Brief psychometrically valid measures are often used to quickly flag a problem or concern and to identify patients who are at risk of a poor health outcome. The sleep item of the physical domain of the Canadian Problem Checklist is a crude indicator of a subjective sleep problem; the inclusion of sleep as an "other" symptom on the ESAS intensity scale could also indicate a sleep problem. Screening is a relatively crude indicator of a problem. Further elaboration using a more focused assessment approach and valid cut-off scores, if available, is essential and may help target appropriate intervention strategies or the need for referral.[11,12]

Focused Assessment: Once a patient with cancer has been identified as experiencing sleep disturbance through screening, a more focused assessment helps identify whether they need immediate referral to a sleep medicine specialist for a definitive diagnosis or whether initial intervention by front line providers is appropriate.

Patient-Reported Outcome Measures for Sleep Disturbance and Sleep Related Impairments: While not cancer specific, clinicians can use the Patient-Reported Outcomes Information System (PROMIS©) "sleep thermometer" as a sound psychometric tool to assess sleep disturbance.[4] The PROMIS sleep disturbance and sleep-related impairment item banks have been shown to have excellent measurement properties that may prove to be useful for assessing general aspects of sleep disturbances irrespective of possible underlying causes.[4] Using a valid tool such as PROMIS as well as a tool such as the Insomnia Severity Index[13] may be helpful in systemizing the assessment and evaluation of sleep problems.

Introduction

The prevalence of insomnia in individuals with cancer ranges from 25% to 59%.[14-17] Research shows that, although patients with insomnia see the sleep problem as being significant and disruptive, they are often reluctant to report sleep problems to their providers.[18] Reasons for this reluctance include the perception that it is outside the job of cancer care professionals. Cancer patients are rarely asked about their sleep, but they believe this should change and that sleep difficulty needs much greater recognition by health professionals.[18]

Insomnia commonly presents as a transient inability to initiate or maintain sleep, whereas insomnia syndrome is the repeated experience of insomnia to the extent that it occurs more than three days per week and is associated with impaired daytime functioning or significant psychological distress for at least a month.[13] Insomnia syndrome can extend for considerable amounts of time.[17] A significant proportion of patients with cancer will have chronic insomnia.[17]

In the general population, risk and/or precipitating factors for insomnia vary but can include being female, advanced age, depressed mood, snoring, low levels of physical activity, co-morbid medical conditions, nocturnal micturation, regular use of agents to aid sleep (i.e., hypnotics), previous complaints about insomnia and high levels of perceived stress.[19,20] In a study investigating the characteristics of sleepers, individuals presenting with insomnia syndrome exhibited pre-morbid psychological vulnerability to insomnia, characterized by higher depressive and anxiety symptoms, lower extraversion, higher arousability and poorer self-rated mental health at baseline. They also presented with higher levels of bodily pain and poorer general health.[21]

Insomnia can often co-occur with other primary sleep disorders, such as obstructive or central sleep apnea, restless legs syndrome or periodic limb movement disorder. Insomnia can also co-occur with psychiatric conditions such as anxiety or depression, or with medical conditions such as hyperthyroidism, chronic pain conditions, chronic obstructive pulmonary disease or chronic renal disease.

Along with the identified risk factors in the general population, risk factors for insomnia in patients with cancer are multi-factorial and can include:

- cancer by-products (e.g., tumours that increase steroid production, dyspnea, nausea, pruritus or symptoms of tumour invasion resulting in pain);
- treatment factors (e.g., corticosteroids and hormonal fluctuations); and
- cancer-related medications (e.g., opiates, chemotherapy, neuroleptics, sympathomimetics, steroids or sedative hypnotics).

Other predisposing factors include:

- biological, psychological and social factors (e.g., headaches, hyperarousability, increased sleep-reactivity or increased stress response);
- precipitating factors (e.g., the stress associated with a cancer diagnosis or cancer treatment);
- perpetuating factors (e.g., conditioned physical and mental arousal or learned negative sleep behaviours); and
- cognitive distortions, which can exacerbate sleep disturbance and lead to insomnia syndrome.[1,15,16,22]

Contrary to what is found in the general population, younger age is associated with increased risk for insomnia in cancer patients (rather than older age). External factors such as noise, light and temperature can make falling asleep difficult or have a negative impact on sleep quality in all populations. This may be particularly important in the context of cancer where a patient may be in hospital or has been moved to an unfamiliar setting. Cancer and treatment can therefore both cause and exacerbate sleep disturbances.

It is important to note that insomnia syndrome will not always resolve with the resolution of the co-occurring disorder or condition (e.g., depression, fatigue or pain). Persistent insomnia has been identified as a predictor of onset of major depression or depressive relapse.[23-27] This highlights the importance of treating insomnia alongside other medical and psychiatric conditions. A common assessment and treatment algorithm used by sleep experts[28] is provided in Appendix I.

The impact of insomnia syndrome includes distress directly related to the inability to initiate or maintain sleep, impairment in social or emotional areas, decreased quality of life and impairment of daily functioning. The daytime consequences include dysphoric states such as irritability, impaired cognition such as poor concentration and memory, and daytime fatigue. Acute sleep problems may persist and become chronic, with numerous negative consequences such as issues with employment, relationships and health outcomes.[29-31]

The initiation or exacerbation of sleep disturbance can be moderated if preventive measures are taken. While non-pharmacological (e.g., cognitive behavioural therapy) and pharmacological interventions are often recommended for insomnia syndrome in

the general population,[22] it is clear that non-pharmacological interventions are rarely offered to patients with cancer.[18] Insomnia is a frequently overlooked symptom, and patients may fail to report sleep disturbance because they assume it is a normal and temporary reaction to the cancer diagnosis or treatment. Patients agree that sleep disturbances need to receive greater attention in cancer care and need to be identified as early in the cancer journey as possible.[18]

Since sleep disturbances are extremely common in cancer populations and there is the likelihood of developing insomnia syndrome with the attending adverse effects, effective evidence-based strategies, tools and guidance are urgently needed to inform patients and health care professionals about preventing, identifying and managing sleep disturbances in adult patients with cancer.

Methodology

Developing the Practice Guideline

The objective of this practice guideline is to develop strategies, algorithms and recommendations for uptake into practice by Canadian health care professionals who care for adult patients with cancer. A further aim is to express the recommendations as action statements to develop a knowledge product that can be used as part of an implementation plan to guide the practice of direct-care interprofessional providers. This practice guideline is based on a synthesis of evidence and the consensus of the Expert Panel.

This practice guideline was developed, in part, based on the ADAPTE methodology[32] and combined a systematic search for primary studies in accordance with the AGREE II convention.[33] Prior to completion, the report was distributed on several occasions to the Expert Panel for feedback concerning the collection, interpretation and synthesis of the evidence, as well as the development and content of the recommendations and related evidence-based algorithms. Members of the Sleep Expert Panel also reviewed, discussed and approved the final version of the guideline.

The Expert Panel comprised nurses, psychologists, primary care physicians, oncologists, physicians who specialize in sleep disturbances, researchers and guidelines methodologists. Content experts and key stakeholders across the country were invited to review and provide input on the guideline (external review). Final consensus regarding the recommendations was reached through a voting process. This guideline will be distributed to key stakeholders across the country. The literature will be reviewed periodically, and the guideline will be updated as new or compelling evidence is identified.

Literature Search

The search of the published literature included MEDLINE, EMBASE, PsycINFO, HealthStar, the Cochrane Library and the Canadian Partnership Against Cancer's Inventory of Cancer Guidelines from 2004 to June 2012. In addition, a one-time targeted environmental scan of selected websites was conducted for supplementary information about assessing and managing sleep-related disorders. The websites included Guidelines International Network; American Academy of Sleep Medicine (AASM); National Guidelines Clearinghouse (AHRQ); National Health Service, United Kingdom; National Institute for Health and Clinical Excellence (NICE); Scottish Intercollegiate Guideline Network; National Comprehensive Cancer Network (NCCN); provincial guideline organizations, including Cancer Care Ontario, Fraser Health in British Columbia and Cancer Care Nova Scotia; and the Canadian Medical Association (CMA).

Literature Search Strategy

The literature search combined sleep-specific terms with oncology terms for systematic reviews, practice guidelines or randomized controlled trials. The literature search strategy is presented in Appendix II, and results of the search are presented in Appendix III.

Study Selection Criteria

Inclusion Criteria

Articles were selected for inclusion in the systematic review if they were clinical practice guidelines, systematic reviews or randomized controlled trials that reported the following:

- Data on the treatment population of interest (i.e., cancer patients or survivors with sleep problems).
- Management or interventions to improve sleep quality.
- Results for the primary outcomes of interest, including sleep quality, efficiency, onset latency, duration or disturbance.

In the event of insufficient evidence identified in cancer populations, high-quality guidance documents about insomnia or sleep disturbances in the general population were considered to help inform the Expert Panel's consensus recommendations.

Exclusion Criteria

Articles were excluded from the systematic review of the evidence if they:

- reported data on subgroups, unless it was reported separately on the population of interest and the analysis was pre-planned;
- were reported in a language other than English where data could not be extracted;
- were not explicitly related to the review question;
- were interventions for insomnia in non-cancer populations.

Literature Search Results

Table 1 shows the three clinical practice guidelines[7,8,34,35] and 12 randomized controlled trials[36-47] that were identified as the primary evidence base for this practice guideline. Given the relative weakness of the body of evidence available to inform recommendations, 28 supporting documents were also identified, including items to identify problems that are part of screening for sleep problems[4] or were literature reviews, information summaries, consensus statements or guidelines that offered best practice advice (e.g., to improve sleep quantity and/or quality in adults) but were not necessarily cancer-focused or evidence-based.[6,18,48-72] This evidence was reviewed to help inform consensus opinion and to ensure that the recommendations were consistent with evidence-based guideline recommendations for insomnia in the general population.

Table 1: Literature Search Results

Report Type	Ref
Practice Guidelines	
• Oncology Nursing Society (ONS), Sleep/Wake Disturbances • American Academy of Sleep Medicine (AASM), Clinical guideline for the evaluation and management of chronic insomnia in adults • National Health Services (NHS), Clinical Knowledge Summaries (CKS), Insomnia	7,34 8 35
Randomized Controlled Trials	
Cognitive Behavioural Therapy Interventions	
• Ritterband et al., 2011: Internet intervention	36
• Barsevick et al., 2010: Information and behavioural skills	37
• Fiorentino et al., 2009: Individualized program with crossover	38
• Berger et al., 2009: Individualized sleep promotion plan	39
• Dirksen et al., 2008: Stimulus control, sleep restriction therapy, relaxation therapy, sleep hygiene	40
• Espie et al., 2008: Stimulus control, sleep restriction therapy, cognitive therapy, sleep education and hygiene	41
• Farrell-Carnahan et al., 2010: Self-hypnosis	42
• Savard et al., 2005: Stimulus control, sleep restriction, cognitive therapy, sleep hygiene, fatigue management	43
Exercise Therapy Interventions	
• Cohen et al., 2004: Tibetan yoga	44
• Payne et al., 2008: Walking	45
• Sprod et al., 2010: Home based exercise	46
• Tang et al., 2010: Walking	47

Note: ONS = Oncology Nursing Society;
AASM = American Academy of Sleep Medicine;
NHS = National Health Service

Practice Guidelines

Table 2 shows that the three practice guidelines were assessed for reporting quality using the AGREE II Instrument (www.agreecollaboration.org). The AGREE II instrument is a critical appraisal tool and an important aid in selecting the best-quality guidelines for use in practice.[33] The decision was made to include the guidelines because they

scored relatively high on rigour (≥ 55%), the evidence was clearly presented, the recommendations were systematically developed and the authors were from credible institutions. Moreover, these guidelines informed the recommendations regarding pharmacological management of insomnia in the general population alongside the consensus of the Expert Panel regarding what best practices were relevant for patients with cancer.

Table 2. Critical Appraisal of Clinical Practice Guidelines

Domains	ONS (2006) (7,34) Sleep/wake disturbance	AASM (2008) (8) Chronic insomnia	NHS (2009) (35) Insomnia
1. Scope and Purpose	77.8%	69%	83%
2. Stakeholder Involvement	51.9%	47%	53%
3. Rigour of Development	64.6%	56%	78%
4. Clarity of Presentation	75.9%	94%	83%
5. Applicability	22.2%	54%	46%
6. Editorial Independence	30.6%	67%	67%
No of reviewers*	3	2	2

Note that the recommended number of reviewers ranges from two to four; however, if two independent reviewers are consistent in their scoring, no further review is necessary.

Randomized Trials

The characteristics and study quality of the 12 randomized controlled trials are described in Tables 3 and 4, respectively. Five trials included breast cancer patients only,[38-40,43,45] six trials had a mixture of cancer patients[36,37,41,42,46,47] and one trial included only patients with lymphoma.[44] Eight trials had patients complete cancer treatment before being eligible for study enrolment,[36,38,40-44,47] while the remaining four trials included patients undergoing cancer treatments: chemotherapy,[37,39] hormone therapy[45] or radiation therapy.[46]

Overall the patient enrolment sizes were small, ranging from 20 to 312 patients randomized. The majority of the trials had less than 41 patients in the intervention and control groups. Two trials had more than 100 patients in each arm[37,39] and one trial used a 2:1 treatment allocation, with 100 patients randomized to the intervention group and 50 patients in the control group.[41]

Eight of the 12 trials used cognitive behavioural therapies as the intervention.[36-43] The cognitive behavioural therapies consisted of multi-component intervention strategies such as sleep education, sleep restriction therapy, sleep hygiene counselling and stimulus control. Two trials used an internet-based cognitive behavioural intervention.[36,42] The remaining four trials[44-47] tested the effect of exercise therapies on sleep quality. Three trials[45-47] used a home-based walking or exercise intervention, whereas the remaining trial used a Tibetan yoga intervention.[44] In the 12 trials, the

control groups involved patients randomized to usual care,[41,45,46] a waitlist,[36,42-44,47] single component therapy[40] or healthy eating.[37,39] One trial used a crossover design.[38] No pharmacological interventions were identified involving cancer patients with established sleep difficulties (insomnia or chronic insomnia); consequently, recommendations for management with pharmacological agents are derived through consensus and informed by the general guidelines for management of insomnia.

The quality assessment of the randomized trials was conducted according to the Cochrane Risk of Bias Tool (www.cochrane.org). All but one trial[47] reported the source of funding (government or charitable organization). All of the trials included a section on statistical methods and reporting statistical analyses and often included trial size calculations.[36-47] Patient follow-up was greater than 75% in 10 trials.[37,39,40,42-47] In the remaining two trials, follow-up results were reported for 71% and 73% of patients enrolled.[38,41] Seven trials[36,37,39,41,42,46,47] reported using an intention-to-treat approach. Adequate sequence generation was reported in half of the trials, but information regarding blinding and allocation concealment were insufficiently documented in the majority of the trials.

According to the quality assessment based on the Cochrane Risk of Bias Tool, the 12 randomized controlled trials faired modestly for overall quality. This assessment takes into consideration the small sample sizes of the treatment groups, the short follow-up period measuring intervention effectiveness (usually three months) and a lack of transparency when reporting study methods.

Table 3: Characteristics of Randomized Controlled Trials

Author, Year	Cancer Type	Did patients have/ meet criteria for Chronic Insomnia?	No. of Patients	Intervention
Cognitive Behavioural Therapy Interventions				
Ritterband et al., 2011[36]	Mixed	No, insomnia	14	Online program to improve insomnia symptoms in cancer survivors.
			14	Control: waitlist
Barsevick et al., 2010[37]	Mixed	No, sleep disturbance	153	Behavioural: information and behavioural skills taught by an oncology nurse in three telephone sessions
			159	Control: Healthy eating and nutrition group
Fiorentino et al., 2009[38]	Breast	No, insomnia	6	Six weekly individualized sessions and crossover to no treatment
			8	Control: no treatment and crossover to six weekly individualized sessions
Berger et al., 2009[39]	Breast	No, acute insomnia	113	Behavioural: stimulus control, modified sleep restriction, relaxation therapy and sleep hygiene
			106	Control: healthy eating in-person sessions of equal time, where nurses discussed a new healthy eating topic and general support
Dirksen et al., 2008[40]	Breast	Yes	40	Behavioural intervention: 10-week intervention of stimulus control instructions, sleep restriction therapy, and sleep education and hygiene
			41	Control: sleep education and hygiene only
Espie et al., 2008[41]	Mixed	Yes	100	Cognitive behavioural therapy: 5 weekly 50-minute sessions to discuss stimulus control, sleep restriction and cognitive therapy strategies
			50	Control: usual care
Farrell-Carnahan et al., 2010[42]	Mixed	No, insomnia	14	Self-hypnosis: sleep healthy using the internet; patients were to visit a website for four weeks and view the self-hypnosis recordings
			14	Control: waitlist
Savard et al., 2005[43]	Breast	Yes	27	Cognitive behavioural: 8 weekly sessions of stimulus control, sleep restriction, cognitive therapy, sleep hygiene and fatigue management
			30	Control: waitlist
Exercise Therapy Interventions				
Cohen et al., 2004[44]	Lymphoma	No, prevent sleep disturbance	19	Tibetan yoga: 7 weekly yoga sessions
			19	Control: waitlist
Payne et al., 2008[45]	Breast	No, fatigue	10	Home based walking intervention: 20 minutes a day, four times a week. Logs were provided to record frequency and length of walking.
			10	Control: usual care
Sprod et al., 2010[46]	Breast and Prostate	No, improve sleep quality	19	Home-based exercise intervention: exercise kit and intensity training
			19	Control: usual care
Tang et al., 2010[47]	Mixed	No, sleep disturbance	36	Home-based walking exercise intervention for 8 weeks, walk briskly for 3 days a week, 30 minutes per day
			35	Control: waitlist

Note: NR = not reported

Table 4: Quality Assessment of Randomized Controlled Trials

Author, Year (Reference)	Adequate sequence generation	Allocation concealment	Blinding	Incomplete outcome data addressed	Free of selective reporting	Free of other bias	Declaration of funding	Statistical analysis methods section	Patient follow-up status	Intent-to-treat
Ritterband et al., 2011[36]	+	+	-	+	+	+	+	+	+	+
Barsevick et al., 2010[37]	+	+	?	+	+	?	+	+	+	+
Fiorentino et al., 2009[38]	+	+	-	?	+	-	+	+	+	-
Berger et al., 2009[39]	+	?	?	?	?	+	+	+	+	+
Dirksen et al., 2008[40]	-	-	?	?	?	?	+	+	?	?
Espie et al., 2008[41]	+	-	-	?	+	+	+	+	+	+
Farrell-Carnahan et al., 2010[42]	?	?	?	?	?	-	+	+	+	+
Savard et al., 2005[43]	+	?	+	?	?	?	+	+	+	?
Cohen et al., 2004[44]	+	+	+	?	?	?	+	+	+	?
Payne et al., 2008[45]	?	?	?	?	?	-	+	+	+	?
Sprod et al., 2010[46]	-	?	-	-	?	-	+	+	+	+
Tang et al., 2010[47]	?	?	?	+	?	?	-	+	+	+

Supporting Documents

The supporting documents[18,48-72] were included to clarify background information and issues in the guidelines, and to cover any gaps, such as the context of cancer. A formal assessment of quality was not conducted because the documents were only used to inform consensus expert opinion. However, checks were made to ensure that it was clear how studies were selected (clear inclusion and exclusion criteria) and assessed, how authors attempted to minimize biases, and how studies were integrated to form recommendations.

Synthesizing the Evidence and Developing the Recommendations

For the clinical practice guidelines, a recommendation matrix was created to summarize and compare guideline recommendations. The comparisons, scope and content, intended users, levels of evidence and harms were based on the recommendation matrix template used by the National Guidelines Clearinghouse (www.guideline.gov) and the ADAPTE methodology.[32] Descriptions of the evidence were written to summarize and highlight key recommendations from the guidelines, covering screening, assessment, contributing factors, treatment and care options. The key statements were used as a base to identify relevant information in the supporting documents and to help build and populate the algorithm framework. A series of action statements (screening, assessment, treatment and care options) for sleep disturbances were also developed from the evidentiary base and used to inform recommendations. The randomized trials, while limited in terms of quality and quantity, helped inform the effectiveness of cognitive behavioural therapy and exercise therapy in improving sleep-related outcomes.

Results

Screening for Sleep Disturbances

Although the AASM[8] does not describe a separate screening process, it recommends that, at a minimum, a patient should complete a general medical/psychiatric questionnaire, the Epworth Sleepiness Scale (ESS) or other sleepiness assessment, and keep a two-week sleep log. The authors report that any questionnaire or sleep log should be completed prior to the first visit to begin the process of the patient viewing global sleep patterns rather than one specific night, and to enlist the patient in taking an active role in treatment. Similar to AASM,[8] the NHS[35] does not delineate screening from assessment. It does, however, describe initial and further evaluation elements. The initial evaluation includes (but is not limited to) exploring beliefs about sleep and what the individual regards as normal sleep (expectations, perceptions of sleep, impairment of daytime functioning), impact on quality of life, recent stressor(s) and the early identification of co-morbid disorders that may cause insomnia. The ONS[7,34] guideline does not include specific screening recommendations for sleep disturbances; however, it states that it is crucial that health professionals understand the symptoms of sleep disturbances in order to provide evidence-based care.

The supporting documents were in agreement that health care practitioners should screen for disturbed sleep. The authors of the Alberta Medical Association (AMA) Toward Optimized Practice (TOP) Guidelines reported that sleep experience should be an essential part of a routine visit for adults in primary care[48] and recommend that the insomnia screening questionnaire be used to screen for a primary sleep disorder.[49] They also reported that red flags include a major depressive episode, generalized anxiety or panic disorder, excessive daytime sleepiness and substance use.[49]

Screening Tools

In Canada, two commonly administered screening tools are the ESAS and the Canadian Problem Checklist. The ESAS was initially developed as a brief symptom assessment tool in palliative patients.[50] The ESAS is a valid and reliable tool and screens for nine common symptoms experienced by cancer patients (pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, wellbeing and shortness of breath) plus an "other problem" option.[51] The severity of each symptom at the time of ESAS screening is rated on a numerical scale from 0 to 10; with 0 meaning that the symptom is absent and 10 that it is the most severe. Results are trended over time.

The ESAS-r[52] is an updated version of the original ESAS tool and incorporates wording to aid patients in interpreting some symptoms, with additional wording for anchors (e.g., depression; also means feeling sad). The ESAS-r items are scored on a range of 0 to 10, and cut-off scores (none to mild: 0-3, moderate: 4-6 and severe: 7-10) are similar to the National Comprehensive Cancer Network (NCCN) screening cut-offs.[6] A systematic review of cancer symptom assessment instruments found that the ESAS is a psychometrically sound screening instrument[53] that has been validated in a variety of populations, including advanced cancer populations and patients earlier in the cancer trajectory.[54,55] The ESAS-r is included as part of the tools provided in this guideline and it is also available at www.palliative.org under Health Professionals/Assessment Tools.

The Canadian Problem Checklist, also included in this guideline, screens for sleep-related problems by asking patients to indicate if sleep has been a problem within the last week (yes or no).

To identify sleep disturbances as a red flag indicator, sleep-related problems can be reported in the "other" ESAS-r domain as a severity of sleep problem scale (0-no sleep problem to 10-worst sleep problem) and/or checked as part of the Canadian Problem Checklist (yes or no for presence of problems with sleep).

More recently, as part of the National Institutes of Health (NIH) roadmap initiative, PROMIS self-report item banks were developed using an iterative review process of measurement items for sleep disturbance.[4] Using Classic Test Theory and Item Response Theory, PROMIS was developed to achieve standardization in the assessment of sleep problems using self-report tools. It also recommends that two key questions could be used to screen for sleep problems in cancer patients that should then be followed with completion of the ESS to rule out sleep problems that require diagnostic assessment and treatment by a specialist (e.g., sleep apnea). The recommendation screening questions are:

- Do you have problems with your sleep or sleep disturbance on average (routinely, in the past month, etc.) for three or more nights a week?
- If yes, does the problem with your sleep negatively affect your daytime function or quality of life?

If the answer is yes to both of these questions, a more focused assessment of the sleep problem is indicated. Further information on the ESS can be found at http://epworthsleepinessscale.com. Additionally, based on the psychometric evidence testing completed by the PROMIS sleep expert group, the PROMIS short form 8A can be used as a as a valid and reliable "sleep thermometer" to identify sleep problems.[4] More information about the PROMIS — Sleep Related Impairment — Short Form 8A and access to this measure can be found by registering with the PROMIS assessment center at www.assessmentcenter.net.

Overall, early detection of sleep disturbances in adults with cancer using validated screening tools is essential to reduce the likelihood of acute problems becoming chronic. Screening is particularly useful when symptoms are multi-factorial, as is often the case in cancer.[6,56] Screening typically involves several question(s) about sleep quality and perceptions, impact on daytime activities and an initial identification of possible underlying causes. Although there are differences in suggested approaches (e.g., specific questions to ask or screening tools to use), guidelines and supporting guidance documents emphasize that routine screening for sleep disturbances in adults with cancer is warranted.

In summary, a two-step screening process is recommended to identify sleep disturbances. Step one includes identifying a sleep problem defined as a patient's indication of a sleep problem on the ESAS-r "other" scale or through a patient reporting a sleep problem on the Canadian Problem Checklist. Step two involves asking the two specific questions noted above.

Assessing Sleep Disturbances

If a patient is red-flagged during screening (sleep problems reported under the "other" category on the ESAS-r or sleep indicated as a concern on the Canadian Problem Checklist) and using the second step screening questions, further assessment is required to clarify the nature and extent of the sleep disturbance.[57] The AASM[8] described an evaluation process that rests on patient history and an examination that addresses sleep and wake function as well as co-morbidities. The AASM recommended sleep logs that include reports of sleep quality, sleep parameters (e.g., sleep duration, frequency and duration of nocturnal awakenings), napping, daytime impairment, medications, activities, time of evening meal, caffeine and alcohol consumption, and stress level before bedtime for each 24-hour period. Daily sleep logs that are completed by individuals over several days (e.g., 2-week period) provide a thorough overview of their home routines and may identify environmental or behavioural contributors. The AASM also recommended that sleep log data be collected prior to and during the course of active (insomnia) treatment and in the case of relapse or re-evaluation in the long term. The AASM reported that the minimum components of an evaluation include a general medical/psychiatric questionnaire to identify co-morbid disorders, the ESS,[73] which assesses the extent of daytime sleepiness, or other patient-reported outcome measures. One measure that can be used for outcome-based

assessment in clinical practice is the Insomnia Severity Index (ISI),[13] a tool to identify insomnia and evaluate effectiveness of treatment. The ISI has been validated to screen and assess sleep difficulties in cancer patients.[74]

The ONS[7,34] does not address assessment directly but identifies nine parameters to measure characteristics of sleep disturbances. The nine parameters are consistent with the areas included in the AASM primary baseline measures in a sleep log.[8] The nine ONS parameters are total sleep time, sleep latency, awakenings during sleep period, wake time after sleep onset, napping during the day, excessive daytime sleepiness, quality of perceived sleep, circadian rhythm and sleep efficiency.[7,34] Of note, the circadian rhythm parameter involves fluctuations in light, hormones, eating and socializing that repeats every 24 hours.

The NHS[35] assessment of an adult with insomnia covers five areas:

- the person's beliefs about sleep;
- the impact that insomnia has on the person's quality of life, ability to drive, employment, relationships and mood;
- any underlying cause of insomnia or an associated co-morbid condition;
- sleep history;
- the duration of symptoms.

The NHS assessment also suggests asking the person to keep a sleep diary.

More specifically, beliefs about sleep include perceptions and understanding of a "normal" sleep pattern. Underlying causes and co-morbidities, which includes recent stressors, can be assessed by taking a detailed history, doing a physical exam to identify physical conditions that may cause insomnia or indicate a co-morbid disorder, and taking a drug history (prescribed, recreational, caffeine, alcohol, nicotine). A detailed sleep history may include asking a bed partner or caregiver about sleep and wake patterns, daytime napping and frequency of symptoms. If a sleep diary is kept, the NHS[35] recommended completing the information for a minimum of two weeks, which is similar to recommendations made by the AASM.[8]

The supporting documents that cover assessment are consistent with the guidelines in terms of elements that should be included in an evaluation of sleep disturbances. The AMA[48] reported a structured approach to the evaluation of sleep. Four key areas are covered: sleep history, sleep hygiene practices, negative learned associations, and the nature and severity of the problem. The NCI[56] reported that assessment data should include predisposing factors, sleep patterns, emotional status, exercise and activity levels, diet, symptoms, medications and caregiver routines. In a review of sleep disturbances in cancer,[58] the authors noted that standard symptom assessment instruments assist the evaluation process by reducing the burden on the patient and are a more efficient use of a clinician's time, particularly in a palliative and support

care setting. Another review[59] reported on the use of sleep logs and the ESS, noting that a total score greater than 10 signifies significant sleepiness.

Taken together, the guidelines[7,8,34,35] and supporting documents[48,56,58,59] are consistent in terms of areas for assessment if symptoms of sleep disturbance are red-flagged during an initial evaluation phase or screening process. A sleep diary or log should be included as part of an assessment. A physical exam may also be part of an assessment if an underlying physical condition is suspected. Assessment tools with valid cut-offs and checklists can help assess for the presence of symptoms and identify patients in need of interventions for insomnia.

In summary, a number of sleep parameters should be measured as part of a focused assessment if a sleep problem is identified during routine screening. Screening should identify patients who require immediate referral (e.g., for sleep apnea), whereas a focused assessment helps identify those patients who require preventive interventions, those for whom initial intervention by front line providers is appropriate or those who need cognitive behavioural intervention approaches by specialists. A valid tool should be used to systematize the assessment process, such as a patient-reported outcome measure (e.g., PROMIS sleep thermometer). A tool such as the ISI[13] may also be helpful in evaluating sleep disturbances.

Risk Factors

The ONS reported that people affected by cancer and their caregivers are at risk of sleep disturbances.[7] The authors noted that fatigue, pain and mood are associated with sleep–wake disturbances, while the AASM[8] listed consistent risk factors for insomnia such as depression, anxiety and substance abuse. The NHS[35] listed causes and co-morbidities associated with insomnia, including psychosocial stressors, psychiatric co-morbidities (e.g., depression, anxiety), medical co-morbidities (e.g., pain, fatigue), drug and substance misuse, and current medications (prescribed or over-the counter).

Of the supporting documents, the AMA[49] reported medical or psychiatric illness (depression, anxiety), substance use problems, older age, female, unemployment, less education, and people separated or divorced as risk factors for insomnia. Kvale and Shuster[58] reported uncontrolled physical symptoms, depression and anxiety, and Buscemi et al.[61] reported female, older age, less education, unemployment, separation or divorce, and medical illness as risk factors. In addition to characteristics of the individual, the NCI[56] also reported external risk factors based on associations with sleep disturbances. It should be noted that in the context of cancer, younger age, rather than older age, is associated with increased risk of sleep disturbances.

Treatment and Care Options for Sleep Disturbances

In caring for adults with cancer that have symptoms of insomnia, the focus is on restoring a pattern of restful sleep that is acceptable to the individual.[58] Achieving this goal requires individualized treatment plans based on the biological, psychological and behavioural factors that contribute to each patient's sleep disturbance.[8] The AASM recommended that, initially, any underlying cause(s) of insomnia such as co-morbid conditions (e.g., depression, anxiety or pain) should be identified and treated concurrently.[8] The AASM also suggested that addressing sleep hygiene practices should be an initial part of treatment, but adjusting current medications for other co-morbid conditions, such as anxiety, may also be necessary in the initial stages of care.[8]

There was overall agreement that non-pharmacological interventions are effective or promising in treating sleep disturbances.[7,8,34,35] It is common practice for non-pharmacological interventions to precede pharmacological interventions, although this depends on the individual's needs and situation[8,35,49,59,62] and the order of treatment is often determined by the patient. The AASM also reported that psychological and pharmacological interventions might be used alone or in combination.[8] The NCI[56] recommended a combined pharmacological and non-pharmacological approach, while the AMA recommended that pharmacotherapy should be considered an adjunctive therapy to cognitive and behavioural therapies.[48] Buscemi et al.[61] reported the effectiveness of non-pharmacological and pharmacological interventions separately, citing insufficient evidence to recommend a combined approach.

The NHS[35] recommended managing acute primary insomnia using behavioural (good sleep hygiene) and cognitive behavioural intervention strategies. Pharmacologic interventions were considered adjunctive to the non-pharmacologic strategies. Sleep hygiene factors included:

- waking up at the same time every day,
- maintaining a consistent bedtime,
- exercising regularly (preferably in late afternoon, but not within two to four hours of bedtime),
- performing relaxing activities before bed,
- keeping the bedroom quiet and cool (extreme temperatures compromise sleep),
- not watching the clock at night,
- avoiding caffeine and nicotine for at least six hours before bedtime,
- drinking alcohol only in moderation and avoiding consumption in the four hours before bedtime,
- avoiding napping because it may interfere with the ability to fall asleep at night,
- avoiding excess fluid intake before bedtime.[8,35,36]

Non-pharmacological Interventions

Non-pharmacological interventions, particularly cognitive behavioural therapy, are first line interventions to manage sleep problems, and they may need to be combined with pharmacology on a short-term basis until the intervention can take effect. These interventions range from behaviours, such as sleep hygiene, to six-week (or more) cognitive behavioural therapy delivered by sleep specialists.

Cognitive Behavioural Therapies

Cognitive behavioural techniques include sleep hygiene, sleep consolidation, sleep restriction, stimulus control, cognitive restructuring and relaxation therapies. Cognitive behavioural therapies are multi-modal and include cognitive restructuring.[6,60] Specific cognitive behavioural techniques recommended by the AASM[8] include stimulus control, sleep hygiene, relaxation therapy and sleep restriction therapy. Of note, there is insufficient evidence to assess the effectiveness of sleep hygiene as a single intervention; however, it is generally included as part of the multifaceted cognitive behavioural therapy protocol or as part of a preventative approach.[8,35,60,63]

Table 5 summarizes eight randomized trials that investigated a cognitive behavioural therapy intervention in cancer patients with sleeping difficulties. Seven of these trials reported some improvements in sleep quality,[36,38-43] while the largest trial reported no significant differences between the intervention and control groups.[37]

- Ritterband et al.[36] reported significant improvements in sleep outcomes after six months of follow-up using an internet-based intervention entitled “Sleep Healthy Using the Internet.”
- The trial by Berger et al.[39] reported significant improvement in the intervention group on sleep quality compared to the controls. However, pair-wise comparisons between the two arms revealed significant differences of sleep quality at three months, but not at one year.
- In a crossover study, Fiorentino et al.[38] reported significant differences in self-reported and objective sleep outcomes; however, patients were only followed for six weeks after receiving the intervention.
- Dirksen et al. reported insomnia severity, quality of life and fatigue improved significantly in the behavioural therapy group[40]; however, both treatment arms reported an improvement according to the ISI, with a 9.5% increase in the behavioural intervention group and a 6.4% increase in the control group.
- The study by Espie et al. found significant improvement relative to the control group by reducing sleep onset latency and increasing sleep efficiency.[41]
- In the trial by Farrell-Carnahan et al., 71% of the intervention group had some reduction in insomnia severity using a web-based self-hypnosis therapy, while 36% of patients in the control group experienced improvements in sleep.[42] The overall adjusted effect shows small self-hypnosis treatment effects in sleep and quality of

life measures; however, likely due to the small sample size (14 patients in each arm), improvements were not found to be statistically significant.

- The study by Savard et al.[43] reported that the cognitive behavioural therapy group had significant improvements for sleep efficiency, total wake time, sleep latency and ISI scores that were well maintained and even enhanced in some cases at the 12-month follow-up. In that trial, the intervention group increased sleep efficiency by 15% from baseline to 12-month follow-up.

It should be noted that these studies were primarily conducted with patients experiencing chronic insomnia and that it is unknown whether the same protocol should be used for acute insomnia.

According to the NHS, while cognitive and behavioural interventions have generally been delivered by psychologists, there is emerging evidence that they can be successfully delivered by appropriately trained and supervised community health nurses, primary care counsellors and primary care physicians.[35] The AASM[8] reported that a clinician who is trained in psychological or behavioural therapies should ideally deliver cognitive behavioural therapy. It also reported that, when this level of care is not available, on-site staff training might provide an option. To achieve best clinical care, an approach called stepped care has been proposed.[64] Depending on the severity and complexity of the sleep disturbance, individuals could be allocated to different levels of psychological treatment with self-administered cognitive behavioural therapy (e.g., reading materials) as the initial entry level, small group cognitive behavioural therapy delivered by nurses as the next level and involvement of more specialized health professionals thereafter.[64] Cognitive behavioural therapy can be delivered individually or in a group setting.[60] Evidence is emerging that self-help treatment for insomnia in cancer,[65] shortened courses of group cognitive behavioural therapy,[67] and self-help interventions delivered online for insomnia in cancer populations[36] or in the general public[66] may improve the quality of sleep. Further research regarding the efficacy of these approaches is needed.

The supporting documents recommended using cognitive behavioural therapy to treat insomnia in the general population and in patients with cancer.[49,56,59-62] In the general population, the British Association for Psychopharmacology guidelines[60] recommended either individual or small group cognitive behaviour therapy as an effective treatment for insomnia. The authors also noted that these therapies were as effective as pharmacological therapies; however, the beneficial effects of the cognitive behavioural therapies may last well beyond the termination of active treatment.

Exercise Interventions

Table 5 also notes four small randomized controlled trials that were specifically designed to test the effectiveness of exercise therapy in improving the sleep quality of cancer patients.[44-47] Three trials used a home-based walking or other exercise intervention, and all reported improvements in sleep quality for patients in the intervention arm compared to controls; however, only two of these trials reported

statistically significant results.[45,47] The remaining trial tested Tibetan yoga as an exercise therapy intervention.[44] In that trial, patients in the Tibetan yoga group reported significantly lower sleep disturbances during follow-up compared with patients in the control group for subjective sleep quality, shorter sleep latency, longer sleep duration and less use of sleep medication. While exercise may have beneficial effects on sleep quality in individuals with cancer, the evidence is inconclusive and of limited quality. In particular, these trials did not select patients with clinical levels of sleep disturbance, hence further research is needed.[68]

Other Non-pharmacological Interventions

Other treatment modalities have been studied. The ONS[7] reported that effectiveness has not been established for expressive therapy, expressive writing, healing touch, autogenic training, massage, muscle relaxation, mindfulness-based stress reduction, yoga, aromatherapy, music therapy, hypnotherapy, guided imagery, education and information, or exercise. In addition, there was insufficient evidence to support acupuncture or homeopathic medicines to manage chronic insomnia.[69,70] More research is needed to determine the effectiveness of Valerian, an herbal dietary supplement sold as an aid for nervous tension and insomnia.[71]

Pharmacological Treatment

No randomized controlled trial data involving pharmacological interventions for established sleep disturbances in cancer populations were identified; however, there have been trials in the general population. In cases where the insomnia is believed to be due to cancer or cancer treatment, the main focus is to alleviate, treat or remove the causative condition (e.g., pain) or agent (e.g., medication), though this is not always possible.

Although the effect of sleep medications for insomnia in the general population is reported to be effective in the short term, the possibility of long-term dependence cannot be ignored. As a general rule, any increases in dosage should be avoided and long-term sleep medication use is not typically recommended.[8,35,49,56,59,60] In addition, sedative hypnotics should only be used on an as-needed basis (e.g., 2 or 3 times per week as needed) for occasional bouts of insomnia or on a scheduled basis (e.g., 2 or 3 times per week, but not every night) in patients with chronic primary insomnia where the goal of therapy is to prevent relapse. No long-term data were identified to inform the lasting effects of these approaches; however, life-expectancy and prognosis are important factors when treating cancer patients with insomnia. While there is concern about the potential for abuse of or addiction to sedative hypnotics, these may be less of a concern in a patient that is terminal or with a very poor prognosis.

Table 5. Randomized Trials of Sleep Interventions

Author Year (Ref)	No. of patients	Trt. Arms	Follow-up Period (Months)	Primary Sleep/QOL Instruments	Sleep Quality Results
Cognitive Behavioural Therapy (CBT)					
Ritterband et al., 2011[36]	14 14	CBT C	6	Sleep diary, ISI	Significant improvements with the internet intervention in overall insomnia severity (p<0.001), sleep efficiency (p=0.002), sleep onset latency (p=0.03), soundness of sleep (p= 0.005), restored feeling on awakening (p=0.002), and general fatigue (p=0.001).
Barsevick et al., 2010[37]	153 159	CBT C	2	Actigraph, PSQI	Patients reported sleep disturbance (PSQI) at baseline and follow-up was much greater than the cut-off score of 5 in both groups, indicating moderate levels of sleep disturbance. However, the actigraphy revealed that the total sleep time was almost eight hours, and sleep percent was greater than 85% for both groups at both time points (normal range).
Fiorentino et al., 2009[38]	6 8	CBT C	1.5	Actigraph, sleep diary, PSQI, ISI	Self-reported insomnia was significantly improved with treatment compared to controls. Pooled analyses showed improvements in self-rated insomnia, sleep quality and objective measures of sleep.
Berger et al., 2009[39]	113 106	CBT C	3, 12	Actigraph, sleep diary, PSQI	The CBT group experienced significant improvement on sleep quality compared to the controls. Pair-wise comparisons revealed significant differences between the groups at 3 months (p=0.002) but not at 1 year (p=0.052). PSQI scores greater than 8 were found in 22% of the CBT group and 36% of the control group at 3 months (p<0.004) and at 1 year in (19% versus 28%, p=NS).
Dirksen et al., 2008[40]	40 41	CBT C	3	ISI	CBT significantly improved insomnia severity, quality of life and fatigue versus baseline. The ISI was improved from baseline to post-treatment by both CBT (14.38% versus 23.91%) and control treatment (16.3% versus 22.7%).
Espie et al., 2008[41]	100 50	CBT C	6	Actigraph, sleep diary	CBT was significantly better than normal clinical practice (control) for cancer-related sleep and fatigue. Sleep diary measures of sleep onset latency and wake time after sleep onset were significantly reduced (p<0.001), and sleep efficiency significantly increased (p < 0.001).
Farrell-Carnahan et al., 2010[42]	14 14	SH C	2	ISI, sleep diary	Overall adjusted effect sizes show small self-hypnosis treatment effects in sleep and quality of life. 71% of the intervention group and 36% of the control group had some reduction in insomnia severity. However, with this small sample size, improvements were not statistically significant.
Savard et al., 2005[43]	27 30	CBT WLC	3, 6, 12	IIS, ISI	Sleep efficiency (p<0.0001), total wake time (p<0.001), sleep onset latency (p<0.05), wake after sleep onset (p<0.0001) and ISI (p<0.05) improved significantly with CBT; total sleep time did not increase significantly after CBT therapy. CBT patients increased their sleep efficiency from 69% to 84% at 12-month follow-up.
Exercise Therapy					
Cohen et al., 2004[44]	19 19	TY WLC	3	PSQI	Patients in the TY group reported significantly lower sleep disturbance scores during follow-up compared with the waitlist control group (5.8 vs. 8.1; p<0.004). This included better subjective sleep quality (p<0.02), faster sleep latency (p<0.01), longer sleep duration (p<0.03) and less use of sleep medications (p<0.02).
Payne et al., 2008[45]	10 10	HBWE C	3	PSQI, actigraph	The effect of the exercise intervention on PSQI scores was highly significant (p=0.007), indicating improved sleep quality. Sleep actigraphy also showed significantly shorter actual wake time and less movement in the exercise group (p=0.02 and p=0.05, respectively).
Sprod et al., 2010[46]	19 19	HBWE C	3	PSQI	Better subjective sleep quality, less sleep latency and more sleep efficiency post-intervention with HBWE group versus control. There was also greater improvement in sleep quality in the exercise group from pre- to post-intervention (p=NS).
Tang et al., 2010[47]	36 35	HBWE C	2	PSQI	Patients in the exercise group reported significant improvements in sleep quality (p<0.01) and the mental health dimension of QoL (p< 0.01). Sleep quality scores in the control group were stable.

Note: WLC = Waitlist control, C = control; HBWE = Home Based Walking Exercise; IIS = Insomnia Interview Schedule; ISI = Insomnia Severity Index; NS = not significant; PSQI = Pittsburgh Sleep Quality Index; QoL = Quality of life; SH = Self Hypnosis; TY =Tibetan Yoga.

With documented adverse effects in certain populations, clinicians and patients should weigh the beneficial and harmful effects of medication according to individual circumstances and priorities. When pharmacotherapy is used, the choice of the specific agent within a class should be directed by symptom pattern, treatment goals, past treatment responses, patient preference, cost, availability of other treatments, co-morbid conditions, contraindications, concurrent medication interactions and side effects.[8]

It should be noted that amitriptyline should not be used in older patients because of a high anticholinergic side effect profile, and amitriptyline and trazodone should not be the primary choice when a patient has insomnia and co-existing depression. The anti-depressant doses for these medications are much higher than their sedating doses and, as the doses increase, so do the side-effects. A sedating SSRI (or possibly mirtazapine) may be a better choice, although mirtazapine is associated with significant weight gain and can be problematic in overweight or obese patients. Short-acting benzodiazepines are useful for sleep-onset insomnia (as are the non-benzodiazepine receptor agonists, such as zopiclone, because of their short half-life). Intermediate acting benzodiazepines, such as temazepam, may be beneficial in attempting to prevent nocturnal awakenings. Long-acting benzodiazepines (e.g., diazepam) can cause significant problems in terms of residual drowsiness and sedation and should not be used to treat insomnia, especially in the elderly. Barbiturates are rarely used and offer no advantages (only disadvantages) over benzodiazepines in terms of treating insomnia.

If daytime impairment is severe, the NHS[35] recommended considering a short course of a hypnotic drug for short-term insomnia (< 4 weeks). If a hypnotic is prescribed, the NHS also recommended that the lowest effective dose should be considered for the shortest period possible.

The British Association for Psychopharmacology did not recommend antipsychotics as first-line therapy for insomnia because of side effects.[60] Atypical antipsychotics are often used to treat insomnia; however, their metabolic side effects can be very problematic. Since medication for insomnia should generally only be used for a short period, using certain benzodiazepines or zopiclone may be better treatment options.

The NCI[56] reported on the cautious use of antihistamines because of daytime sedation and delirium (especially in older patients and patients with advanced cancer). In addition, it reported that long-acting benzodiazepines are characterized by half-lives longer than 24 hours, pharmacologically active metabolites, accumulation with multiple dosages, and impaired clearance in older patients and those with liver disease. In addition, barbiturates should not be used to manage sleep disturbances in cancer patients.[56]

Because of the relative lack of efficacy and safety data, over-the-counter antihistamine, antihistamine/analgesic, herbal and nutritional substances (e.g., valerian and melatonin) were not recommended to treat chronic insomnia.[8] Little data exists about their efficacy and tolerance, and rebound insomnia is a

significant problem as a result of their use. From the supporting documents, the AMA[49] reported variable evidence for the use of L'tryptophan, melatonin and valerian (natural, nutritional sleep aids). The efficacy of melatonin is inconclusive. The AMA also acknowledged that, while over-the-counter products are available, they did not recommend their use as sleep aids (e.g., "Sleep Eze", Benadryl®). In addition, because of a relative lack of evidence and side effects, the AMA did not recommend mirtazapine, fluvoxamine, tricyclics, amitriptyline, chlorpheniramine, anti-psychotics, intermediate and long-acting benzodiazepines (e.g., diazepam, clonazepam, lorazepam), triazolam (short-acting benzodiazepine), chlorals (chloral hydrate, ethchlorvynol) or muscle relaxants.

Pharmacological interventions in cancer populations must consider the concomitant use of these agents with agents for cancer treatment, as well as the type of cancer (e.g., involvement of the central nervous system as primary or secondary to cancer may preclude their use and aggravate symptoms). Moreover, pharmacological agents should be considered a short-term solution while waiting for cognitive behavioural therapy interventions delivered by specialists to take effect. Concomitant cognitive behavioural therapies during tapered pharmaceutical discontinuation may be helpful,[63] and adding medication to behavioural therapy is a better and more desirable option than medication use alone. For further information about pharmacological options, please see *Chronic Insomnia* by Morin and Benca,[9] *Management of Acute Insomnia* by James McFarlane[75] and *Treating Insomnia in Primary Care* by Judith R. Davidson,[76] or visit the website of the Canadian Sleep Society (www.canadiansleepsociety.com).

Strengths and Weaknesses of the Body of Evidence

Sleep–wake disturbances are often described as subjective complaints of poor quantity or quality of sleep despite adequate time for sleep. Sleep disturbances are common among cancer patients and may have profound effects on daily activities, mood, cognitive function and quality of life. A theme that emerges in the literature specific to insomnia in the general population and sleep–wake disturbances in cancer patients is the need for optimal screening, assessment and management of symptoms contributing to sleep disturbance.

At this time there is no definition of "normal" sleep and some variation exists regarding the gold standard measures for assessment of sleep disturbances. A wide range of terminology also exists for defining the duration and frequency of symptoms, which adds to the lack of clarity with regard to classifying sleep disturbances. Screening, assessment and management of sleep disturbances in the context of cancer is also challenging because there are few guidelines specific to the field of oncology.

Important gaps exist in the current knowledge of sleep disturbances in adults with cancer. Although there is some evidence that cognitive behavioural therapy is beneficial in treating sleep disturbances in adults with cancer, most treatment protocols use a combination of cognitive behavioural techniques, and further work is

needed to determine which aspects are essential.[58] Moreover, more high-quality research with a greater number of participants is needed to identify the specific determinants of sleep disturbance in the cancer context in order to better adapt the intervention to the needs of cancer patients.

Discussion

It is clear that screening for sleep disturbances in adults with cancer is warranted, and a range of screening tools and self-report assessments are available. Health care professionals, as part of routine practice, should screen for sleep disturbances, and if necessary, assess for the presence of symptoms, pertinent history and risk factors. The emphasis in treatment and care is to restore a pattern of sleep that is restful and acceptable to the individual. To achieve this person-centered goal requires individualizing the treatment plan based on the biological and psychological (i.e., cognitive, affective and behavioural) factors that contribute to the sleep disturbance. Referral to other guidelines or appropriate services may be necessary when underlying conditions are identified that require further evaluation or treatment.

In addition to treating any ongoing contributor to insomnia, non-pharmacological treatments are often the first line of therapy. Cognitive behaviour therapies may be as effective as medical treatment for insomnia, with safer, more sustainable results. Cognitive behavioural approaches for sleep disturbances seem well suited in cancer populations because they do not burden patients with additional pharmacological interventions and can relieve specific symptoms like anxiety and fatigue that are also characteristic of this population.

Cognitive behavioural therapy can include any combination of sleep restriction, stimulus control, stress management, relaxation and cognitive therapy delivered by appropriately trained individuals. Future studies should include more patients and have a longer follow-up period. While exercise therapies such as walking and yoga may be beneficial for improving sleep quality, there is no evidence that they can address insomnia syndrome. Additionally, most of the interventions were tested on breast cancer patients and future studies should include patients with other types of cancer.

A variety of pharmacologic agents have been recommended to manage sleep disturbances in the general population, but their efficacy and use in adults with cancer has not been established. These agents should be used with caution and with a full understanding of the concomitant reactions that could occur with cancer type or cancer treatment modalities. For example, short/intermediate acting benzodiazepine receptor agonists and medications in the non-benzodiazepines groups (e.g., anti-psychotics, antidepressants) are recommended for intermittent use depending on individual circumstances. However, long-acting benzodiazepines may lead to further sleep problems and should be used short term or not at all. Concerns about medications to treat insomnia include possible daytime residual effects related to sedation, rebound insomnia (insomnia that reoccurs after ceasing use of the

medication) and tolerance, along with side effects specific to each drug group. The choice of agent should be carefully assessed in terms of side effect profile; patient preference and possible complications should be kept in mind (e.g., daytime sedation, tolerance, rebound insomnia). All patients should be informed of any potential harm or side effect.

External Review

A draft version of this report was reviewed by 16 health care professionals from across Canada involved in the psychosocial and supportive care of cancer survivors. Respondents were asked to complete a survey about the relevance and quality of the guideline and comment on the draft. The Cancer Journey Sleep Expert Panel reviewed the results of the external review, addressed the comments and made modifications accordingly. The findings of the external review are summarized in Table 6.

Table 6 shows that the majority of the respondents agreed about the appropriateness of the guideline and 83% indicated they would likely or very likely make use of the recommendations to inform the development of survivorship services in their own organization, practice or community program. A total of 75% of respondents indicated that they did not currently follow a practice guideline on sleep disturbance, and 81% indicated that they agreed with the recommendations as written. Suggestions for improvement included more on pharmacological recommendations, more inclusion of other disciplines (e.g., social **workers) and patient education materials. Several reviewers thought that imple**mentation would be a challenge given the lack of sleep services and specialists available to receive referrals.

Table 6. Summary of External Review Survey Results (Number (%))

Survey items	Strongly Agree	Agree	Somewhat Agree	Undecided / NA
The overall objective of the sleep disturbance guideline is specifically described.	8 (50%)	7 (44%)	1 (0%)	0 (0%)
The target population for the sleep disturbance guideline is clearly described.	9 (56%)	6 (38%)	1 (6%)	0 (0%)
The target users of the sleep disturbance guideline are clearly defined.	9 (56%)	5 (31%)	2 (12%)	0 (0%)
Systematic search methods to identify relevant guidelines for adaptation were used for the sleep disturbance guideline.	7 (44%)	7 (44%)	2 (12%)	0 (0%)
The methods for formulating the sleep disturbance recommendations are clearly described.	5 (33%)	8 (53%)	2 (13%)	0 (0%)
The recommendations for sleep disturbance are easily identifiable.	9 (56%)	6 (38%)	1 (6%)	0 (0%)
The recommendations for sleep disturbance are appropriate.	6 (40%)	4 (27%)	4 (27%)	1 (7%)
The recommendations for sleep disturbance are feasible.	3 (20%)	4 (27%)	5 (33%)	2 (13%)
When applied, the sleep disturbance guideline will produce more benefits for patients than harm.	9 (56%)	5 (31%)	2 (12%)	0 (0%)
Survey items	**Very Likely**	**Likely**	**Somewhat Likely**	**Undecided / Unlikely**
How likely would you be to apply the recommendations in the sleep disturbance guideline to clinical practice?	4 (25%)	6 (38%)	1 (6%)	2 (12%)

NA = Not applicable.

Conclusions

The Sleep Expert Panel concluded that it is reasonable to routinely screen adult cancer patients for sleep disturbances using standardized screening scores. Screening for sleep disturbances requires more than using the ESAS or ESAS-r symptom intensity tool and endorsing sleep as concern on the Canadian Problem Checklist because these tools are imprecise. More specific screening and a focused assessment of sleep is needed to establish the extent and nature of the sleep disturbance symptoms. Assessments and response is a shared responsibility among members of the interprofessional team. When symptoms are identified, the team must decide when referral to an appropriately trained professional is needed based on the factors contributing to the sleep disturbance or using established cut offs found in valid and reliable assessment tools. In terms of treatment, sleep disturbances may be related to other identifiable and potentially treatable conditions, such as pain and depression. Reversible contributing factors should be addressed first or concomitantly with cognitive behavioural therapy for insomnia, particularly with cognitive approaches given that a specific sleep intervention is often needed. There may be some benefits from exercise interventions since they may aid in reducing stress and optimizing sleep quality, although the empirical evidence is sparse.

Incorporating integrated sleep services as part of cancer programs where clinical programs use best practices to attempt to prevent insomnia and to promote and tailor sleep hygiene, would be an ideal service to provide patients before, during and after their cancer treatment. Although this approach seems promising, its efficacy is yet to be established as a preventive approach.

The Sleep Expert Panel concluded that the choice of a sedating medication should be informed by the side effect profiles of the medications, tolerability of treatment (including the potential for interaction with other current medications), response to prior treatment and patient preference. Patients should be warned about any potential harm. Moreover, patients with cancer who are prescribed pharmacological agents with sedating properties should be monitored closely for adverse side effects. Managing sleep disturbances must be tailored to the individual patient, who should be fully informed of the options and have the opportunity to take part in decision-making. Each practice setting should have agreed protocols for managing sleep disturbances that include expectations or standards for referral, including processes for referral to appropriate specialists.

Sleep difficulty is a prevalent problem in cancer that needs greater recognition by health professionals. Patients wish to receive more information about sleep difficulty and insomnia; and although patients perceive sleep as being important, they are reluctant to report sleep problems to doctors. The screening, assessment and treatment of sleep difficulty for cancer patients or survivors should be fully integrated into the health care system.

Recommendations

Unless stated otherwise, the following recommendations, strategies and algorithms on the optimal screening, assessment and management of adult patients with cancer who experience sleep disturbances should be considered consensus-based. The recommendations are based on the expert consensus of the Sleep Expert Panel of the Cancer Journey Advisory Group, Canadian Partnership Against Cancer, feedback from external reviewers with content expertise, and informed by limited data from clinical practice guidelines, randomized controlled trials and supporting guidance documents.

Screening for Sleep Disturbance

- It is recommended that all health care providers routinely screen for symptoms of sleep disturbances from the point of cancer diagnosis onward.
- It is recommended that all patients with cancer be screened for sleep disturbances at initial diagnosis, start of treatment, regular intervals during treatment, end of treatment, post-treatment survivorship, on recurrence or progression, at end of life and during times of personal transition (e.g., family crisis).
- It is recommended that the identifying sleep problems be a two-step screening process:

    1. Identify the occurrence of a sleep problem (a non-"0" score for sleep in the "other" category on the ESAS or ESAS-r and/or a yes or a checkmark on the Canadian Problem Checklist) followed by two additional questions to determine if this problem interferes with daily functioning:

        - Do you have problems with your sleep or sleep disturbance on average (routinely, in the past month, etc.) for three or more nights a week?
        - If yes, does the problem with your sleep negatively affect your daytime function or quality of life?

        The PROMIS® "sleep thermometer tool" patient-reported outcome measure (8 items) can also be used to identify a sleep problem.

    2. Identify patients that require immediate referral to a specialist by determining excessive daytime sleepiness using the ESS combined with specific targeted questions about nocturnal movements or excessive snoring, episodes of witnessed sleep apnea or gasping for breath during the night.

Focused Assessment of Sleep Disturbances

A focused assessment of sleep should identify signs and symptoms of sleep disturbances, the severity of insomnia, possible stressors, risk factors (e.g., fatigue and pain) and co-morbid conditions associated with the sleep problem (e.g., depression) and should also explore other underlying problems or causes. For

example, medical and substance-induced (e.g., corticosteroids, opioids or alcohol) causes of sleep disturbances should be identified.

Parameters for assessing sleep disturbances should include total sleep time, sleep latency, wake time after sleep onset, napping during the day, excessive daytime sleepiness, quality of perceived sleep, circadian rhythm and sleep efficiency. This information can be gathered using a sleep diary. In addition, assessment includes asking about interference with daytime functioning; effects on quality of life, employment and relationships; and beliefs (perceptions) about sleep.

The following key questions could be asked during the clinical interview as part of the focused assessment process.

	Questions	Recommendations
1.	Have you had difficulties sleeping at night or staying awake in the day during the last month?	If no, stop the sleep assessment.
2.	What is the nature of the sleep complaint (e.g., problems sleeping at night, excessive sleepiness during the day or abnormal behaviours during sleep)?	
3.	How long have these difficulties been present?	If less than one month, address precipitating events and keep monitoring.
4.	What is the clinical significance of this problem (frequency, severity and impact on daytime functioning)?	
5.	Do the onset and course of this problem coincide with another medical or psychological problem?	If yes, treat both conditions concurrently, whenever possible.
6.	Are there symptoms of other sleep disorders (e.g., sleep apnea, narcolepsy, restless legs syndrome)?	If yes, refer to a sleep disorders centre.

It is recommended that a sleep diary such as the Consensus Sleep Diary[77] be used to evaluate patterns of insomnia, and the ISI[13] to quantify perceived insomnia severity. These are valid and reliable tools that support the systematic assessment of sleep problems and evaluation of interventions for effectiveness.

Treatment and Care Options for Sleep Disturbances

It is recommended that treatment for sleep disturbances consist of a combined approach that targets any contributing factors (e.g., hot flashes, pain or nocturia), and the factors that are believed to maintain the sleep difficulties over time (e.g., maladaptive sleep behaviours and dysfunctional beliefs about sleep). Although sleep disturbances might initially have been triggered by factors such as hot flashes, pain, etc., it is likely not sufficient to treat those factors to address the sleep difficulty because insomnia rapidly becomes self-reinforced.

Non-pharmacological Interventions for Sleep Disturbance

It is recommended that cognitive behavioural interventions be used as first-line treatments prior to pharmacological treatment. However, patients may require short-term use of pharmacological interventions until cognitive behavioural therapy takes effect or is available.

It is recommended that a stepped care approach be used to manage sleep problems; however, each patient must be considered individually. The person-centered and stepped care approach recommended for the non-pharmacological management of sleep disturbance in cancer patients is as follows:

- ***Step 1:*** Sleep hygiene and environmental strategies should be part of a supportive education approach combined with self-management strategies that patients can use, such as manuals or online resources.
- ***Step 2:*** If patients are still symptomatic, cognitive behavioural therapy for insomnia delivered by direct-care providers trained in using these skills and following a manual to ensure a standardized delivery approach.
- ***Step 3:*** Cognitive behavioural therapy for insomnia delivered by sleep experts.

Step 1: It is recommended that all patients receive supportive education and information, including coaching in sleep hygiene strategies, as a standard preventive or early intervention approach. This should be combined with other self-management strategies to manage insomnia and as an adjunct to cognitive behavioural therapy. The patient should be advised and be coached in the use of the following behaviours:

- Wake up at the same time (regardless of how many hours of sleep and including weekends)
  - *Rationale:* Morning rising time plays a large role in determining bedtime based on the accumulation of sleep pressure throughout the day. Considering that there are 24 hours in a day, if the patient has an 8-hour sleep need and they wake up at 6:00 am, approximately 16 hours will need to pass before they are likely to feel sleepy (24-8=16). This would bring their predicted sleep time to 10:00 pm. Sleeping in after a night of disrupted sleep, or on weekends, tends to perpetuate sleep problems by preventing the accumulation of sleep pressure, leading to more difficulty falling asleep or maintaining sleep.
- Ensure light exposure soon after waking
  - *Rationale:* Exposure to natural or artificial light is thought to be an important regulator of sleep–wake rhythms. These rhythms are often compromised while in hospital or recovering. Light exposure can help “set” a patient’s circadian clock, making it easier for them to continue with the same wake up time.
- Designate a “clear-your-head time”
  - *Rationale:* Patients sometimes avoid thoughts that are unpleasant and worrisome during the day. This is counterproductive because these thoughts often re-appear when they are not able to distract or busy themselves, such as when they are trying to sleep. Establishing 30 to 45 minutes devoted to

problem solving, planning and worrying in the early evening can help patients deal with the concerns that may contribute to mental activity at night. It is often recommended that patients write these concerns down to avoid mental rehearsal and remind themselves that they have already devoted time to a topic if it re-appears.

- Establish a 90-minute buffer zone before intended bed time
  - *Rationale:* Implementing a designated time to unwind in the evening before bed allows patients to create an environment that is conducive to sleep. Dim lighting and a relaxing, pleasant and sedentary activity promote sleep. Some examples of activities may include reading, meditation, prayer, TV/movies, crosswords, warm bath, magazines, audiobooks, music, relaxation, imagery or anything that does not produce cognitive or physiological arousal.
- Only go to bed when sleepy (i.e., feel sleepy regardless of what the clock says) and don't spend extra time trying to sleep
  - *Rationale:* During recovery, it can be difficult to differentiate tiredness, fatigue and boredom with feelings of sleepiness. A common coping strategy is to spend more time in bed and try harder to sleep. Spending extra time awake in bed and trying to sleep DOES NOT increase the chances of falling asleep. In fact, this strategy can be counterproductive because it can contribute to performance anxiety, frustration and eventually conditioned arousal.
- Use your bedroom for sleep and sex only
  - *Rationale:* During recovery, the bed is often used for activities other than sleep. In order to preserve the bed as a strong environmental and psychological signal for sleep, it is necessary to make the other areas where a patient spends time during the day as comfortable as their bed.
- If you are not asleep within 20 to 30 minutes, get out of bed and return when sleepy
  - *Rationale:* If a patient is not asleep and their mind becomes active after being in bed for 20 to 30 minutes, it is recommended that they interrupt the tendency to try harder to sleep by getting out of bed and returning to their buffer zone activity. Once the patient feels that sleep is imminent (i.e., feels sleepy), they should return to bed. This may need to be planned for in advance or repeated several times until the disruptive sleep cycle is broken. The goal of this strategy is to reinforce the association between the bedroom and sleep.
- Ensure sleep expectations are realistic
  - *Rationale:* There are several frequently held, yet inaccurate, sleep beliefs that can contribute to increased patient anxiety surrounding sleep. One of the most common is that 8 hours of sleep is optimal for everyone when, in fact, normal sleep needs range from 6 to 10 hours. Additional problematic beliefs are often related, but not limited, to:
    - Age: Sleep needs do not change with age but sleep quality does (lighter).
    - Awakenings: It is normal to awaken 1 to 2 times, not to remain awake.

- Restrict Napping
  - It is generally recommended that patients avoid multiple naps, especially in the evening; however, a short nap (less than one hour) in the afternoon, starting before 3:00 pm, may be helpful and is less likely to interfere with nighttime sleep.
  - If resting, rather than sleeping, it should be done in a room other than the bedroom.
- Additional strategies to minimize sleep disturbances in a hospital setting
  - Minimize noise and disruptions during night.
  - Use earplugs and eye masks.
  - Advocate for effective symptom control, especially pain.
  - Avoid unnecessary time in bed during the day.
  - For patients confined to bed, provide as much cognitive and physical stimulation as possible throughout the day, with the appropriate buffer zone prior to sleep onset.

Step 2: It is recommended that patients who are still symptomatic or exhibit signs of chronic insomnia after following Step 1 interventions be provided cognitive behavioural therapy by direct-care providers trained in using these skills and following a written (manualized) procedure to ensure a standardized delivery approach.

Step 3: It is recommended that patients presenting with signs of chronic insomnia or whose sleep problem is not managed through Step 2 interventions be referred for cognitive behavioural therapy for insomnia delivered by sleep experts.

- The recommended number of individual or group sessions with cancer patients is approximately 6 to 8.
- It is recommended that patients be advised of other strategies, such as exercise or yoga, that may help improve transient insomnia or as an adjunct to cognitive behavioural therapy.

Pharmacological Approaches

Pharmacological management is considered a short-term or occasional intervention while waiting for cognitive behavioral therapy to take effect. Consider short-term pharmacologic therapy if there is no benefit following a period of approximately eight weeks of cognitive behavioural therapy (i.e., individual remains dissatisfied with the quality of their sleep). It is not recommended to pursue a daily pharmacological treatment for more than four weeks; however, if an improvement in sleep is observed, it is reasonable to offer a combined psychological-pharmacological intervention in which the medication is gradually tapered off. It may be appropriate to consider pharmacologic therapy in patients who are very ill and/or unable to complete cognitive behavioural therapy for insomnia.

The choice of a medication should be informed by patient-specific factors, including age, proposed length of treatment, primary sleep complaint, history of drug or alcohol

abuse, side effect profiles of the medications, tolerability of treatment (including the potential for interaction with other current medications), response to prior treatment and patient preference. Patients should be warned of any potential harm or adverse effects.

Offer support and provide education and information about sleep disturbance and its management to all patients and their families and what specific symptoms warrant a call to the physician or nurse.

Training and Implementation

Cancer survivors are a growing population in Canada. Greater recognition of the demand for survivorship services and increased training and education among front-line providers is needed to address issues around sleep disturbance at every point in the cancer trajectory. This includes greater resources and specific programs for those with cancer who suffer from sleep disturbance, as well as patient education and strategies to prevent sleep disturbance.

Currently, many health care providers do not have the training or education to screen or assess for sleep disturbances, and of those that do, many do not refer patients for cognitive behavioural therapy because of limited resources for this service. There was no evidence identified that provided insight into the potential resource implications of applying the recommendations; however, it is well known that resources can vary widely across Canadian health jurisdictions. A promising model is to use online cognitive behavioural interventions that could be used widely for relatively little resource allocation. In the face of limited resources, pharmacological approaches are often used, and perhaps overused; however, this is not ideal and cognitive behavioural interventions offered through sleep clinics are the preferred first-line course of action. More information about sleep clinics and their locations in Canada can be found at www.canadiansleepsociety.com.

The guideline recommendations were developed to be implemented in a variety of front-line health settings. The guideline summary and care paths were designed to facilitate that implementation and will be distributed widely. Barriers to implementation and application of the guideline recommendations include the need to increase awareness of sleep disturbance issues among front-line practitioners and cancer survivors and also providing adequate services in the face of limited resources. As part of the next steps, the guideline will be translated into French, and partnering with the Canadian Association of Psychosocial Oncology will also ensure greater exposure and guideline implementation. The guideline will be posted on the websites of the Canadian Partnership Against Cancer (Cancer Journey Advisory Group) and the Canadian Association of Psychosocial Oncology, and will also be published in a peer-reviewed journal. Furthermore, this guidance document will be disseminated through cancer advocacy survivorship groups, including the Canadian Cancer Action Network and the Canadian Cancer Society.

Acknowledgements

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Screening and Assessment – Sleep Disturbance in Adults with Cancer*

Screen for sleep-wake disturbances[1] at start of treatment, periodically during treatment and periodically during post-treatment survivor follow-up care.[2]

- ☐ Review all ESAS or ESAS-r scores and problem checklist in conversation[3] with patient/family and discuss expectations and beliefs about support needs (e.g., Canadian Problem Checklist[1]).
- ☐ Sleep problems are identified by patient endorsement of a sleep problem on the Canadian Problem Checklist (checked yes for sleep problem) or as an "other" item on the ESAS scale with any score >"0" (sleep severity is an imprecise measure of sleep problems). Indicates occurrence of a sleep problem.
- ☐ Occurrence of a sleep problem should prompt two additional screening questions to identify sleep-wake disturbance: 1) Do you have problems with sleep for three or more nights/week? 2) If yes, does this sleep problem interfere with daytime functioning? If answer is yes to one or both: focused assessment needed.

Step 1: Identify need for **immediate** referral to a sleep specialist.

Assess for symptoms of sleep apnea: loud chronic snoring, choking or gasping during sleep, witnessed periods of apnea during sleep, excessive daytime sleepiness (can use Epworth Sleepiness Scale to assess), morning headaches, poor concentration and/or memory problems.

Referral is also required if patient complains of restless leg/movement disorders.

Immediate referral to a sleep clinic or sleep specialist for sleep study work-up and a polysomnogram.

Step 2: Focused Assessment (clarify nature/extent of sleep-wake disturbance)

- O** - When did it start? How many nights is sleep disturbed? Number and duration of night wakening? Early morning wakening? Non-restorative sleep?
- P – Pre-sleep activities (before bed and in bed); bedroom environment; precipitating factors (stress, pain); sleep–wake schedule and regularity of following this? Medications used for sleep (which can aggravate sleep problems)?
- Q - Assess sleep quality. Non-restorative sleep. Consider daily sleep logs over a two-week period (i.e., Consensus Sleep Diary).
- R - In what ways does it affect you day-to-day (e.g., daily tasks, daytime somnolence, emotional distress, attention and memory impairment, slow response time, adverse effects on work, social life and family)?
- S - How bothered are you by your sleep problem?
- T - What do you do to manage your sleep problem? How effective are your efforts? Assess use of sleep hygiene strategies.
- U - What do you believe is causing your sleep problems? What about it concerns you the most?
  - I – What is the effect on daily function and other aspects of life?
- V - What is your goal for this symptom? What is your comfort goal or acceptable level for this symptom (able to work, attend leisure activities, etc.)?

PROMIS-short form sleep or Insomnia Severity Index can be used for systematic assessment.

Insomnia Symptoms: Non-restorative; difficulty falling asleep (>30 minutes); early wakening; night wakening (30 minutes) more than 3 nights/week; significant distress or negative mood due to sleep disturbance; diminished concentration or attention; slow response time; impairment of ADLs; rumination about sleep problems.[9]

Identify Pertinent History: Specific Risk Factors for Sleep-Wake Disturbances

- History of sleep-related problems, depression, other pre-existing mental health problems
- Stressors (e.g., life events; disease status: diagnosis, recurrence, advanced or progressive disease [i.e., vulnerable points])
- Current or recent change in medications associated with depression (can cause insomnia) or sedating medications
- Cancer treatment modalities (e.g., treatment with chemotherapy, other agents such as steroids that can impact sleep)
- Assess for specific contributing factors that should be treated based on other guidelines (e.g., pain, fatigue, depression). Sleep problems often occur as part of symptom cluster of sleep, pain and fatigue.

Mild Sleep Disturbance | **Transient Insomnia Symptoms** | **Insomnia Syndrome**

* Refer to the full technical guideline document for the disclaimer statement on the Canadian Association of Psychosocial Oncology website (www.capo.ca).

1 Use Screening for Distress Tool (SDT), which includes Edmonton Symptom Assessment System (ESAS-r) and Canadian Problem Checklist (CPC).

2 At initial diagnosis, start of treatment, regular intervals during treatment, end of treatment, post-treatment or at transition to survivorship, at recurrence or progression, advanced disease, when dying, and during times of personal transition or re-appraisal such as family crisis, during survivorship, when approaching death (CAPO/CPAC guideline: "Assessment of Psychosocial Health Care Needs of the Adult Cancer Patient" by Howell et al., 2009).

3 The health care team for cancer patients may include surgeons, oncologists, family physicians, nurses, social workers, psychologists, radiation therapists, patient navigators and other health care professionals (HCPs).

** Fraser Health Symptom Assessment Acronym OPQRSTU(I)V: O = Onset; P = Provoking/Palliating; Q = Quality; R = Region or Radiating; S = Severity and Duration; T = Treatment; U = Understanding/I=Impact; V = Values

Care Map: Sleep-Wake Disturbances in Adults with Cancer*

Mild Sleep Disturbance	Transient Insomnia Symptoms	Insomnia Syndrome
• Occasional sleep disruption that does not impair daily functioning • Ability to carry out Activities of Daily Living (ADLs) = usual or desirable functioning (e.g., daily tasks, work, social life, other)	• Difficulty falling asleep at night or getting back to sleep after waking (takes >30 minutes to fall asleep, stay awake for >30 minutes) • Waking up frequently at night • Sleep feels light, fragmented, unrefreshing (poor sleep quality) • Sleepiness and low energy throughout the day • Disturbance occurs <3 times/week	• Symptoms of insomnia ≥3 nights a week for at least 1 month • Impairment of daily activities • Impairment of psychological function • Negative expectations regarding sleep • Hyper-arousal such as hyper-vigilance or racing thoughts about sleep at bedtime • Learned sleep-preventing associations
Care Pathway 1 *Prevention and Supportive Education*	***Care Pathway 2*** *Specific Interventions*	***Care Pathway 3*** *Specific Interventions*

Non-pharmacological Interventions

- Preventive and supportive education as in Care Pathway 1 should be used as an adjunct to more specific non-pharmacological interventions.
- Cognitive behavioural therapy (CBT) specific for insomnia (CBT-I) is the most effective intervention to improve sleep problems based on trials in the general population and cancer patients.
- CBT-I can initially be provided as a self-administered intervention or by trained front line providers, but insomnia syndrome is best managed by a psychologist or other specialist in CBT-I.
- Other interventions such as exercise may also be helpful for transient insomnia.
- Treat other conditions such as pain or fatigue or depression.

Pharmacological Interventions

- Pharmacological agents as appropriate on a short-term or intermittent basis (e.g., see indications section for pharmacological agents). Special monitoring is required for cancer patients on pharmacological agents and for adverse effects in combination with cancer treatment and other medications.
- Use lowest effective dose (e.g., minimize daytime sedation and confusion).

Preventive-Supportive Education Interventions for All Patients

- Provide patient anticipatory education to ensure they report changes in sleep quality or sleep problems.
- Advise patient in the use of the following sleep-promoting strategies:
  1. Wake up at the same time (regardless of how many hours of sleep and including weekends)
     - Morning anchor determines bed time based on sleep pressure
     - Ensure morning light exposure (natural or artificial): At least 30 minutes within 1 hour of waking
  2. Designate a "clear-your-head time"
     - 30-45 minutes devoted to problem solving, planning, worrying in the early evening
     - Remind yourself that you have already devoted time to topic if it re-appears
  3. Establish a 90-minute buffer zone before intended bed time
     - This time needs to be spent in *dim light*, while engaged in *individualized sedentary*, *pleasant* and *relaxing* activities (e.g., reading, meditation, prayer, TV/movies, crosswords, warm bath, magazines, audiobooks, music, relaxation/imagery or anything that does not produce cognitive or physiological arousal)
  4. Only go to bed when sleepy (regardless of what the clock says) and don't spend extra time trying to sleep
     - Don't confuse tired/fatigued or bored with being sleepy
     - Spending extra time awake in bed DOES NOT increase chances of falling asleep and adds to anxiety, frustration and conditioned arousal
  5. Use your bedroom for sleep and sex only
     - During recovery, the bed is often used for activities other than sleep, this weakens its power as a cue for sleep
     - Make other areas of the house as comfortable; minimize noise/disruption during night (use ear plugs/eye masks)
  6. If not asleep within 20-30 minutes, get up and return to bed when sleepy. Refer to #4. Esp. important if mind becomes active!
     - Return to buffer zone activity; plan for this in advance
  7. Ensure sleep expectations are realistic (sleep needs range: 6-10 hours; sleep quality becomes lighter with age but not need)
     - It is normal to awaken 1-2 times; it is not normal to remain awake. Most people feel sleepy in the afternoon.
  8. Avoid unnecessary time in bed during day and avoid napping multiple times throughout the day
     - For patients confined to bed, provide cognitive stimulation throughout the day
- Napping
  - While multiple naps throughout the day should be avoided, an afternoon nap of one hour or less may be helpful
  - A short nap (less than one hour) taken in the afternoon, starting before 4pm, are unlikely to interfere with nighttime sleep
  - It is possible to rest without necessarily sleeping
- Preparatory education to increase patient's awareness of the difference between normal and cancer-related sleep-wake disturbance and its persistence post-treatment and the need to optimize sleep quality during and post-treatment
- Provide counseling about general strategies such as:
  - Maintaining good sleep habits and sleep hygiene practices
  - Relaxation
- Educate about signs and symptoms to report to appropriate health care professional if sleep-wake disturbance worsens
- Refer for practical support (e.g., accommodation, transportation, financial assistance, additional health/drug benefits, employment advice) to manage reduced physical functioning and disability due to sleep-wake disturbances

Follow-Up and Ongoing Re-assessment[1] and change (reduction) from previous score

* Refer to the full technical guideline document for the disclaimer statement on the Canadian Association of Psychosocial Oncology website (www.capo.ca)

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Edmonton Symptom Assessment System Revised Version (ESAS–R*)

Patient's Name: _____

Date of Completion: _____ **Time:** _____

Completed by: ❑ Patient ❑ Family ❑ Health Professional ❑ Assisted by family or health professional

Please circle the number that best describes:

No pain	0	1	2	3	4	5	6	7	8	9	10	Worst possible pain
No tiredness *(tiredness = lack of energy)*	0	1	2	3	4	5	6	7	8	9	10	Worst possible tiredness
No drowsiness *(drowsiness = feeling sleepy)*	0	1	2	3	4	5	6	7	8	9	10	Worst possible drowsiness
No nausea	0	1	2	3	4	5	6	7	8	9	10	Worst possible nausea
No lack of appetite	0	1	2	3	4	5	6	7	8	9	10	Worst possible lack of appetite
No shortness of breath	0	1	2	3	4	5	6	7	8	9	10	Worst possible shortness of breath
No depression	0	1	2	3	4	5	6	7	8	9	10	Worst possible depression
No anxiety	0	1	2	3	4	5	6	7	8	9	10	Worst possible anxiety
Best wellbeing *(wellbeing = how you feel overall)*	0	1	2	3	4	5	6	7	8	9	10	Worst possible wellbeing
No _____ Other problem *(e.g., constipation)*	0	1	2	3	4	5	6	7	8	9	10	Worst possible _____

**Source: Regional Palliative Care Program in Edmonton, Alberta.*
Find at www.palliative.org under Health Professionals/Assessment Tools
Re-printed with permission.

Canadian Problem Checklist

Please check all of the following items that have been a concern or problem for you in the past week including today:

Practical:
- ❑ Work/School
- ❑ Finances
- ❑ Getting to and from appointments
- ❑ Accommodation

Social/Family:
- ❑ Feeling a burden to others
- ❑ Worry about family/friends
- ❑ Feeling alone

Emotional:
- ❑ Fears/Worries
- ❑ Sadness
- ❑ Frustration/Anger
- ❑ Changes in appearance
- ❑ Intimacy/Sexuality

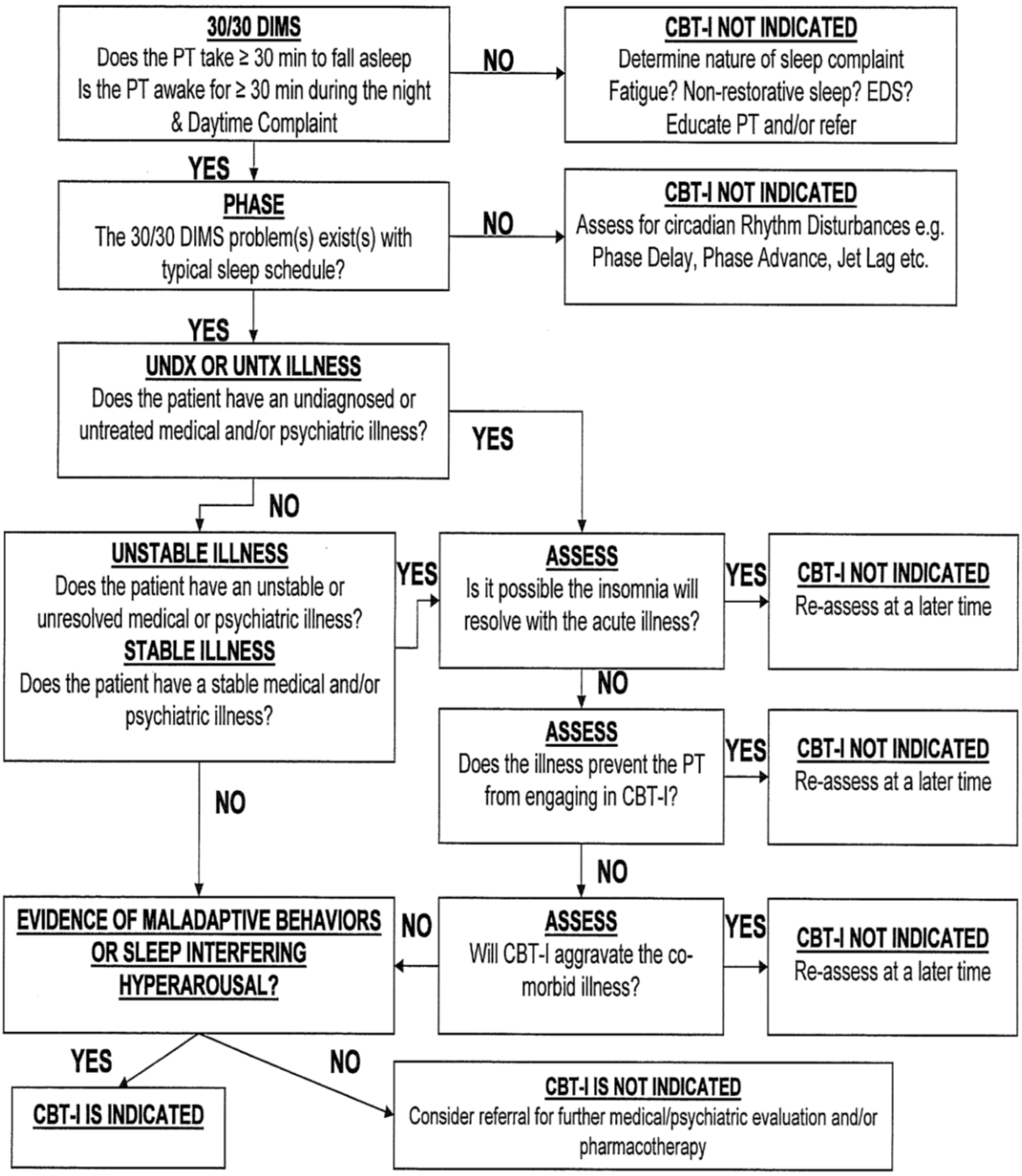
Informational:
- ❑ Understanding my illness and/or treatment
- ❑ Talking with the health care team
- ❑ Making treatment decisions
- ❑ Knowing about available resources

Spiritual:
- ❑ Meaning/Purpose of Life
- ❑ Faith

Physical:
- ❑ Concentration/Memory
- ❑ Sleep
- ❑ Weight

**Source: Canadian Partnership Against Cancer, Cancer Action Journey Group Guide to Implementing Screening for Distress, The 6th Vital Sign: Moving Toward Person-Centered Care. Toronto, ON: Canadian Partnership Against Cancer; 2009. Part A. Background, recommendations and implementation.*

Appendix I: Assessing Candidates for Cognitive-Behavioural Therapy for Insomnia



Note: DIMS = disorders of initiating and maintaining sleep, PT = Patient, min = minute, UNDX = undiagnosed, UNTX = Untreated, CBT-I = cognitive behavioural therapy - insomnia.

Reproduced with permission: *Smith MT, Perlis ML (2006)*[28]

Appendix II: Literature Search Strategy

Database: Embase <1996 to 2012 Week 24>, Ovid Healthstar <1966 to May 2012>, Ovid MEDLINE(R) without Revisions <1996 to June Week 1 2012>, PsycINFO <2002 to June Week 2 2012>

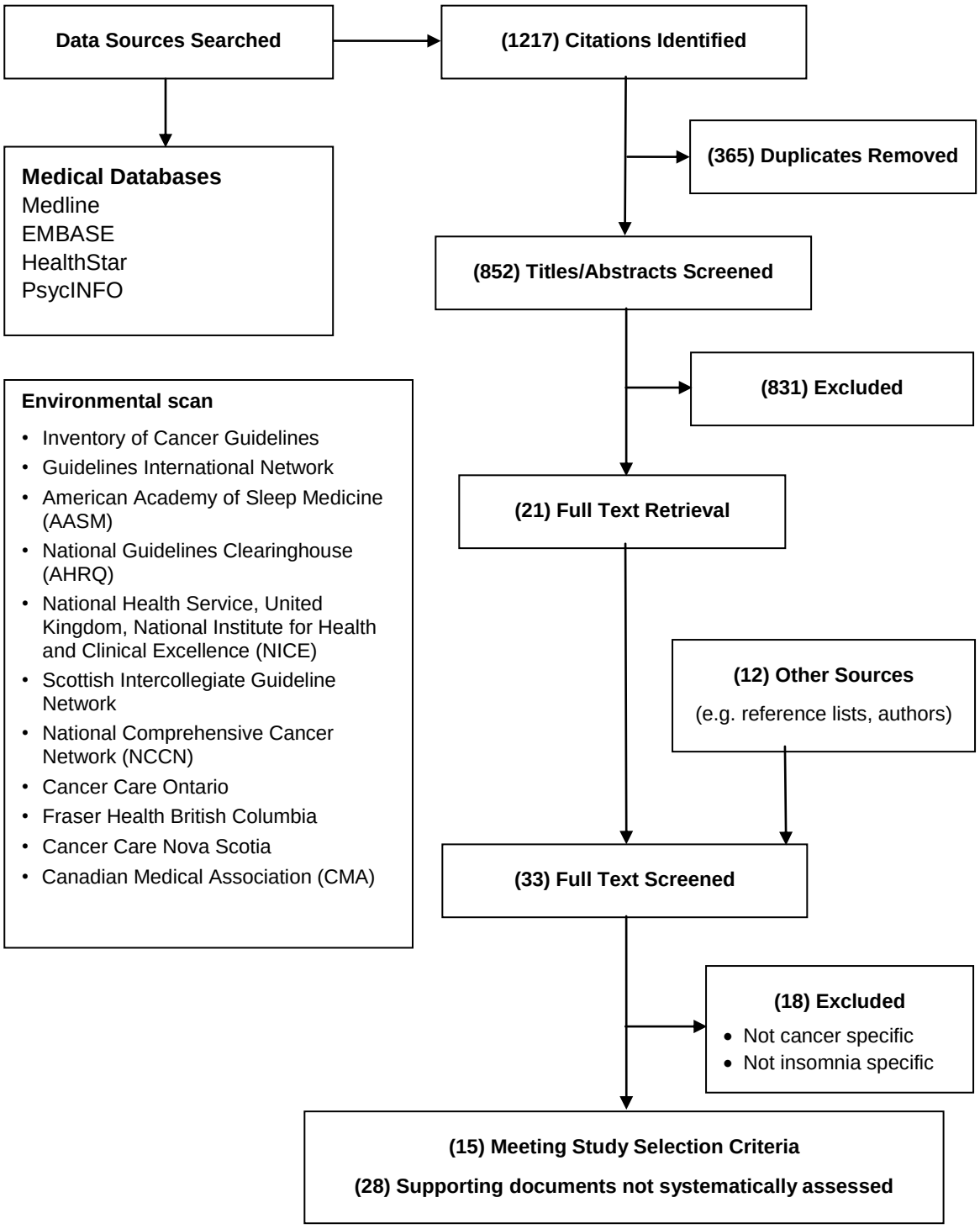
Search Strategy

1 ((exp practice guideline/ or practice guidelines/ or practice guideline as topic/ or guidelines/ or consensus development conferences/ or guideline adherence/ or practice guideline.pt. or guideline.pt. or consensus development conference.pt. or practice guideline.tw. or practice guidelines.tw. or practice parameter.tw. or practice parameters.tw. or guideline.tw. or guidelines.tw. or consensus.ti. or recommendation.ti. or recommendations.ti. or (review/ and systematic.tw.) or (exp review literature as topic/ and systematic.tw.) or systematic review$.tw. or meta-analysis as topic/ or meta-analysis.pt. or meta analy$.tw. or metaanaly$.tw. or meta-analy$.tw. or synthes$s.tw. or (systematic adj (review$ or overview$)).tw. or (selection criteria.ab. and review.pt.) or (data extraction.ab. and review.pt.) or (quality assessment.ab. and review.pt.) or (methodological quality.ab. and review.pt.) or (study selection.ab. and review/) or exp systematic review/ or exp meta analysis!

/ or (meta analy$ or metaanaly$ or meta-analy$).tw. or (systematic review$ or pooled analy$ or statistical pooling or mathematical pooling or statistical summar$ or mathematical summar$ or quantitative synthes?s or quantitative overview).tw. or (systematic adj (review$ or overview?)).tw. or ((Cochrane or MEDLINE or EMBASE or psychlit or psyclit or psychinfo or psycinfo or cinahl or cinhal or science citation index or scisearch or bids or sigle or cancerlit).tw. and review.mp.) or (study adj selection).ab. or randomized controlled trial.pt. or controlled clinical trial.pt. or random.ab. or placebo.ab. or clinical trials as topic.sh. or randomly.ab. or trial.ti. or exp randomized controlled trial/ or exp clinical trial/ or (random$ or rct or phase III or phase 3).tw. or exp controlled clinical trial/) and random$.tw.) not (comment or letter or editorial or note or erratum or short survey or news or newspaper article or patient education handout or case report or historical article)/not animal/ (1431538)

2 limit 1 to yr="2004 - 2012" (895085)
3 insomnia/ or sleep/ or sleep disturbance/ (123895)
4 (insomnia or sleep or sleep disturbance).mp. (281334)
5 3 or 4 (281334)
6 cancer/ or oncology/ or neoplasm/ (536361)
7 (cancer or oncology or neoplasm).mp. (2917926)
8 6 or 7 (3028212)
9 (screening or assessment or treatment or management or practice or interventions).mp. (10921687)
10 screening/ or assessment/ or treatment/ or management/ or practice/ or interventions/ (273524)
11 9 or 10 (10930686)
12 2 and 5 and 8 and 11 (1217)
13 remove duplicates from 12 (852)

Appendix III: Literature Search Results Flow Chart



References

1 Ancoli-Israel S. Recognition and treatment of sleep disturbances in cancer. *Journal of Clinical Oncology*. 2009; 27(35):5864-6.

2 Miaskowski C, Dodd M, Lee K, West C, Paul SM, Cooper BA, et al. Preliminary evidence of an association between a functional interleukin-6 polymorphism and fatigue and sleep disturbance in oncology patients and their family caregivers. *Journal of Pain and Symptom Management*. 2010; 40(4):531-44.

3 Davidson JR, MacLean AW, Brundage MD, Schulze K. Sleep disturbance in cancer patients. *Social Science & Medicine* . 2002; 54(9):1309-21.

4 Buysse DJ, Yu L, Moul DE, Germain A, Stover A, Dodds NE, et al. Development and validation of patient-reported outcome measures for sleep disturbance and sleep related impairments. *Sleep*. 2010; 33(6): 781–92.

5 Howell D, Keller-Olaman S, Oliver TK, Hack TF, Broadfield L, Biggs K et al., on behalf of the Cancer Journey Advisory Group of the Canadian Partnership Against Cancer. A Pan-Canadian Practice Guideline: Screening, Assessment and Care of Cancer-Related Fatigue in Adults with Cancer. Accessed September 30, 2011 at www.capo.ca.

6 NCCN Clinical Practice Guidelines in Oncology: Cancer-Related Fatigue, v.1.2012. National Comprehensive Cancer Network (NCCN). Available at: www.nccn.org/professionals/physician_gls/f_guidelines.asp.

7 Page M, Berger A, Johnson L. (Oncology Nursing Society, ONS) Putting evidence into practice: evidence-based interventions for sleep disturbances. *Clinical Journal of Oncology Nursing*. 2006; 10(6):753-67.

8 Schutte-Rodin S, Broch L, Buysse D, Dorsey C, Sateia M. (American Academy of Sleep Medicine, AASM) Clinical guideline for the evaluation and management of chronic insomnia in adults. *Journal of Clinical Sleep Medicine*. 2008; 4(5):487-504.

9 Morin CM, Benca R. Chronic insomnia. *Lancet*. 2012. http://dx.doi.org/10.1016/S0140-6736(11)60750-2.

10 American Psychiatric Association (APA). Diagnostic and statistical manual of mental disorders. 4th ed. DSM-IV-TR. Washington, DC: American Psychiatric Association; 2000.

11 Howell D, Currie S, Mayo S, Jones G, Boyle M, Hack T, et al. A Pan-Canadian Clinical Practice Guideline: Assessment of Psychosocial Health Care Needs of the Adult Cancer Patient. Toronto, ON: Canadian Partnership Against Cancer (Cancer Journey Action Group) and the Canadian Association of Psychosocial Oncology; 2009.

12 Adler N, Page A, eds. Institute of Medicine (IOM). Cancer care for the whole patient: meeting psychosocial health needs. Washington, DC: The National Academies Press; 2008.

13 Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Medicine*. 2001; 2(4):297-307.

14 Davidson JR, MacLean AW, Brundage MD, Schulze K. Sleep disturbance in cancer patients. *Social Science & Medicine*. 2002; 54(9):1309-21.

15 Savard J, Villa J, Ivers H, Simard S, Morin CM. Prevalence, natural course, and risk factors of insomnia comorbid with cancer over a 2-month period. *Journal of Clinical Oncology*. 2009; 27(31):5233-9.

[16] Palesh O, Roscoe J, Mustian K, Roth T, Savard J, Ancoli-Israel S, et al. Prevalence, demographics, and psychological associations of sleep disruption in patients with cancer: University of Rochester cancer centre – Community clinical oncology program. *Journal of Clinical Oncology*. 2010; 28(2):292-98.

[17] Savard J, Ivers H, Villa J, Caplette-Gingras A, Morin CM. Natural course of insomnia comorbid with cancer: an 18-month longitudinal study. *Journal of Clinical Oncology*. 2011; 29(26):3580-6.

[18] Davidson JR, Feldman-Stewart D, Brennenstuhl S, Ram S. How to provide insomnia interventions to people with cancer: insights from patients. *Psycho-Oncology*. 2007; 16(11):1028-38.

[19] Harsora P, Kessmann J. Nonpharmacologic Management of Chronic Insomnia. *American Family Physician*. 2009; 79(2):125-30.

[20] Mai E, Buysse DJ. Insomnia: prevalence, impact, pathogenesis, differential diagnosis, and evaluation. *Sleep Medicine Clinics*. 2008; 3(2):167-74.

[21] LeBlanc M, Mérette C, Savard J, Ivers H, Baillargeon L, Morin CM. Incidence and risk factors of insomnia in a population-based sample. *Sleep*. 2009; 32(8):1027-37.

[22] Schutte-Rodin S, Broch L, Buysse D, Dorsey C, Sateia M. Clinical guideline for the evaluation and management of chronic insomnia in adults. *Journal of Clinical Sleep Medicine*. 2008; 4(5):487-504.

[23] Franzen PL, Buysse DJ. Sleep disturbances and depression: risk relationships for subsequent depression and therapeutic implications. Review. *Dialogues in Clinical Neuroscience*. 2008; 10(4):473-81.

[24] Lustberg L, Reynolds CF. Depression and insomnia: questions of cause and effect. *Sleep Medicine Reviews*. 2000; 4(3):253-62.

[25] Breslau N, Roth T, Rosenthal L, et al. Sleep disturbance and psychiatric disorders: a longitudinal study of young adults. *Biological Psychiatry*. 1996; 39:411-8.

[26] Roberts RE, Shema SJ, Kaplan G, et al. Sleep complaints and depression in an aging cohort: a prospective perspective. *American Journal of Psychiatry*. 2000; 157:81-8.

[27] Perlis ML, Giles DE, Buysse DJ, et al. Self-reported sleep disturbance as a prodromal symptom in recurrent depression. *Journal of Affective Disorders*. 1997; 42:209-12.

[28] Smith MT, Perlis ML. Who is a candidate for cognitive-behavioral therapy for insomnia? *Health Psychology*. 2006; 25(1):15-9.

[29] Buscemi N, Vandermeer B, Friesen C, Bialy L, Tubman M, Ospina M, et al. Manifestations and Management of Chronic Insomnia in Adults. Evidence Report/Technology Assessment No. 125. (Prepared by the University of Alberta Evidence-based Practice Center, under Contract No. C400000021.) AHRQ Publication No. 05-E021-2. Rockville, MD: Agency for Healthcare Research and Quality; 2005.

[30] Cappuccio F, D'Ella L, Strazzullo P, Miller M. Sleep duration and all-cause mortality: a systematic review and meta-analysis of prospective studies. *Sleep*. 2010; 33(5):585-92.

[31] Fleming L, Gillespie S, Espie CA. The development and impact of insomnia on cancer survivors: a qualitative analysis. *Psycho-Oncology*. 2010; 19(9):991-6.

[32] Fervers B, Burgers J, Haugh M, Laterille J, Mlika-Cabanne N, Paquet L, et al. Adaptation of clinical guidelines: literature review and proposition for a framework and procedure. *International Journal of Quality in Health Care*. 2006; 18(3):167-76.

[33] Brouwers MC, Kho ME, Browman GP, Burgers JS, Cluzeau F, Feder G, et al. Development of the AGREE II, part 1: performance, usefulness and areas for improvement. *Canadian Medical Association Journal*. 2010; 182(10):1045-52.

[34] Oncology Nursing Society (ONS). Sleep/Wake Disturbances. Accessed July 2010. www.ons.org/Research/PEP/Sleep.

[35] National Health Service (NHS) Clinical Knowledge Summaries (CKS): Insomnia (revised July 2009). Accessed November 2010. www.cks.nhs.uk/insomnia#376442001

[36] Ritterband LM, Bailey ET, Thorndike FP, Lord HR, Farrell-Carnahan L, Baum LD. Initial evaluation of an Internet intervention to improve the sleep of cancer survivors with insomnia. *Psycho-Oncology*. 2011. doi: 10.1002/pon.1969. [Epub ahead of print]. *Nature and Science of Sleep*. 2009; 2010:1-8.

[37] Barsevick A, Beck SL, Dudley WN, Wong B, Berger AM, Whitmer N, et al. Efficacy of an intervention for fatigue and sleep disturbance during cancer chemotherapy. *Journal of Pain and Symptom Management*. 2010; 40(2):200-16.

[38] Fiorentino L, McQuaid JR, Liu L, Natarajan L, He F, Cornejo M, et al. Individual cognitive behavioral therapy for insomnia in breast cancer survivors: a randomized controlled crossover pilot study. *Nature and Science of Sleep*. 2009; 2010:1-8.

[39] Berger AM, Kuhn BR, Farr LA, Von Essen SG, Chamberlain J, Lynch JC, Agrawal S. One-year outcomes of a behavioural therapy intervention trial on sleep quality and cancer related fatigue. *Journal of Clinical Oncology*. 2009; 27(35):6033-40.

[40] Dirksen SR, Epstein DR. Efficacy of an insomnia intervention on fatigue, mood and quality of life in breast cancer survivors. *Journal of Advanced Nursing*. 2008; 61(6):664-75.

[41] Espie CA, Fleming L, Cassidy J, Samuel L, Taylor LM, White CA, et al. Randomized controlled trial of cognitive behaviour therapy compared with treatment as usual for persistent insomnia in patients with cancer. *Journal of Clinical Oncology*. 2008; 26(28):4651-8.

[42] Farrell-Carnahan L, Ritterband LM, Bailey ET, Thorndike FP, Lord HR, Baum LD. Feasibility and preliminary efficacy of a self-hypnosis intervention available on the web for cancer survivors with insomnia. *Electronic Journal of Applied Psychology*. 2010; 6(2):10-23.

[43] Savard J, Simard S, Ivers H, Morin CM. Randomized study on the efficacy of cognitive behavioural therapy for insomnia secondary to breast cancer, part I: sleep and psychological effects. *Journal of Clinical Oncology*. 2005; 23(25):6083-96.

[44] Cohen L, Warneke C, Fouladi RT, Rodriguez MA, Chaoul-Reich A. Psychological adjustment on sleep quality in a randomized trial of the effects of a Tibetan yoga intervention in patients with lymphoma. *Cancer*. 2004; 100(10):2253-60.

[45] Payne JK, Held J, Thorpe J, Shaw H. Effect of exercise on biomarkers, fatigue, sleep disturbances and depressive symptoms in older women with breast cancer receiving hormone therapy. *Oncology Nursing Forum*. 2008; 35(4):635-42.

[46] Sprod LK, Palesh OG, Janelsins MC, Peppone LJ, Heckler CE, Adams MJ, et al. Exercise, sleep quality and mediators of sleep in breast and prostate cancer patients receiving radiation therapy. *Community Oncology*. 2010; 7(10):463-71.

[47] Tang MF, Liou TH, Lin CC. Improving sleep quality for cancer patients: benefits of a home-based exercise intervention. *Supportive Care in Cancer*. 2010; 18:1329-39.

[48] Alberta Medical Association (AMA). Assessment to diagnosis: guideline for adult insomnia, 2010. Toward Optimized Practice (TOP) program. Accessed at www.topalbertadoctors.org.

[49] Alberta Medical Association (AMA). Diagnosis to management: guideline for adult primary insomnia, 2010. Toward Optimized Practice (TOP) program. Accessed at http://www.topalbertadoctors.org.

[50] Bruera E, Kuehn N, Miller MJ, Selmser P, Macmillan K. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. *Journal of Palliative Care*. 1991; 7(2):6-9.

[51] Linden W, Yi D, Barroetavena MC, MacKenzie R, Doll R. Development and validation of a psychosocial screening instrument for cancer. *Health and Quality of Life Outcomes*. 2005; 3:54.

[52] Watanabe SM, Nekolaichuk C, Beaumont C, Johnson L, Myers J, Strasser F. A multi-centre comparison of two numerical versions of the Edmonton Symptom Assessment System in palliative care patients. *Journal of Pain and Symptom Management*. 2011; 41:456-68.

[53] Kirkova J, Davis MP, Walsh D, et al. Cancer symptom assessment instruments: a systematic review. *J Clin Oncol*. 2006; 24:1459-73.

[54] Chang VT, Hwang SS, Feuerman M. Validation of the Edmonton Symptom Assessment Scale. *Cancer*. 2000; 88:2164-71.

[55] Nekolaichuk C, Watanabe S, Beaumont C. The Edmonton Symptom Assessment System: a 15-year retrospective review of validation studies (1991-2006). *Palliative Medicine*. 2008; 22:111-22.

[56] National Cancer Institute (NCI) – Sleep Disorders (PDQ®): Supportive care - Health Professional Information, updated March 4, 2010. Accessed April 2010 at www.cancer.gov/cancertopics/pdq/supportivecare/sleepdisorders.

[57] Howell D, Currie S, Mayo S, Jones G, Boyle M, Hack T, et al. A Pan-Canadian Clinical Practice Guideline: Assessment of Psychosocial Health Care Needs of the Adult Cancer Patient. Toronto, ON: Canadian Partnership Against Cancer (Cancer Journey Action Group) and the Canadian Association of Psychosocial Oncology; 2009.

[58] Kvale E, Shuster J. Sleep disturbance in supportive care of cancer: a review. *Journal of Palliative Medicine*. 2006; 9(2):437-50.

[59] Panossian L, Avidan A. Review of sleep disorders. *Medical Clinics of North America*. 2009; 93:407-25.

[60] Wilson S, Nutt D, Alford C, Argyropoulos S, et al. British Association for Psychopharmacology consensus statement on evidence-based treatment of insomnia, parasomnias and circadian rhythm disorders. *Journal of Psychopharmacology*. 2010. doi: 10.1177/0269881110379307

[61] Buscemi N, Vandermeer B, Friesen C, Bialy L, Tubman M, Ospina M, et al. Manifestations and Management of Chronic Insomnia in Adults. Evidence Report/Technology Assessment No. 125. (Prepared by the University of Alberta Evidence-based Practice Center, under Contract No. C400000021.) AHRQ Publication No. 05-E021-2. Rockville, MD: Agency for Healthcare Research and Quality; 2005. Accessed at http://archive.ahrq.gov/clinic/epcsums/insomnsum.htm.

[62] Ramakrishnan K, Scheid D. Treatment options for insomnia (American Association of Family Physicians guideline). *American Family Physician*. 2007; 76(4):517-26.

[63] Morin CM, Bootzin RR, Buysse DJ, Edinger JD, Espie CA, Lichstein KL. Psychological and behavioral treatment of insomnia: update of the recent evidence (1998-2004). *Sleep*. 2006; 29(11):1398-414.

[64] Espie C. "Stepped Care": a health technology solution for delivering cognitive behavioral therapy as first line insomnia treatment. *Sleep*. 2009; 32(12):1549-58.

[65] Savard J, Villa J, Simard S, Ivers H, Morin CM. Feasibility of a self-help treatment for insomnia comorbid with cancer. *Psycho-Oncology*. 2011; 20(9):1013-9.

[66] Vincent N, Lewycky S. Logging on for better sleep: RCT of the effectiveness of online treatment for insomnia. *Sleep*. 2009; 32(6):807-15.

[67] Swift N, Stewart R, Andiappan M, Smith A, Espie CA, Brown JS. The effectiveness of community day-long CBT-I workshops for participants with insomnia symptoms: a randomised controlled trial. *Journal of Sleep Research*. 2011. doi: 10.1111/j.1365-2869.2011.00940.x

[68] Youngstedt SD. Effects of exercise on sleep. *Clinical Journal of Sport Medicine*. 2005; 24(2):355-65, xi.

[69] Cheuk DKL, Yeung J, Chung KF, Wong V. Acupuncture for insomnia. *Cochrane Database of Systematic Reviews*. 2007, Issue 3. Art. No.: CD005472. doi: 10.1002/14651858.CD005472.pub2

[70] Cooper KL, Relton C. Homeopathy for insomnia: a systematic review of research evidence. *Sleep Medicine Reviews*. 2010; 14(5):329-37.

[71] Fernandez-San-Martin MI, Masa-Font R, Palacios-Soler L, et al. Effectiveness of valerian on insomnia: a meta-analysis of randomized placebo-controlled trials. *Sleep Medicine*. 2010; 11(6):505-11.

[72] Montgomery P, Dennis JA. Cognitive behavioural interventions for sleep problems in adults aged 60+. *Cochrane Database of Systematic Reviews*. 2003, Issue 1. Art. No.: CD003161. doi: 10.1002/14651858.CD003161

[73] Johns MW. A new method for measuring daytime sleepiness: the Epworth Sleepiness Scale. *Sleep*. 1991; 50-55.

[74] Savard M-H, Savard J, Simard S, Ivers H. Empirical validation of the Insomnia Severity Index in cancer patients. *Psycho-Oncology*. 2005; 14:429-41.

[75] McFarlane J. Management of Acute Insomnia. In Press.

[76] Davidson JR. Treating Insomnia in Primary Care. In Press.

[77] Carney CE, Buysse DJ, Ancoli-Israel S, Edinger JD, Krystal AD, Lichstein KL, Morin CM. The consensus sleep diary: standardizing prospective sleep self-monitoring. *Sleep*. 2012; 35(2):287.