

Vagus Nerve Stimulation

What Is Vagus Nerve Stimulation (VNS)?

Vagus nerve stimulation (VNS) prevents seizures by sending regular, mild pulses of electrical energy to the brain along the vagus nerve in the neck.

A stimulation device, similar to a pacemaker, generates these electrical pulses. The VNS therapy system is surgically placed under the skin on the chest wall. A wire runs from the stimulator to the vagus nerve, which is part of the autonomic nervous system. The autonomic nervous system controls involuntary body functions, such as heart rate.

Who Benefits From Vagus Nerve Stimulation?

For some children who have epilepsy, VNS helps reduce the number and/or length of their seizures. VNS therapy is approved for use in people 12 and older who have partial onset seizures that don't respond to antiepileptic medicines. If your child experiences warning signs (auras) before a seizure, with VNS you can activate the stimulator with a special magnet when the warning happens, which can help stop the seizure.

What to Expect With Vagus Nerve Stimulation

VNS surgery involves placing a generator in the upper left chest, and attaching flexible wires to the vagus nerve in the left neck area. The generator delivers an electrical current to the vagus nerve. The nerve then sends the current to the brain.

The VNS implant is programmed to send stimulation 24 hours a day. Starting with a low level of stimulation, your child's health care provider increases the level gradually over the course of several weeks. This gradual approach helps lessen vagus nerve stimulation side effects, which can include:

- Tingling or mild discomfort in the neck.
- Mild hoarseness in the voice.
- Increased coughing.
- Prickly feeling on the skin.
- Trouble swallowing or increased drooling.

These symptoms might occur initially, but usually lessen within a few weeks of starting VNS therapy.

Children who use VNS should avoid therapeutic ultrasounds for physical therapy, because they can create heat in the VNS system and damage the device (diagnostic ultrasounds are fine). Additionally, only certain types of MRI scans should be performed. Ask your health care provider if the recommended scan is safe with VNS.

Preparing for Surgery

You can help make sure your child has the best possible surgery outcome by understanding what to expect before, during and after the procedure for VNS at Gillette. Here are a few resources to help you feel more prepared:

- Review tips to prepare for surgery at Gillette.
- Understand the amenities available at Gillette.

A Week Before Surgery

A week before the surgery, we will contact you to:

- Gather a health history, including details about medicines (name, dose, frequency), pharmacy and primary care doctor.
- Discuss what to expect on the day of surgery and during the hospital stay.
- Let you know what you'll need when your child leaves the hospital.

Maintain a Healthy Diet and Regular Activity

Overall health can affect how well and how quickly your child recovers from VNS surgery. In general, kids should maintain regular levels of activity.

Before and after the surgery, make sure your child eats enough food with iron, calcium and vitamins C and D. Fresh colorful fruits and vegetables, dairy food, and other products with added iron and calcium offer great ways to get these nutrients.

Tell Us About Latex Allergies

Gillette is a latex-free facility. However, we still want to know if your child has a latex allergy or has ever had a severe reaction to latex.

Manage Stress

Sometimes fears, behavior or expectations related to upcoming surgery can cause stress for families. Contact your child's primary health care provider or Gillette Child and Family Services for support.

We can also help with resources that might reduce anxiety for your family. Our child life specialists can provide emotional support and distractions, such as toys and movies in the waiting area before surgery begins. Child life specialists can also meet with your child's siblings to address their feelings and concerns.

Knowing what to expect can help everyone feel more prepared. We'll take time to clarify short- and long-term expectations for outcomes following the VNS procedure.

During Your Hospital Stay **The Day of Surgery**

Arrival

The perianesthesia staff welcomes you when you arrive. We weigh your child, and ask them to change into a hospital gown. We also check temperature, pulse and blood pressure. A child life specialist helps your child feel more at ease with toys, crafts or movies.

Surgery Preparation

Next, you and your child meet with the surgery team, which includes:

- Pediatric neurosurgeon.
- Nurse anesthetist.
- Anesthesiologist.
- Nurses.

This is a chance for you to raise any questions or concerns. The anesthesiologist discusses how anesthesia and pain medicine are used during surgery. You can talk about your child's experiences with pain and request medicine or other techniques to help them relax.

Surgery

1. The surgeon makes an incision along the outer side of the chest on the left side, and implants the device under the skin. The device is a flat, round battery, about the size of a silver dollar, depending on the model used. (Newer models might be somewhat smaller.)

2. The surgeon then makes a second incision in the lower neck, along a crease of skin.

3. Finally, the surgeon winds the wire from the stimulator around the vagus nerve in the left side of the neck.

The procedure usually lasts between 50 and 90 minutes, during which your child will be under general anesthesia. The brain itself is not involved in the surgery.

After Surgery

Every child heals differently, and outcomes depend on the neurologic condition of your child before surgery. Usually the child can go home later the same day, but sometimes an overnight stay might be necessary.

Following the surgery, your health care provider will give you a magnet you can use to increase the stimulation level in case you need to stop or reduce a seizure in your child.

How Vagus Nerve Stimulation Helps

After VNS, many children experience:

- Fewer and less severe seizures.

- Better recovery period after a seizure.
- Improved mood.
- Improved alertness.
- Better memory and cognition.
- Fewer emergency room visits.

VNS therapy doesn't typically cause depression, confusion, weight gain, fatigue, insomnia or low energy like some medicines do.

If VNS therapy is successful, your health care provider might lower the dose of your child's antiepileptic medication.

Integrated Care

If your child experiences seizures or has epilepsy, Gillette offers a team of experts to provide comprehensive care. As one of the first epilepsy centers in the region to use VNS, our team has extensive experience in choosing patients who will benefit from the procedure, surgical placement, and programming the system to achieve the best outcomes.

As part of your treatment plan, your family might work with specialists in:

- **Endocrinology.**
- **Medical genetics and genetic counseling.**
- **Neurodevelopmental pediatrics.**
- **Neurodiagnostics**, for tests such as **electroencephalograms (EEGs)**, video electroencephalographs (VEEGs) and overnight **sleep studies (polysomnography)**.
- **Neuropsychology.**
- **Nutrition and feeding.**
- **Pediatrics and general medicine.**
- **Psychology.**
- **Rehabilitation medicine.**
- **Rehabilitation therapies**, including occupational, physical, and speech and language therapy.
- **Sleep medicine.**
- **Social work.**
- **Therapeutic recreation.**

As your family adjusts to life with your child's epilepsy and seizures, we're here to help you navigate conversations about school, sports and social situations. Our Life Stages® for Epilepsy program teaches families about the important steps to take as children with epilepsy grow into their teen years and adulthood.

Make An Appointment

651-290-8707

Refer a Patient

651-325-2200

This information is for educational purposes only. It is not intended to replace the advice of your health care providers. If you have any questions, talk with your doctor or others on your health care team.

If you are a Gillette patient with urgent questions or concerns, please contact Telehealth Nursing at **651-229-3890**.