

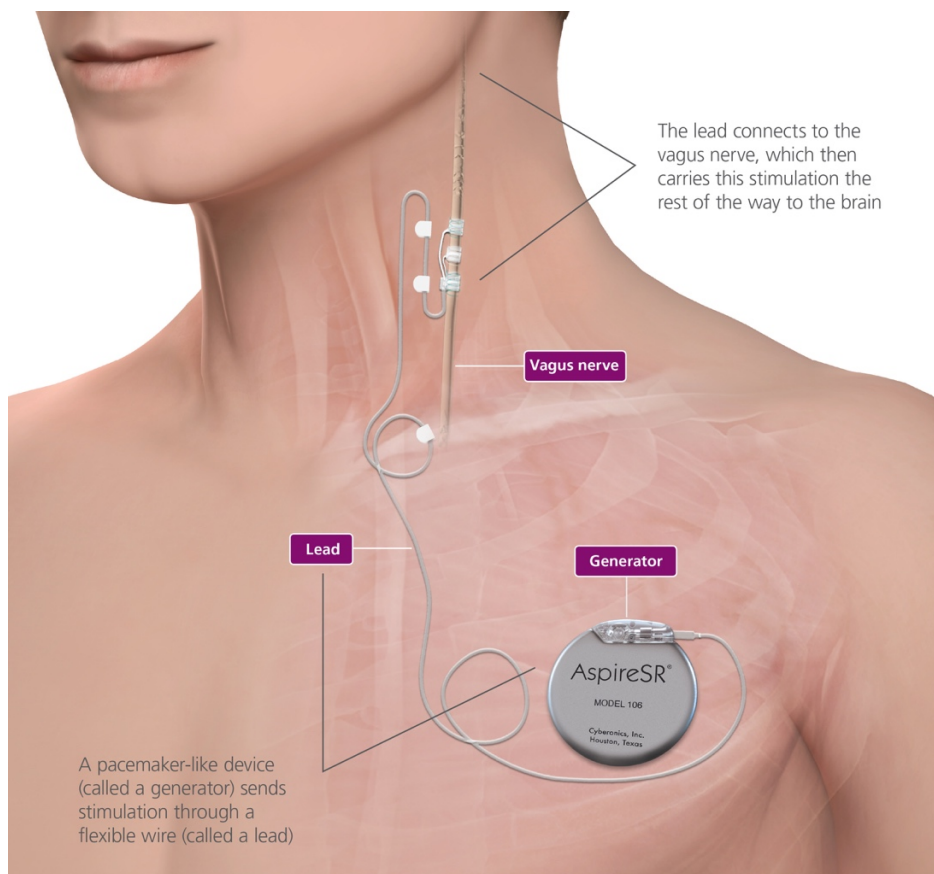
# Vagus Nerve Stimulation (VNS) therapy for epilepsy

## Who is this information for?

This document is for patients, families and carers. It provides information about Vagus Nerve Stimulation (VNS) therapy that has been approved by the Technology/Clinical Practice Committee at Monash Health. It will inform you about the reasons for the procedure, the known benefits and risks of the procedure, so that an informed decision can be made. Your neurologist has recommended VNS therapy to treat your epilepsy related seizures. It is your decision whether to go ahead with the procedure.

## What is VNS therapy?

VNS therapy involves a small electrical device (Aspire SR<sup>®</sup>) like a pacemaker, which is implanted under the skin of your chest. The device sends electrical impulses to your brain through a nerve in your neck called the vagus nerve. The aim is to reduce the number of seizures you have and make them less severe.



VNS therapy uses the VNS system, which is made up of the following three parts:

1. A small pacemaker-like device, called a generator. Size of generator is 52mm x 52mm x 6.9mm
2. A thin, flexible wire, called a lead
3. A hand-held magnet which the patient or care provider would keep on their person



The vagus nerve sends messages between the brain and other parts of the body. In VNS therapy, a generator is connected to the vagus nerve by a lead. The generator is programmed to send electrical impulses to the vagus nerve at regular intervals, all day, every day. These impulses are then carried by the vagus nerve to the brain. This regular stimulation can help to reduce the number of seizures you have and make them less severe.

You can also sweep the hand-held magnet over the generator to send more impulses to the vagus nerve. This could be if you have an aura (warning) before a seizure, if you feel a seizure starting, or when you are having a seizure. A carer or family member can also use the magnet if they see that you are having a seizure.

Some people find that using the magnet

- Stops a seizure happening
- Shortens the seizure
- Makes the seizure less severe
- Reduces the recovery time after the seizure

The magnet can also be used to stop the stimulation function for the time it is held over the generator.

The Aspire SR<sup>®</sup> generator can also detect increases in heart-rate. In some people with epilepsy an increase in heart-rate can be a sign that they are having a seizure. When the generator detects an increase in heart-rate, it automatically sends an extra dose of impulses to the vagus nerve. This may help to stop a seizure happening or make it less severe. The generator can distinguish between normal rises in heart rate such as during exercise or increases during a seizure.



## What does the procedure involve?

- Surgery to implant the VNS system is carried out by a neurosurgeon, under general anaesthetic.
- The operation takes 2 hours and you usually go home the same day, or the next day.
- The neurosurgeon makes 2 small incisions, 1 in a natural crease on the left side of your neck, and 1 in the left-hand side of your chest, below your collarbone. The generator is placed under the skin in your chest. A lead is inserted under the skin to connect the generator to the left vagus nerve in the neck.
- The lead is secured by placing an anchor tether on the vagus nerve and using a series of loops with tie-downs to create a strain relief. Inadequate strain relief may cause adverse events or reduced lead life.
- The generator is usually left switched off for at least two weeks after surgery. After that, it is usually switched on by your neurologist in a clinic. They will gradually increase the settings over several weeks. This gives you a chance to get used to the sensation of stimulation over time.

## What are the benefits of VNS therapy?

The benefits of VNS can include the following:

- Having fewer seizures
- Having less severe seizures or shorter seizures
- Having improved quality of life
- Improved alertness, mood and memory

You might not see any improvement in your seizures at first. You might find your seizure control slowly improves anywhere from a few months to 1 to 2 years after the VNS system is fitted.

- For most people, VNS does not stop seizures completely.

## What are the alternatives to VNS therapy?

1. Try alternative antiepileptic drugs
2. Enrol on to a clinical trial involving a new antiepileptic drug
3. Ketogenic diet

## What if I decide not to have the procedure?

- Continue your regular antiepileptic drugs
- Continue your regular follow-up with your neurologist
- Discuss with your neurologist regarding alternatives

## What should I do with my medication?

VNS is designed to be used in addition to epilepsy medicine, not to replace it. Most people need to keep taking epilepsy medicine after they have had a VNS system fitted. Some people can reduce the amount of epilepsy medicine they take over time. You will be able to talk to your epilepsy specialist about any possible changes to your medicine.

It is important to tell your care team about any allergies you may be aware of and treatments or medications you may be taking, including non-prescription medications, vitamins or herbal remedies.

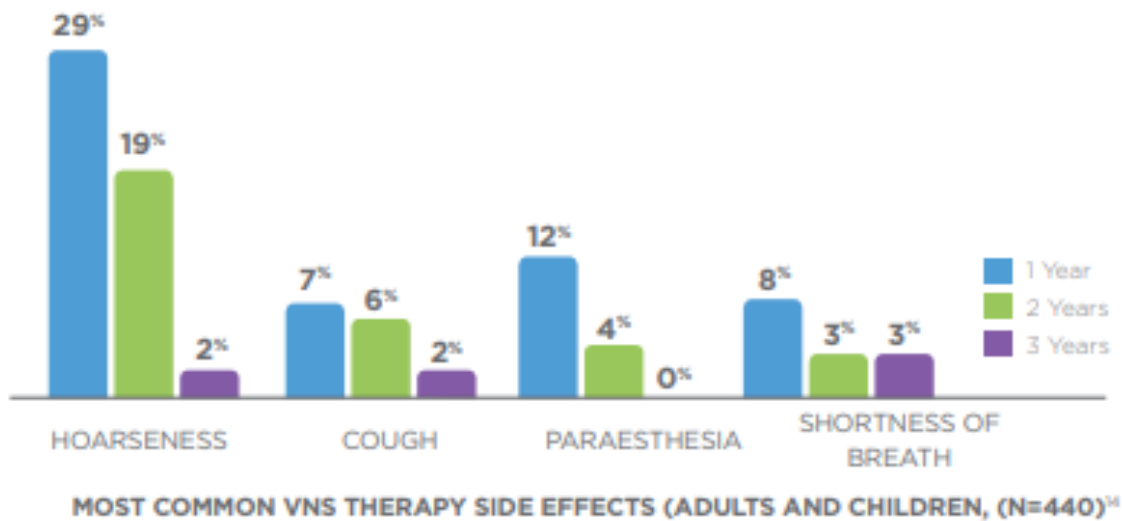
## What complications can happen?

- As with any operation, there is a small risk of reaction to the anaesthetic.
- There is also a small risk of bleeding, infection or trauma to the structures in the neck. Your surgeon will give you more detailed information before the operation takes place.
- The most common side-effect reported from VNS is hoarseness/a change in voice.
- Other common side effects include:
  - Sore throat
  - Shortness of breath
  - Coughing
- Other possible side-effects include palpitations and difficulty swallowing
- The side-effects of VNS usually happen during stimulation periods and commonly lessen over time. If you find the side-effects uncomfortable talk to your neurologist. They may be able to help by altering the level of stimulation.
- As with any prosthetic device there is the possibility of mechanical failure.
- The generator has an average battery life of close to five years depending on frequency of stimulation.

## How soon will I recover?

- You might have some pain for a few weeks in the area of the implant after VNS surgery.
- Your doctor can prescribe simple painkillers for this to take home on discharge.
- There may be some bruising around the scars for a few weeks.
- Generally, overall recovery takes a couple weeks at most.
- Sutures are usually dissolvable and do not require removal.
- The wound needs to be inspected by the GP at approximately seven days before getting it wet.
- Follow up will be with both the neurosurgery and neurology teams. The neurosurgery team will usually see the patient at 6 weeks after surgery and then discharge the patient for the programming regime to be carried out by the neurologist.

## Nonpharmacological side effect profile



## Cost

There is no cost to the patient for this surgery. All treatment and investigations are provided at the Monash Medical Centre and Monash Children's Hospital in Clayton.

## Summary

- VNS therapy involves a small device implanted under the skin of your chest that sends impulses to your brain via a nerve in your neck. It aims to reduce the number of seizures you have and make them less severe.
- After VNS implantation, if you need to undergo any other surgery, the VNS device may have to be turned off temporarily. Similarly, there may be limitations on MRI scanning. Please inform your doctor about your VNS.

# Meet the team

## Neurology



### **Assoc. Professor Udaya Seneviratne**

Professor Udaya Seneviratne *MBBS, MD, MRCP(UK), FRACP, PhD* is an Associate Professor at The University of Melbourne, and an Adjunct Associate Professor at Monash University. He is a Consultant Neurologist and Epileptologist at Monash Health, where he directs the Epilepsy Service and leads clinical trials, and at St. Vincent's Hospital, Melbourne. He has published 68 peer-reviewed articles in leading neurology, neurophysiology and epilepsy journals including *Brain, Neurology, and Epilepsia*, 3 book chapters and 33 abstracts. He is a peer-reviewer for several epilepsy journals and serves on the editorial board of the journal *Frontiers in Neurology*. Dr Seneviratne's main research focus has been on the utility of seizure semiology and EEG in the diagnosis, classification, management, and prognosis of epilepsies. As a clinician, his main interest is the management of drug refractory epilepsy including treatment with VNS Therapy.



### **Dr Shabeed Chelakkadan**

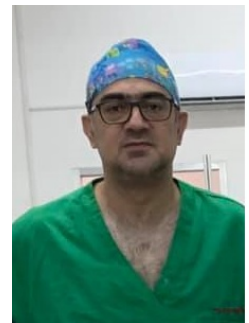
Dr Chelakkadan *MBBD, MD, FRCAP* is a Paediatric Neurologist who practices with a specialty in evaluation of complex epilepsy patients including surgical planning and prolonged EEG monitoring and VNS Therapy. He started his advanced training in neurology at Monash Medical Centre as a Paediatric Neurology/Rehabilitation Fellow and completed his Fellowship at Sydney Children's Hospital (SCH). He has built up his paediatric neurology knowledge through extensive experience in General Paediatrics over the past 6 years including a consultant role at Lady Cilantro Children's Hospital, Brisbane between 2010 – 2012. He has a special interest in paediatric epilepsy and extensive experience in managing complex epilepsy patients including surgical work up and ketogenic diet. Shabeed has a keen interest in paediatric epilepsy related clinical trials and is currently involved with two international trials. He also has a keen interest in supervising and teaching paediatric and neurology trainees.

# Neurosurgery



## Associate Professor Andrew Danks

Professor Andrew Danks *MBBS, MD, FRACS*, is an adult and paediatric neurosurgeon. He trained in the Australasian training system, working in all major Victorian neurosurgical units before completing a doctorate by thesis in the field of brain tumour biology. He then completed a joint fellowship at The Brigham and Women's Hospital in Boston and Boston Children's Hospital in neuro-oncology and paediatric neurosurgery. A/Prof Danks has worked in public and private practice at Monash Medical Centre and Jessie McPherson Private Hospital for 23 years, and as the head of the neurosurgery unit there for 19 years. He is heavily involved in training and supervision of junior staff and has been an examiner for the FRACS in neurosurgery for the last 6 years. He has considerable experience and expertise in brain tumour surgery and management, hydrocephalus and its surgical management, medical and surgical treatment for epilepsy, trigeminal neuralgia, Chiari malformations, spinal dysraphism, elective and emergency neurovascular conditions; and in the management of spinal disorders including cord compression, spinal tumours, radiculopathy, syringomyelia and degenerative spinal conditions. A/Prof Danks is expert in peripheral nerve disorders and their treatment and performs deep brain stimulation surgery for movement disorders.



## Mr Bob Homapour

Mr Homapour *MBCHB, FRCS(SN), MSc*, completed his neurosurgical training in the UK with a subspecialty Fellowship in Paediatric Neurosurgery at the Great Ormond Street Hospital London, the largest and busiest unit in the UK for children with neurological disorders. He has a wide range of experience in treating children with highly complex conditions including spinal and cranial dysraphism, spinal deformity, epilepsy, supra/infratentorial tumours, vascular disorders such as Moya Moya, as well as more general neurosurgical conditions such as trauma and CSF disorders. He also has further post CCT Paediatric Neurosurgery fellowship experience from Bristol Royal Hospital for Children and Birmingham Children's Hospital. He has a strong academic track record with an MSc in Surgical Sciences, multiple publications and national/international presentations.

## Important Information for patients and families

If you have any concerns as a result of your procedure, you can seek advice from the following sources:

- Your own GP practice for routine post-operative care.
- If you have concerns regarding the wounds or are unwell in any way after surgery you can seek advice from your local Emergency Department. Emergency Departments within the Monash network are at Casey, Dandenong and Clayton Hospitals.

For administration issues or general enquiries (9am to 5pm):

- Neurosurgery office: 95946141
- Neurology office: 95942240
- Email: [neurosurgery@monashhealth.org](mailto:neurosurgery@monashhealth.org) or [neurologyreception@monashhealth.org](mailto:neurologyreception@monashhealth.org)

## Important Information for doctors

- To discuss complex & urgent referrals please contact the on call registrar for neurology or neurosurgery via the Monash Health Switchboard on: 9594 6666
- For routine referrals please Fax or e-mail a referral form to:

The Specialist Consulting Services- Fax: 9594 2273

Email- [neurosurgery@monashhealth.org](mailto:neurosurgery@monashhealth.org) or [neurologyreception@monashhealth.org](mailto:neurologyreception@monashhealth.org)

(The referral form can be downloaded from the Monash website Neurology page)