Overview of the treatment of insomnia in adults

AUTHOR: John W Winkelman, MD, PhD
SECTION EDITOR: Ruth Benca, MD, PhD
DEPUTY EDITOR: April F Eichler, MD, MPH

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INTRODUCTION

Insomnia is one of the most common symptoms for which adults seek medical advice. Although sleep is a strong and highly regulated biologic drive, the ability to fall asleep at the desired time and maintain sleep without excessive waking is fragile and influenced by multiple factors. Identification of these factors is at the core of insomnia treatment.

Management of insomnia requires a stepwise approach, beginning with attempts to eliminate, or at least minimize, the multiple contributing factors and comorbid illnesses that can interfere with optimal sleep. Insomnia often responds only partially to treatment of sleep-impairing influences, however, and many patients require treatment directed towards sleep itself. However, successful behavioral and pharmacologic approaches to insomnia should only be implemented once all contributing factors are recognized and attempts to address them are made.

This topic is an overview of the approach to management of acute and chronic insomnia in adults. Specific medications and behavioral therapies for insomnia are reviewed in more detail separately. (See "Pharmacotherapy for insomnia in adults" and "Cognitive behavioral therapy for insomnia in adults".)

INITIAL ASSESSMENT AND COUNSELING

Insomnia etiology is best conceptualized as a combination of predisposing, precipitating, and perpetuating factors that vary over time. Each of these factors should be assessed to formulate an individualized treatment plan.

Predisposing and precipitating factors — The sleep history should include an examination of the social, medical, and psychiatric events that may have been relevant at the time insomnia began. When an individual is under psychologic or physiologic stress, such factors are variably amplified in the context of their underlying reactivity to sleep disturbance (table 1) [1,2]. (See "Evaluation and diagnosis of insomnia in adults", section on 'Common comorbidities'.)

Such events and comorbidities are important for treatment because:

- Insomnia precipitated or exacerbated by a symptom of medical illness (eg, pain, nocturia, or shortness of breath) is unlikely to improve without maximal treatment of the medical disorder. (See 'Pain' below.)

- Sleep disorders other than insomnia (eg, obstructive sleep apnea [OSA], circadian rhythm disorders, restless legs syndrome [RLS]) may present with insomnia but are unlikely to improve without treatment directed at the specific sleep disorder. Suspected OSA is an indication for in-laboratory polysomnography or home sleep apnea testing. (See 'Patients with comorbid sleep disorders' below and "Clinical presentation and diagnosis of obstructive sleep apnea in adults", section on 'Diagnostic evaluation'.)

- Psychiatric disorders and insomnia have a bidirectional relationship, and concomitant treatment for both disorders is often necessary to hasten recovery and increase the likelihood of sustained response of both disorders. (See 'Patients with comorbid psychiatric disorders' below.)

- A history of childhood trauma or chaotic home environment at night (even in the absence of posttraumatic stress disorder [PTSD]) may increase vulnerability to sleeplessness as an adult. Awareness of this history is valuable as it may shed light on etiology and help identify targets of cognitive therapy.

Medication side effects — Medications used to treat a comorbid condition may themselves precipitate insomnia through stimulation of arousal centers or other central nervous system effects (eg, stimulants, glucocorticoids, some antidepressants), nocturia (eg, diuretics), or respiratory suppression (eg, opioids) (table 2). Use of medications with the potential to disrupt sleep has been associated with an increased risk of insomnia on a population level [3] and is commonly overlooked as a contributing factor.

- **Stimulants** – The major determinants of whether stimulants such as methylphenidate or modafinil will interfere with sleep are dose and effective half-life. Many stimulants have effective half-lives greater than 10 hours and can therefore interfere with both sleep onset and sleep maintenance. Lowering the dose, choosing a shorter-acting agent, and administering the medication earlier in the day may attenuate the sleep disturbance.

- **Antidepressants** – Selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs) are associated with treatment-induced insomnia in approximately 20 percent of patients. While morning dosing is commonly recommended to mitigate sleep disturbances, it is not clear that this reduces the risk of incident insomnia. Lowering the dose may be of value. Sometimes, the sleep disruptive effects of antidepressants are transient, and temporary use of a sedating medication may be indicated to address this side effect.

- **Glucocorticoids** – Oral or inhaled glucocorticoids commonly produce insomnia [4]. Lowering the dose and administering the medication earlier in the day may attenuate the sleep disturbance. If sleeplessness does not improve over time, co-administration of a sedating medication is a common approach.

- **Opioids** – Although opioids are often sedating, chronic use can lead to increased sleep fragmentation and nocturnal awakenings related to changes in sleep architecture and respiratory control. Polysomnography is required to diagnose sleep-disordered breathing due to chronic opioids, as central apneas or irregular breathing patterns may not be apparent to the patient or a bed partner. Lowering or eliminating the opioid dose and positive airway pressure therapy are the primary treatment strategies. (See "Sleep-disordered breathing in patients chronically using opioids".)

Perpetuating factors — Behavioral and cognitive compensatory responses to sleeplessness, some of which can be maladaptive for sleep, may further disturb sleep onset and maintenance, and perpetuate insomnia.

Many patients with insomnia have poor sleep habits (table 3), substantial anxiety about falling or staying asleep, unrealistic expectations of sleep, or inappropriate attributions about the association of daytime symptoms and nocturnal sleep. When these counterproductive processes are substantial, they should be addressed, either alone or in addition to other therapeutic strategies.

- Determine consistency of timing of bedtime and waking time and amount of time allotted to attempts to sleep. A sleep diary (table 4A-B), filled out by the patient for at least two weeks, is an important component of the evaluation and is often informative for both

patient and clinician. Regular timing of bedtime and, particularly, waking time (seven days per week) is essential for those with insomnia. The amount of time in bed, from initial attempts to sleep until final waking time, should not exceed the estimated total sleep time.

- Ask if the patient is actually sleepy at bedtime. Attempts to sleep should occur only when sleepy (similar to attempts to empty the bowel or bladder).
- Ask about napping and dozing during the day or evening, which should be avoided to maximize sleep drive at night.
- Determine the level of anxiety regarding sleeplessness, both in the evening before bed as well as while awake in bed attempting to sleep. If substantial anxiety is present ("insomnia phobia"), methods to reduce anxiety should be instituted. (See 'Overview of cognitive behavioral therapy' below.)
- Ask about clock-watching while in bed.
- Ask about nocturnal environmental disturbances (children, pets, bed partner, electronics).
- Determine if expectations of sleep onset time, number of awakenings, and total sleep time are realistic for age, and, if not, educate about appropriate expectations (figure 1). (See "Insufficient sleep: Definition, epidemiology, and adverse outcomes", section on 'How much sleep do we need?'.)
- Assess perceived consequences of sleeplessness and attributions of daytime function and health to sleep. Educate about appropriate attributions of the effects of insomnia.

Maladaptive habits (behaviors) and attitudes (cognitions) that may perpetuate sleeplessness are the targets of cognitive behavioral therapy for insomnia (CBT-I) and should be addressed in all patients with chronic insomnia. However, it should be noted that by the time patients present to a clinician, it is often difficult to determine if such compensations are the most important cause of the insomnia or simply an inappropriate response to it.

APPROACH TO ACUTE INSOMNIA

Short-term insomnia is a common form of insomnia and usually results from psychologic or physiologic stress. Patients with acute insomnia can often identify the immediate precipitant to the insomnia. Symptoms most often last for less than a month, although formal diagnostic criteria allow for symptoms lasting up to three months [5]. The clinical approach to acute insomnia is twofold:

- Discuss the role that the stressor is playing in disturbing sleep and assess the level of distress. Education can provide some control or at least acceptance of the temporary sleeplessness. For patients with mild or manageable levels of distress, we provide reassurance and a plan for follow up if insomnia does not improve.

- When the insomnia is severe or associated with substantial distress, we offer short-term use of an insomnia medication to help address immediate interference with daytime function and to control escalating anxiety about sleep. Selection of a medication is individualized using the same principles as those for chronic insomnia medication selection. (See "Pharmacotherapy for insomnia in adults", section on 'Our approach'.)

The goal of pharmacologic therapy in this setting is to minimize the additional psychologic and physical stress that sleeplessness produces. In addition, medication treatment of short-term insomnia may reduce the development of dysfunctional cognitive and behavioral responses to sleeplessness that could otherwise increase the risk of more chronic insomnia.

Follow-up in two to four weeks is encouraged to reassess sleep-related symptoms and anxiety about sleep, reinforce good sleep habits, and consider additional causes of insomnia. If insomnia is persistent, we encourage evaluation and treatment with cognitive behavioral therapy for insomnia (CBT-I). (See 'Overview of cognitive behavioral therapy' below.)

APPROACH TO CHRONIC INSOMNIA

Cognitive behavioral therapy (CBT) and pharmacotherapy are the main treatment options for chronic insomnia that persists despite appropriate identification and management of precipitating and perpetuating factors.

Choice of initial therapy — CBT for insomnia (CBT-I) is preferred as first-line therapy for chronic insomnia in most patients. However, CBT-I is not effective for all patients and is not accessible to many, either due to lack of therapists or to limitations of insurance or time. In such cases, long-term use of medications is an acceptable approach if the patient is thoroughly evaluated beforehand, is followed regularly during the course of treatment, and continues to respond positively to the medication [6].

Several prospective studies have assessed the comparative efficacy of CBT-I, medications, and combination therapy as an initial approach. In short-term trials, CBT-I alone and CBT-I in combination with medications demonstrate relatively equivalent outcomes, and both are superior to medication alone [7-9]. Longer-term outcome studies (12 to 24 months) also demonstrate superior efficacy of CBT-I alone or in combination with medication compared with

medication-alone approaches for subjective sleep outcomes [10]. CBT-I without medication has the advantage that it does not expose patients to side effects and potential drug interactions, and it provides patients with lifelong skills should insomnia recur [6,11,12]. However, it is unclear that CBT-I produces benefits for objective sleep parameters [13]. A preference for CBT-I or other behavioral therapies over medication as initial therapy has been endorsed in clinical practice guidelines of the American Academy of Sleep Medicine [12], the British Association for Psychopharmacology [14], the American College of Physicians [11,15], and the European Sleep Research Society [16]. (See 'Society guideline links' below.)

For patients who require a rapid response for clinical reasons (eg, deterioration in daytime function) or who have excessive anxiety regarding sleeplessness (which may interfere with the ability to follow time in bed restriction and stimulus control aspects of CBT-I), a combination approach can be used initially (given the faster response with medication approaches), with a plan to taper the medication over time (eg, six to eight weeks). (See 'Follow-up and monitoring' below.)

There are no reliable predictors of treatment response to CBT-I or medications [17]. One might predict that deviations from optimal thoughts and behaviors would provide greater opportunity for benefit from CBT-I; however, counterproductive beliefs and behaviors may have developed as a consequence of more severe sleep disturbance, more disorganized lifestyle, or underlying anxiety disorder and therefore may actually be markers of treatment resistance. One study suggested that greater distress at baseline or prolonged times to fall asleep may predict beneficial response to CBT-I, whereas short total sleep time (<6 hours) may predict poor response [18,19].

Predictors of treatment success with medications for insomnia are also poorly characterized. In one meta-analysis of nonbenzodiazepine benzodiazepine receptor agonists (BZRAs), younger age and female sex were associated with greater improvements in sleep onset latency [20]. Anecdotally, previous nonresponse to high doses of hypnotics or substantial discrepancy between self-reported and objectively recorded total sleep time (referred to as paradoxical insomnia) are indicators of poor future response to medications.

Overview of cognitive behavioral therapy — Cognitive behavioral therapy for insomnia (CBT-I) is the preferred form of treatment for chronic insomnia in adults and has been endorsed as first-line therapy by multiple societies and guideline panels [6,11,14,15,21,22].

CBT-I is a multicomponent approach to chronic insomnia that addresses common thoughts and behaviors that interfere with optimal sleep. It is traditionally delivered in face-to-face individual or group settings, over four to eight sessions; remote delivery (online or telephone) can also be

effective, although adherence is less robust in this context. CBT-I is distinct from other forms of CBT (eg, for anxiety and mood disorders), and referring providers should confirm that the therapist has been specifically trained in this modality.

The behavioral components of CBT-I include:

- Establishment of a stable bedtime and waking time seven days per week
- Reduction in time in bed to approximate the total hours of estimated sleep (time in bed restriction) (table 5)
- Encouragement to use the bed only for sleep and sex; try to sleep only when sleepy; and get out of bed if anxiety occurs while unable to sleep (stimulus control) (table 6)
- Sleep hygiene, which includes avoidance of substances that interfere with sleep, avoidance of naps to maximize sleep drive, and optimization of the comfort of the sleep environment (table 3)

The cognitive approaches of CBT-I address:

- Anxious and catastrophic thoughts that are associated with sleeplessness
- Inappropriate expectations about hours of sleep
- Misattributions regarding the effects of sleeplessness
- Relaxation through progressive muscle relaxation, mindfulness, and meditation (table 7)

CBT-I and other behavioral approaches to chronic insomnia are reviewed in more detail separately. (See "Cognitive behavioral therapy for insomnia in adults".)

Overview of pharmacotherapy — For such patients who have not responded to CBT-I, the risks of untreated insomnia (eg, falls at night, cognitive impairment, development of mood/anxiety disorder, worsening of a medical disorder) also factor into decision-making [23-25]. The choice among various medications for insomnia is individualized based on a variety of factors, including patient age and comorbidities, type of insomnia complaint, side effect profiles, cost, and clinician and patient preference (algorithm 1). The choice of therapy, specific drugs, side effects, and risks are reviewed separately. (See "Pharmacotherapy for insomnia in adults", section on 'Drug selection'.)

Medications with regulatory approval for insomnia treatment span multiple classes and agents that can be categorized based on their mechanism of action or original indication: benzodiazepine receptor agonists (BZRAs, including benzodiazepines and nonbenzodiazepine BZRAs, such as zolpidem), histamine receptor antagonists (eg, low-dose doxepin), melatonin

receptor agonists (eg, ramelteon), and dual orexin receptor antagonists (eg, suvorexant) (table 8A-C).

Use of other sedating medications for insomnia should be considered for patients who do not have an adequate therapeutic response to first-line medications with regulatory approval for insomnia, when a different mechanism of action is desired, or when there is a specific reason to avoid BZRAs. Medications with sedating effects, such as trazodone and gabapentin, when used at much lower doses than those studied and approved for other indications, may represent a relatively safe alternative to BZRAs in selected patients, even if the evidence base for efficacy is not as robust.

FOLLOW-UP AND MONITORING

Response assessment — Insomnia is a clinical diagnosis, and therefore treatment response is based on history and patient self-report. A sleep diary (table 4A-B) is a valuable supplement to the history, as some patients may remember only the nights when they slept poorly.

Consumer wearable devices that report sleep parameters are increasingly popular and may be of some value, but only to compare sleep before and after treatment, as their accuracy for absolute sleep metrics is often poor. (See "Actigraphy in the evaluation of sleep disorders", section on 'Consumer wearable devices'.)

Follow-up after the first month of medication use is indicated if continued treatment is planned. Thereafter, follow-up at least every six months is recommended.

Poor response to initial therapy — In patients who fail insomnia treatment, it is important to discuss expectations of sleep, particularly in those with advanced age and comorbidities. In the presence of unreasonable expectations, all treatments have a high likelihood of failure.

Examination of sleep diaries for timing of sleep and duration of time in bed may demonstrate conditions that make optimal sleep unlikely (eg, excess time in bed, variable bedtimes or waking times) or that sleep has in fact improved. Similarly, persistent medical, sleep, or psychiatric disorders can reduce the efficacy of both CBT-I and medications, and these potential contributors should be reassessed. (See 'Perpetuating factors' above.)

Cognitive behavioral therapy for insomnia (CBT-I) requires discipline, perseverance, and a belief that counterintuitive behaviors (eg, reduction in time in bed, getting out of bed when not asleep) can be therapeutic. These factors contribute to suboptimal adherence to, and benefit from, CBT-I in some patients. In such cases, a trial of medication is often reasonable as second-

line therapy. Maintenance of as many of the components of CBT-I as possible remains important over time.

When medication treatments fail, clinicians should determine whether failure is due to lack of efficacy or treatment-emergent side effects. Both of these limitations can often be addressed by altering the dose, timing, or specific medication that is prescribed. This topic is reviewed in more detail separately. (See "Pharmacotherapy for insomnia in adults", section on 'Patients with inadequate response'.)

Tapering medications — Attempts to discontinue sedative medications are a valuable but difficult task, as patients may be reluctant to fix what is not broken and are very anxious about the return of sleeplessness. A supportive discussion about the patient's concerns and about the probability of successful discontinuation is recommended.

The duration of insomnia prior to medication treatment is the best predictor of the likelihood of continued need for medication. Nonetheless, approximately 75 percent of those with insomnia have symptoms for less than one year [26]. Conveying this message may be reassuring when patients are considering whether medication remains necessary.

CBT-I treatment is encouraged prior to medication taper to reinforce optimal sleep habits and manage dysfunctional thoughts that will often arise during the process. In general, a slow reduction in medication dose is the best approach, with roughly 25 percent reduction of the original dose each week [27]. For patients who have used a medication for sleep chronically, a taper over many months may be warranted, with allowance for as-needed use when first attempting to stop regular nightly use.

Reasons for subspecialty referral — Referral to a subspecialist is appropriate under the following circumstances:

- There is suspicion that a relevant comorbidity (medical, psychiatric, or sleep) is an important contributor to the insomnia and requires further expertise and management in that context.
- A patient is not responding to treatments that are generally effective for insomnia.

TREATMENT CONSIDERATIONS FOR SPECIFIC POPULATIONS

Patients with comorbid psychiatric disorders — At least one-third of patients with chronic insomnia have a psychiatric disorder, and, conversely, the majority of those with a psychiatric disorder have insomnia. Although it is worthwhile examining the temporal relationship between

the sleep disturbance and the psychiatric illness, establishing a clear causal relationship between the two is often difficult if not impossible. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), defines insomnia disorder as a distinct entity, encouraging independent diagnosis and treatment of insomnia in the context of psychiatric illness [28].

In the context of an untreated psychiatric disorder with substantial insomnia, treatment should be directed towards both sets of symptoms, both to reduce suffering and to enhance psychiatric treatment. For example, concurrent treatment of insomnia with eszopiclone in patients undergoing initial treatment of mood and anxiety disorders has been shown to enhance response time and overall efficacy for the underlying psychiatric illness [29,30].

Treatments that address both sets of symptoms (eg, sedating antidepressants) are often considered when insomnia is a prominent feature of a mood or anxiety disorder. However, the short-term advantages of this approach need to be weighed against the potential side effects (eg, weight gain with mirtazapine, dry mouth with most drugs, daytime sedation), considering that long-term use of the medication for the psychiatric disorder may be required. In addition, the doses of sedating antidepressants used for insomnia (eg, trazodone) are usually far from therapeutic from the standpoint of the mood disorder.

Mood and anxiety disorders — Treatment of mood and anxiety disorders with either pharmacotherapy or psychotherapy produces improvements in insomnia in most patients. However, persistent or treatment-emergent insomnia may occur even after improvement of the psychiatric illness in many patients. Sleep disturbance is the most common persistent symptom in treated depression and is a risk factor for recurrence of a mood episode in euthymic depressed or bipolar patients [31,32]. Treatment of insomnia in this context should be directed towards the presumed causes of the sleep disturbance, assessing the roles of persistent mood disorder, a comorbid sleep, medical or psychiatric disorder, behavioral factors, and the antidepressant medication itself [33]. (See 'Predisposing and precipitating factors' above and 'Perpetuating factors' above.)

The value of cognitive behavioral therapy for insomnia (CBT-I) in patients with mood disorders is unsettled. Initial studies suggested that adding this approach to psychiatric medications improved both sleep disturbance and the underlying depression or bipolar disorder [34,35]. However, subsequent studies, while confirming the benefits of CBT-I for insomnia in this context, have shown mixed results on outcomes related to psychiatric illness or suggest that the benefit for the mood disorder is independent of the effect on sleep [36-38]. There are few controlled data on the use of CBT-I in anxiety disorders comorbid with insomnia.

Posttraumatic stress disorder — Insomnia is nearly universal in patients with posttraumatic stress disorder (PTSD), consistent with the hypervigilance and nightmares that are diagnostic criteria for the disorder. Insomnia is also one of the most common persistent symptoms after evidence-based treatment for PTSD [39]. Consistent with general guidelines, CBT-I is considered first-line therapy for insomnia treatment in PTSD, and one controlled study demonstrated benefit of CBT-I for multiple sleep outcomes compared with a waitlist control group [40]. (See "Posttraumatic stress disorder in adults: Psychotherapy and psychosocial interventions".)

No controlled trials have specifically examined the use of pharmacotherapy to address insomnia in PTSD. However, the most commonly used medications for insomnia in PTSD are trazodone, prazosin, and nonbenzodiazepine benzodiazepine receptor agonists (BZRAs). Treatment of nightmares is discussed separately. (See "Nightmares and nightmare disorder in adults".)

Psychotic disorders — Insomnia is common and often multifactorial in patients with schizophrenia, both prior to and with treatment of the psychotic illness. Contributing factors may include the underlying psychotic disorder, erratic sleep schedules and suboptimal sleep environment, comorbidity with other sleep disorders (eg, sleep apnea), and comorbid psychiatric (eg, substance abuse/dependence) or medical illness.

Clinicians will often use sedating antipsychotics in such patients, either switching from an existing agent or as an adjunctive medication. Unfortunately, these medications have a propensity for weight gain and metabolic disturbances.

Small, controlled trials support the use of CBT-I or eszopiclone in the treatment of insomnia in schizophrenia [41,42]. In the eszopiclone trial, eight weeks of nightly treatment was associated with improvement in overall insomnia severity in patients with clinically stable schizophrenia [42].

Substance use disorders — Substance use disorders, like many other psychiatric disorders, have a bidirectional relationship with insomnia. Insomnia is a risk factor for substance abuse and occurs with increased frequency during active use and in early or late recovery [43,44]. Insomnia is also a risk factor for relapse.

As in other patients with chronic insomnia, use of CBT-I is preferred, particularly as patients with a substance use disorder may have "forgotten" how to initiate sleep without a sedative. Mastering CBT-I may provide confidence that sleep can be achieved using the body's own sleep drive [45,46]. Because CBT-I may take more time to become effective than medications, use of pharmacotherapy early in sobriety may be beneficial in selected patients. Gabapentin, trazodone, and quetiapine are commonly used in this setting. BZRAs are generally avoided due

to concerns about relapse, dependence, and the combined toxicity of BZRAs with alcohol and other substances.

The evaluation and treatment of insomnia in patients with a substance use disorder is reviewed in more detail separately. (See "Insomnia in patients with a substance use disorder".)

Older adults — Although insomnia symptoms related to sleep maintenance and achievement of restorative sleep become more prominent with age [26], the prevalence of insomnia disorder is reduced in older adults compared with younger adults, possibly because of decreased expectations of sleep, more flexible sleep hours, or changing role expectations [47].

Treatment of insomnia in older adults requires careful attention to the role of medical, neurologic, sleep, and psychiatric comorbidities. Vulnerability to side effects increases with age, and medications for insomnia often exacerbate existing age-related impairments such as gait instability, sedation, cognitive dysfunction, urinary and bowel dysfunction, and cardiac arrhythmias. Older adults may have slower drug metabolism, more drug-drug interactions, and thus maximum and next-day serum concentrations will be increased. (See "Pharmacotherapy for insomnia in adults", section on 'Special populations'.)

Due to these concerns, CBT-I is the treatment of choice in older adults with chronic insomnia. CBT-I has shown efficacy for sleep as well as depression outcomes in trials in older adults, both in individual and group settings [37,48,49]. CBT-I is well tolerated in this context. When time in bed restriction is used as part of CBT-I, attention to next-day sleepiness is warranted [50]. Other nonpharmacologic interventions that may help sleep in older adults include exercise and tai chi [51-54]. (See "Cognitive behavioral therapy for insomnia in adults" and "Physical activity and exercise in older adults".)

Pharmacotherapy in older adults with persistent insomnia should be individualized with increased awareness of the potential for drug interactions, altered metabolism, and side effects. These considerations are reviewed separately. (See "Pharmacotherapy for insomnia in adults", section on 'Special populations'.)

Hospitalized patients — Insomnia, whether acute or chronic, is commonly encountered in hospitalized patients. Sleep disturbances in the hospital are often multifactorial, and the initial approach should focus on optimizing the sleeping environment, reducing unnecessary nocturnal assessments, treating the underlying medical illness, minimizing stimulating or sleep-related side effects of concomitant medications, and using nonpharmacologic strategies to improve sleep. When pharmacotherapy is deemed necessary, selection of an agent should be individualized based on symptom severity, age, comorbidities, side effects, and drug-drug interactions. (See "Poor sleep and insomnia in hospitalized adults".)

Dementia and other neurodegenerative disorders — Many neurologic disorders are associated with insomnia, either as a result of dysfunction in central nervous system pathways that regulate sleep or as a consequence of pain, immobility, or respiratory dysfunction.

- **Alzheimer disease** – Insomnia is very common in Alzheimer disease (AD) and can manifest with disturbances in circadian timing of sleep, frequent awakenings, and nocturnal restlessness. Nonpharmacologic therapies are the mainstay of treatment. First-line approaches include treatment of comorbid medical and sleep disorders, adjustment of potentially sleep-disruptive medications, and behavioral approaches such as stability of the light-dark cycle and enhancement of social and physical activity during the day.

  There are few studies of medication treatments for insomnia in patients with AD, a population in which the risk of side effects is increased. Evaluation and management of sleep disturbances and sleep disorders in patients with AD and other forms of dementia are reviewed in more detail separately. (See "Sleep-wake disturbances and sleep disorders in patients with dementia".)

- **Parkinson disease** – Insomnia is also very common in Parkinson disease (PD), with primary motor symptoms of tremor, bradykinesia, and rigidity leading to impairments in sleep maintenance. Nonmotor symptoms such as depression, hallucinations, and nocturia can also contribute. A stepwise approach to evaluation and treatment of insomnia in patients with PD is presented separately. (See "Evaluation and treatment of insomnia, daytime sleepiness, and other sleep disorders in Parkinson disease", section on 'Insomnia'.)

Concussion and traumatic brain injury — Insomnia is reported by more than half of patients with traumatic brain injury and is especially common among those with milder injuries, including concussion. Circadian rhythm disturbances are also common and can be misattributed to insomnia. The approach to insomnia and other sleep disturbances in patients with traumatic brain injury is reviewed separately. (See "Sleep-wake disorders in patients with traumatic brain injury".)

Patients with comorbid sleep disorders

Obstructive sleep apnea — Insomnia and obstructive sleep apnea (OSA) are distinct sleep disorders that typically require independent treatment; however, they commonly co-occur. Approximately 15 percent of patients with insomnia have moderate to severe OSA, with higher rates in males, older adults, those who snore, and patients with metabolic syndrome, obesity, or daytime sleepiness [55]. Undiagnosed OSA is common among patients with insomnia complaints [56]. Roughly one-third of those with OSA have insomnia complaints, which are

actually more common than daytime sleepiness [57]. Comorbid insomnia also interferes with adherence to continuous positive airway pressure (CPAP) and has been associated with increased risk of hypertension, cardiovascular disease, and all-cause mortality compared with either condition alone [58].

There are a limited number of controlled trials of medications or CBT-I for treatment of insomnia in OSA, and the existing studies usually address untreated OSA. Concerns about exacerbation of respiratory status with use of BZRAs have limited their use in this context. However, short-term trials have demonstrated that neither benzodiazepines nor nonbenzodiazepine BZRAs worsen untreated, nonsevere OSA [59,60]; minimum oxygen saturation may be decreased with benzodiazepines in severe OSA.

Patients with mild to moderate sleep apnea benefit from insomnia treatment to a similar degree as those without sleep apnea [61]. Patients with insomnia may struggle more to adjust to sleep apnea treatments such as positive airway pressure (PAP) therapy than those without insomnia [62,63].

Limited prospective data suggest that CBT-I is an effective strategy for improving sleep as well as enhancing CPAP adherence in patients with insomnia and moderate to severe OSA [64-67]. Patients should be monitored closely for increased daytime sleepiness in the initial period of bedtime restriction therapy, if used. (See "Cognitive behavioral therapy for insomnia in adults", section on 'Precautions'.)

Short-term use of sedating medications appears to be safe as a means to improve CPAP adherence and potentially address underlying insomnia in patients with mild-moderate OSA [59]. In one trial, eszopiclone reduced the severity of sleep-disordered breathing and improved sleep during one to two nights of use [68,69]. CPAP treatment adherence and rates of CPAP discontinuation over the first two weeks of treatment also improved, although other studies have shown mixed results. (See "Assessing and managing nonadherence with continuous positive airway pressure (CPAP) for adults with obstructive sleep apnea", section on 'Pharmacological therapy'.)

Restless legs syndrome — Insomnia is nearly universal in patients presenting for treatment of restless legs syndrome (RLS). A single question such as "Do your legs bother you at night?" should be asked of all patients with insomnia to screen for RLS. In older adults, a very delayed sleep phase (eg, sleep onset at 4 AM) may be a clue to an underlying diagnosis of RLS. As with other insomnia contributors, addressing RLS is an important component of successful therapy for sleeplessness.

Gabapentinoids (eg, gabapentin, pregabalin) are preferred as initial agents for RLS in most patients, since long-term use of dopamine agonists commonly worsens the RLS ("augmentation" of symptoms) [70]. Serotonergic agents (eg, selective serotonin reuptake inhibitors, serotonin norepinephrine reuptake inhibitors, mirtazapine) can exacerbate RLS symptoms (table 9). (See "Management of restless legs syndrome and periodic limb movement disorder in adults".)

Of note, patients with RLS may be at increased risk for complex sleep-related behaviors with use of BZRAs such as zolpidem. Treatment-emergence of a sleep-related eating disorder, in particular, is sometimes a clue that a patient has underlying RLS that was not previously recognized. (See "Disorders of arousal from non-rapid eye movement sleep in adults", section on 'Sleep-related eating disorder'.)

Patients with comorbid medical conditions — Sleep disturbance is associated with a wide range of medical conditions. Cumulative number of medical conditions (multimorbidity) predicts rates of sleep disturbance as well as use of sedating medications, independent of age [71,72]. Optimal management of these conditions often improves sleep; however, insomnia may persist even with resolution of the medical condition or with partial, but maximal, medical management.

As bidirectional relationships exist among many medical conditions and insomnia, addressing insomnia may improve both the patient's medical status and their quality of life. Considerations in some of the more common medical comorbid conditions are reviewed in the sections below.

Pain — Pain is one of the most common causes of both acute and chronic insomnia. Sources of pain that may be especially likely to disrupt sleep are gastroesophageal, headache, musculoskeletal, and neuropathic.

Management of the pain is the primary method to improve sleep, and medications directed towards sleep should be reserved until maximal pain control is established. However, as sleeplessness most likely increases pain intensity and frequency, insomnia treatment is an important goal in optimal pain relief.

Many insomnia therapies (eg, CBT, sedating antidepressants, BZRAs, gabapentin/pregabalin) have overlapping indications for various pain syndromes and are reasonable choices in patients with pain for whom a secondary sleep benefit is desired [73].

Chronic lung disease — Over 25 percent of patients with chronic obstructive pulmonary disease (COPD) have insomnia disorder [74]. Contributing factors include cough, dyspnea,

medication use, comorbid sleep-related breathing disorders, and medical and psychiatric comorbidities.

Polysomnography (PSG) to exclude a sleep-related breathing disorder should be performed in patients who have anatomical risk factors of OSA (eg, obesity, upper airway crowding) and/or more severe overnight oxygen desaturation (or those with cyclical/sawtooth oxygenation), morning headaches after oxygen administration, obesity, or gastroesophageal reflux disease [75]. (See "Sleep-related breathing disorders in COPD".)

Studies on the treatment of insomnia in patients with COPD are limited. In the absence of sleep apnea identified on PSG, CBT-I is encouraged as first-line therapy. Medications are generally reserved for patients who have failed CBT-I, based on concerns about increased vulnerability to adverse effects on respiratory drive, diaphragmatic endurance, and oxygen saturation. Sedating antidepressants, melatonin, and gabapentin may be safer choices than BZRAs in most patients. BZRAs can be used in patients with normocapnic COPD, followed by overnight oximetry monitoring. In a systematic review of five small studies, BZRAs improved objective sleep measures but not subjective sleep in patients with COPD [76].

Renal failure — Insomnia is highly prevalent in patients with chronic kidney disease (CKD). Contributing factors may include pruritus, pain, nocturnal leg cramps, RLS, sleep apnea, comorbid medical illnesses, circadian rhythm alterations, and poor sleep hygiene. Overnight polysomnography should be performed if a sleep-related breathing disorder is suspected based on clinical symptoms (eg, excessive daytime sleepiness, snoring, witnessed apneas during sleep) and risk factors such as obesity and end-stage kidney disease (ESKD). (See "Sleep disorders in end-stage kidney disease", section on 'Sleep apnea'.)

There are no controlled data on CBT-I in patients with CKD, but supportive evidence in the general population is likely generalizable to these patients, who are at increased risk for altered drug clearance and adverse drug effects. Optimization of renal replacement therapy is an important consideration in patients with ESKD. (See "Sleep disorders in end-stage kidney disease", section on 'Treatment'.)

A few small studies have examined pharmacotherapy in patients with CKD. In short-term placebo-controlled studies, zolpidem, zaleplon, and clonazepam all improved sleep quality [77]. Melatonin improved sleep measures in a short-term, but not a one-year, study [78]. When medications are prescribed for sleep, initial low doses and slow upward titration are recommended. Drugs that are renally eliminated should be avoided (eg, gabapentin).

Pregnancy — Sleep disturbance increases during the course of pregnancy, affecting one-quarter of individuals in the first trimester to over two-thirds by the end of the third trimester

[79]. Common causes of insomnia also change over time, from nausea, urinary frequency, and backache early in pregnancy to fetal movements, heartburn, leg cramps, RLS, OSA, and physical limitations in achieving a comfortable position by the end of pregnancy. Although many pregnant individuals have disturbed sleep, most do not identify it as a disorder, possibly because they have prepared for it or recognize that it is time limited. Nevertheless, some patients do have more severe insomnia or are more severely disturbed by nighttime awakenings or associated daytime dysfunction.

RLS is important to recognize as it occurs with increased frequency as pregnancy progresses and often interferes with initiation of sleep. Often, the simple prompt "Do your legs bother you when you are lying down at night?" will facilitate diagnosis during pregnancy. Treatment options include oral or intravenous iron supplementation, nonpharmacologic therapies, and medications in selected patients. (See "Restless legs syndrome during pregnancy and lactation".)

There are few controlled data on treatment of insomnia in pregnancy [80]. Nonpharmacologic therapies are the safest option and are preferred over pharmacotherapy by most patients [81-83]. Several randomized trials support the efficacy of CBT-I in pregnancy using in-person or digital delivery methods [84-88].

Over-the-counter sedating antihistamines such as doxylamine or diphenhydramine can be used in patients who desire medication and have no alternative causes of sleeplessness that can be addressed more effectively (eg, RLS, gastroesophageal reflux) [89,90]. Other pharmacologic options, including BZRAs and sedating antidepressants, should generally be avoided as potential risks likely outweigh benefits. (See "Prenatal care: Patient education, health promotion, and safety of commonly used drugs", section on 'Difficulty sleeping'.)

Menopause — Females in the menopausal transition commonly report insomnia. Factors associated with insomnia include vasomotor symptoms (hot flashes and night sweats), reproductive hormonal changes themselves, an increase in obstructive sleep apnea prevalence, and increased risk of comorbid mood and medical disorders. (See "Clinical manifestations and diagnosis of menopause", section on 'Sleep disturbance'.)

Similar to the general population, CBT-I is an effective treatment for menopausal insomnia, both in patients with and without nocturnal hot flashes. In one trial, six-session individual CBT-I delivered by telephone was effective for both overall insomnia severity and difficulty falling and staying asleep (but not for total sleep time) in menopausal insomnia with hot flashes [91]. In another trial, face-to-face multimodality CBT-I and single-modality sleep-restriction therapy (SRT) were each more effective than sleep hygiene education among 150 postmenopausal

females with menopause-related chronic insomnia [92,93]. The degree of improvement on sleep outcome measures as well as depression and maladaptive thinking tended to be greatest with CBT-I, and there was trend towards greater insomnia remission rates with CBT-I over SRT.

For patients with hot flashes and sleep disturbances, improvements in sleep have also been observed with a range of pharmacotherapies including menopausal hormone therapy, venlafaxine, gabapentin, fluoxetine, eszopiclone, escitalopram, and suvorexant [94-96]. (See "Menopausal hot flashes", section on 'Management'.)

Yoga and exercise may be beneficial for sleep during the menopausal transition, although the effect size is likely to be small [97,98].

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Insomnia in adults".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topic (see "Patient education: Insomnia (The Basics)")
- Beyond the Basics topics (see "Patient education: Insomnia (Beyond the Basics)" and "Patient education: Insomnia treatments (Beyond the Basics)")

SUMMARY AND RECOMMENDATIONS

- **Pretreatment assessment** – Insomnia often has multiple etiologies (table 2). All patients should be evaluated for predisposing and precipitating factors (eg, depression, anxiety, pain), concomitant medications that may be interfering with sleep, and maladaptive cognitive and behavioral responses to sleeplessness (table 1 and table 3). (See 'Initial assessment and counseling' above.)

- **Short-term insomnia** – Short-term insomnia (<3 months) usually results from psychologic or physiologic stress and is often self-limited, lasting days to weeks.

  - For patients with mild or manageable levels of distress, we provide education on sleep hygiene (table 3), reassurance, and a plan for clinical follow-up. If insomnia persists at follow-up, we reassess level of distress and proceed as for chronic insomnia below. (See 'Approach to acute insomnia' above.)

  - When acute insomnia is severe or associated with substantial distress, we offer short-term use of an insomnia medication to help address immediate interference with daytime function and to control escalating anxiety about sleep (algorithm 1). Medication selection is reviewed separately. (See "Pharmacotherapy for insomnia in adults", section on 'Drug selection'.)

- **Chronic insomnia** – Patients with chronic insomnia (≥3 months) have persistent sleep difficulties that last months to years and often follow a waxing and waning course (table 10).

  - In most patients with chronic insomnia, we suggest cognitive behavioral therapy for insomnia (CBT-I) as first-line therapy, rather than medication (**Grade 2B**). CBT-I is more efficacious, avoids medication risks, and provides patients with lifelong skills. (See 'Overview of cognitive behavioral therapy' above.)

    In patients with severe distress (eg, deterioration in daytime function or excessive anxiety regarding sleeplessness), use of a medication in combination with CBT-I is reasonable, as this may enhance the patient's ability to follow sleep restriction and stimulus control aspects of CBT-I. (See 'Choice of initial therapy' above.)

  - When medications are used for chronic insomnia, selection should be individualized based on patient age and comorbidities, the type of insomnia complaint, side effect profiles, cost, and clinician and patient preference (algorithm 1 and table 8A-C). Safe prescribing practices may help mitigate common risks of insomnia medications (table 11). (See "Pharmacotherapy for insomnia in adults", section on 'Drug selection'.)

- **Follow-up and monitoring**
  - Patients on long-term pharmacotherapy should be seen at least every six months to reassess need for medication and reinforce optimal sleep habits. (See 'Response assessment' above.)
  - Attempts to discontinue sedative medications are a valuable but difficult task, as patients are anxious about the return of sleeplessness. To discontinue long-term therapy, taper slowly (eg, over many months), ideally in conjunction with CBT-I. (See 'Tapering medications' above.)
- **Special populations** – Special populations in whom additional treatment considerations arise include older adults, patients with comorbid psychiatric, neurologic, and sleep disorders, and those with medical comorbidities and conditions. (See 'Treatment considerations for specific populations' above.)

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Topic 97867 Version 26.0

GRAPHICS

Examples of predisposing, precipitating, and perpetuating factors in insomnia

Predisposing factors	Precipitating events	Perpetuating factors
Factors that increase risk for insomnia disorder	Events that lead to sleep disruption	Behavioral and cognitive factors that sustain poor sleep over time
▪ History of childhood or interpersonal trauma ▪ Chronic mental health conditions, depression, or anxiety ▪ History of shift work or erratic sleep-wake patterns ▪ Chronic pain conditions	▪ Severe accident leading to physical injury ▪ Divorce or death of a spouse or close family member ▪ Change in occupation such as loss of a job or transition to a new job	▪ Watching television in bed while trying to fall asleep ▪ Staying in bed for extended periods of time in an effort to obtain more sleep or taking long naps during the day ▪ Anxiety and worry about sleep loss

Adapted from: Martin JL, Badr MS, Zeineddine S. Sleep Disorders in Women Veterans. Sleep Med Clin 2018; 13:433.

Graphic 122747 Version 1.0

Risk factors and comorbidities of chronic insomnia in adults

Psychiatric conditions	Medical conditions	Neurological conditions	Medications and substances	Other disor
▪ Depression ▪ Anxiety ▪ Substance use disorders ▪ Posttraumatic stress disorder ▪ Bipolar disorder ▪ Psychotic disorders ▪ Eating disorders	▪ Pulmonary • Chronic obstructive pulmonary disease • Asthma ▪ Musculoskeletal • Arthritis • Fibromyalgia • Chronic pain ▪ Cardiovascular • Heart failure • Ischemic heart disease • Nocturnal angina • Hypertension ▪ Endocrinologic • Hyperthyroidism ▪ Urinary • Nocturia ▪ Gastrointestinal • Gastroesophageal reflux ▪ Diabetes ▪ Cancer ▪ Pregnancy ▪ Menopause ▪ Lyme disease ▪ Human immunodeficiency virus (HIV) infection ▪ Myalgic encephalomyelitis/chronic fatigue syndrome ▪ Dermatologic (eg, pruritus)	▪ Neurodegenerative diseases (eg, Alzheimer dementia, Parkinson disease) ▪ Neuromuscular disorders including painful peripheral neuropathies ▪ Cerebral hemispheric and brainstem strokes ▪ Brain tumors ▪ Traumatic brain injury ▪ Headache syndromes (eg, migraine, cluster, hypnic headache, and exploding head syndromes) ▪ Fatal familial insomnia	▪ Central nervous system stimulants ▪ Central nervous system depressants ▪ Bronchodilators ▪ Antidepressants ▪ Beta antagonists ▪ Diuretics ▪ Glucocorticoids ▪ Caffeine ▪ Alcohol	▪ Res syn ▪ Per mo dis ▪ Sle bre dis ▪ Cir rhy sle dis • • • • • •

Sleep hygiene guidelines

Recommendation	Details
Regular bedtime and rise time	Having a consistent bedtime and rise time leads to more regular sleep schedules and avoids periods of sleep deprivation or periods of extended wakefulness during the night.
Avoid napping	Avoid napping, especially naps lasting longer than 1 hour and naps late in the day.
Limit caffeine	Avoid caffeine after lunch. The time between lunch and bedtime represents approximately 2 half-lives for caffeine, and this time window allows for most caffeine to be metabolized before bedtime.
Limit alcohol	Recommendations are typically focused on avoiding alcohol near bedtime. Alcohol is initially sedating, but activating as it is metabolized. Alcohol also negatively impacts sleep architecture.
Avoid nicotine	Nicotine is a stimulant and should be avoided near bedtime and at night.
Exercise	Daytime physical activity is encouraged, in particular, 4 to 6 hours before bedtime, as this may facilitate sleep onset. Rigorous exercise within 2 hours of bedtime is discouraged.
Keep the sleep environment quiet and dark	Noise and light exposure during the night can disrupt sleep. White noise or ear plugs are often recommended to reduce noise. Using blackout shades or an eye mask is commonly recommended to reduce light. This may also include avoiding exposure to television or technology near bedtime, as this can have an impact on circadian rhythms by shifting sleep timing later.
Bedroom clock	Avoid checking the time at night. This includes alarm clocks and other time pieces (eg, watches and smart phones). Checking the time increases cognitive arousal and prolongs wakefulness.
Evening eating	Avoid a large meal close to bedtime. Eat a healthy and filling (but not too heavy) meal in the early evening and avoid late-night snacks.

Graphic 122804 Version 4.0

Consensus Sleep Diary

Sample ID/Name: ___________

Today's date	4/5/11						
1. What time did you get into bed?	10:15 PM						
2. What time did you try to go to sleep?	11:30 PM						
3. How long did it take you to fall asleep?	55 min						
4. How many times did you wake up, not counting your final awakening?	6 times						
5. In total, how long did these awakenings last?	2 hours 5 min						
6a. What time was your final awakening?	6:35 AM						
6b. After your final awakening, how long did you spend in bed trying to sleep?	45 min						
6c. Did you wake up earlier than you planned?	☒ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
6d. If yes, how much earlier?	1 hour						
7. What time did you get out of bed for the day?	7:20 AM						
8. In total, how long did you sleep?	4 hours 10 min						
9. How would you rate the quality of your sleep?	☐ Very poor ☒ Poor ☐ Fair ☐ Good ☐ Very good	☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good	☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good	☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good	☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good	☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good	☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good
10. How rested or refreshed did you feel when you woke up for the day?	☐ Not at all rested ☒ Slightly rested ☐ Somewhat rested ☐ Well-rested ☐ Very well-rested	☐ Not at all rested ☐ Slightly rested ☐ Somewhat rested ☐ Well-rested ☐ Very well-rested	☐ Not at all rested ☐ Slightly rested ☐ Somewhat rested ☐ Well-rested ☐ Very well-rested	☐ Not at all rested ☐ Slightly rested ☐ Somewhat rested ☐ Well-rested ☐ Very well-rested	☐ Not at all rested ☐ Slightly rested ☐ Somewhat rested ☐ Well-rested ☐ Very well-rested	☐ Not at all rested ☐ Slightly rested ☐ Somewhat rested ☐ Well-rested ☐ Very well-rested	☐ Not at all rested ☐ Slightly rested ☐ Somewhat rested ☐ Well-rested ☐ Very well-rested
11a. How many times did you nap or doze?	2 times						
11b. In total, how long did you nap or doze?	1 hour 10 min						
12a. How many drinks containing alcohol did you have?	3 drinks						
12b. What time was your last drink?	9:20 PM						
13a. How many caffeinated drinks (coffee, tea, soda, energy drinks) did you have?	2 drinks						
13b. What time was your last drink?	9:20 PM						
14. Did you take any over-the-counter or prescription medication(s) to help you sleep? If so, list medication(s) dose, and time taken	☒ Yes ☐ No Medication(s): Relaxo-Herb Dose: 50 mg Time(s) taken: 11 PM	☐ Yes ☐ No Medication(s): Dose: Time(s) taken:	☐ Yes ☐ No Medication(s): Dose: Time(s) taken:	☐ Yes ☐ No Medication(s): Dose: Time(s) taken:	☐ Yes ☐ No Medication(s): Dose: Time(s) taken:	☐ Yes ☐ No Medication(s): Dose: Time(s) taken:	☐ Yes ☐ No Medication(s): Dose: Time(s) taken:
15. Comments (if applicable)	I have a cold						

Questions 1 through 10 are to be completed within one hour of getting out of bed in the morning. Question 15 are to be completed before bed.

Graphic 87134 Version 7.0

Consensus Sleep Diary instructions

General instructions

What is a sleep diary?

A sleep diary is designed to gather information about your daily sleep pattern.

How often and when do I fill out the sleep diary?

It is necessary for you to complete your sleep diary every day. If possible, the sleep diary should be completed within one hour of getting out of bed in the morning.

What should I do if I miss a day?

If you forget to fill in the diary or are unable to finish it, leave the diary blank for that day.

What if something unusual affects my sleep or how I feel in the daytime?

If your sleep or daytime functioning is affected by some unusual event (such as an illness or an emergency), you may make brief notes on your diary.

What do the words "bed" and "day" mean on the diary?

This diary can be used for people who are awake or asleep at unusual times. In the sleep diary, the word "day" is the time when you choose or are required to be awake. The term "bed" means the place where you usually sleep.

Will answering these questions about my sleep keep me awake?

This is not usually a problem. You should not worry about giving exact times, and you should not watch the clock. Just give your best estimate.

Sleep diary item instructions

Use the guide below to clarify what is being asked for each item of the sleep diary.

Date: Write the date of the morning you are filling out the diary.

1. What time did you get into bed?

Write the time that you got into bed. This may not be the time you began "trying" to fall asleep.

2. What time did you try to go to sleep?

Record the time that you began "trying" to fall asleep.

3. How long did it take you to fall asleep?

Beginning at the time you wrote in question 2, how long did it take you to fall asleep?

4. How many times did you wake up, not counting your final awakening?

How many times did you wake up between the time you first fell asleep and your final awakening?

5. In total, how long did these awakenings last?

What was the total time you were awake between the time you first fell asleep and your final awakening? For example, if you woke 3 times for 20 minutes, 35 minutes, and 15 minutes, add

them all up (20 + 35 + 15 = 70 minutes or 1 hour and 10 minutes).

6a. What time was your final awakening?

Record the last time you woke up in the morning.

6b. After your final awakening, how long did you spend in bed trying to sleep?

After the last time you woke up (item #6a), how many minutes did you spend in bed trying to sleep? For example, if you woke up at 8:00 AM but continued to try and sleep until 9:00 AM, record 1 hour.

6c. Did you wake up earlier than you planned?

If you woke up or were awakened earlier than you planned, check yes. If you woke up at your planned time, check no.

6d. If yes, how much earlier?

If you answered "yes" to question 6c, write the number of minutes you woke up earlier than you had planned on waking up. For example, if you woke up 15 minutes before the alarm went off, record 15 minutes here.

7. What time did you get out of bed for the day?

What time did you get out of bed with no further attempt at sleeping? This may be different from your final awakening time (eg, you may have woken up at 6:35 AM but did not get out of bed to start your day until 7:20 AM).

8. In total, how long did you sleep?

This should just be your best estimate, based on when you went to bed and woke up, how long it took you to fall asleep, and how long you were awake. You do not need to calculate this by adding and subtracting; just give your best estimate.

9. How would you rate the quality of your sleep?

"Sleep quality" is your sense of whether your sleep was good or poor.

10. How restful or refreshed did you feel when you woke up for the day?

This refers to how you felt after you were done sleeping for the night, during the first few minutes that you were awake.

11a. How many times did you nap or doze?

A nap is a time you decided to sleep during the day, whether in bed or not in bed. "Dozing" is a time you may have nodded off for a few minutes, without meaning to, such as while watching TV. Count all the times you napped or dozed at any time from when you first got out of bed in the morning until you got into bed again at night.

11b. In total, how long did you nap or doze?

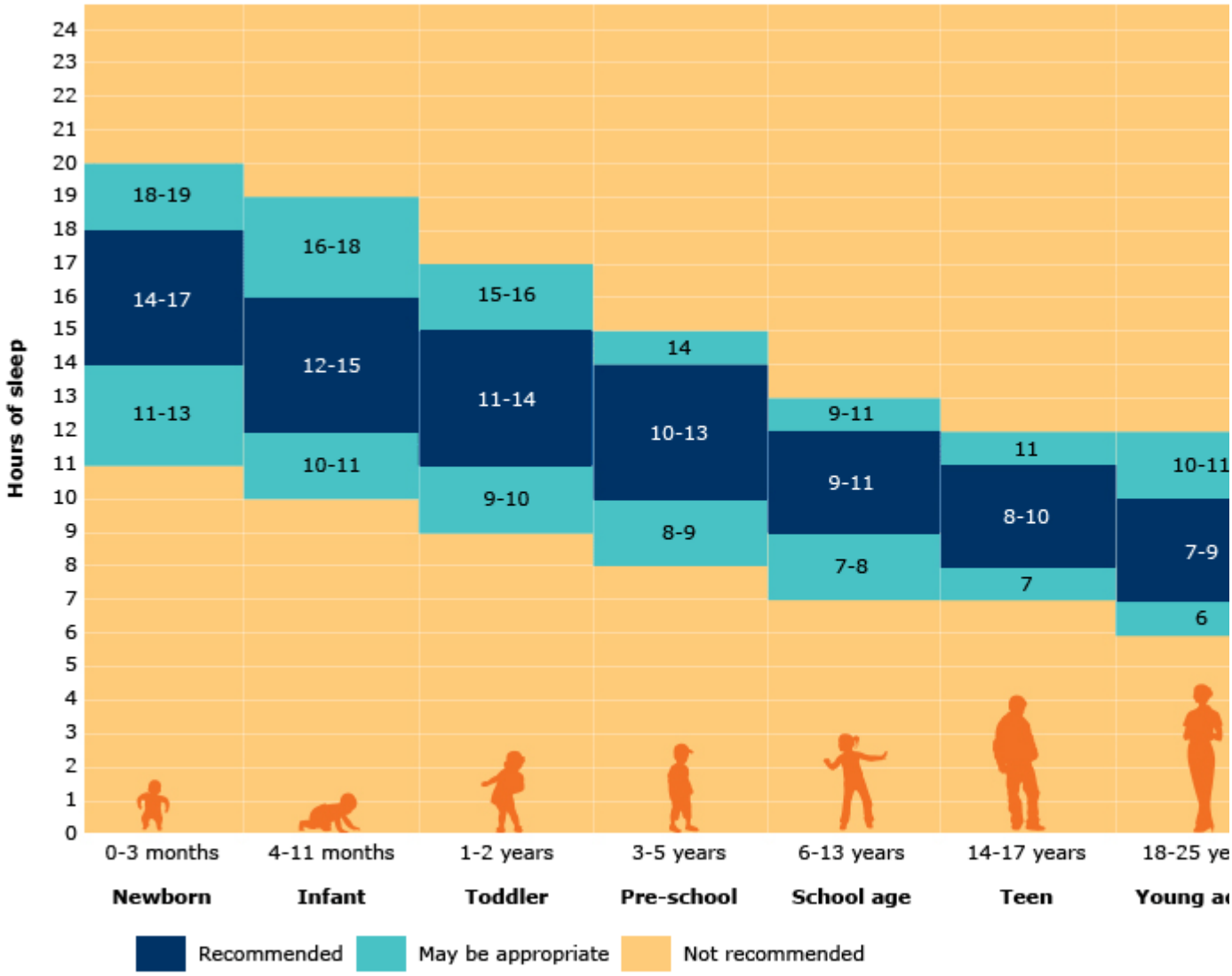
Estimate the total amount of time you spent napping or dozing, in hours and minutes. For instance, if you napped twice, once for 30 minutes and once for 60 minutes, and dozed for 10 minutes, you would answer "1 hour 40 minutes." If you did not nap or doze, write "N/A" (not applicable).

12a. How many drinks containing alcohol did you have?

Enter the number of alcoholic drinks you had where 1 drink is defined as one 12 oz beer (can), 5 oz wine, or 1.5 oz liquor (one shot).
12b. What time was your last drink? If you had an alcoholic drink yesterday, enter the time of day in hours and minutes of your last drink. If you did not have a drink, write "N/A" (not applicable).
13a. How many caffeinated drinks (coffee, tea, soda, energy drinks) did you have? Enter the number of caffeinated drinks (coffee, tea, soda, energy drinks) you had where for coffee and tea, one drink = 6 to 8 oz, while for caffeinated soda one drink = 12 oz.
13b. What time was your last caffeinated drink? If you had a caffeinated drink, enter the time of day in hours and minutes of your last drink. If you did not have a caffeinated drink, write "N/A" (not applicable).
14. Did you take any over-the-counter or prescription medication(s) to help you sleep? If so, list medication(s), dose, and time taken: List the medication name, how much and when you took EACH different medication you took tonight to help you sleep. Include medication available over the counter, prescription medications, and herbals (example: "Sleepwell 50 mg 11:00 PM"). If every night is the same, write "same" after the first day.
15. Comments: If you have anything that you would like to say that is relevant to your sleep, feel free to write it here.

Graphic 87859 Version 6.0

Sleep duration recommendations by age from the National Sleep Foundation*



* These recommendations are very similar, but not identical to those from the American Academy of Sleep M

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1. *Paruthi S, Brooks LJ, D'Ambrosio C, et al. Recommended amount of sleep for pediatric populations: A statement of the Medicine. J Clin Sleep Med 2016; 12:785.*
2. *Consensus Conference Panel, Watson NF, Badr MS, et al. Recommended amount of sleep for a healthy adult: A Joint C Academy of Sleep Medicine and Sleep Research Society. J Clin Sleep Med 2015; 11:591.*

Graphic 106597 Version 3.0

Sleep restriction therapy for chronic insomnia (conducted over multiple visits)*

Step 1:	Patient maintains a daily sleep diary for 1 to 2 weeks. Average total sleep time and sleep efficiency are computed from the information on the sleep diary¶.
Step 2:	If sleep efficiency is below 85%, the time in bed window (ie, elapsed time from bedtime to rise time) is set to equal the number of hours of sleep based on the sleep diary but not less than 6 hours, with a consistent bedtime and rise time each day. The patient is instructed not to nap during the day. The patient continues to keep a sleep diary until the next visit.
Step 3:	Average total sleep time and sleep efficiency are computed from the information on the sleep diary, and one of the following steps is taken: A. If sleep efficiency is >90% and the patient does not feel sufficiently rested, the time in bed window is increased, typically by 15 minutes. B. If sleep efficiency is between 85 to 90%, the sleep schedule is maintained. C. If sleep efficiency is <85% and the patient does not feel sleepy, the time in bed window is shortened by 15 minutes. The patient continues to keep a sleep diary until the next visit.
Step 4:	Step 3 is repeated until sleep quality is satisfactory (refer to step 3A above) and the patient feels sufficiently rested during the day.

* Sleep restriction therapy is also sometimes referred to as "time in bed restriction" or "sleep efficiency training."

¶ Sleep efficiency is the time asleep divided by time in bed × 100.

Graphic 122801 Version 3.0

Stimulus control instructions for chronic insomnia

1. Go to bed only when sleepy.
2. Use the bed and bedroom only for sleep (and sex).
3. If you are in bed and unable to sleep, get out of bed and return only when sleepy. Typically, this is within 20 minutes.
4. Get up at the same time in the morning regardless of how much sleep was obtained.
5. Do not nap during the day.

Graphic 122803 Version 1.0

Breathing with your diaphragm

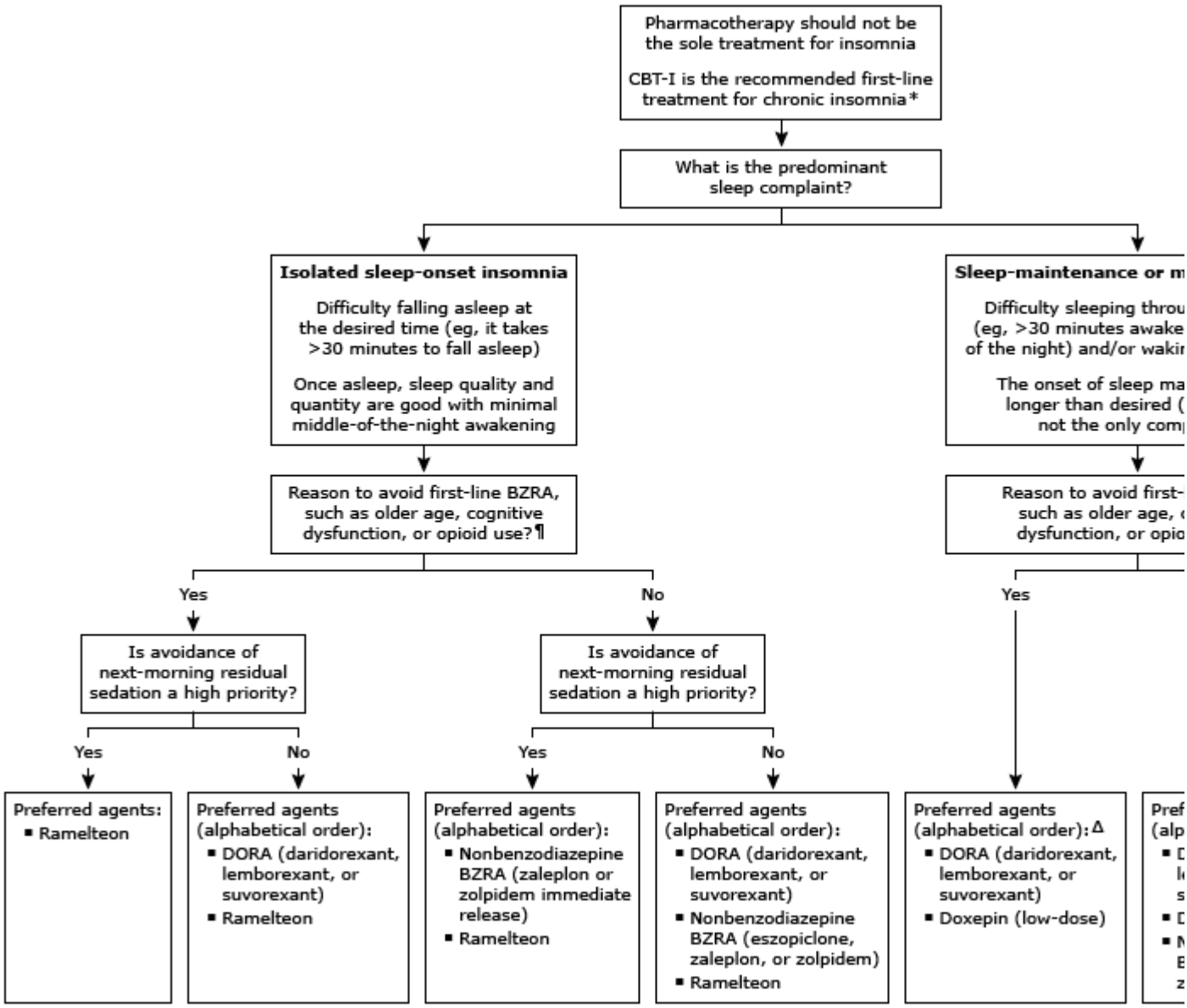
NOTE: Before using this type of breathing to help with sleep, practice it daily until it becomes easy to get into a relaxed state. It might help to write down each time you practice, so you can keep track.

- Wear comfortable clothing.
- Sit in a comfortable chair with both feet on the floor.
- Place one hand at the top of your chest and the other on your belly with your little finger about 1 inch above your belly button.
- Breathe slowly through your nose using **only** your diaphragm. Try not to use your chest muscles at all. When you are doing this correctly:
  - Your belly should swell out as you breathe in, and fall back in as you breathe out.
  - Only your lower hand (on your belly) should move.
- Once you are breathing only with your diaphragm, start counting your breaths:
  - Count each time you breathe in, then think the word "out" as you breathe out (think "1, out," "2, out," "3, out...").
  - Do this for a total of 10 breaths counting forward from 1 to 10. Then do another 10 breaths counting backward from 10 to 1.
- Breathe at your own pace. Try not to breathe faster or slower than normal. Concentrate on using only your diaphragm.
- When you are done counting breaths, let your hands rest in your lap or at your side for a minute while you breathe normally. Then get up slowly.

Relaxation practice log:

Date	Time	Notes

Medication selection for insomnia in adults



CBT-I: cognitive behavioral therapy for insomnia; DORA: dual orexin receptor antagonist; BZRA: benzodiazep agonist.

* When used, medications should be part of a holistic approach that includes healthy sleep habits, adequate sleep, treatment of relevant comorbidities, and CBT-I when appropriate and available. Treatment selection is based on the nature of the insomnia symptoms, past treatment responses, medication availability and cost, comorbidities, and patient preferences. Duration of effect varies based on elimination half-life, patient age, factors. Refer to UpToDate topic and tables for dosing and administration details.

¶ BZRAs include benzodiazepines and nonbenzodiazepine BZRAs such as zolpidem. Among the benzodiazep approved for insomnia that may be used as second-line therapies, temazepam has the most favorable safet

Δ All patients should be aware of the risk of next morning sedation with insomnia medications. Agents with for sleep onset and sleep maintenance difficulties (eg, DORAs, zolpidem extended release, eszopiclone, zopi higher risk of next-morning residual sedation than other first-line agents such as doxepin.

Graphic 129521 Version 5.0

Benzodiazepines in the management of insomnia in adults

Benzodiazepine	Clinical use*	Adult dose (usual)¶	Dose in older adults (≥65 years)	Half-life (hours)	Potential for drug interactionsΔ
Estazolam	Sleep onset or sleep maintenance insomnia	1 to 2 mg	0.5 mg	Intermediate (10 to 24)	CYP3A4 to minimally active metabolite.
Flurazepam	Sleep onset or sleep maintenance insomnia	15 to 30 mg	15 mg	Long (40 to 114; 120 to 160 older adults)	Non-CYP glucuronidation in liver. Active metabolite.
Temazepam	Sleep onset or sleep maintenance insomnia	7.5 to 30 mg	7.5 to 15 mg	Intermediate (8 to 15)	Primarily non-CYP glucuronidation in liver to inactive metabolites. CYP3A4 to active metabolite (minor pathway, clinically insignificant).
Triazolam	Sleep onset insomnia	0.125 to 0.25 mg	0.125 to 0.25 mg	Short (2 to 5)	CYP3A4. No active metabolite.
Quazepam	Sleep onset or sleep maintenance insomnia	7.5 to 15 mg	7.5 mg	Long (39)	CYP3A4, CYP2C9/19. Active metabolites.

* Appropriate clinical uses may differ from the US Food and Drug Administration (FDA)-approved indication(s) for a given drug.

¶ Initiate treatment using lowest dose shown for those with low body weight, debilitated patients, and those receiving treatment with opioid analgesics or other central nervous system or cardiorespiratory depressants.

Δ For specific drug interactions, including management recommendations and combinations that should be avoided, use Lexi-Interact drug interactions program included with UpToDate.

Graphic 117509 Version 5.0

Nonbenzodiazepine benzodiazepine receptor agonists (BZRAs) in the management of insomnia in adults

Nonbenzodiazepine	Clinical use*	Preparations	Adult dose (initial)¶	Adult dose (max)	Dose in older adults (≥65 years)	Half-lif (hours
Eszopiclone	Sleep onset or sleep maintenance insomnia	Tablet	1 mg	3 mg	1 to 2 mg	Intermedi (6)
Zaleplon	Sleep onset insomnia	Capsule	5 mg	20 mg	5 mg	Short (1)
Zolpidem	Sleep onset or sleep maintenance insomnia	Tablet, capsule, sublingual tablet (5 mg or 10 mg), oral liquid (5 mg per spray)	Males 5 to 10 mg Females 5 mg	10 mg	5 mg	Short (1.4 4.5)
Zolpidem extended release	Sleep onset or sleep maintenance insomnia	Coated tablet	Males 6.25 to 12.5 mg Females 6.25 mg	12.5 mg	6.25 mg	Intermedi (1.6 to 4◇
Zolpidem middle of the night (fast-acting, low dose)	Sleep maintenance insomnia (middle of the night)	Sublingual tablet (1.75 mg or 3.5 mg)	Males 3.5 mg Females 1.75 mg	3.5 mg	1.75 mg	Short (1.4 4.5)
Zopiclone (not available in the United States)	Sleep onset or sleep maintenance insomnia	Tablet	3.75 mg	7.5 mg	3.75 mg	Intermedi (5 to 7)

* Appropriate clinical uses may differ from the US Food and Drug Administration (FDA)-approved indication(s) for a given drug.

¶ Initiate treatment using lowest dose shown for those with low body weight, debilitated patients, and those receiving treatment with opioid analgesics or other central nervous system or cardiorespiratory depressants.

Δ For specific drug interactions, including management recommendations and combinations that should be avoided, use Lexi-Interact drug interactions program included with UpToDate.

◇ Duration of effect longer than predicted by half-life due to sustained release.

Graphic 117510 Version 8.0

Other drugs for the management of insomnia in adults

Other drugs	Mechanism of action	Clinical use*	Adult dose (usual)	Dose in older adults (≥65 years)	Half-life (hours)	Potential for drug interactions¶
Doxepin	Histamine H1 receptor antagonism[Δ]	Sleep maintenance insomnia	3 to 10 mg[◇]	3 to 6 mg	Long (15 drug; 31 active metabolite)	▪ Moderate ▪ Doxepin clearance is largely dependent on CYP2D6 ▪ Avoid use within two weeks of MAOI administration
Ramelteon	Melatonin receptor agonist	Sleep onset insomnia	8 mg	8 mg	Short (1 to 2.6 drug; 2 to 5 active metabolite)	▪ Moderate ▪ Ramelteon clearance is largely dependent on CYP1A2 and CYP2C9
Lemborexant	Dual orexin receptor antagonist (DORA)	Sleep onset or sleep maintenance insomnia	5 to 10 mg	5 mg	Long (17 to 19)	▪ Significant drug interactions ▪ Lemborexant clearance is dependent on CYP3A4 ▪ If used in combination with mild inhibitors of CYP3A4, recommended dose is 5 mg ▪ Avoid use of lemborexant with moderate

						and strong inhibitors and inducers of CYP3A4
Suvorexant	DORA	Sleep onset or sleep maintenance insomnia	10 to 20 mg	10 to 15 mg	Intermediate (12)	▪ Significant drug interactions ▪ Suvorexant clearance is largely dependent on CYP3A ▪ If used in combination with moderate inhibitors of CYP3A, recommended dose is 5 mg; may increase to 10 mg ▪ Avoid use of suvorexant with strong inhibitors or inducers of CYP3A
Daridorexant	DORA	Sleep onset or sleep maintenance insomnia	25 to 50 mg	25 to 50 mg	Intermediate (8)	▪ Significant drug interactions ▪ Daridorexant clearance is largely dependent on CYP3A ▪ If used in combination with moderate inhibitors of CYP3A, recommended dose is 25 mg ▪ Avoid use of daridorexant with strong inhibitors or moderate/strong

						inducers of CYP3A
Trazodone[§]	Serotonin 5-HT2A, alpha-1 adrenergic, and histamine H1 receptor antagonism[Δ]	Sleep onset or sleep maintenance insomnia	50 to 100 mg	25 to 100 mg	Intermediate (10 to 12)	▪ Moderate ▪ Trazodone is metabolized by CYP3A4 to an active metabolite; use with caution in combination with other serotonergic drugs

Dosing in this table is for adult patients with normal organ (eg, kidney, liver) function. For dosage adjustments, refer to Lexicomp drug information included with UpToDate.

CYP: cytochrome P450; MAOI: monoamine oxidase inhibitor; FDA: US Food and Drug Administration.

* Appropriate clinical uses may differ from the FDA-approved indication(s) for a given drug.

¶ For specific drug interactions, including management recommendations and combinations that should be avoided, use Lexi-Interact drug interactions program included with UpToDate.

Δ Although classified as antidepressants, these drugs are not therapeutic for treating depression at the doses used for insomnia.

◇ FDA-approved for insomnia at doses of 3 and 6 mg daily using tablet formulation.

§ Not approved by the FDA for insomnia indication.

Graphic 117512 Version 10.0

Drugs that can worsen symptoms of restless legs syndrome (RLS)

Alcohol, caffeine
Antidepressants (except bupropion)
Antipsychotics
Dopamine-blocking antiemetics (eg, metoclopramide)
Centrally-acting antihistamines (eg, diphenhydramine)

Graphic 88603 Version 5.0

International Classification of Sleep Disorders, third edition (ICSD-3) diagnostic criteria for chronic insomnia disorder

Diagnostic criteria A-F must be met:	
A	The patient reports, or the patient's parent or caregiver observes, one or more of the following: ▪ Difficulty initiating sleep* ▪ Difficulty maintaining sleep¶ ▪ Waking up earlier than desiredΔ ▪ Resistance to going to bed on appropriate schedule ▪ Difficulty sleeping without parent or caregiver intervention
B	The patient reports, or the patient's parent or caregiver observes, one or more of the following related to the nighttime sleep difficulty: ▪ Fatigue/malaise ▪ Attention, concentration, or memory impairment ▪ Impaired social, family, occupational, or academic performance ▪ Mood disturbance/irritability ▪ Daytime sleepiness ▪ Behavioral problems (eg, hyperactivity, impulsivity, aggression) ▪ Reduced motivation/energy/initiative ▪ Proneness to errors/accidents ▪ Concerns about or dissatisfaction with sleep
C	The reported sleep-wake complaints cannot be explained purely by inadequate opportunity (ie, enough time is allotted for sleep) or inadequate circumstances (ie, the environment is safe, dark, quiet, and comfortable) for sleep
D	The sleep disturbance and associated daytime symptoms occur at least three times per week
E	The sleep disturbance and associated daytime symptoms have been present for at least three months
F	The sleep/wake difficulty is not better explained by another sleep disorder

* In general, delays of >20 minutes for children and young adults and >30 minutes for middle-aged and older adults are considered clinically significant.

¶ In general, periods of awakening in the middle of the night of >20 minutes for children and young adults and >30 minutes for middle-aged and older adults are considered clinically significant.

Δ In general, waking up >30 minutes before normal awakening time is considered clinically significant.

Graphic 117710 Version 2.0

Safe medication prescribing practices for insomnia*

▪ Prescribe the lowest possible effective dose
▪ Avoid prescribing a dose greater than the maximum recommended dose
▪ Avoid providing refills until continued need, efficacy, and tolerability are established
▪ Avoid combining with alcohol or other sedatives, including opioids
▪ Use increased caution in older adults and patients with renal and liver dysfunction
▪ In patients with comorbid depression, assess for suicidal ideation before prescribing and if present, monitor closely while considering other treatment options
▪ Instruct patients on proper timing of the drug in relation to desired sleep onset
▪ Instruct patients on drug half-life and expected duration of effect
▪ Advise against use if there is insufficient time for drug elimination between planned bedtime and rise time
▪ Discuss risk of next-day impairment in alertness, memory, coordination, and driving
▪ Discuss risk of complex sleep-related behaviors such as sleep walking, eating, and driving
▪ Schedule regular follow-up to review efficacy, side effects, non-pharmacologic options, and assess ongoing need for medication

* For detailed prescribing information, clinicians should refer to the individual drug information topics within UpToDate. Comprehensive information on drug-drug interactions can be determined using the drug interactions tool (Lexi-Interact online). This tool can be accessed from the UpToDate online search page or through the individual drug information topics in the section on Drug interactions.

Adapted from: McCall WV, Benca RM, Rosenquist PB, et al. Hypnotic medications and suicide: Risk, mechanisms, mitigation, and the FDA. Am J Psychiatry 2017; 174:18.

Graphic 113191 Version 4.0

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