



Our Case for Support



What is TSC?

Tuberous sclerosis complex (TSC) is a rare genetic disease that causes tumors to form in many different organs, including the brain, eyes, heart, kidneys, skin and lungs. Worldwide, TSC affects nearly 1 million people and approximately 50,000 people in the United States.

Every individual's experience with TSC is different—many are able to live independently despite the disease, while others experience more challenges requiring complex care. Changes in the brain caused by TSC have the biggest impact on quality of life, from seizures and developmental delays to intellectual disabilities, behavioral challenges and autism.

TSC is a linchpin disease, meaning its genetic pathway also plays a role in other diseases and disorders. Advancements in TSC research may lead to a better understanding of autism, epilepsy, traumatic brain injury, diabetes and cancer—diseases that affect more than 65 million people in the United States alone.



“Understanding TSC echoes into other disorders like epilepsy, autism, cancer. So, by focusing on this rare disease we are learning a lot about some common diseases as well. It is a very vibrant research environment.”

Peter B. Crino, MD, PhD, Chair
of Neurology, University of Maryland
School of Medicine

The TSC Alliance is here for everyone affected by TSC

The TSC Alliance improves quality of life for everyone affected by TSC by catalyzing new treatments, **driving research toward a cure** and expanding access to lifelong support.

Founded in 1974 by four mothers of children with TSC, the TSC Alliance quickly became the leading source of support and hope for those affected by the disease. Since then, we have made incredible progress in raising awareness, accelerating research discoveries and creating support systems around the world.

Today, the TSC Alliance is a leader in the rare disease community and a comprehensive resource for anyone touched by TSC. We won't stop until every person with TSC can realize their fullest potential—no matter how complex the journey is to get there.

How will we achieve our vision?

Accelerating research

We equip TSC researchers with the data and funds they need to discover breakthroughs.

Strengthening care

We improve access to high-quality care for people with TSC.

Empowering the community

We advocate with and for the TSC community to ensure everyone affected by the disease can live their fullest lives.

We have a proven track record of research success

The TSC Alliance is committed to further catalyzing research to create meaningful outcomes for people living with TSC and their families. Since 1984, we have funded more than \$37 million in TSC research and leveraged \$505 million in additional federal funding through the National Institutes of Health and the Department of Defense Congressionally Directed Medical Research Program.

Our accomplishments to date include:

- Backing the **first-ever preventative clinical trial** for epilepsy in the United States
- Sponsoring research that helped identify the **two genes that cause TSC**
- Supporting the development of a **genetic test for TSC**
- Establishing the first **TSC Natural History Database** in the world and enrolling more than 2,680 individuals
- Creating a **Biosample Repository** with more than 2,660 samples linked to clinical data in the Natural History Database
- Building the **first clinical network** for patient care, clinical studies and clinical trials
- Funding research that resulted in **FDA approval of three drugs** specifically for TSC
- **Increasing accessibility of vigabatrin**, the first-line treatment for infantile spasms in TSC
- Organizing the first **TSC Clinical Consensus Conference** to update international gold standards for TSC diagnosis, surveillance and treatment
- Conducting 185 experiments evaluating 82 compounds with 23 industry partners in the **Preclinical Consortium**
- Partnering with the **Clinical Research Consortium** on two clinical biomarker studies
- Providing support for a **rare diseases clinical research network**

We have funded nearly
\$37 Million
in TSC research



“The ongoing efforts into TSC research provide a strong sense of hope as we collectively move forward to change the course of the disease.”

Tanjala Gipson, MD, TAND Unit Director, Tuberos Sclerosis Center of Excellence at Le Bonheur Children's Hospital

There's more work to be done

Although significant advances have been made in diagnosis and treatment, many individuals with TSC have disorders and symptoms that significantly impact the quality of their lives.

- **85%** of individuals affected by TSC experience seizures during their lifetime.
- **80%** of individuals with TSC develop angiomyolipomas, which can lead to the risk of kidney disease or kidney failure.
- The majority of women impacted by TSC will develop cysts in their lungs, which can lead to decreased lung function and the need for a transplant.
- **50%** of those affected will also live with autism spectrum disorder.

Other challenging symptoms for individuals with TSC include sleep difficulties, learning challenges and behavioral issues.

Fortunately, TSC research is advancing faster than ever before. In the last decade, the TSC Alliance has helped drive and fund research that resulted in three new FDA-approved drugs for TSC manifestations.

But we can't stop there. TSC is a linchpin disease, which means it shares similar features with other disorders. Advancements in TSC research can lead to advancements in treatments for cancer, epilepsy and autism, which affect millions worldwide.



The TSC Alliance launches the 50 FORWARD FUND



The **50 Forward Fund** is the TSC Alliance's largest research initiative in our 50-year history. It was designed as part of the TSC Alliance's Research Business Plan to guide research efforts and develop evidence-based standards of care for TSC individuals. The **50 Forward Fund** bolsters the momentum we've built since our founding while ambitiously looking forward to a future where everyone affected by TSC can live their fullest lives.

Through the **50 Forward Fund**, we will advance research toward the following goals:

- Focusing research to better understand TSC and identify new treatments
- Altering the course of the disease and improving quality of life through prenatal diagnoses and preventative treatments
- Educating medical professionals to achieve more rapid diagnosis and better treatment aligned with evidence-based standards of care



"I believe it should be everyone's mission to support research, because it is with science that the most important discoveries are made."

Anita Bhatia, MHA, CEO & Executive Director, Ramesh and Kalpana Bhatia Family Foundation

For more information: [Lisa Moss, Vice President, Donor Relations, lmoss@tscalliance.org, 800-225-6872](mailto:lmoss@tscalliance.org)

THE LEADERS TAKING US INTO THE FUTURE OF TSC RESEARCH

Steve Roberds, PhD

Steve joined the TSC Alliance staff in 2011 as Chief Scientific Officer after spending 16 years in the pharmaceutical industry. In this role, he leads the development and execution of the TSC Alliance's research strategy through partnerships and conversations with all stakeholders, including individuals and families affected by TSC, basic and clinical researchers in academia and industry, healthcare providers, government agencies involved in medical research and other non-profit organizations.



Dean Aguiar, PhD

Dean joined the TSC Alliance in November 2018 with more than 17 years of research and development (R&D) leadership in biopharmaceutical and medical device industries, leading teams and technologies from discovery to investigational new drug and investigational device exemption, a pre-requisite for clinical trial evaluation. He brings an entrepreneurial and collaborative approach to R&D, identifying opportunity, defining strategy and developing a scientific data package to warrant clinical translation of technologies to benefit the patient, the family and the care provider.



Chip and Kristin Burkhalter

Chip and Kristin are parents to Bear, age 10, with TSC as well as two other boys. The impact of TSC on their family led them to be passionate advocates for all those affected by TSC. They believe strongly in the impact TSC research will have on Bear's future, as well as the future of all those living with TSC. They devote their time and energy as chairs of the **50 Forward Fund**, knowing the more we learn about TSC, the better chance we have at funding new treatments for some of the most challenging TSC manifestations.

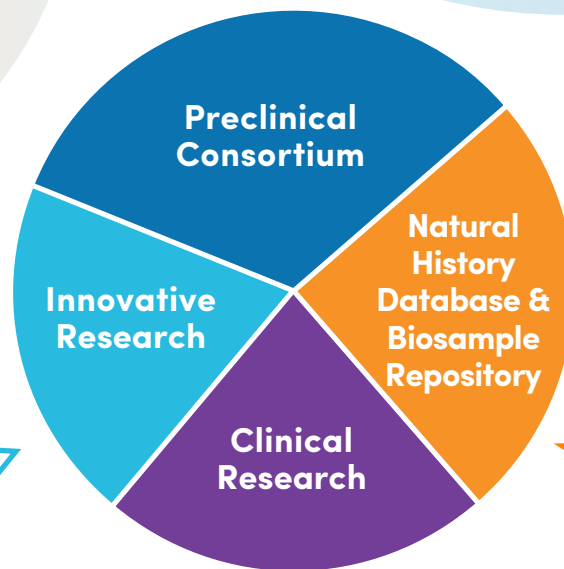


Changing the course of TSC

Since the start of our research business plan in 2019, we've made significant progress in changing the course of TSC through our four key areas of research: the TSC Natural History Database and Biosample Repository, Clinical Research, Preclinical Consortium and Innovative Research. **Below are some of our significant accomplishments since 2019.**

- Conducted 226 experiments evaluating 89 compounds with 23 industry partners in the Preclinical Consortium to identify new therapeutics and treatments for TSC
- Established five epilepsy and tumor models as well as four new models: one with autism-like features, two Tsc2 models exhibiting epilepsy and/or behaviors, along with validating a lymphangioleiomyomatosis (LAM) model

- Invested \$2,659,023 in research grants funding 35 researchers at 29 institutions
- Held Innovation Workshop to launch newborn screening assay development, blood-based biomarkers for TSC-Associated Neuropsychiatric Disorders (TAND) and consensus guidelines for reproductive and perinatal health
- Hosted three International TSC Research Conferences averaging more than 225 attendees each



- Added first patient-reported outcomes on epilepsy and TAND to Natural History Database
- Launched mobile blood collection and reached 2,758 participants in the Natural History Database and 2,710 samples in the Biosample Repository
- Established and sequenced 115 samples through our Whole Genome Sequencing initiative to assess which medication and/or preventative intervention may work in each individual and to provide genetic testing results back to families
- Initiated clinical trial based upon analysis of blood samples from the Biosample Repository

- Initiated STEPS (Sirolimus TSC Epilepsy Prevention Study) Trial and funded completion of data analysis for Preventing Epilepsy Using Vigabatrin in Infants with TSC (PREVeNT) trial
- Supported Developmental Synaptopathies Consortium studying autism in TSC
- Invested \$575,000 in Bcureful Travel Funding to support families visiting TSC Clinics and participating in clinical trials

OUR PLAN FOR ACCELERATING THE NEXT GENERATION OF TSC RESEARCH AND DISCOVERY

We believe the next breakthroughs in TSC research are on the horizon—and to achieve the progress our community is depending on, we're investing **\$40 million in four key areas of research.**

Natural History Database and Biosample Repository

\$11
MILLION



TSC affects everyone differently. To understand which drugs will be most effective for each individual, researchers need biosamples, clinical data and patient-reported outcomes (PROs). These require efficient collection processes, standardized analysis protocols and robust data management.

Expanded funding will:

- Broaden the diversity of biosamples through mobile at-home collection anywhere in the United States
- Enable prediction of an individual's risk of the many manifestations of TSC
- Accelerate outcome measures in clinical trials and facilitate preventative treatments
- Identify additional targets for drug development
- Uncover why some cells develop into tumor-like growths while others do not

Measuring outcomes:

- Accelerate the racial and ethnic diversification of biosamples and data
- Establish a TAND PRO instrument suitable for clinical trials to measure changes in the most significant TAND symptoms for an individual
- Establish a biomarker panel for the most impactful manifestations of TSC

Clinical Research

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Clinical studies require extensive planning and collaboration. The TSC Alliance aims to alleviate the obstacles that stand in the way of efficient, effective and safe clinical trials.

Expanded funding will:

- Support initiatives to build evidence to address gaps in current surveillance and management guidelines for TSC care
- Provide travel funding for more individuals and families to participate in clinical trials
- Engage clinical study coordinators to support efficient clinical trial implementation
- Develop PROs as a resource for future FDA drug approval
- Generate data leading to evidence-based guidelines to improve outcomes and quality of life

Measuring outcomes:

- Publish updated guidelines for unaddressed aspects of TSC care including reproductive and perinatal health and SUDEP
- Add five evidence-based guidelines required in TSC Clinics as standards of care
- Develop a template for and require a transition-of-care plan at all TSC Clinics



“Only through discovery can we determine what the best practices and therapeutics might be and learn how to take better care of kids and adults with TSC.”

Shafali Spurling Jeste, MD, Chief, Division of Neurology at Children's Hospital Los Angeles

Preclinical Consortium

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The Preclinical Consortium fills a critical research gap for standardized, rigorous testing of potential new TSC therapies prior to clinical trials. This innovative platform provides industry and academic members access to reproducible preclinical models and outcome measures, offering an unbiased platform for this critical stage in drug development. The Preclinical Consortium removes risks associated with developing new drugs by providing models for testing in TSC and will encourage more companies to focus on treatments for our community.

Expanded funding will:

- Move more drug candidates into clinical trials
- Expand testing of potential new therapies for epilepsy, TAND, LAM and TSC tumors
- Expand the number of industry partners
- Add new animal models for TAND and LAM

Measuring outcomes:

- Move at least two projects from preclinical testing into clinical trials
- Test at least 20 compounds or other therapeutic technologies in animal models
- Establish and make available cell-based neurology model and assay(s) suitable for drug screening

“When I first became involved with TSC Alliance, our mission was simply to raise awareness of the disease and the people living with it. But now there are drug therapies that shrink tumors and prevent seizures. Such amazing progress is worth investing in.”

Julianne Moore



Innovative Research

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Our goal is to award more research grants annually, forge stronger connections between the top researchers around the world and bring stakeholders together at Innovation Workshops.

Expanded funding will:

- Identify which individuals are candidates for emerging treatments, including gene therapy
- Identify an easy, inexpensive and effective way to screen all newborns for TSC
- Bring new researchers and research organizations into the TSC field
- Support biennial International TSC Research Conferences to stimulate collaborative research

Measuring outcomes:

- With external collaborations, generate necessary data to pilot a newborn screening assay
- Establish a TSC collaborative data analysis and sharing portal by 2026
- Hold biennial TSC Alliance-hosted International TSC Research Conferences
- Fund a minimum of three merit-based research grants per year to early-career researchers

“My life has been enriched because of recent discoveries. Research is vital to prolonging lives so I hope with more funding, we can unlock the answers we have so desperately been seeking.”

Jennifer Waldron, TSC adult





The TSC Alliance launches the 50 FORWARD FUND



Working together for a better future

Together, we can ensure people navigating TSC have access to the best possible care—and hope—every step of the way. To make this mission into a reality, we're committed to investing \$40 million over eight years to accelerate the discovery and development of improved therapies for TSC.

This investment will bring us closer to our vision of a world where every individual living with TSC receives early detection and preventative treatments, has access to the highest quality of care, finds support within their communities and gains the resources needed to live their life to the fullest.

With your help, the TSC Alliance can build on our research successes. We believe the TSC Alliance's \$40 million investment will drive the most promising TSC research forward.

Support the 50 Forward Fund today

Join us as we plot a course to a bring more hopeful futures into focus. By contributing to the **50 Forward Fund**, you will help us reach forward-thinking milestones on our way to life-changing research results.

We will not stop until everyone with TSC can realize their full potential, no matter how complex the journey is to get there. With you—and the power of the TSC community—we can fuel the research that will change the course of TSC for all.

Additional ways to help

- Host a fundraising event to gather resources that could change the course of TSC.
- Introduce the TSC Alliance to people in your community who care about discovering new therapies for epilepsy, autism or cancer.
- Put the TSC Alliance in touch with private foundations or donor advised funds interested in medical research or empowering people living with a rare disease.

Invest in the 50 Forward Fund and make a real difference in the lives of people affected by TSC. DONATE NOW!



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