



# EVIDENCE-BASED GUIDELINE UPDATE: VAGUS NERVE STIMULATION FOR THE TREATMENT OF EPILEPSY

This is a summary of the American Academy of Neurology (AAN) guideline regarding efficacy and safety of vagus nerve stimulation (VNS) for epilepsy, currently approved as adjunctive therapy for partial-onset seizures in patients over 12 years of age.

Please refer to the full guideline at [www.aan.com](http://www.aan.com) for more information, including definitions of the classifications of evidence and recommendations.

## In children with epilepsy, is using adjunctive VNS therapy for seizure frequency reduction better than not using adjunctive VNS therapy for seizure frequency reduction?

<b>Weak evidence</b>	VNS may be considered as adjunctive treatment for children with partial or generalized epilepsy ( <b>Level C</b> , 14 Class III studies).
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### Clinical context

VNS may be considered a possibly effective option after a child with medication-resistant epilepsy has been declared a poor surgical candidate or has had unsuccessful surgery.

## In patients with Lennox-Gastaut syndrome (LGS), is using adjunctive VNS therapy for seizure frequency reduction better than not using adjunctive VNS therapy for seizure frequency reduction?

<b>Weak evidence</b>	VNS may be considered in patients with LGS ( <b>Level C</b> , 4 Class III studies).
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### Clinical context

The responder rate for patients with LGS does not appear to differ from that of the general population of patients with medication-resistant epilepsy.

## In patients with epilepsy, is using VNS associated with mood improvement?

<b>Weak evidence</b>	In adult patients receiving VNS for epilepsy, improvement in mood may be an additional benefit ( <b>Level C</b> , 2 Class III studies).
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### Clinical context

Depression is a common comorbidity for people with epilepsy. VNS may provide an additional benefit by improving mood in some patients; however, the potential for mood improvement should be considered a secondary rather than a primary reason for VNS implantation. The evidence does not clearly support an independent effect on mood in this complex population.

## In patients with epilepsy, is VNS use associated with reduced seizure frequency over time?

<b>Weak evidence</b>	VNS may be considered progressively effective in patients over multiple years of exposure ( <b>Level C</b> , 2 Class III studies).
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### Clinical context

The loss of medication efficacy over time is a challenging aspect of epilepsy management. The evidence of maintained efficacy in the long-term and the trend toward improvement over time make VNS an option.

## In patients undergoing VNS therapy, does rapid stimulation (usual VNS settings are 7 seconds "on" and 30 seconds "off") improve seizure frequency more often than standard stimulation settings (30 seconds "on" and 300 seconds "off")?

<b>Insufficient evidence</b>	Optimal VNS settings are still unknown, and the evidence is insufficient to support a recommendation for the use of standard stimulation versus rapid stimulation to reduce seizure occurrence ( <b>Level U</b> , 3 underpowered Class III studies).
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### Clinical context

Rapid cycling increases the duty cycle and hastens the need for battery replacement; therefore, when used, the efficacy of rapid cycling should be

Carefully assessed.

## In patients undergoing VNS therapy, does using additional magnet-activated stimulation trains for auras or at seizure onset interrupt seizures relative to not using additional magnet-induced stimulation trains for auras or at seizure onset?

<b>Weak evidence</b>	Patients may be counseled that VNS magnet activation may be associated with seizure abortion when used at the time of seizure auras ( <b>Level C</b> , 3 Class III studies) and that seizure abortion with magnet use may be associated with overall response to VNS treatment ( <b>Level C</b> , 2 Class III studies).
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## In patients undergoing VNS therapy, have new safety concerns emerged since the last assessment?

<b>Insufficient evidence</b>	There is insufficient evidence to determine whether or not new safety concerns have emerged since the last assessment ( <b>Level U</b> , case reports).
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### Clinical context

Current physician attention to intraoperative rhythm disturbances from VNS use need not be changed. The paroxysmal nature of epilepsy poses a challenge for identifying a cardiac rhythm disturbance as device-related rather than as an additional seizure manifestation. Video-EEG and EKG monitoring of new-onset events that might be cardiac related would be warranted to exclude this possibility in what is likely to be a small number of patients. Reduced sudden unexpected death in epilepsy (SUDEP) rates over time is an important finding associated with VNS therapy; in a cohort of 1,819 individuals followed 3,176.3 person-years from VNS implantation, the SUDEP rate was 5.5 per 1,000 over the first 2 years but only 1.7 per 1,000 thereafter. The clinical importance of the effect of VNS on sleep apnea and treatment is unclear, but caution regarding VNS use in this setting is suggested.

## In children undergoing VNS therapy, do adverse effects differ from those in adults?

<b>Insufficient evidence</b>	There is insufficient evidence to determine whether or not adverse effects differ in children from those in adults ( <b>Level U</b> , Class IV studies).
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### Clinical context

Children may have greater risk for wound infection than adults due to behaviors more common in children. Extra vigilance in monitoring for occurrence of site infection in children should be undertaken.

## This guideline was endorsed by the American Epilepsy Society.

<p>This statement is provided as an educational service of the American Academy of Neurology. It is designed to provide members with evidence-based guideline recommendations to assist the decision making in patient care. It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods of care for a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodologies. The AAN recognizes that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, and are based on all of the circumstances involved. Physicians are encouraged to carefully review the full AAN guidelines so they understand all recommendations associated with care of these patients.</p>
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