

2020/2021



# STROKE

**UPSTATE**  
COMPREHENSIVE STROKE CENTER

750 EAST ADAMS STREET | SYRACUSE, NY | [WWW.UPSTATE.EDU/STROKE](http://WWW.UPSTATE.EDU/STROKE)



# WELCOME

## FROM THE MEDICAL DIRECTOR AND STROKE PROGRAM MANAGER

### Past Year

Greetings! Thank you for a wonderful year of stroke care, despite ongoing concerns presented by the COVID-19 pandemic. In 2020, the Upstate Stroke Program provided 99 doses of IV thrombolytics and provided care for 64 “drip and ship” patients. We performed 64 neurointerventional stroke procedures and other surgical procedures for stroke patients in our region.

### Awards

Throughout the uncertainty and trepidation of the pandemic, the Upstate Stroke Program provided consistently fast and safe stroke care to our region. Last year in the Upstate Emergency Department, the median IV thrombolytic treatment time was 32 minutes. More than 90% of our Alteplase patients received their dose in under 45 minutes, and over 50% received their dose in under 30 minutes. This is a great achievement for the Upstate

Comprehensive Stroke Center and one for which we are very proud to earn recognition from the American Heart/Stroke Association.

### Ahead

As you will read, **we are excited to announce the integration of IV Tenecteplase into our stroke treatment formulary.** This drug, previously only used in patients with STEMI, has shown impressive results when used in the treatment of suspected stroke. We will be offering Tenecteplase as a first line medication to our patients. At Upstate, we continue to investigate the use of high-tech applications that will help augment our stroke care.

Thank you for taking time to read our stroke publication. It is our hope that you will gain a better understanding of our commitment to delivering the very best and innovative stroke care to our region.

*Above, left to right:*

*Josh Onyan, BSN, RN, SCRNP,  
Stroke Program Manager*

*Julius Gene Latorre, MD, MPH,  
Medical Director of the  
Upstate Comprehensive  
Stroke Program*



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# STROKE CARE DURING THE COVID-19 PA

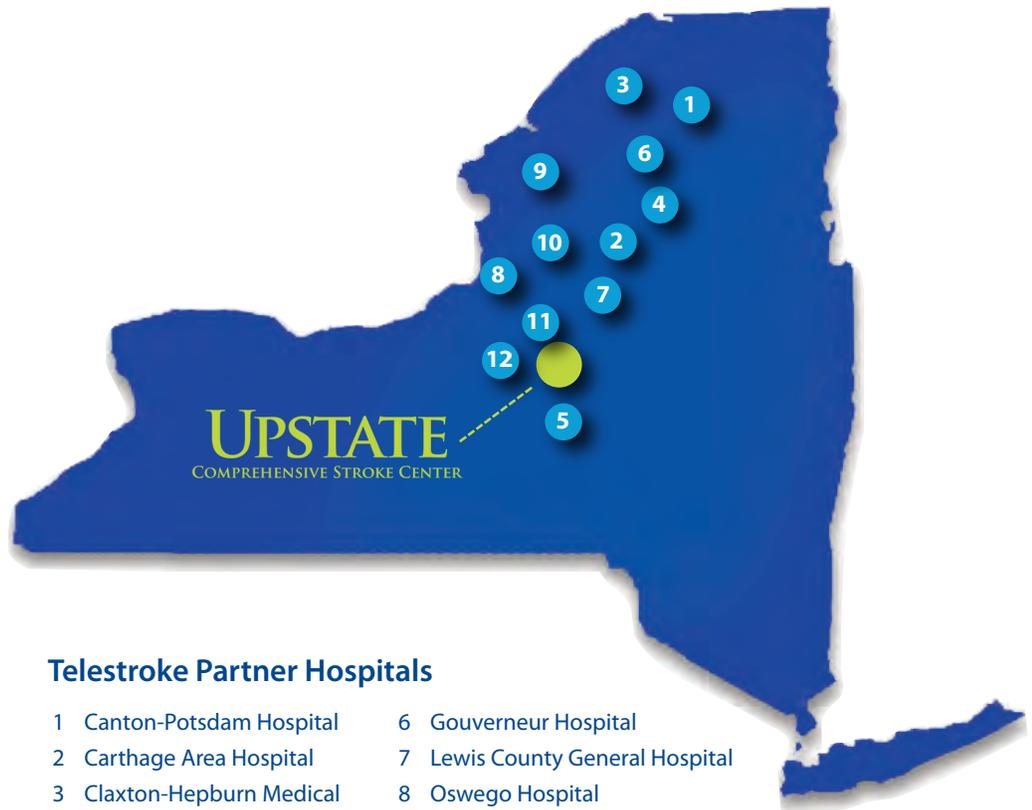
## HOW THINGS HAVE CHANGED.

### Telestroke

Upstate continues our telestroke program with 12 institutions in our 14-county catchment area participating. In this manner, our stroke neurologists can consult over a secure video feed. Our specialists are not only able to visualize and perform a neurological exam with the assistance of the requesting providers, but they can view imaging studies and offer patients and providers their recommendations and treatment options for stroke care. During the COVID surge, this availability allowed our physicians to prioritize patients for transfer to Upstate who may have required advanced stroke care available at a Comprehensive Stroke Center.

Many Upstate clinics and departments have benefited from the groundwork laid by the telestroke program. The ease with which these telehealth visits were accomplished was reassuring to all. During a time when office visits were discouraged unless essential, providers were able to continue to monitor their patients' health and remain available for their health care needs.

While maintaining the patient/ provider relationship is of great importance, maintaining the relationship between patients and their family/friends is equally important. The same technology that makes our telestroke network possible has enabled our patients to stay connected when their families could not be at their side. Caring for our patients' needs is of paramount importance!



### Telestroke Partner Hospitals

- |                                    |                                 |
|------------------------------------|---------------------------------|
| 1 Canton-Potsdam Hospital          | 6 Gouverneur Hospital           |
| 2 Carthage Area Hospital           | 7 Lewis County General Hospital |
| 3 Claxton-Hepburn Medical Center   | 8 Oswego Hospital               |
| 4 Clifton-Fine Hospital            | 9 River Hospital                |
| 5 Cortland Regional Medical Center | 10 Samaritan Medical Center     |
|                                    | 11 St. Joseph's Hospital        |
|                                    | 12 Upstate Community Hospital   |

### Strokes by Diagnosis 2020

N= 927

- |   |                                     |
|---|-------------------------------------|
|  | <b>136</b> Intracerebral Hemorrhage |
|  | <b>52</b> Subarachnoid Hemorrhage   |
|  | <b>99</b> Transient Ischemic Attack |
|  | <b>640</b> Ischemic Stroke          |



## HOW THINGS HAVE STAYED THE SAME.

### We value performance

Our door-to-treatment times continue to improve for both thrombolytics and clot retrieval therapies. In 2020, we reached a 32-minute median door-to-thrombolytic-treatment time. The Upstate Stroke Program has been recognized repeatedly by the American Heart/American Stroke Association for consistent compliance with quality measures, most recently receiving The Gold Plus Award for 2020.

### We are prepared

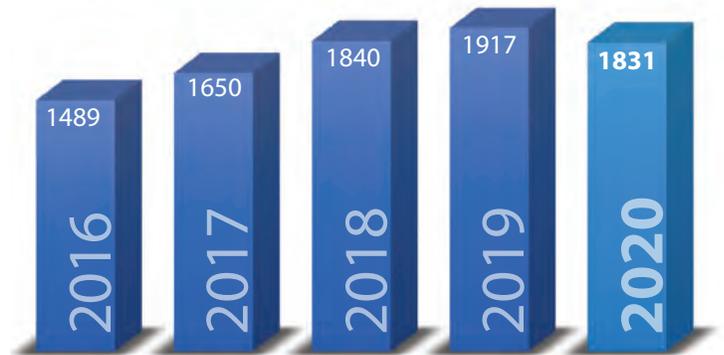
The COVID-19 pandemic has required us to make changes in our program, but that has not changed our dedication to our patients or our partners in health care. At Upstate, we have developed policies, protocols, order sets and algorithms — all written and devised using evidence-based practice. These have allowed us to maintain the same degree of excellence throughout the pandemic for both ischemic and hemorrhagic strokes.

### We do it with purpose

The Upstate Stroke Program adheres to American Heart Association/American Stroke Association guidelines for stroke care, as well as DNV and NYS DOH standards in order to improve patient outcomes. We continue to monitor all time targets and stroke core measures for compliance. Our patients can expect the same comprehensive stroke care we provided pre-pandemic.

2020 showed the first decrease in the number of patients evaluated by our stroke neurologists at Upstate in several years. There have been corresponding decreases in the numbers of stroke diagnoses and treatments. These decreases have been noted at many institutions across the country. The cause has yet to be determined, but there are indications that it may be due in part to hesitancy to go to a hospital during the height of the pandemic.

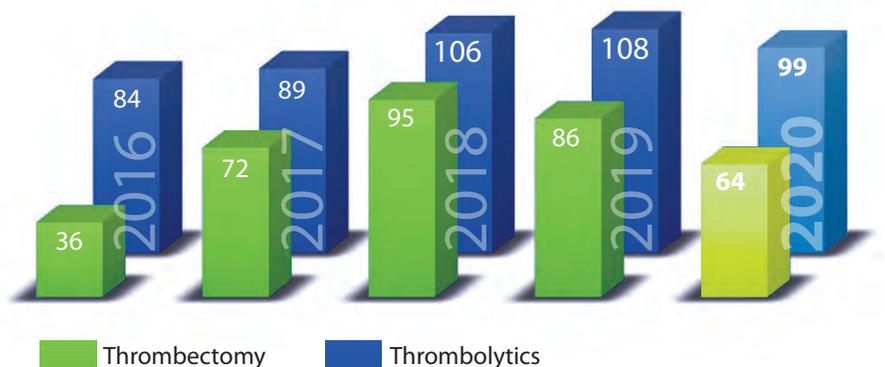
**Total Patients through the Upstate Comprehensive Stroke Center**



**Total Strokes through the Upstate Comprehensive Stroke Center**



**Five Years of Stroke Treatments: Upstate thrombolytic and reperfusion cases**



# THROMBOLYTIC THERAPY: NEW OPTIONS

Arkadiy Makaron, PharmD



Alteplase (tPA) has been the thrombolytic (clot buster) medication of choice for treatment of strokes within 4.5 hours of stroke onset. This left patients with unknown times of onset or “wake up” strokes without any treatment options. However, in the last year, Upstate Comprehensive Stroke Center has begun using advanced MRI imaging techniques to examine certain sequences and doing volumetric analyses (DWI and FLAIR mismatch) to essentially determine the age of the stroke in order to safely administer Alteplase to selected patients. This technique opens up an incredible opportunity for patients who might otherwise have not been able to receive treatment and be facing a major disability from a serious stroke.

Another type of tPA, or tissue plasminogen activator, Tenecteplase (TNK), has been the latest topic of discussion among stroke neurologists. Although TNK has a successful history of use for treatment of heart-related ischemic events, it is the practical application of TNK that has many stroke centers taking a second and third look.

Although TNK is not FDA approved for use in stroke, the available evidence suggests that TNK is at least as safe and

effective versus Alteplase and associated with better functional outcomes after three months. There is also evidence that TNK shows more frequent vessel re-perfusion, therefore making it a good choice for large vessel strokes requiring recanalization via a thrombectomy procedure. In addition, AHA recent guidelines for stroke treatment do recommend TNK as a possible alternative treatment in minor strokes.

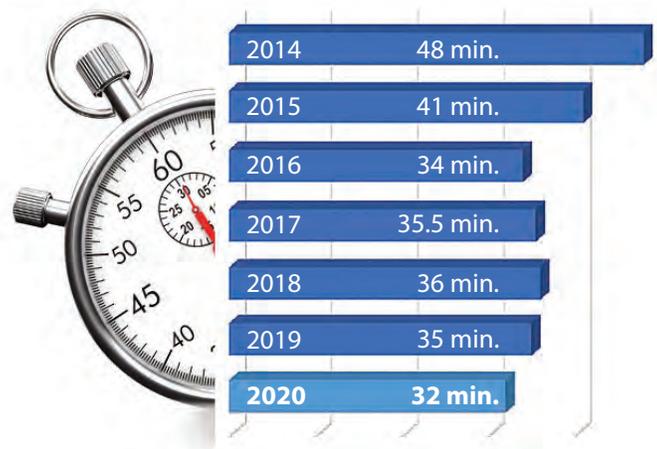
The longer half-life of TNK (> 20 minutes) allows for administration in a single bolus over five seconds, whereas Alteplase is a 10% bolus followed by a 90% hourlong infusion. This quick administration of TNK is very attractive to stroke centers who strive for the safest (potential for less calculation errors) and shortest “Door to Needle” times. The single bolus administration makes TNK an easier and viable option for regional hospitals planning to transfer a patient to a larger center, as they would no longer need to send a nurse with the patient to manage an infusion. TNK is also less costly than Alteplase, which also makes TNK a more attractive choice.

Based on this latest information, Upstate Comprehensive Stroke Center has recently joined several other stroke centers nationally to begin offering TNK as primary thrombolytic treatment for stroke. Upstate CSC is committed to providing the most effective stroke treatment and therefore the best possible quality of life for our patients.

(1) Campbell BCV, et al. *N Engl J Med* 2018; 378: 1573

(2) Katsanos, A, et al. *Stroke* 2020; 52: 1

## Upstate Median Thrombolytic Treatment Times



# ULTIMATE BIRTHDAY GIFT

## RECOGNIZING, RESPONDING QUICKLY HELPED SAVE A MAN'S LIFE

It was early afternoon on Aug. 8, and Timothy Carpenter, 57 years old, had just returned home from taking his wife, Michelle Angel, to Watertown for her birthday lunch. He had some copies to make. He was running a page through the copy machine when he started feeling dizzy. He mumbled something.

"What did you say?" his wife called from across the room. She turned just in time to see him collapse. She called 911.

Carpenter recalls that his right side was not working. He'd knocked over the chair when he fell. Now he struggled to get up, and he struggled to speak.

Soon, two old friends from the Fisher's Landing Fire Department were at Carpenter's side. His nephew, Andy Baltz, walked in, took one look at him, and walked back out to call the helicopter. Thousand Islands Emergency Rescue Services arrived to transport Carpenter from his home to the nearby Can-Am Speedway in LaFargeville, where the LifeNet helicopter could land safely.

"It didn't seem like it took hardly any time at all," Carpenter says of the flight to Upstate University Hospital in Syracuse. He recalls glancing out the window to see Interstate 81 and the Great Lakes Cheese plant in Adams from above. He remembers landing, hearing the blades of the chopper wind down, and being wheeled into the hospital.

Carpenter's stroke happened on his wife's birthday. Fourteen years earlier, he survived a heart attack on her birthday. "I'm kind of a resilient old bird," he says. He worked in a lumber yard when he had his heart attack. At first, he shrugged off the

pain as a pulled muscle and continued working. That night he went go kart racing. The next day, he couldn't raise his arm above his head, but he worked his entire shift. He returned the next day to load trucks for delivery. Finally, feeling awful, he said he had to go home.

His wife had an ambulance friend stop by to assess him. The man took Carpenter's blood pressure and turned white. He told Carpenter he was going to the hospital, and he was going immediately. "What scared me," Carpenter says, years later, "is that he flat refused to tell me what my blood pressure was." Since then, Carpenter has taken an aspirin every day. He said it's unclear whether his stroke is related to his heart attack.

He awoke Aug. 9 under the care of Timothy Beutler, MD, a neurosurgeon who specializes in critical care at Upstate.

A blood clot had totally blocked one of the vessels in his brain. Members of the stroke team gave him a powerful thrombolytic to help dissolve clots, and Amar Swarnkar, MD, a professor of radiology, neurology and neurosurgery, used tools to locate and retrieve the clot in a procedure called a thrombectomy.

"Everything in stroke care is time-sensitive," Beutler explains. "Mr. Carpenter had quite a good outcome. That's because of a quick recognition of his stroke symptoms and his quick arrival to

Upstate. He was able to get the thrombolytics and to get into the angio suite for the thrombectomy."

Beutler says based on the location and size of the clot, if Carpenter had not arrived so quickly, he likely would have suffered a stroke that caused potentially life-threatening brain swelling. He would have been hospitalized for weeks and may have required emergency surgery. He likely would have been left with severe deficits and been discharged to a nursing home.

Because Timothy got prompt care, his only remaining symptom is a mild facial droop that is barely noticeable. He is looking forward to an uneventful birthday for his wife next year!



# TECHNOLOGY AND STROKE



**Josh Onyan, BSN, RN, SCRNP** and **Claribel Wee, MD** answer questions on recent health care technologies and applications. Onyan is the Stroke Program manager at Upstate University Hospital. Wee is a neurocritical care attending physician and a Stroke Fellow. Both have a special interest in technologies meeting health care needs.

## When did the Stroke Program at Upstate start to really introduce technologies into stroke care?

**Josh:** Let me preface this question with a reminder that advancing technology will never exceed the clinical decision-making ability of a medical provider. With that being said, technology is being used as an adjunct to the decision-making process in stroke care. Obtaining a computerized tomography (CT) scan is the first essential step in the stroke decision process. Additionally, through sophisticated CT scans such as a CT Angiogram, we are able to see blood vessels of the brain, including blockages and bursting blood vessels. At Upstate, almost every patient coming in with suspected stroke will receive a scan similar to this.

With this background on CT scanners, we can no longer imagine how computer learning and artificial intelligence (AI) can come into play. When a high-power computer processor is applied to a CT scan, we are able to clearly capture supporting images that can help guide stroke treatment even further. For example, the CT angiogram mentioned above would now be able to exactly

pinpoint where and how much brain blood vessel blockage is occurring. When we combine one more specialized scan, a CT perfusion scan, with similar AI technology, we are able to determine the amount of brain tissue that has already died versus how much is still potentially salvageable. The software that is used at Upstate is called RAPID.

All of this information is extremely essential to help guide the care of the stroke patient at Upstate.

## What does the integration of this type of technology mean to you as a stroke provider?

**Dr. Wee:** It's certainly an exciting time to be involved in stroke care. Just a couple decades ago, we had no acute treatment to offer patients with ischemic stroke. When thrombolytics — or clot-busting therapies — were shown to improve functional outcomes, the game was changed, and then just a few short years ago endovascular therapies began to be quite effective.

Improvements to our radiographic technologies and capabilities have developed in parallel here at Upstate and have made it easier to offer thrombolytic or endovascular therapy to the right patients. Shorter door-to-scanner times means faster door-to-treatment times. Perfusion scans can also help us make more informed decisions regarding endovascular therapy.

**"In stroke, millions of neurons are lost with every passing minute that blood flow is not restored, and our radiographic advancements help me offer the right treatments to the right patients in the shortest amount of time possible." Claribel Wee, MD**



## What changes have you seen since the integration of RAPID at Upstate?

**Dr. Wee:** I remember when we initially started using RAPID at Upstate as part of one of the landmark clinical trials that would later go on to show how endovascular therapies can be effective for patients presenting outside of the acceptable treatment window at that time. Like any new tool, there was a learning curve. Fast forward a few years, and now it's well established in our vernacular, part of the decision tree we teach our up-and-coming resident physicians. With RAPID, we are now able to identify patients who would benefit from endovascular therapy and who likely would not have been offered this treatment prior to the advent of this technology.

## Can you talk about advancements in communications technology?

**Josh:** Team communication, starting at the pre-hospital level, is essential to ensure timely and thorough stroke care for each and every patient. We at Upstate, like many large stroke centers across the country, have identified a need to enhance this communication. We are currently looking to implement some of this technology in the very near future.

## Do either of you have anything else to add?

**Dr. Wee:** Integrating these technological advancements into our stroke care at Upstate has been thrilling, but the process is ongoing. And I'm excited to see what the future holds.



# NEURO-INTERVENTION AND NEW TECHNOLOGIES

Restoring the blood flow to the dying part of the brain as quickly as possible is the laser-focused thought in the minds of all stroke doctors responding to a stroke alert. Thrombolytic medications may start the lysing process, but the patient may still require surgical intervention to maximize their chances of a good clinical outcome. At Upstate, our neuro-interventional radiology (NIR) team comprises physicians cross-trained in neurology, radiology and neurosurgery who stand ready to put their expertise to work by performing clot retrieval procedures through the guidance of cerebral angiography.

Upstate is also committed to training new physicians in these life-saving techniques through our Early Specialization in Stroke Neuro-intervention/Neuro-interventional Stroke Pathway (ESNI) Fellowship and Residency programs. Along with physician training, we are working to continually evaluate the tools and methods used in these sensitive procedures to ensure optimal patient comfort and safety.

As a teaching hospital, Upstate University Hospital supports guiding the growth of our physician trainees as they pursue their passions for learning through research, simulation experiences and clinical applications. Neil Suryadevara, MD, MPH is pursuing his combined fellowship training through the ESNI pathway. His team had the opportunity to use Tenecteplase, a thrombolytic being introduced into stroke care, and bring patients into the angiography suite to assist in performing mechanical thrombectomy. They are able to

work with new interventional radiology devices, including a smaller, innovative stent retriever to retrieve clots from smaller arteries and larger bore access aspiration catheters.

Another aspect of the neuro-interventional program is trans-radial access (TRA). Hayden Hoffman, MD, PGY-6 contributed to the research for the use of TRA in acute neurological interventions. Cerebral angiography and neuro-interventions have traditionally been performed through the femoral artery (TFA). However, TRA is an alternative that is gaining popularity in acute neurological interventions. TRA was initially proposed for coronary angiography in 1989 and has been used since, with numerous small case series published throughout the '90s for angiography/angioplasty.

The benefits of TRA include: shorter observation times needed after the procedure, no unnecessary bedrest post-procedure, shorter hemostasis time, easier navigation of Bovine/Type III arches, lower risk of access complications, easier access for obese patients, and simpler use with patients who have had peripheral artery disease or prior aorto-iliac interventions. However, smaller access sites, vasospasm risk, arteria lusoria and the potential for greater difficulty navigating proximal common carotid tortuosity may require further studies and considerations. In the future, we hope to see longer multi-center prospective studies and radial specific devices developed for the use in neuro-intervention.



*Hayden Hoffman, MD*



*Neil Suryadevara, MD, MPH*

# A STROKE SURVIVOR'S JOURNEY:

How one man was helped by rehabilitation, a vegan diet and pharmacogenomics.



**Members of the Upstate Pharmacogenomics Team:** Karen Albright (Neurologist); Stephanie Loveless (Nurse Practitioner); Katie Reed (Nurse); Danielle Delvecchio (Pharmacist).

## Pharmacogenomics

*Pharmacogenomics is the study of how a person's genetic makeup influences their response to medications or classes of medications.*

*How can Pharmacogenomics help in the care of stroke patients?*

- Medications not achieving the desired results
- Multiple medications
- History of adverse drug reactions

Contact PGx (pharmacogenomics) at Upstate Neurology: 315-464-4343

Peter Wong was in his early 50s when he had his first stroke. Today, he says, "I remind myself over and over again how lucky I am to be on this side of the earth."

Through a lengthy journey back to health, Wong has been helped by several experts at Upstate Medical University, including physical therapists, a doctor who oversaw important dietary changes, and another who streamlined his prescriptions.

Wong, 60, of Liverpool, loved his job and spent many hours at Hancock International Airport. He worked for an airline, directing planes into terminals, ticketing passengers, collecting baggage and various other tasks.

One morning in October 2014, just after the last of the passengers were checked in, Wong suddenly leaned against the wall. His words became garbled. His body slid down the wall until he sat on the baggage belt.

Co-workers helped him into the break room. He got worse. Paramedics wanted to bring him to the emergency department. Wong resisted. Finally, he agreed to let a co-worker drive him home. She instead drove him to the hospital.

"They found that two ischemic strokes had occurred in the pons area of my brain," Wong recalls, "and determined it was too late for medication to break up the clots."

An ischemic stroke occurs when a clot blocks blood flow in an artery in the brain. The pons area is the largest part of the brain stem, where information is relayed about motor function and sensation, eye movement, hearing, taste and more. Medication can be used to help break up clots that are causing strokes, but only if administered quickly.

Wong was hospitalized for a week. But the day he was to be discharged, he suffered a third stroke. Wong couldn't swallow, see or move his left side.

Several weeks later, he was transferred into the Physical Medicine and Rehabilitation (PMR) program

at Upstate Medical University. He still struggled physically. "My cognitive, intelligent self was trapped in a world it didn't want to be in," Wong recalls. The PMR therapists, doctors and nurses "took super care of me. They had to help me through some really, really difficult times."

For two months at Upstate and another six months after he was discharged, Wong worked to regain the ability to swallow and to stand and eventually to walk. He continued having transient ischemic attacks, small strokes known as TIAs. Sometimes he would stumble and injure himself falling or have a seizure. One of his doctors recommended a vegan diet to break his cycle of strokes. Wong eliminated animal fat from his diet for an entire year, gradually adding other protein sources like eggs and yogurt. He says it was torture, but it helped improve his blood pressure — a key risk factor requiring good control to reduce recurrent strokes.

During a follow-up appointment, Wong's doctor told him about neurologist Karen Albright, DO, PhD, a specialist in pharmacogenetics, how an individual's genetic makeup affects their response to medications. Wong got an appointment with Albright at the Department of Neurology's pharmacogenomics clinic.

Albright told him of an unusual tendency for people from specific regions of Asia to have a genetic variant that could disrupt the metabolism of certain medications, including Clopidogrel (a.k.a Plavix), the one he was taking to reduce his risk of stroke by inhibiting platelets in his blood. Wong was born in Hong Kong. He was willing to have blood drawn for a genetic test that would reveal how his body was handling the medications he was taking.

"Clopidogrel has to get absorbed and then activated," Albright explains.

Wong learned that he had a genetic variant that was not allowing his body to fully activate clopidogrel. Albright discontinued his Clopidogrel and replaced it with an alternative antiplatelet medication. "I have not had a TIA or stroke since. It's unbelievable," Wong says.



## RESEARCH STUDIES UNDERWAY AT UPSTATE

The Upstate Comprehensive Stroke Center is at the forefront of testing medical innovations and cutting-edge technologies. Below are the active clinical trials in which Upstate is participating.

 **CHARM:** Randomized, Double-Blind, Placebo-Controlled, Parallel-Group, Multicenter, Phase 3 Study to Evaluate the Efficacy and Safety of Intravenous BIIB093 (Glibenclamide) for Severe Cerebral Edema Following Large Hemispheric Infarction

**Objective:** To determine if BIIB093 improves functional outcome at Day 90 as measured by the mRS when compared with placebo in subjects with LHI. The endpoint that relates to this objective is Day 90 mRS as a 5-category ordinal scale.

 **MOST:** Multi-arm Optimization of Stroke Thrombolysis (MOST): a single blinded, randomized controlled adaptive, multi-arm, adjunctive-thrombolysis efficacy trial in ischemic stroke.

**Objective:** To determine if Argatroban or Eptifibatid results in improved 90-day mRS scores as compared with placebo in acute ischemic stroke patients treated with Alteplase or Tenecteplase within three hours of symptom onset.

 **SATURN:** STATINS USE IN INTRACEREBRAL HEMORRHAGE PATIENTS

**Objective:** To determine the effects of continuation vs. discontinuation of statins on the risk of ICH recurrence during 24 months of follow-up in patients presenting with a spontaneous lobar ICH while taking a statin drug.

 **Sleep SMART:** Sleep for Stroke Management and Recovery Trial

**Objective:** To test whether treatment of OSA with CPAP after recent stroke or high-risk TIA prevents recurrent stroke, acute coronary syndrome or death.

 **ASPIRE:** Anticoagulation in ICH Survivors for Stroke Prevention and Recovery

**Objective:** To determine if Apixaban is superior to aspirin for prevention of the composite outcome of any stroke (hemorrhagic or ischemic) or death from any cause in patients with recent ICH and atrial fibrillation.

 **PassPort:** Personalized Antiplatelet Secondary Stroke PRevention (PASSPoRT). A Randomized, Phase II, Open Label, Trial in High Risk Transient Ischemic Attack (TIA) and Ischemic Stroke Survivors Age 18 Years and Older

**Objective:** To determine safety and feasibility in participants randomized to antiplatelet therapy informed by genotype and phenotype vs. standard of care.

# UPSTATE

COMPREHENSIVE STROKE CENTER

750 East Adams Street  
Syracuse, NY 13210



DESIGNATED STROKE CENTER



## KNOW THE SIGNS OF STROKE

If you're experiencing stroke symptoms, call 911.

- F** Facial Droop
- A** Arm or Leg Weakness
- S** Speech Trouble
- T** Time/Terrible Headache
- E** Eye Deviation or Vision Loss
- D** Denial or Dizziness

