

#### INTRODUCTION

- Narcolepsy is a **lifelong** neurological sleep disorder of **hypersomnia** characterized by excessive daytime sleepiness (EDS) and intermittent manifestations of rapid eye movement (REM) sleep during wakefulness. Excessive sleepiness is defined by the International Classification of Sleep Disorders, third edition (ICSD-3) as “daily episodes of an irrepressible need to sleep or daytime lapses into sleep” (**Sateia 2014**).
- Patients with narcolepsy often have many nighttime arousals and sleep disturbances that contribute to excessive drowsiness during the day. EDS can vary in severity, and some patients involuntarily fall asleep during normal daily activities. This can put the patient or others at risk if these daytime lapses into sleep occur during activities such as operating a motor vehicle. While all patients with narcolepsy experience EDS, additional symptoms may include cataplexy, which is the sudden and complete loss of muscle tone, dream-like images or hallucinations at sleep onset or awakening, and sleep paralysis (*National Institute of Neurological Disorders and Stroke [NINDS] 2017, Scammell 2019*).
- The ICSD-3 establishes 2 subtypes of narcolepsy: narcolepsy type 1 and narcolepsy type 2. Patients are diagnosed with narcolepsy type 1 if they have 1 or both of the following: (1) a cerebrospinal fluid (CSF) hypocretin-1 deficiency; (2) clear cataplexy and a mean sleep latency of < 8 minutes on the multiple sleep latency test (MSLT) with evidence of 2 sleep-onset rapid-eye movement periods (SOREMPs), one of which may be seen on a preceding overnight polysomnogram. A diagnosis of narcolepsy type 2 also requires a mean sleep latency of < 8 minutes on the MSLT and at least 2 SOREMPs, but cataplexy must be absent and CSF hypocretin-1 levels must not meet the type 1 criterion (**Sateia 2014**).
- Narcolepsy affects males and females equally. While symptoms typically begin to present in the teens or early twenties, they can occur at any time throughout a patients' life (*NINDS 2017, Scammell 2019*). It is estimated that approximately 135,000 to 200,000 people in the United States (US) are diagnosed with narcolepsy; however, this number may actually be higher as many patients often go undiagnosed (*NINDS 2017*). Narcolepsy is a chronic condition, but does not typically get worse over time. There is no cure for narcolepsy but there are pharmacological and nonpharmacological options that can be implemented to help patients manage their symptoms. The goal of therapy is to mitigate symptoms in order to improve the patient's quality of life (*Morgenthaler et al 2007a, NINDS 2017*).
- This review will focus on 2 wakefulness promoting agents, modafinil (Provigil) and armodafinil (Nuvigil), 1 central nervous system (CNS) **depressant** agent, sodium oxybate (Xyrem), and **1 dopamine norepinephrine reuptake inhibitor (DNRI), solriamfetol (Sunosi)**. These **4** medications are approved by the US Food and Drug Administration (FDA) for the symptomatic treatment of narcolepsy. There are several **amphetamine-like** stimulant medications indicated for the treatment of narcolepsy; however, they will not be covered in this review.
- Modafinil and armodafinil (the longer half-life R-enantiomer of modafinil) are both FDA-approved to improve wakefulness in adult patients with excessive sleepiness associated with narcolepsy, obstructive sleep apnea (OSA), and shift work disorder (SWD). OSA is a sleep disorder that is characterized by obstructive apneas and hypopneas, causing patients to have frequent sleep interruptions due to increased respiratory effort. Often, patients do not feel rested in the morning and continue to have excessive sleepiness throughout the day (*American Academy of Sleep Medicine [AASM] 2009, Strohl 2019*). SWD is a circadian rhythm sleep disorder that occurs in individuals who work non-traditional hours and is characterized by excessive sleepiness and/or insomnia (*Morgenthaler et al 2007b*). Modafinil and armodafinil have been shown to produce psychoactive and euphoric effects similar to CNS stimulants, as well as alterations in mood, perception, thinking and feelings. As a result, these agents are classified as Schedule IV controlled substances.
- Sodium oxybate is gamma-hydroxybutyric acid (GHB), a known drug of abuse. It is FDA-approved for the treatment of EDS and cataplexy in patients **≥ 7 years of age** with narcolepsy and is classified as a Schedule III controlled substance for these indications. However, non-medical uses of sodium oxybate are classified under Schedule I. Sodium oxybate carries a boxed warning regarding CNS depression, abuse, and misuse, and may only be dispensed to patients enrolled in the Xyrem Risk Evaluation and Mitigation Strategy (REMS) program using a specially certified pharmacy. Prescribers and patients must also be enrolled in this REMS program (*Xyrem REMS Web site*).
- **Solriamfetol is FDA-approved to improve wakefulness in adult patients with EDS associated with narcolepsy or OSA. Solriamfetol is pending U.S. Controlled Substances Act scheduling (Sunosi dossier 2019).**

- While placebo-controlled (PC) clinical studies document the efficacy of these agents, the exact mechanisms of action are not completely understood. Head-to-head studies are limited, and current clinical guidelines recommend modafinil and sodium oxybate as first-line treatments for EDS and cataplexy, respectively.
- Medispan class: Stimulants – misc.; Anti-cataplectic agents.

**Table 1. Medications Included Within Class Review**

Drug	Generic Availability
Nuvigil (armodafinil)	✓
Provigil (modafinil)	✓
Sunosi (solriamfetol)	-
Xyrem (sodium oxybate)	-

(Drugs@FDA 2019, Orange Book: approved drug products with therapeutic equivalence evaluations 2019)

## INDICATIONS

**Table 2. Food and Drug Administration Approved Indications**

Indication	Nuvigil (armodafinil)	Provigil (modafinil)	Sunosi (solriamfetol)	Xyrem (sodium oxybate)
To improve wakefulness in adult patients with excessive sleepiness associated with narcolepsy, OSA, or SWD	✓	✓		
To improve wakefulness in adult patients with EDS associated with narcolepsy or OSA			✓	
For the treatment of cataplexy and EDS in narcolepsy in patients ≥ 7 years of age				✓

(Prescribing information: Nuvigil 2018, Provigil 2018, Sunosi 2019, Xyrem 2018)

- Information on indications, mechanism of action, pharmacokinetics, dosing, and safety has been obtained from the prescribing information for the individual products, except where noted otherwise.

## CLINICAL EFFICACY SUMMARY

### Narcolepsy

- The efficacy of modafinil for EDS associated with narcolepsy was established in 2 multicenter (MC), double-blind (DB), PC, randomized controlled trials (RCTs). In both studies, patients treated with modafinil showed statistically significant improvement in objective measures of excessive sleepiness as measured by the MSLT and Maintenance of Wakefulness Test (MWT); and the subjective Epworth Sleepiness Scale (ESS) compared to placebo ( $p < 0.001$  for all endpoints in both studies). Overall clinical condition as rated by the Clinical Global Impression of Change (CGI-C) at the final visit was also significantly improved over baseline for patients treated with modafinil compared to placebo in both studies ( $p < 0.005$  and  $p < 0.03$ ) (US Modafinil in Narcolepsy Multicenter Study Group 1998, US Modafinil in Narcolepsy Multicenter Study Group 2000).
- The efficacy of armodafinil for EDS associated with narcolepsy was established in a MC, DB, PC, RCT. Patients treated with armodafinil showed a statistically significant enhanced ability to remain awake as measured by the MWT compared to placebo ( $p < 0.01$ ), as well as improvement in overall clinical condition as rated by the CGI-C compared to placebo ( $p < 0.0001$ ). Armodafinil was also associated with statistically significant improvements in memory, attention, and fatigue ( $p < 0.05$ ) (Harsh et al 2006).
- The effectiveness of sodium oxybate in the treatment of EDS in patients with narcolepsy was established in 2 MC, DB, PC, RCTs.

- In the first study, patients treated with sodium oxybate 6 and 9 grams per night achieved statistically significant improvements on the ESS, MWT, and CGI-C compared to the placebo group ( $p < 0.001$  for all) (*Xyrem International Study Group 2005a*).
- The second study required patients to be taking a stable dose of modafinil before study randomization. Patients were randomized to placebo, sodium oxybate, modafinil, or sodium oxybate plus modafinil. Patients who were switched from modafinil to sodium oxybate did not experience any decrease in sleep latency, suggesting that both medications are equally effective for EDS. Patients taking sodium oxybate alone and sodium oxybate plus modafinil had statistically significant improvements in sleep latency from baseline as measured by MWT compared to the placebo group ( $p < 0.001$ ). The sodium oxybate plus modafinil group showed a significantly greater increase in sleep latency from baseline compared to the sodium oxybate alone group ( $p < 0.001$ ), suggesting that the combination of drugs had an additive effect (*Black & Houghton 2006*).
- The efficacy of sodium oxybate in the treatment of cataplexy in patients with narcolepsy was established in 2 DB, PC, RCTs.
  - In the first study, patients treated with 6 and 9 grams per night saw a significant decrease in cataplexy attacks compared to placebo ( $p < 0.05$  for both doses) (*U.S. Xyrem Multicenter Study Group 2002*).
  - The second study was a randomized withdrawal trial including narcoleptic patients already established on sodium oxybate therapy prior to study entry. Patients were randomized to continue treatment with sodium oxybate or to placebo, which included discontinuation of sodium oxybate therapy. Patients who discontinued sodium oxybate experienced a significant increase in cataplexy attacks compared to patients who remained on sodium oxybate ( $p < 0.001$ ) (*U.S. Xyrem Multicenter Study Group 2004*).
- The efficacy of solriamfetol for the treatment of narcolepsy or narcolepsy with cataplexy was evaluated in a DB, PC, MC, RCT (*Thorpy et al 2019*). Patients were stratified on the basis of presence or absence of cataplexy. Cataplexy was present in 50.8% of patients overall, with similar percentages of patients with cataplexy in each of the treatment groups. At week 12, treatment with solriamfetol significantly improved mean sleep latency measured by the MWT vs placebo ( $p < 0.0001$ ) and ESS scores ( $p \leq 0.02$ ). Significantly higher percentages of patients treated with solriamfetol also reported improvements in Patient Global Impression of Change (PGI-C) vs placebo ( $p < 0.0001$ ). There was no clear effect of solriamfetol on the number of cataplexy attacks per week among patients with cataplexy, although this study was not powered or designed to rigorously evaluate the effects of solriamfetol on cataplexy (data not shown).

## OSA

- The efficacy of modafinil for EDS associated with OSA was established in 2 DB, PC, RCTs. In both studies, patients treated with modafinil saw a statistically significant improvement in wakefulness compared to placebo ( $p < 0.001$  for both) (*Black et al 2005, Pack et al 2001*).
- The efficacy of armodafinil for EDS associated with OSA was established in 2 PC, DB, RCTs. In both studies, patients treated with armodafinil showed a statistically significant improvement in the ability to remain awake as measured by the MWT ( $p < 0.001$  and  $p = 0.0003$ ) and overall clinical condition per the CGI-C compared to placebo ( $p < 0.001$  and  $p = 0.0069$ ) (*Roth et al 2006, Hirshkowitz et al 2007*).
- The efficacy of solriamfetol for the treatment of EDS in patients with OSA with current or prior sleep apnea treatment was demonstrated in a DB, PC, MC, RCT (*Schweitzer et al 2018*). At week 12, solriamfetol-treated patients had significantly greater improvements in mean sleep latency assessed by the MWT ( $p < 0.001$ ) and ESS score ( $p \leq 0.02$ ). At week 12, higher percentages of patients on solriamfetol reported overall improvement on the PGI-C vs placebo ( $p < 0.0001$ ).
- A randomized withdrawal study evaluated the maintenance of efficacy and safety of solriamfetol vs placebo for the treatment of EDS in adults with OSA (*Strollo et al 2019*). After 2 weeks of clinical titration and 2 weeks of stable dose administration, patients who reported “much improved” or “very much improved” on the PGI-C and had numerical improvements on the MWT and ESS were randomly assigned to placebo or solriamfetol for 2 additional weeks. From baseline to week 4, mean sleep latency on the MWT and ESS scores improved. From weeks 4 to 6 (randomized withdrawal phase), solriamfetol-treated patients maintained improvements in MWT and ESS. During the randomized withdrawal phase, more patients who were switched to placebo reported worsening on the PGI-C and CGI-C vs those who continued solriamfetol.
- An OL extension study evaluated the long-term safety and maintenance of efficacy of solriamfetol for up to 52 weeks in the treatment of patients with narcolepsy or OSA who completed previous trials of solriamfetol (*Sunosi dossier 2019*). In

a 2-week OL titration phase, patients received solriamfetol, titrated to a maximum tolerated dose, followed by a maintenance phase. During a 2-week PC randomized withdrawal phase ~6 months later, patients were randomized either to placebo or to continue their maintenance solriamfetol dose for 2 weeks. From the beginning to the end of the randomized withdrawal phase, the ESS score was significantly improved with solriamfetol vs placebo ( $p < 0.0001$ ). The percentage of patients who were reported as worse on the PGI-C at the end of the randomized withdrawal phase was greater for patients randomized to placebo compared to patients on solriamfetol ( $p < 0.0001$ ). Long-term maintenance of efficacy of solriamfetol was demonstrated by sustained reductions in ESS scores. During the randomized withdrawal period, patients did not demonstrate rebound sleepiness or withdrawal after abrupt discontinuation of solriamfetol.

### SWD

- The efficacy of modafinil in treating EDS associated with SWD was evaluated in a DB, PC, RCT. Patients treated with modafinil showed a statistically significant improvement in nighttime sleep latency as measured by the MSLT ( $p = 0.002$ ) (Czeisler et al 2005).
- The efficacy of armodafinil in treating EDS associated with SWD was evaluated in a DB, PC, RCT. Patients treated with armodafinil showed a statistically significant improvement in sleep latency as measured by nighttime MSLT compared to placebo ( $p < 0.001$ ) (Czeisler et al 2009).
- A head-to-head study conducted by Tembe et al compared armodafinil to modafinil in patients with SWD. The study compared the response rate, defined as the proportion of patients showing  $\geq 2$  grades of improvement based on the Stanford Sleepiness Score (SSS). After 12 weeks of therapy, there was no statistically significant difference in response rates between patients treated with armodafinil vs modafinil ( $p = 0.76$ ). Compliance to therapy and adverse events (AEs) were also similar between groups ( $p = 0.63$  and  $p = 0.78$ , respectively) (Tembe et al 2011).
- Armodafinil, modafinil, sodium oxybate, and solriamfetol have all been shown to be more effective compared to placebo for their respective FDA-approved indications, as demonstrated by significant improvements in objective and subjective measures of EDS. In addition, sodium oxybate has been shown to significantly reduce the rate of cataplexy attacks in narcolepsy patients compared to placebo. While there is insufficient evidence to suggest that one agent is more efficacious than another, some studies have demonstrated that concurrent therapy with sodium oxybate and modafinil had a greater effect on EDS and wakefulness than either agent on its own, suggesting an additive effect (Alshaiikh et al 2012, Billiard et al 1994, Black & Houghton 2006, Black et al 2010a, Black et al 2010b, Black et al 2016, Broughton et al 1997, Kuan et al 2016, Xyrem International Study Group 2005b, Schwartz et al 2010, Weaver et al 2006).

## CLINICAL GUIDELINES

### Narcolepsy:

- The 2007 AASM practice parameters for the treatment of narcolepsy and other hypersomnias of central origin (Morgenthaler et al 2007a) recommend pharmacologic therapy based on the diagnosis and targeted symptoms. Most of the agents used to treat EDS have little effect on cataplexy or other REM sleep associated symptoms, while most antidepressants and anticataplectics have little effect on alertness; however, some medications act on both symptoms. Co-administration of 2 or more drug classes may be required in some patients to adequately address their symptoms. Scheduled naps may be beneficial, but seldom suffice as primary therapy for narcolepsy. The guidelines state that modafinil is effective for treatment of EDS due to narcolepsy and sodium oxybate is effective for treatment of cataplexy, EDS, and disrupted sleep due to narcolepsy. Sodium oxybate may be effective for treatment of hypnagogic hallucinations and sleep paralysis. Amphetamine, methamphetamine, dextroamphetamine, and methylphenidate are effective for treatment of EDS due to narcolepsy. Antidepressants (tricyclics, selective serotonin reuptake inhibitors [SSRIs], venlafaxine) may be effective for treatment of cataplexy. Tricyclics, SSRIs, and venlafaxine may be effective treatment for sleep paralysis and hypnagogic hallucinations.
- The European Academy of Neurology (EAN) 2011 guidelines on management of narcolepsy in adults (Billiard et al 2011) recommend modafinil as the first-line treatment for EDS associated with narcolepsy when EDS is the most disturbing symptom. Sodium oxybate is recommended when EDS, cataplexy, and poor sleep coexist. The guideline notes that the combination of modafinil and sodium oxybate may be more effective than sodium oxybate alone. Methylphenidate may be an option if the response to modafinil is inadequate; sodium oxybate is not recommended. Naps are best scheduled on a patient-by-patient basis.
- While armodafinil has been shown in clinical studies to be effective for EDS in narcolepsy, its specific place in therapy is not discussed in the current guidelines.



**OSA:**

- The 2006 AASM practice parameters for the medical therapy of OSA (*Morgenthaler et al 2006*) provide recommendations for patients with OSA who do not adapt well to or respond to initial therapy with continuous positive airway pressure (CPAP), oral appliances, or surgical modification. Dietary weight loss in obese individuals may be beneficial and should be combined with a primary treatment for OSA. Modafinil is recommended for the treatment of residual EDS in OSA patients who have sleepiness despite effective PAP treatment and who are lacking any other identifiable cause for their sleepiness.

**SWD:**

- The AASM practice parameters for the clinical evaluation and treatment of circadian rhythm sleep disorders (*Morgenthaler et al 2007b*) recommend planned napping before or during the night shift to improve alertness and performance in patients with SWD. Timed light exposure in the work environment and light restriction in the morning, when feasible, is indicated to decrease sleepiness and improve alertness during night shift work. Administration of melatonin prior to daytime sleep is indicated to promote daytime sleep among night shift workers. Hypnotic medications may be used to promote daytime sleep among night shift workers. Carryover of sedation to the nighttime shift with potential adverse consequences for nighttime performance and safety must be considered. Modafinil is indicated to enhance alertness during the night shift for SWD. Caffeine is indicated to enhance alertness during the night shift for SWD.

**SAFETY SUMMARY**

- Sodium oxybate is contraindicated in patients with succinic semialdehyde dehydrogenase deficiency and when used in combination with sedative hypnotics or alcohol.
- Sodium oxybate carries a boxed warning regarding CNS depression and misuse and abuse.
  - Respiratory depression may occur; the concurrent use of sodium oxybate with other CNS depressants may increase the risk of respiratory depression, hypotension, profound sedation, syncope, and death.
  - As a sodium salt of the Schedule I controlled substance GHB, sodium oxybate abuse or misuse may be associated with CNS AEs including seizure, respiratory depression, decreased levels of consciousness, coma, and death.
  - Because of these risks, sodium oxybate is only available through a restricted distribution program called the Xyrem REMS program using a central pharmacy that is specially certified. Prescribers and patients must also enroll in the program (*Xyrem REMS Web site*).
- Additional warnings and precautions for sodium oxybate include:
  - Patients should avoid participation in hazardous activities requiring complete mental alertness or motor coordination within the first 6 hours of dosing or after first initiating treatment until certain that sodium oxybate does not adversely affect them.
  - Monitor patients for signs of new or increased depression and suicidality, impaired motor and cognitive function, and episodes of sleepwalking.
  - Due to its high sodium content, patients with heart failure, hypertension, or impaired renal function should be routinely monitored while taking sodium oxybate.
- Common AEs with sodium oxybate were nausea, dizziness, vomiting, somnolence, enuresis, and tremor.
- Warnings and Precautions for modafinil and armodafinil include:
  - Cases of serious rash, including Stevens-Johnson Syndrome, have been reported. Discontinue therapy at the first sign of rash unless certain rash is not drug-related.
  - Angioedema and anaphylaxis reactions may occur. Discontinue therapy and immediately seek medical attention at the first signs of angioedema or anaphylaxis.
  - Multi-organ hypersensitivity reactions may occur. There are no known factors to predict the risk of occurrence or the severity of the reaction, and therapy should be discontinued in these patients.
  - Persistent sleepiness: patients should be regularly assessed for degree of sleepiness and advised against driving or other potentially dangerous activities if necessary.
  - The emergence or exacerbation of psychiatric symptoms have been reported; use particular caution in patients with a history of psychosis, depression, or mania.
  - Consider increased monitoring in patients with known cardiovascular disease.

- The most common AEs with modafinil were headache, nausea, nervousness, rhinitis, diarrhea, back pain, anxiety, insomnia, dizziness, and dyspepsia; the most common AEs with armodafinil were headache, nausea, dizziness, and insomnia.
- Drug interactions for modafinil and armodafinil:
  - Exposure to CYP 3A4/5 substrates may be decreased:
    - Effectiveness of steroidal contraceptives may be reduced; use alternative or concomitant contraceptive methods while taking and for 1 month after discontinuation of modafinil or armodafinil.
    - Blood concentrations of cyclosporine may be reduced requiring monitoring and possible dose adjustment.
  - Exposure to CYP2C19 substrates, such as omeprazole, phenytoin, and diazepam, may be increased.
  - More frequent monitoring of prothrombin times/international normalized ratio (INR) should be considered when administered with warfarin.
  - Use caution when concomitantly used with monoamine oxidase inhibitors (MAOIs).
- Solriamfetol is contraindicated with concomitant use of MAOIs, or within 14 days following discontinuation of an MAOI because of the risk of hypertensive reaction.
- Warnings and precautions of solriamfetol include blood pressure and heart rate increases and psychiatric symptoms such as anxiety, insomnia, and irritability.
- The most common AEs in either the narcolepsy or OSA populations were headache, nausea, decreased appetite, insomnia, and anxiety.

## DOSING AND ADMINISTRATION

**Table 3. Dosing and Administration**

Drug	Available Formulations	Route	Usual Recommended Frequency	Comments
Nuvigil (armodafinil)	Tablets	Oral	<i>Narcolepsy or OSA</i> : once daily in the morning.  <i>SWD</i> : once daily, approximately 1 hour prior to the start of the work shift.	The dose should be reduced in patients with severe hepatic impairment and geriatric patients.
Provigil (modafinil)	Tablets	Oral	<i>Narcolepsy or OSA</i> : once daily in the morning.  <i>SWD</i> : once daily, approximately 1 hour prior to the start of the work shift.	Patients with severe hepatic impairment should reduce the dose to one-half the recommended dose.  Consider a lower dose in geriatric patients.
Sunosi (solriamfetol)	Tablets	Oral	<i>Narcolepsy or OSA</i> : once daily	Renal impairment: dose adjustments required; not recommended for use in patients with end-stage renal disease.
Xyrem (sodium oxybate)	Solution	Oral	Adults: administer nightly in 2 equal divided doses: at bedtime and 2.5 to 4 hours later; titrate to effect as directed	Both doses should be prepared prior to bedtime; dilute each dose with approximately ¼ cup of water in pharmacy-provided vials.  Take each dose while in bed and lie down after dosing.

Drug	Available Formulations	Route	Usual Recommended Frequency	Comments
			Pediatrics: weight-based dose administered at bedtime and 2.5 to 4 hours later; titrate to effect as directed.	<p>Patients with hepatic impairment should reduce the starting dose by 50%.</p> <p>When using concomitantly with divalproex sodium, an initial dose reduction of at least 20% is recommended.</p>

See the current prescribing information for full details

## CONCLUSION

- Narcolepsy is a chronic neurological condition that causes excessive sleepiness throughout the day. EDS can vary in severity and in the most severe cases patients suddenly fall asleep during normal activities. Patients with narcolepsy present with or without clear evidence of cataplexy (type 1 vs type 2, respectively). There is no cure for narcolepsy and current treatments focus on alleviating symptoms and improving quality of life.
- Current clinical evidence supports the use of modafinil as a first-line agent in treating EDS associated with narcolepsy. Sodium oxybate can be used as a second-line agent for EDS in narcolepsy, but is considered first-line therapy for patients diagnosed with cataplexy. While armodafinil has been shown in clinical studies to be effective in treating narcolepsy-associated EDS, the current clinical guidelines do not discuss a specific place in therapy. Amphetamine, methamphetamine, dextroamphetamine, and methylphenidate are additional treatment alternatives for EDS due to narcolepsy, while TCAs, SSRIs, and venlafaxine are second-line alternatives for patients with cataplexy. **Solriamfetol has not yet been incorporated into the guidelines.**
- Patients with OSA should be treated with **primary** CPAP therapy, and then may use modafinil as an adjunctive treatment for residual sleepiness. SWD should be treated by utilizing a planned sleep schedule, including regular naps before and during the work shift; modafinil may be used to enhance wakefulness in these patients.
- While current clinical data indicate that modafinil, armodafinil, sodium oxybate, **and solriamfetol** are all effective for their respective FDA-approved indications, there is a lack of head-to-head data among these agents. A treatment plan should be individualized for all patients and the risks and benefits should be evaluated before beginning any pharmacological therapy.
- Modafinil, armodafinil, **and solriamfetol** are oral tablets that are dosed once daily. Sodium oxybate is an oral solution that must be taken at bedtime and repeated 2.5 to 4 hours later. Currently, modafinil and armodafinil are available generically.
- Sodium oxybate carries a boxed warning for the risk of CNS depression, misuse, and abuse. Sodium oxybate is only available through the Xyrem REMS program; patients and prescribers must enroll in the program and sodium oxybate is only dispensed through a specially certified pharmacy.

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