

WakeMed Health and Hospitals: Innovative Procedure to Bring Quality of Life



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Raleigh Hospital, North Hospital, Garner Healthplex, Brier Creek Healthplex, and Wendell Healthplex





Cary Hospital and Apex Healthplex



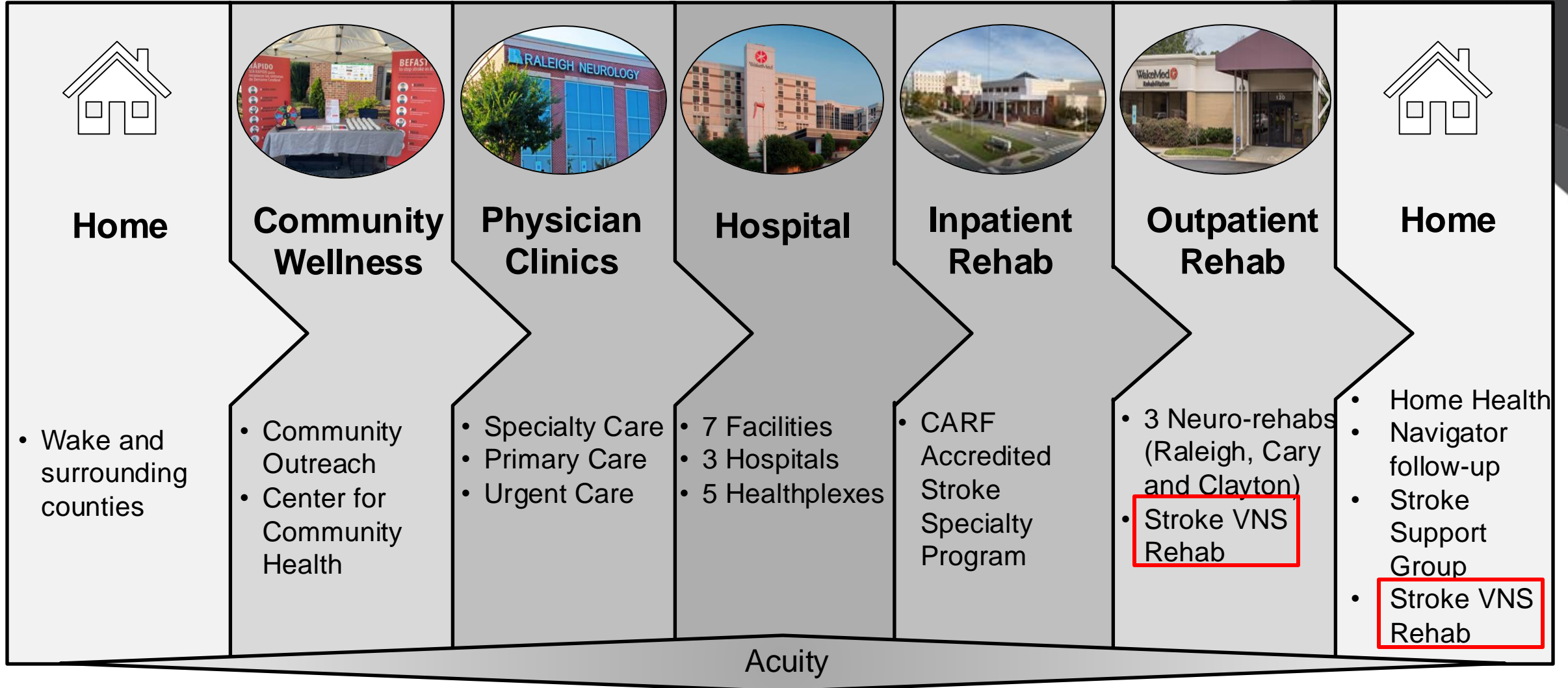


WW2E Tenets
+
WW2E Behaviors

WakeWay² Excellence



Why we took on this challenge?

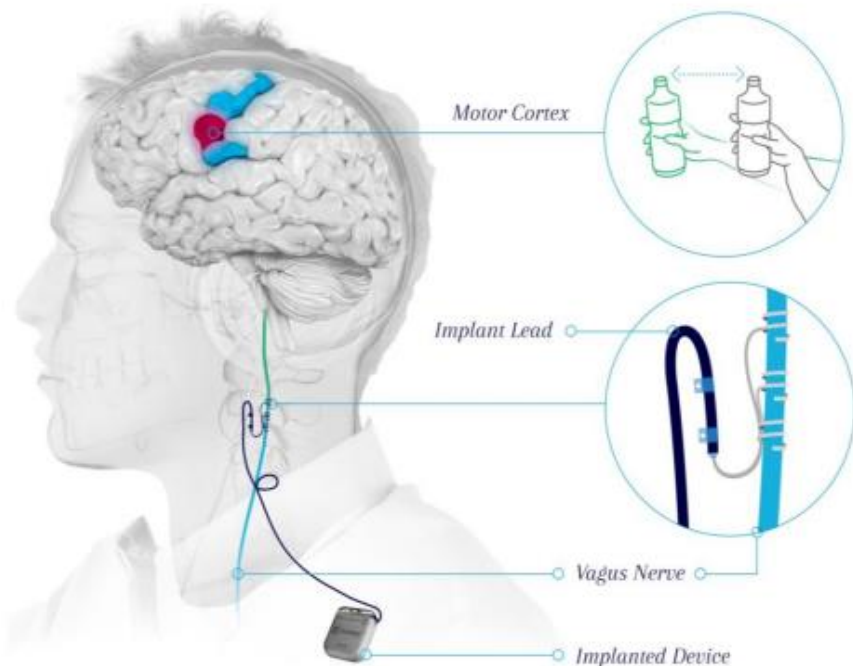


Stroke VNS Rehab



WakeMed

Vivistim® Paired VNS™



FDA Approved (August 2021)

For chronic stroke survivors with moderate to severe upper limb impairment

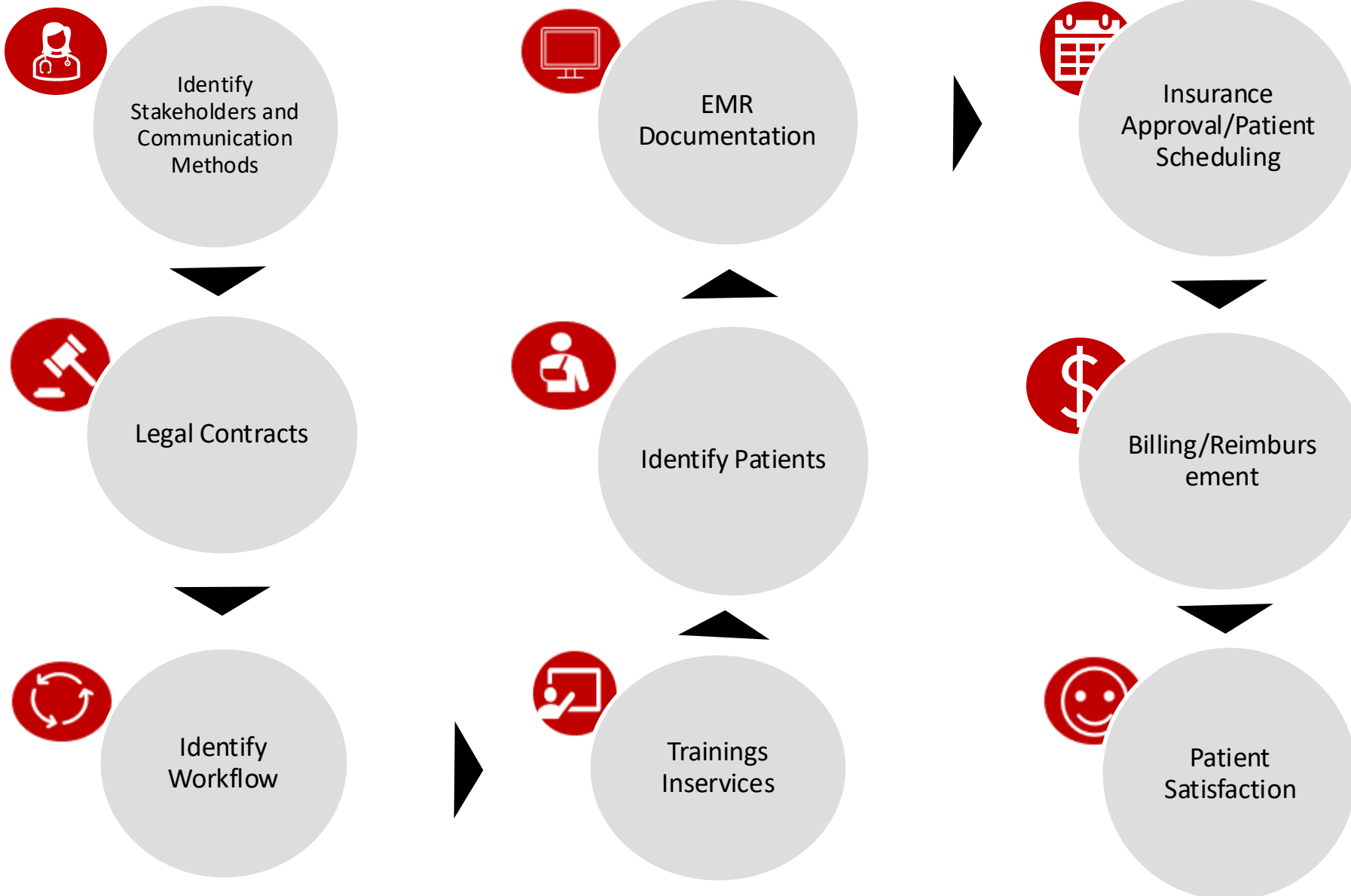
In-Clinic
90-min sessions, 3x per week for 6 weeks



- Therapist triggers VNS at key moment via a remote
- Movement is paired with a brief train pulse of VNS (½ second)
- Task-specific training and high repetitions

Paired VNS offers 2-3 times the improvement in impairment and function than intense rehab alone

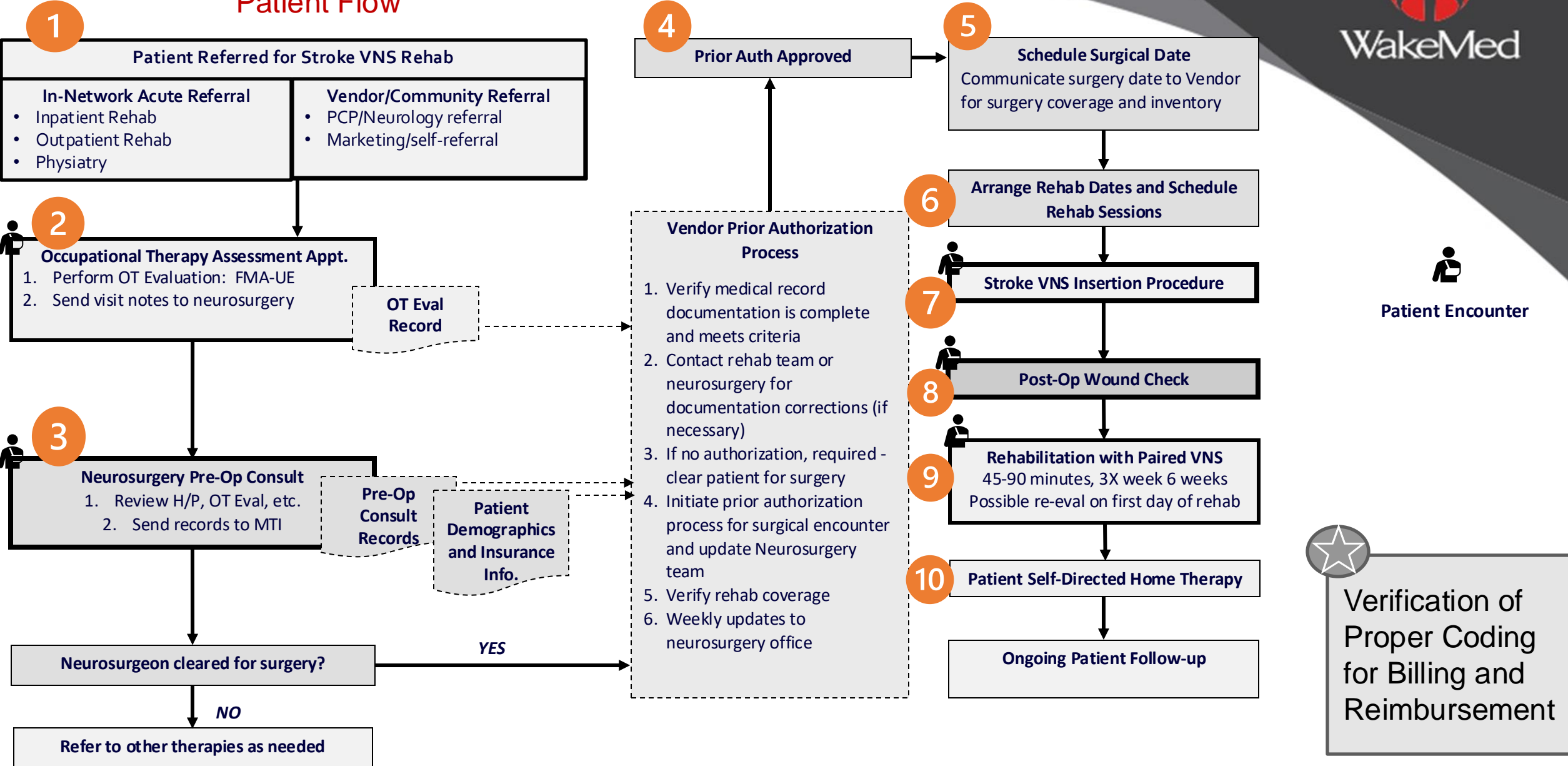
Planning



Stroke VNS Rehab



Patient Flow



Introducing WakeMed Stroke VNS Rehabilitation

After experiencing a stroke, nearly 60 percent of survivors continue to suffer from persistent impaired upper limb function and weakness.

WakeMed offers a safe and effective breakthrough treatment via a small, implanted FDA-approved device that improves upper limb function for stroke survivors who have not yet regained hand and arm mobility after active rehabilitation therapy, even years later.

Within WakeMed's Stroke Program, neurosurgeons, neurologists and occupational therapists collaborate to offer vagus nerve stimulation (VNS) during physical therapy to improve upper limb function for stroke survivors.

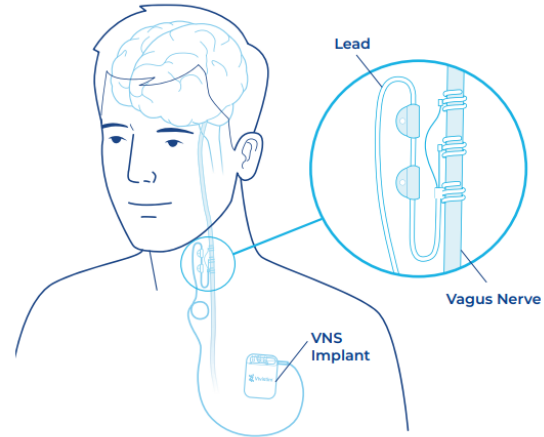
When used in combination with intense outpatient occupational therapy and at-home activities, the VNS stimulation activates the parts of the brain (via the vagus nerve) that are important for motor learning and generates two to three times more hand and arm function for stroke survivors than occupational therapy alone after six weeks of outpatient therapy.

Even if a stroke happened years ago, patients may experience increased hand and arm function over time. When the stroke VNS therapy boosts the brain's neural activity, it builds lasting connections that continue to work even when the implanted device is not in use.

Benefits of Stroke VNS Rehab

Users report improvement across numerous qualities of life measures, including:

- Strengthened brain connections needed to improve hand and arm function after stroke
- Increased functional mobility, as early as two to three weeks
- Improved self-care such as preparing meals, getting dressed or playing cards
- Positive daily living



Is Stroke VNS Rehab Right for You?

Stroke VNS Rehab is intended for chronic ischemic stroke patients with moderate to severe arm and hand impairment six months after stroke. If you think you may benefit from Stroke VNS Rehab, speak to your health care provider about receiving an evaluation with a WakeMed rehabilitation professional to see if you are an eligible candidate.

If you pass the initial rehab assessment, you will then be referred for a consultation with a neurosurgeon to determine if you are a good candidate for the implantation procedure.

For more information about Stroke VNS Rehab, call **919-350-7000** or scan the QR code to learn more.



New Therapy Now Available for Chronic Stroke Patients with Upper Extremity Weakness Introducing Stroke VNS Rehab

Stroke patients who suffer from post ischemic stroke upper extremity weakness now have a new therapy available. Utilizing vagus nerve stimulation (VNS) during rehabilitation therapy, 25 percent of ischemic stroke patients may benefit from this breakthrough treatment. Used in conjunction with rehabilitation therapy, VNS is shown to generate two to three times more hand and arm function than rehabilitation therapy alone.

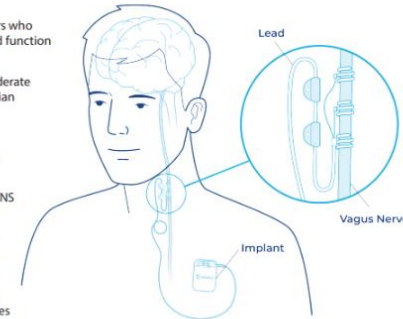
Who Can Benefit?

- Chronic ischemic stroke survivors who have not regained arm and hand function six months after their stroke
- Patients considered to have moderate to severe deficits by their physician

How Does it Work?

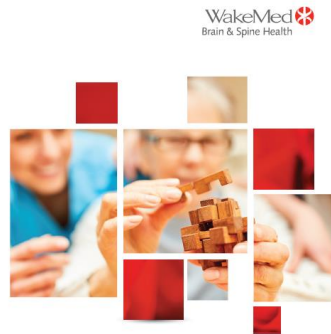
Stroke VNS Rehab includes three therapeutic components:

- Outpatient procedure to place VNS device in upper left chest
- VNS stimulation combined with intensive rehabilitation therapy for six weeks
- VNS for at-home therapy during prescribed rehabilitation exercises



Referrals

If you have a patient that you believe may benefit from Stroke VNS Rehab, you can place an order through Epic for a Stroke VNS OT Initial Evaluation. For non-EPIC users, fax the referral to 919-235-1328 or call **919-350-7000** with further questions. Our outpatient rehabilitation experts will follow up to evaluate eligibility, determine potential clinic benefit and provide family and caregivers guidance for next steps.

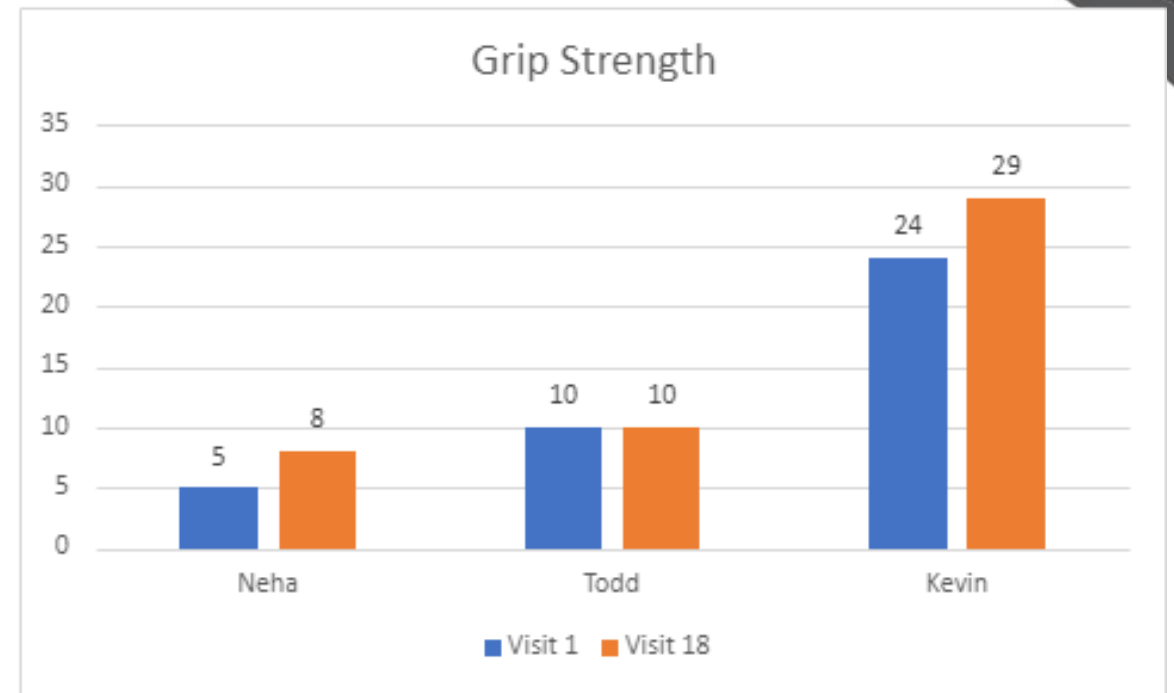
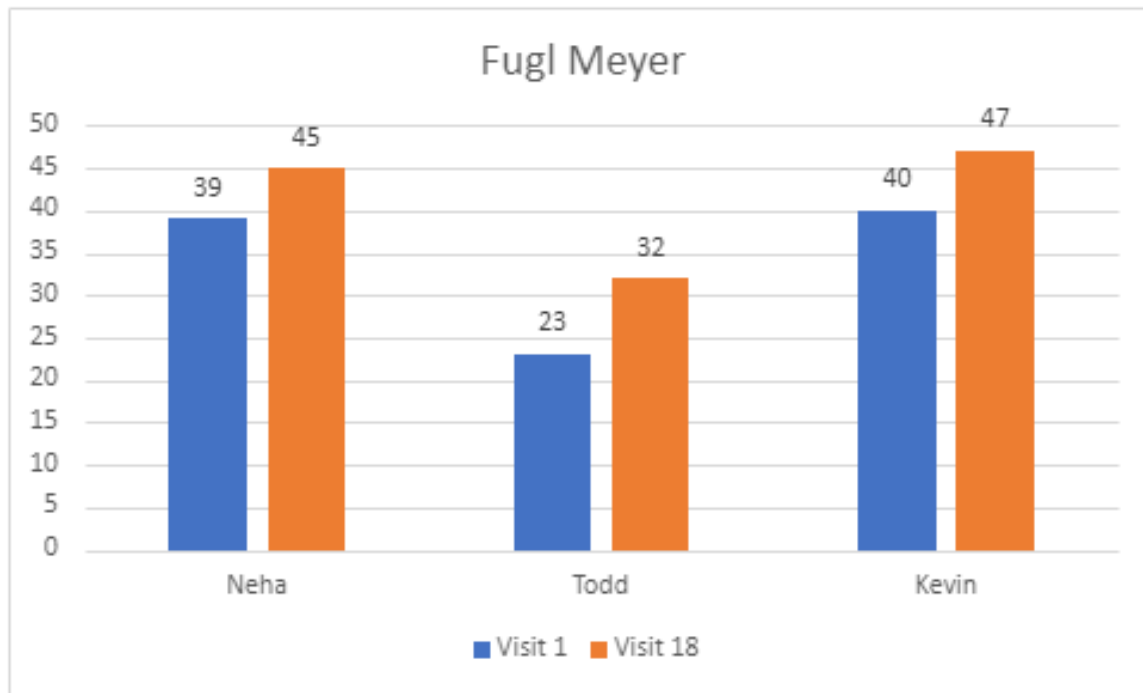


Stroke VNS
Rehabilitation

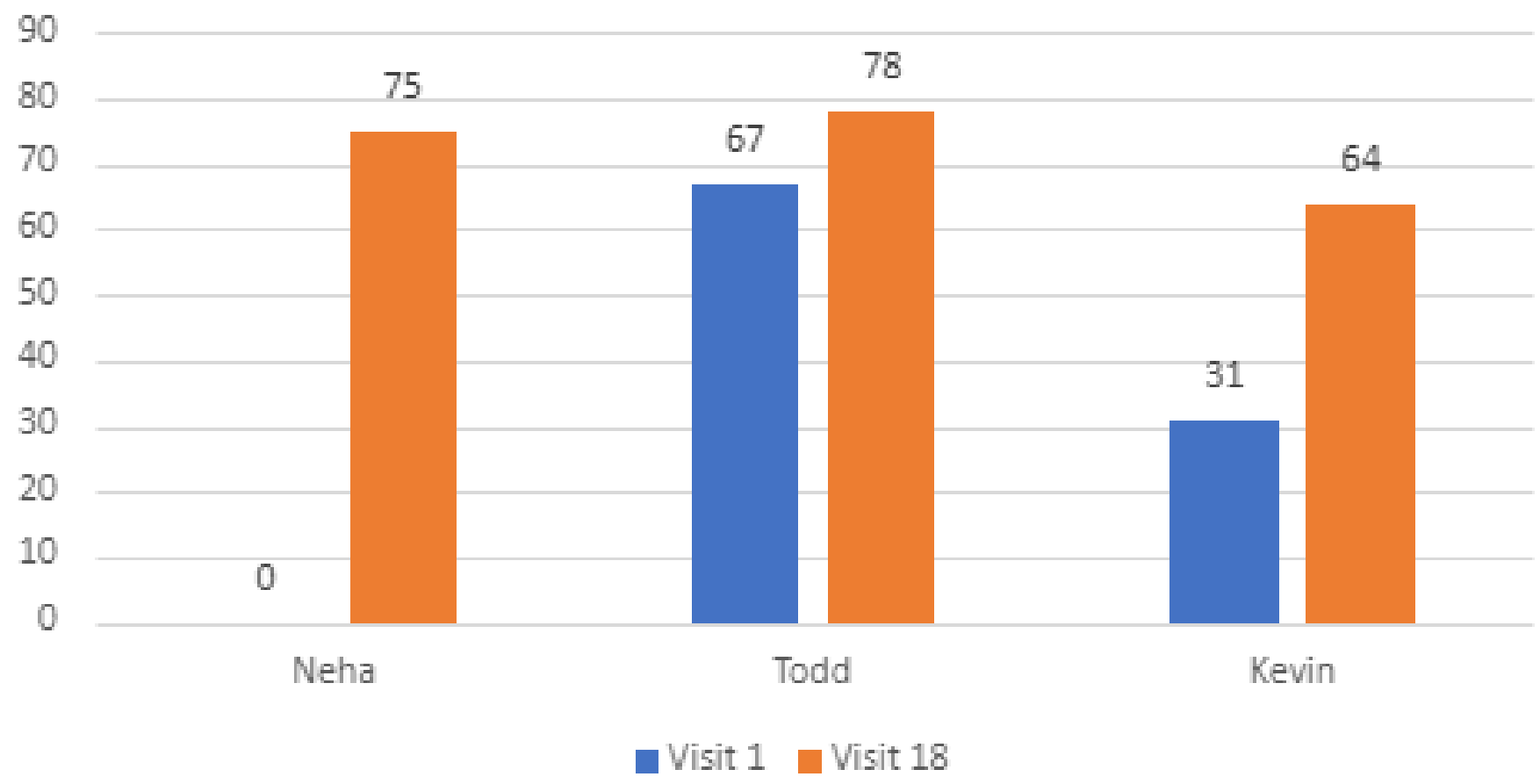
web page: [New Therapy Now Available for Stroke Patients with Upper Extremity Weakness | WakeMed](#)



Patient outcomes



Motor Activity Log



Stroke VNS Rehab Update

Blog:

[Stroke at 38: New Stroke VNS Rehab Gives New Hope to Neha Zadoo | WakeMed](#)

WakeMed Weekly:

[WakeMed First: VNS Rehabilitation for Stroke \(sharepoint.com\)](#)

Microscope:

See article on Right

Social (Instagram/LinkedIn/Facebook/Twitter):

[Neha Reel](#)

Time is Brain Conference (September)

NCOTA (November)

SHINE Conference (March)



Nearly 60 percent of ischemic stroke survivors suffer from persistent arm and hand weakness and impairment. This can make everyday activities like cooking, cleaning and dressing more difficult and tiring.

WakeMed recently became the first Triangle-area hospital – and just the second in the state – to introduce vagus nerve stimulation (VNS) during physical therapy for stroke survivors. This safe and effective treatment involves placing a small device – a vagus nerve stimulator – under the skin of the chest and tunneling the device lead to the vagus nerve in the neck. Once the device is in place, the patient participates in an intense outpatient therapy regimen for six weeks.

In these sessions, an occupational therapist activates the neurostimulator while the patient completes a variety of rehabilitation tasks. Most patients do not feel the stimulation, but it boosts the brain's neural activity, building lasting connections that continue to work even when the implanted device is not in use. According to a recent study by the American Stroke Association, the treatment shows significant – and lasting – improvement in arm and hand function.

In March of 2024, Robert Dallapiazza, MD, (Raleigh Neurosurgical Clinic), performed the first VNS implantation procedure at WakeMed. The patient was Neha Zadoo, who had experienced a stroke in January 2018 and still experienced weakness in her left arm and fingers several years later.

The procedure was successful and several weeks later Zadoo began her therapy journey with occupational therapist Amber Lewis (Rehab Therapy). The goal of their sessions – which took place three days a week for six weeks – was to get at least 500 repetitions of a movement per session. "Being able to directly stimulate the brain is new territory. Now we can pair the vagus nerve, which gives input to the brain as we are doing therapy. This is blending technology and clinical elements to produce more functional outcomes," comments Lewis.

Since completing the initial outpatient rehab therapy program, Zadoo has seen great improvement in her arm and fingers. "Before the procedure, many things were hard and even impossible. Cooking and cleaning took a long time because I did everything with my right hand," she explained.

As Zadoo looks to the future, she feels tremendous gratitude for those who helped her get to where she is: "To my neurosurgeon and neurologist, resident physician, physician assistant, anesthesiologist, nurses, occupational therapist and staff – thank you for your dedication to care and excellence. Without you all, external supporters and most importantly – my family and God – this would not have been possible."



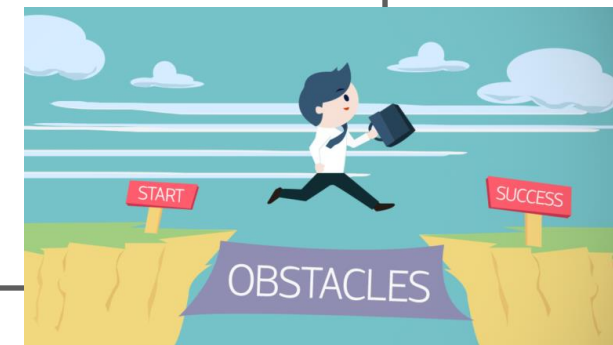
Challenges

HOSPITAL

- System buy in
- Insurance approval
- VNS new for Stroke
- Proper coding
- Bringing Awareness to community and bringing patients back 6 months post CVA

PATIENT

- Patience through insurance approval process
- Time/Transportation
 - OT 90 minutes 3x's/week
- Intensive Rehab



Stroke VNS Rehab at WakeMed

For questions:

StrokeProgram@wakemed.org

For referrals:

EPIC referral- Stroke VNS OT
Initial Evaluation

Non-EPIC users- Fax the referral
to 919-235-1328

Visit our website:

For physicians-



For patients-



Research Articles

Kimberley TJ, Prudente CN, Engineer ND, et al. (June 2019). Study protocol for a pivotal randomised study assessing vagus nerve stimulation during rehabilitation for improved upper limb motor function after stroke. *European Stroke Journal*, 4(4), 363–377. <https://doi.org/10.1177/2396987319855306>

Francisco GE, Engineer N, Dawson J, et al. (March 2023) Vagus Nerve Stimulation Paired with Upper-Limb Rehabilitation After Stroke: Two- and Three-Year Follow-up from the Pilot Study. *Arch Phys Med Rehabil*, 104(8), 1180-1187. <https://doi.org/10.1016/j.apmr.2023.02.012>

Dawson J, Liu CY, Francisco GE, et al. (April 2021). Vagus nerve stimulation paired with rehabilitation for upper limb motor function after ischaemic stroke (VNS-REHAB): a randomised, blinded, pivotal, device trial. *Lancet*, 397(10284), 1545–1553. [https://doi.org/10.1016/S0140-6736\(21\)00475-X](https://doi.org/10.1016/S0140-6736(21)00475-X)

Questions

