

# Responsive Neurostimulation (RNS® System)



Responsive Neurostimulation (also known as the RNS System by NeuroPace) is a “smart” device. It can monitor and respond to brain activity. When seizure activity is picked up, the device stimulates the brain to quickly stop seizures or prevent seizures from starting. The RNS System was approved by the U.S. Food and Drug Administration for use in 2013.



The RNS has two main parts:

- A neurostimulator device placed in the skull (bone covering the brain) that can be programmed to record and stimulate brain activity.
- Thin wires or “leads” are placed on the surface of the brain in the area where seizures begin (seizure focus). They are then connected to the neurostimulator device.

The RNS parts are placed or implanted in the operating room. It is programmed to start recording seizure activity, but it does not start stimulation right away. Programming the device is done in outpatient clinic by your epilepsy team.

## Who can use RNS?

The RNS is used to help control seizures in people who:

- Are adults age 18 and over.
- Have focal epilepsy that is not controlled after trying at least 2 seizure medicines (called drug resistant epilepsy).
- Are not able to have epilepsy surgery or who had resective surgery before and are still having seizures.
- Have had testing at a comprehensive epilepsy center to see if they could have surgery. Testing would include, EEG monitoring, imaging tests (MRI), and other tests.

“

RNS can help many people who are unable to have epilepsy surgery

”



## How does the RNS device work?

The RNS System can:

- Regularly monitor brain waves where the seizure starts, even during sleep.
- Detects unusual electrical activity in the brain that can lead to a seizure. The RNS system is programmed by a doctor to detect brain wave patterns that are specific to each person.
- Respond quickly (within milliseconds) to seizure activity by giving small pulses of stimulation to the brain. These pulses can stop the brain waves that cause seizures and let the brain waves return to normal.

### More about the RNS System...

- Once the leads and device are placed by the surgeon, nothing can be seen.
- A few weeks after surgery, you'll be seen in the outpatient epilepsy clinic. The epilepsy team can see if seizure activity has been recorded by the RNS.
- The device will be adjusted so the RNS stimulates the brain if seizure activity happens or certain brainwave patterns are seen.
- You can't feel the stimulation once it's programmed. It's not painful and doesn't cause other sensations.
- You'll continue to take seizure medicine while using the RNS. If you have a good response to RNS therapy, sometimes medications can be reduced over time.
- The device can be removed if needed.



### How well does RNS therapy work?

The RNS System lowers the number of seizures in the many people who have used this.

- About half of people with RNS will have a positive response.
- On average, seizures decrease by about 50% after 2 years of using RNS.
- The positive effects of RNS seem to increase over time.
- After 7 years, 2 out of 3 people had their seizures cut in half.
- People may also notice changes in quality of life over time.

### Where can I learn more about the RNS System?

- To learn more, talk to your epilepsy doctor or nurse. Many comprehensive epilepsy centers that offer surgery will offer RNS.
- Learn more about treatments for epilepsy and seizures at [www.epilepsy.com/treatment](http://www.epilepsy.com/treatment).

**About the Epilepsy Foundation:** The Epilepsy Foundation, and its network of 50 organizations throughout the United States, leads the fight to overcome the challenges of living with epilepsy and to accelerate therapies to stop seizures, find cures, and save lives. To learn more, please visit [epilepsy.com](http://epilepsy.com).

**Disclaimer:** This publication is designed to provide general information about epilepsy and seizures to the public. It is not intended as medical advice. People with epilepsy should not make changes to treatment or activities based on this information without first consulting with their health care provider.

This publication is made possible with funding from the Centers for Disease Control and Prevention (CDC) under cooperative grant agreement number 1NU58DP006256-02-00. Its contents are solely the responsibility of the Epilepsy Foundation and do not necessarily represent the views of the CDC.

