

# Home-use light box therapy for seasonal affective disorder

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Policy contains: Light box; light therapy; seasonal affective disorder; winter depression.

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## Coverage policy

Home-use light box therapy is clinically proven and, therefore, may be medically necessary for seasonal affective disorder (major depressive disorder with seasonal patterns) when the following criteria are met:

- The member is diagnosed with recurring depression (at least two years) during a period when light decreases, which also alleviates when light increases (National Institute of Mental Health, 2023).
- An evaluation and recommendation for light box therapy is made by a physician, for treatment of no longer than one hour, most often early in the morning (Kurlansik, 2012; National Health Service, 2022).

### Limitations

No limitations were identified during the writing of this policy.

### Alternative covered services

- Vitamin D supplements.
- Antidepressants, especially selective serotonin reuptake inhibitors.
- Psychotherapy.
- Cognitive behavioral therapy.

## Background

Seasonal affective disorder is a type of depression characterized by its recurrent seasonal pattern, with symptoms lasting about four to five months per year (National Institute of Mental Health, 2023). Low levels of serotonin and elevated levels of melatonin in the brain may contribute to this condition, with symptoms including low energy, hypersomnia, overeating, weight gain, craving for carbohydrates, and social withdrawal (feel like “hibernating”).

While the precise causes of the disorder are not known, risk factors are well documented. These include being female (80% are women), family history of other types of depression, having depression or bipolar disorder, and being younger (versus older) adults. Geographic prevalence varies greatly; for example, an estimated 1.4% of Florida residents have the disease, compared to 9.9% in Alaska (Rohan, 2013).

Treatment options for seasonal affective disorder include vitamin D supplements, antidepressant medication, psychotherapy, and light therapy. A variety of light boxes are available for seasonal affective disorder. Each filters out the ultraviolet rays and requires 20 – 60 minutes of exposure to 10,000 lux of cool-white fluorescent light, an amount that is about 20 times greater than ordinary indoor lighting (National Institute of Mental Health, 2023). Caution is advised not to sit directly facing the box, and at a reasonable proximity, namely 16 to 24 inches away (Mayo Clinic, 2022).

Bright light works by stimulating cells in the retina that connect to the hypothalamus, a part of the brain that helps control circadian rhythms. Activating the hypothalamus at a certain time every day can restore a normal circadian rhythm that normal light in winter cannot for some individuals (Miller, 2012).

## Findings

The American Academy of Family Physicians recommends light box therapy for seasonal affective disorder, noting that improvement is usually observed one to four weeks after treatment starts. The Academy also recommends cognitive behavioral therapy and antidepressants (Kurlansik, 2012).

The British National Health Service states that cognitive behavioral therapy, antidepressants, and light therapy are all acceptable treatments for seasonal affective disorder. Light therapy works best in the morning, but is not appropriate for persons sensitive to bright light, or for those taking antibiotics and antipsychotics that increase light sensitivity (National Health Service, 2022).

A Canadian panel, while acknowledging light therapy to be one of the major options for persons with seasonal affective disorder, could not recommend either light or drug therapy over the other due to a lack of evidence (British Columbia Drug and Poison Information Centre, 2017).

The American Psychiatric Association guideline states that use of light box therapy “might be used” to treat seasonal affective disorder, and “may hasten the response to treatment with antidepressant medication” (American Psychiatric Association, 2010).

A meta-analysis of 18 randomized controlled trials ( $n = 610$  adults with seasonal affective disorder) compared bright light therapy to dim light or sham/low-density negative ion generators as controls. Bright light therapy was superior to controls for depression ratings and response to active treatment. Authors recommended higher-quality trials due to moderate heterogeneity and moderate/high risk of bias, plus small sample sizes in the current research (Prjek, 2020).

A systematic review/meta-analysis ( $n = 397$ ) found improvements in depression scores for participants with seasonal affective disorder given light therapy plus placebo were greater than those given antidepressants plus placebo. Light therapy yielded a significantly greater improvement at  $P < .001$  than those given antidepressants

plus placebo, and was significantly more effective for non-seasonal depression ( $P < .005$ ). Authors note that light therapy has been found effective, but is underused in clinical settings (Geoffroy, 2019).

A systematic review of 40 studies observed bright light therapy demonstrated improvements to phase-advance delayed rhythms, sleep-wake disorders, and mood symptoms, but could not conclude that treatment results in changes in circadian outcomes (Menculini, 2018).

A systematic review (43 articles) of light therapy found no adverse ocular effects in otherwise healthy, unmedicated persons using the treatment. Further study is warranted for those with pre-existing ocular abnormalities or elevated photosensitivity (Brouwer, 2017).

A meta-analysis of two studies on seasonal affective disorder showed that persons using light box therapy reached significant improvement levels at the second and third weeks after initiation, and at the endpoint of the trials (Martensson, 2015).

In a Cochrane review of six studies, two ( $n = 146$ ) compared outcomes for the second-generation antidepressant fluoxetine with those of light therapy for seasonal affective disorder. Trends in depression were similar in both groups, in which about two-thirds of subjects improved (Nussbaumer-Streit, 2021).

In 2022, we found no new relevant literature to add to the policy.

In 2023, we updated the references and added one new systematic review/meta-analysis to the policy, with no policy changes warranted. A meta-analysis of seven trials ( $n = 258$  participants) compared a circadian stimulus model to light level and spectrum parameters to quantify the lighting in bright light therapy for treating depression. A circadian stimulus model calculates circadian phototransduction (i.e., the process by which light captured by the retina is converted to neural electrical signals). High circadian stimulus lighting, defined as circadian stimulus  $> 0.1$ , was associated with a significant reduction in depressive symptoms (mean difference =  $-5.56$ , 95% confidence interval  $-9.22$  to  $-1.90$ ,  $P = 0.003$ ); the results require clinical confirmation (Zhou, 2022).

In 2024, we updated the references and added a scoping review of the feasibility, safety, and efficacy of bright light therapy for adolescents ages 12 to 18 years with depressive disorders. The analysis consisted of seven controlled trials ( $n = 270$ ) and 12 uncontrolled studies ( $n = 132$ ) of low quality. While the use of bright light therapy for depression in adults is well established, the evidence in adolescents is less certain. Bright light therapy appears to be well-tolerated, but its long-term effects and adverse effects are not well-described. Treatment protocols varied significantly making comparison of treatment response and tolerability difficult to quantify (Ballard, 2023). No policy changes are warranted.

## References

On November 14, 2023, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were “light box,” “light therapy,” “seasonal affective disorder,” and “winter depression.” We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.

American Psychiatric Association. Practice guideline for the treatment of patients with major depressive disorder, third edition.

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## Policy updates

5/2020: initial review date and clinical policy effective date: 6/2020

2/2021: Policy references updated.

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