Allergy and Asthma Update

Transforming lives with innovative science and compassionate care.

We are dedicated to finding causes, treatments, and cures for allergic diseases, bringing greater peace of mind to children, adults, and families locally and globally.

Because of You

We are: Learning. Growing. Reaching out. Moving forward. Bringing education, awareness, discoveries, and excellent care to patients and families living with allergies and asthma.

Thank you for your commitment to end allergic disease.
Transforming lives with innovative science and compassionate care.

We are dedicated to finding causes, treatments, and cures for allergic diseases, bringing greater peace of mind to children, adults, and families locally and globally.

We draw inspiration from our international community of scientists, clinicians, patients, industry and academic collaborators, and you, our donors and supporters. We are grateful for your generosity, vision, and leadership as we advance together toward our goal of ending allergic disease and asthma.
Strengthening Our Connections As We Grow

Strong bonds create the foundation for something bigger and more complex. It’s true in science and true in communities, too.

This has been a year of incredible growth for our Sean N. Parker Center for Allergy & Asthma Research at Stanford University. We have increased and strengthened connections with our partners in the scientific community, those in the technology and industry communities, and, of course, you, our amazing philanthropic community. These relationships allow us to expand our knowledge, research, and treatment of allergies and asthma beyond our immediate borders.

The worldwide allergy epidemic continues, posing a serious health threat to millions. In response, we have intensified our efforts to prevent and find cures for allergy and asthma. But we cannot achieve this goal without help. Increasingly, studies show that the molecular reactions of the immune system leading to various kinds of allergic response—whether through the skin, lungs, or stomach—are very similar. Studies of molecular changes in eczema can lead us to important discoveries about what happens in food allergies. Drugs approved for one type of allergy show promise in helping stop or slow other allergic reactions.

Given this molecular interrelationship among diseases of the immune system, the collaborations we are creating with other investigators become particularly vital. Colleagues across the United States and in Australia, England, France, South Africa, Switzerland, and other areas are working with us as we broaden our search for causes and improve treatments of allergic disease. We are sharing data, technology, tissue samples, and expertise, each supplying resources the others may not have. We are also seeking to build an umbrella research program at Stanford that will connect basic science investigations related to allergies and immunology.

We continue to strengthen bonds with our patients and families, increasing our clinical trials and following trial graduates to see how long immunotherapy treatment is effective (so far, for as long as 10 years!).

Finally, we celebrate our strongest bond—with you, our donors. Your support and belief in our work have made it possible for us to become a true research and treatment Center, a magnet for partners from around the world, all of us connected by the goal of transforming the lives of people with allergies and asthma through innovative science and compassionate care.

In this report, you will find stories of the connections you are supporting and see the impact you are making with your generosity, kindness, and leadership. As always, I look forward to sharing our progress with you personally and hope to see you soon.
Scientific Advances and Program Achievements

The Sean N. Parker Center for Allergy & Asthma Research strives to transform the lives of allergy and asthma patients through a seamless loop of innovative science and compassionate care.

Our goal is to prevent and find cures for allergic disease by bringing thoroughly researched and tested treatments to people with allergies and asthma everywhere.

The important scientific investigations required to achieve this goal are fueled by the support of our philanthropic community. Nearly all our funding comes from private philanthropy. Our work would be impossible without our donors and courageous patients.

Our Center remains committed to accelerating research, bringing together multidisciplinary teams of top-ranked scientists and physicians—from academic institutions and industry—to study the molecular causes of allergies and asthma. We constantly refine these laboratory discoveries, testing potentially beneficial therapies to get the most promising treatments to patients through safe and effective clinical trials. The samples and data from our trials advance or confirm what we and our partners learn in the lab. Some of our key scientific achievements of 2017 include:

Evaluating the Role of Environmental Pollutants in Allergic Disease

Air and Drinking Water Pollution

We are committed to shedding further light on the relationship between air, water, and soil pollution, and the molecular changes involved in allergies and asthma, to better inform policy. To understand the role of environmental pollutants in allergic disease, we analyzed data from individuals with and without allergies and asthma in Fresno, a city in California’s Central Valley where air pollution levels and rates of allergic disease are higher than the national average. We found that increasing levels of fine particulate matter, carbon monoxide, and nitrogen dioxide are associated with alterations of key genes (epigenetic modifications) involved in allergy and asthma. These modifications do not change the fundamental nature of genes but tag the genes so that the expression of key immune factors is altered. We also found an inverse association between polycyclic aromatic hydrocarbons (PAH), an environmental pollutant, and the length of telomeres, the “caps” at the ends of each section of DNA that protect our chromosomes.

Through presentations of our findings, we are advocating for national and international efforts to reduce carbon emissions and improve air and water quality.

Molecular and Cellular Characterization

Targeted Treatments

We continue to characterize the molecular components of allergens, called epitopes, involved in chemical reactions leading to allergic reactions. We have published our findings on the purification and characterization of certain food allergens, identifying and mapping characteristics of key allergenic epitopes that can help us design targeted treatments and better ways to diagnose allergies. We are also characterizing immune cell changes that occur when the immune system becomes sensitive to a particular allergen, with the aim of using these findings to test new therapies. For instance, Stanford researchers have found that certain regulatory T cells (cells that usually inhibit allergic response) do not work properly in people with peanut allergies and are unable to inhibit allergic response. These results open the possibility of limiting allergic reactions in some patients with severe peanut allergies by treating them with specific regulatory T cells that have been engineered to function properly.

New Diagnostics

We have also shown promising results using basophil activation tests (BAT) to more accurately measure allergic reaction to food. Our Center scientists are working with other Stanford researchers in this important analytic investigation. Currently, these tests involve giving an allergen to someone with an allergy to stimulate a reaction. The allergen causes basophils (cells present in allergic reactions) to produce detectable levels of biomarker substances such as CD63. However, other cells that also express CD63 can interact with basophils to falsely elevate the CD63 levels, creating the appearance of a nonexistent allergic response. Recently, we combined this activation test with fluorophore-labeled avidin (Av-F), a special imaging technology, to detect increased levels of activated basophils in a small amount of blood taken from allergy patients. So far, the preliminary test has been shown to be more accurate and faster than others, and does not require patients to be exposed to an allergen.

This method shows promise as a possibly safer and more effective way to diagnose multiple allergies.

Immunotherapy Studies

Multiple Allergens

About 40 percent of children with food allergies are allergic to more than one food and have a much higher risk for anaphylactic reactions. We recently published the results of a multisensig oral immunotherapy (OIT) study in The Lancet Gastroenterology & Hepatology, which was profiled in U.S. News & World Report and global media. In OIT, patients with food allergies receive tiny amounts of the foods they are allergic to, gradually increasing the amount they can tolerate without getting sick. In this study, participants treated with OIT for multiple allergens were also given omalizumab (Xolair), a medication approved for asthma, that blocks IgE, an antibody involved in allergic response. After nine months, 83 percent of children receiving omalizumab could tolerate at least two grams of two different food allergens, whereas only 33 percent receiving multi-food OIT alone reached the same tolerance level. The results of the pilot study indicate that omalizumab possibly increases the speed of allergen tolerance and is a potentially safe treatment for multiple food allergies.
Optimal Maintenance and Long-Term Dosing Studies

Previous studies have found that although OIT can desensitize people to allergens, they need to keep taking medication for a long time. Our studies have shown that both high and low maintenance doses were equally effective in keeping them allergy-free. This is encouraging because patients were more likely to continue taking a lower maintenance dose of medication than a higher one.

Clinical Trials and Scientific Collaborations

Expanding Studies

We continue to expand our inpatient clinical research, increase research collaborations, and hire key research scientists, clinicians, and bioinformaticists. Our biobank now consists of 51,000 samples catalogued with direct links to well-characterized patient data. Sponsors, including the National Institutes of Health (NIH), Food Allergy Research and Education (FARE), and End Allergies Together (EAT), have provided resources for our studies, along with substantial philanthropic support. We launched nine new clinical trials in 2017. We had more than 1,400 clinical visits in 2017, with 144 patients newly screened, and 97 adults and children successfully enrolled in new interventional studies. In 2017, we had 20 ongoing clinical trials (refer to following page). Further details on these trials can be obtained by visiting ClinicalTrials.gov. Besides our extensive research on food allergies, we are conducting studies on eosinophilic esophagitis and asthma. We continue to conduct oral and epicutaneous (under the skin) immunotherapies for food allergies (peanut, wheat, milk, and multiple allergens) as well as the use of novel antibodies (IL-13, IL-23, IL-33) and vaccines (ARA LAMP Vax). We are evaluating fully characterized peanut formulations (AR101) and the hypoallergenicity of a specially designed formula for use in infants and children with cow’s milk allergy.

Our Collaborations

We have been designated a Center of Excellence by the World Allergy Organization, an international umbrella organization of 97 regional and national allergy and clinical immunology societies from around the world. As one of seven Consortium of Food Allergy Research (COFAR) centers, we continue to conduct multicenter clinical trials, observational studies, mechanistic studies, and basic research toward finding the best possible approaches for prevention and treatment of allergies. Besides Stanford School of Medicine, the COFAR group includes iCaSH Network of Allergy and Immunology Research and the National Institutes of Health (NIH), Food Allergy Research and Education (FARE), and End Allergies Together (EAT), have provided resources for our studies, along with substantial philanthropic support. We launched nine new clinical trials in 2017. We had more than 1,400 clinical visits in 2017, with 144 patients newly screened, and 97 adults and children successfully enrolled in new interventional studies. In 2017, we had 20 ongoing clinical trials (refer to following page). Further details on these trials can be obtained by visiting ClinicalTrials.gov. Besides our extensive research on food allergies, we are conducting studies on eosinophilic esophagitis and asthma. We continue to conduct oral and epicutaneous (under the skin) immunotherapies for food allergies (peanut, wheat, milk, and multiple allergens) as well as the use of novel antibodies (IL-13, IL-23, IL-33) and vaccines (ARA LAMP Vax). We are evaluating fully characterized peanut formulations (AR101) and the hypoallergenicity of a specially designed formula for use in infants and children with cow’s milk allergy.

Technological Advances with Stanford

- We are working with Sindy K.Y. Tang, PhD, assistant professor at Stanford in the Department of Mechanical Engineering, on a portable device for home-based food allergy diagnostics.
- Immune cells called basophils are activated during allergic reactions. In collaboration with Stephen J. Galli, MD, professor of microbiology and immunology at Stanford, we have developed a novel avidin-based fluorochrome method for monitoring basophil activation, which may enable a more specific and sensitive method for the diagnosis of food allergies and the prediction of severity of reactions to food allergens.
- We are using state-of-the-art sorting and sequencing equipment to reach new understandings of T and B cell biology in allergy, working with Hark M. Davis, PhD; Howard Y. Chang, MD, PhD; Scott Boyd, MD, PhD; and Stephen Quake, MS, PhD.
- We are working with Garry Nolan, PhD, and Michael Angelo, MD, PhD, who have developed a new imaging technology that simultaneously labels antibodies with metallic elements, then scans the tissue using an ion beam to reveal up to 100 proteins simultaneously in a single cell. This novel technology is promising, and we are using it to evaluate gut biopsies of patients with food allergies. Such “multidimensional” information may enable us to identify distinctive proteins in healthy and allergic individuals and design targeted therapies.
FROM DISCOVERY TO COMPASSIONATE CARE

In 2017, we were involved in the following 20 clinical trials, with more in the pipeline.

<table>
<thead>
<tr>
<th>Study Topic</th>
<th>Date Started/Status</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eosinophilic Esophagitis</td>
<td>2017, ongoing</td>
<td>Compare the efficacy and safety of fluticasone propionate in a tablet form with placebo in adults with eosinophilic esophagitis.</td>
</tr>
<tr>
<td>Asthma</td>
<td>2017, ongoing</td>
<td>Assess the safety and efficacy of subcutaneously administered risankizumab as add-on therapy in patients with severe persistent asthma.</td>
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<tr>
<td>Multi-Food Allergy</td>
<td>2013-17, completed</td>
<td>Test the tolerance and safety of subcutaneously administered omalizumab in multi-food-allergic patients receiving OIT for multiple allergens.</td>
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<tr>
<td>OIT with omalizumab</td>
<td>2017, ongoing</td>
<td>Determine whether omalizumab improves the safety of multiple food allergens OIT and whether it lowers the maintenance dose of each food allergen.</td>
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<tr>
<td>Peanut Allergy (cont.)</td>
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<tr>
<td>OIT with peanut flour long-term study</td>
<td>2017, ongoing</td>
<td>Assess AR101 peanut flour's safety and tolerability over an extended dosing period.</td>
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<tr>
<td>Vaccine</td>
<td>2016, ongoing</td>
<td>Evaluate safety, tolerability, and immune response in peanut-allergic adults receiving a protein DNA plasmid injection.</td>
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<tr>
<td>Skin patch</td>
<td>2017, ongoing</td>
<td>Assess the safety and efficacy of Viaskin Peanut, a skin patch, to induce desensitization to peanuts in peanut-allergic children 1 to 3 years old.</td>
</tr>
<tr>
<td>Skin patch</td>
<td>2016, ongoing</td>
<td>Evaluate the safety of Viaskin Peanut skin patch treatment for peanut allergies in children 4 to 11 years old.</td>
</tr>
<tr>
<td>Skin patch follow-up</td>
<td>2017, ongoing</td>
<td>Follow patients who completed a previous Viaskin Peanut skin patch study for two to three more years.</td>
</tr>
<tr>
<td>OIT</td>
<td>2013, ongoing</td>
<td>Compare peanut OIT to placebo in inducing tolerance and desensitization in peanut-allergic children for 134 weeks, followed by 26 weeks of peanut avoidance.</td>
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<tr>
<td>OIT maintenance</td>
<td>2014, ongoing</td>
<td>Determine whether desensitization to peanuts is maintained after avoiding them for three months, following successful completion of OIT.</td>
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<tr>
<td>Cow's Milk Allergy</td>
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<tr>
<td>OIT</td>
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<tr>
<td>Skin patch follow-up</td>
<td>2015, ongoing</td>
<td>Evaluate the safety and efficacy of Viaskin Milk skin patch immunotherapy after 12 months and assess long-term effects after 48 months in children with cow's milk allergies.</td>
</tr>
</tbody>
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**Study Topic**

- **Eosinophilic Esophagitis**
- **Asthma**
- **Multi-Food Allergy**
- **OIT with omalizumab**
- **Peanut Allergy (cont.)**
- **Vaccine**
- **Skin patch**
- **Skin patch follow-up**
- **OIT**
- **Cow's Milk Allergy**
Analyze data from multiple sources.

Sandra Andorf, PhD (right), Kim and Ping Li Director of Computational Biology and instructor in pulmonary and critical care medicine, and research assistant Bryan Bunning analyze data from multiple sources.

Using blood, tissue samples, and data gathered from patients in trials, our researchers search for new and better treatments for allergies and asthma.

Shu Chen Lyu, MSc, our Center’s laboratory unit manager, has more than 20 years of experience in human immunology work.

Completing the Loop in the Lab

For more details on these trials, visit ClinicalTrials.gov.

Study Topic | Date Started/Status | Purpose
--- | --- | ---
Wheat Allergy | 2013-17, completed | Evaluate whether people with wheat allergies who have successfully completed OIT can develop the ability to eat wheat regularly without allergic symptoms after stopping the therapy.

Mechanistic Studies

Twin study | 2010, ongoing | Provide a better understanding of how the immune system works in twins with and without allergic disease.

Longitudinal follow-up study | 2016-17, completed | Provide better understanding of the long-term effects of food immunotherapy on the immune system and how it may induce tolerance to foods that participants were once allergic to.

Other

Sean N. Parker Center Registry | 2016, ongoing | Create an electronic database with information on healthy, asthmatic, and allergic individuals.

For more details on these trials, visit ClinicalTrials.gov.

Seed Grant Awards

As part of our commitment to fostering emerging research, our Center has awarded grants to the following researchers:

2015

Ruchi S. Gupta, MD, MPH, associate professor of pediatrics, Northwestern Medicine, Chicago. Dr. Gupta’s lab is analyzing data from a national survey to determine the prevalence, severity, and distribution of allergies. She is comparing this data with past information to study increasing rates of food allergies.

Mübeccel Akdis, PD, MD, PhD, director of the Swiss Institute of Allergy and Asthma Research. Dr. Akdis’ lab has shown that certain viruses increase allergic reaction by entering and activating B cells. These findings suggest that regulating B cell responses to viruses may lead to treatments for virus-induced exacerbation of asthma.

2016

Jayakar V. Nayak, MD, PhD, associate professor of otolaryngology at Stanford. Dr. Nayak is studying the anti-inflammatory effects of glucocorticoids—steroid hormones used to reduce and shrink nasal polyps. He believes these drugs may reduce inflammation by recruiting immune cells called T regulatory cells.

Julie Parsonnet, MD, professor of health research and policy at Stanford. The use of antimicrobials has been associated with a higher risk of allergy. Dr. Parsonnet’s lab is evaluating the effects of detergents containing certain antimicrobials on the incidence of allergy in a birth cohort.

2017

Stephen Luby, MD, professor of medicine at Stanford. Exposure to particulate matter from vehicle emissions, fires, and other sources increases asthma exacerbations. Dr. Luby is evaluating interventional methods and management of smoke from brick kilns in South Asia and their effects on asthma.

Justin L. Sonnenburg, PhD, associate professor of microbiology and immunology, and professor of otolaryngology at Stanford. Drs. Sonnenburg and Gardner’s research is focused on understanding the role of dietary fiber and microbiota in allergic disease, and how changes involving the microbiome might improve the immune system and decrease disease.

Inaugural 2018 Gordon Research Conference on Food Allergy

In January 2018, Dr. Nadeau chaired the first-ever Gordon Research Conference on Food Allergy with vice chair Gideon Lack, MD, PhD, of King’s College London. These prestigious international scientific conferences cover pioneering research in the biological, chemical, and physical sciences. Our Center was proud to be a part of this groundbreaking event, and its work to create an international scientific community to foster collaborations to advance and accelerate food allergy research.

The conference held in Ventura, California, provided an informal forum for researchers from industry, academia, and government to present cutting-edge studies; created a focused international scientific community; and built momentum to accelerate research in finding innovative ways to predict, prevent, and ultimately cure food allergies.

Researchers from 15 countries and some 90 institutions—about half of them women—attended the conference. Nearly 80 speakers and discussion leaders, including many members of our Center’s Scientific Advisory Committee, made presentations and participated in panels. Session topics explored a wide variety of areas, including the global impact of food allergy; the role of different types of cells; new ways to diagnose; and novel therapies, including nanoparticles, vaccines, and peptide immunotherapy.

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Using blood, tissue samples, and data gathered from patients in trials, our researchers search for new and better treatments for allergies and asthma.

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SCIENTIFIC ADVANCES AND PROGRAM ACHIEVEMENTS
Philanthropic Impact

We value the strong bond we share with our donor community. Your connection to our Center fuels our success.

Many Thanks!

These visionary partners played an important part in our work in 2017.

The Canfield family provided an important gift to fund our education and outreach efforts in the Chicago area. The Giorgi family has created a fund in memory of their daughter Natalie who tragically passed away from an allergic reaction to peanuts. The Fund in Memory of Natalie Giorgi will help ensure the safety of all children with food allergies.

The Soffer family has endowed a research fund for Bali Pulendran, PhD, whose work in microbiology and immunology will help us pinpoint the causes and develop better treatments for allergies and asthma. The Lainovic, Bunning, Gies, Barakett, Bravo, Carell, Bezos, and Li families have been instrumental for their partnerships and impact through their generous endowments to our Center.

We continue to thank Sean N. Parker for his naming gift and ongoing support for our mission of treating, better diagnosing, and ultimately curing allergies and asthma, and Ray Chambers who partnered with Mr. Parker in his gift. We are grateful to the Clark family for a gift allowing access to an important bio-library that we believe will prove very useful in future studies.

Our thanks to The Safe + Fair Food Company for its continued support, and to End Allergies Together (EAT), Food Allergy Research and Education (FARE), the National Institutes of Health (NIH), and TripAdvisor.

Your generosity allows us to conduct studies in the laboratory and in the clinic; bring education and hope to patients, families, and communities; and create partnerships with institutions around the world in our quest to develop lasting cures for allergies and asthma. Without your support, none of this would be possible.
Helping Others Find Peace of Mind

Inspiring stories, in their own words, from some of our courageous and generous donor families.

Giorgi Family
Joanne, Danielle, Catherine, Michael, Louis

We thought we would see our daughter Natalie help make change in her lifetime. Instead, we are doing it in our lifetime, in her memory. Natalie loved Disneyland, the ocean, gymnastics, and Giants baseball games. She proudly wore sparkly hearing aids. She wanted to be a marine biologist. She was a caring, loving 13-year-old with a goofy, infectious laugh. She also had a peanut allergy.

We did everything we could to keep Natalie and her twin sister, Danielle—who also has the allergy—safe. We kept a nut-free household. The girls were careful about what they ate. But five years ago, on the last day at a family camp, Natalie unknowingly ate a bite of a crispy rice treat containing peanut butter. Twenty minutes later, she had a severe allergic reaction that three EpiPen injections couldn’t stop. We lost Natalie, despite many valiant attempts to save her.

We want to ensure other families will never have to lose a child because of a food allergy. We also want to honor Natalie’s empathy with those who struggle. To help make this happen, we have created the Fund in Memory of Natalie Giorgi to support Dr. Nadeau and her team in fulfilling their mission to diagnose, treat, prevent, raise awareness of, and ultimately cure allergies and asthma for everyone, everywhere.

Canfield Family
Phil, Meg, Clay, Mary Beth, Molly

Clay was diagnosed with a severe peanut allergy when he was 14 months old and developed anaphylaxis. As he got older, it was harder for us to manage his exposures. When his sisters came along, we screened them for food allergies. Molly was lucky and had none, but Meg had peanut and chickpea allergies with even greater severity than Clay’s.

We decided to have Clay and Meg participate in a food allergy trial at Stanford. It was extremely challenging because the food challenges and peanut flour made both kids sick. But we received amazing support and reassurance. Talking with clinicians and other parents helped us stay the course.

Dr. Nadeau met with us in Chicago to tell us she had just opened a clinic and offered to talk with our children. We immediately signed up. We knew was peanut avoidance, plagued us for a lifetime, in her memory.

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Feltzin Family
Allison, Luke, Chloe, Brian, Emma

Living in fear was not a long-term solution for our family.

When they were very young, all three of our children were diagnosed with severe allergies to multiple foods. Since the trial, our lives have changed dramatically.

We no longer live in fear or a state of avoidance. Our kids eat many of their allergens regularly. It is surreal to watch our oldest, Chloe, who has had a milk and egg allergy, enjoy smoothies, tuna salad, and fried rice with scrambled egg.

It was not easy. Travel and long clinic appointments were challenging, as was the daily maintenance dosing for three kids with multiple food allergies. But we always felt supported. Now we are thrilled to share our experience through his fourth-grade experience.

Clark Family
Catherine

Just before my second birthday, I had my first anaphylactic reaction from a severe peanut allergy. Since then until very recently, the only life I ever knew was peanut avoidance, plagued with fear and worry: countless EpiPen training sessions, blank stares in restaurants, traveling and having my seat thoroughly sanitized before sitting in it.

At the start of my oral immunotherapy (OIT), Dr. Nadeau gave me one-eighth of a peanut butter candy. This was the beginning of a life-changing journey. I’m currently eating eight peanuts a day with no reaction or symptoms. I am still in awe at the indescribable feeling of liberation this experience has afforded me. It is because of this metamorphosis from fear to freedom that my family and I feel so strongly about supporting the Center with the hope one day there will be a cure available to all food allergy sufferers.

Gorelick Family
Allison, Eli, Jeff, Lucas

In 2009, on a car trip to Tahoe, I gave our 16-month-old son, Eli, a bit of a peanut-butter-and-jelly sandwich. He immediately swelled up and got hives. We spent the next 24 hours at a hospital.

We learned about Dr. Nadeau’s work from friends. Eli now eats a piece of four different nuts each morning. We feel much safer knowing he is protected from a small amount of cross contamination. He feels less anxious about having a reaction and joins the other kids having cheese pizza. He is excited to share his experience through his fourth-grade science fair project.

As a family, we have always been huge advocates of donating to nonprofits doing life-changing work. The Center was a clear choice for us. Dr. Nadeau’s research and trials are providing critical information for those with food allergies.
Important New Partnerships

An anonymous donor has fully funded an ongoing collaboration between Stanford University and Mayo Clinic to study the link between gastrointestinal ailments and oral immunotherapy (OIT) with the aim of testing drugs that could prevent gastrointestinal problems, allowing more people to benefit from the therapy. The Amouyal family and others across the nation have provided ongoing support for a partnership with the University of California, Los Angeles to find the safest and most effective dosing strategies for OIT. That trial began in 2017.

Supporting Top Talent

Scott Boyd, MD, PhD, whose work has been endowed by an anonymous donor, is studying the role of B cells in immune reactions with an eye to testing new therapies that can circumvent the chemical reactions that cause allergies and asthma. Mary Prunicki, MD, PhD, endowed by the Barakett family, is developing an outreach and education program using home assistant technology for families dealing with asthma and allergies in California’s rural Central Valley. Her pioneering work will be translated to our Center’s underserved program nationwide, broadening our reach and increasing access to those in need. Dr. Prunicki is also studying the role of air pollution in asthma.

Exciting New Therapies and Diagnostics

A peptide “vaccine” trial is underway, thanks to a matching grant from the Hartman Family Foundation. We are also continuing to validate and standardize results that will allow us to develop a smartphone device that will diagnose more than 100 allergens using a drop of blood, thanks to a generous gift from an anonymous donor.

Expanding into the Future

A generous donation from the Koch family will increase our clinical space, allowing us to perform more clinical trials so we can get therapies to more patients, faster. The new space in the West building of Lucile Packard Children’s Hospital will become available after renovations to the building are finished. We are looking forward to this new clinic, just steps away from our research team.
more than 150 Scamperers and were $50,000 to support our work. We had come to play, and raised more than Hospital Stanford—our Center team benefiting Lucile Packard Children’s annual 5K, 10K, and kids’ fun run. 16 17

Here is what the Shapiros, one of our top fundraising teams at the event.

“We did oral immunotherapy (OIT) do for our family? It gave us peace of mind. Here are just a few examples:

1) We can worry about the same things other parents of college students worry about instead of wondering if one bite of the wrong muffin will send our daughter to the emergency room.

2) The girls can both order a scoop of ice cream without asking to have the scoop washed first.

3) We have a valid medical reason to eat Nutella every day.

Patient Support
You may graduate from a trial, but you will always be considered a member of our Center family. Our Center offers multiple support programs for patients, families, and graduates before, during, and after a trial. Some of these services include:

ED SHAPIRO, parents of trial graduates MADDI and MARI

The many ways we connect with our community include:

Community Boards

Community Council: Our Community Council of alumni and current Center families and communities shares the latest information about asthma and allergies with parents and the general public through year-round outreach events. In 2017, the council’s many activities included the State of the Center Forum, with presentations from Dr. Nadeau and Center clinicians.

National Advisory Board: This group works to engage volunteers, promote fundraising efforts, advise on the direction of various campaigns, and raise awareness of our Center’s work in the philanthropic community.

Teen Board: Teen Board volunteers mentor new trial participants, providing peer-to-peer support during what can be a stressful time.

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a patient registry to speed the process of trial recruitment; the services of a child and family therapist in our clinic; a national support team of trial graduate families; and alumni meetings and graduate webinars with the clinical staff.

Awards and Honors
Dr. Nadeau was honored with a dinner to celebrate her being named the first holder of the Naddisy Foundation Professorship in Pediatric Food Allergy, Immunology, and Asthma.

In May 2017, our Center was selected by The Safe + Fair Food Company to be its primary charitable beneficiary.

Education and Outreach
Expanding access to care: In 2017, Dr. Nadeau traveled to Fresno, California to speak about the strong link between asthma and air pollution. Mary Prunicki, MD, PhD, has been working with underserved populations in the state’s Central Valley, developing a telehealth program giving people who live far from an allergy specialist access to expert information and advice. This program is being expanded to the Chicago area, where our Center is also working with Ruchi Gupta, MD, MPH, and Mary C. Tobin, MD, to ensure people in underserved communities have access to epinephrine pens and education. Our Center has another outreach program in New York.

Bringing the world to our doorstep: In 2017 and January 2018, our Center hosted a series of presentations by guest lecturers from around the nation and the world. Presenters included Cezmi Akdis, MD, PhD, and Mubezcel Akdis, PD, MD, PhD, from the Swiss Institute of Allergy and Asthma Research; Cathryn Nagler, PhD, from the University of Chicago; and many others.

Keeping patients and families informed: Besides the State of the Center Forum, mentioned previously, our Center hosted a joint workshop with Food Allergy Research and Education (FARE). Speakers included Gina Clowes, author, coach, and FARE’s national director of training, and Marité J. Matthews, MA, MFT, our Center’s consulting family therapist.

Keeping in Touch
Our quarterly e-newsletter continued to educate the public about advancements in allergy and asthma research. Archived issues are on our Center website. For more information, visit med.stanford.edu/allergyandasthma or email us at snpcenter@allergy.inquiry@stanford.edu.
Clinical Impact

Each year, we are proud to enroll more people in our clinical trials under the guidance of Drs. Nadeau and Chinthrajah.

Your generous support allows our Center team of clinicians to connect with patients of all ages. From bottom left, R. Sharon Chinthrajah, MD, director of our Center’s Clinical Translational Research Unit; medical assistant Alex Sanchez; and research nurse practitioner Anny Uyehara, NP.

Andrew Long, PharmD
Center Pharmacist

Since joining our Center in 2014, Andrew Long, PharmD, has been tirelessly offering patients with allergies the best and safest treatments available. Not only does he store, log, and dispense doses of the investigational products involved in clinical trials, he analyzes data, runs protocols, and helps develop treatment studies.

When he started, he says, “We only had a handful of studies. Now we have at least 20 and more coming up. The research has just exploded.”

The most satisfying part of his job? Watching people get better. “You see them going from this very allergic person to someone who can go home and incorporate whatever food they were allergic to into their routine. It’s always nice to see the impact of what you’re doing.”

Christina Stankey
Center Intern

During her nine-week internship in Dr. Nadeau’s lab, Christina Stankey, a junior at Yale University, sought answers to a fundamental question: What biological changes are occurring in those who become desensitized via oral immunotherapy (OIT)? It was also a very personal question.

Stankey, who has multiple food allergies, started OIT as a teen participant in a Center trial. She is now on a maintenance dose consisting of various amounts of tree nuts. As an intern, she examined changes in antibodies associated with allergic diseases and prepared an abstract of her findings for a national allergy conference.

“Dr. Nadeau continues to inspire me,” she says. “I am very thankful for her mentorship and continued support.” Stankey plans to enter medical school after graduation.

Melanie Shojinaga
Center Intern

Melanie Shojinaga first came to our Center clinic as a high school student with a severe peanut allergy. In 2017, she returned for the summer to become a valued member of our clinical team.

Shojinaga is currently studying at the University of California, Davis. As a clinic intern, she digitized consent forms, calmed anxious trial participants, and made sure things ran on schedule. “I now understand how much work goes on in the background to keep things at the Center running smoothly and efficiently,” she says.

Diagnosed with a peanut allergy as an infant, Shojinaga says she often downplayed her allergies to fit in before learning to advocate for herself. During OIT, she was desensitized to peanuts before she started college. We are excited to have her join our Center as a staff member in 2018.
Our Patients’ Voices

Over the last nine years, our Center has treated more than 1,500 patients. Here is what some of them have to say about how our food allergy trials have changed their lives:

**Andrew**
16 years old

“As a teen with an anaphylactic nut allergy, my life has changed dramatically thanks to the oral immunotherapy (OIT) trial. I can go for overnight retreats, summer programs on a college campus, and Boy Scout camps in the wilderness with a freedom that would have been unfathomable before the trial! I still carry medications to these adventures, but I also carry a sense of confidence that I can live a full life.”

**Michelle**
15 years old

“I recently ate a slice of my dad’s birthday cake, which accidentally had nuts—something that previously meant a hospital visit—and did not react. My sense of relief quickly became a sense of gratitude to Dr. Nadeau and her staff. I no longer live my life fearing a food allergy reaction. Instead, I can use this positive energy to fully develop my abilities and pay forward the kindness shown to me.”

**Oliver**
7 years old

“It was a dream come true to be a part of this study and to meet and work with Dr. Nadeau and her team. Oliver’s life, and ours by extension, has changed in such a positive way since he has overcome his allergies. We cannot ever thank you and the team enough for your kindness and care, and amazing expertise. Congratulations on the success of the study!”

— Barbara, Oliver’s mom

**Nikhil**
16 years old

“The OIT trial has allowed me to be more independent. Before the trial, it was important to ensure everything I ate was peanut-free. During the trial, I was sometimes anxious, remembering the allergic reactions I’d had in the past. Now I feel comfortable around peanuts. My family even eats peanuts around me. It has boosted the confidence of my entire family when we are dealing with food.”

**Hana**
11 years old

“We met in September 2014 when we were both enrolled in the peanut OIT study. We took our first dose together. Since then, we have been friends. One of us (Hana) has multiple nut allergies. The other (Amelia) is allergic only to peanuts. But we both have had scary anaphylactic reactions. Living with a food allergy was not easy for us or our families. Neither was the trial. Eating peanuts, knowing you might have a reaction, is stressful. Having a friend made it a lot easier. During blood draws we held hands. When one of us took our dose at night, we thought about the other one taking her dose. That kept us going. The trial has made a big difference in our lives. For the first time, we could both enjoy Halloween and not be afraid of having a reaction.”

**Amelia**
18 years old

“Since receiving the peanut OIT, I went on a mission trip to East Timor. I was able to eat the local food with much less concern and anxiety. My dad even joined me on a canoe trip! The trial has made a huge difference in my life.”

**Megan**
17 years old

“I want to thank Dr. Nadeau and her amazing team for changing my life with my multi-food OIT trial. I now feel safe and secure because of the work they have done. Through the thick and thin of the trial, the entire staff was by my side. Now I don’t have to live with fear or have the danger of anaphylaxis whenever I go out. This trial has truly saved my life.”

**Parker**
17 years old

“I really didn’t believe Dr. Nadeau when she said I would be able to eat pizza and ice cream. Now I can’t imagine life without those foods. I feel so much safer now, and I wanted to give back. So, for my Eagle Scout project I made a video for elementary school kids about food allergies. It teaches what food allergies are, how serious they can be, and how to help kids with food allergies stay safe. The video has been shown in elementary schools, and I am creating a private link to share it online. I cannot thank the Center team enough.”
Forging Bonds That Can’t Be Broken
Patients in our studies become part of our Center family and our partners in developing safe, effective treatments for allergies and asthma.

From Top Clockwise:
Drina Bogusich, assistant clinical research coordinator, helps track progress in our clinical trials.
Medical assistant Alex Sanchez, left, guides patients through the trial.
Age-appropriate virtual reality helps patients feel less anxious during their sessions.
Anny Uyehara, NP, makes sure patients feel safe.
Doses are carefully measured.
Physician-researcher Sayantani (Tina) Sindher, MD, applies what she learns in her research to provide excellent patient care.
Four of our Center’s clinicians (from left): nurse practitioner Uyehara and Drs. Sindher, Nadeau, and Chinthrajah.
Our Center brings together a cross-disciplinary team of world-renowned scientists to improve diagnostics, prognostics, and therapies.

Members of our Scientific Advisory Committee come from all over the United States and the world, bringing together the best minds in allergy and asthma science. They span a wide range of specialties, from immunology to genetics to bioengineering. Led by Dr. Nadeau, the committee focuses on cutting-edge innovation to discover immune mechanisms, unraveling the causes of allergies and asthma, and shedding light on how therapy works.

We share data, insights, and new developments with the global scientific community through our interconnected satellite centers. We believe these collaborations present the greatest opportunity to bring the safest and best treatments for allergies and asthma to people around the world.

Kari C. Nadeau, MD, PhD
Director of the Sean N. Parker Center for Allergy & Asthma Research at Stanford University

Dr. Nadeau, Naddisy Foundation Professor of Pediatric Food Allergy, Immunology, and Asthma, is one of the world’s foremost experts in adult and pediatric allergy, asthma, and immunology. She is also director of the Food Allergy Research and Education (FARE) Center of Excellence at Stanford and runs her own laboratory, collaborating closely with Center faculty and staff.

Sean N. Parker
Sean Parker, philanthropist and entrepreneur, established the Sean N. Parker Center for Allergy & Asthma Research at Stanford in 2014 with a $24 million leadership gift and the goal of propelling innovation in allergy research. Mr. Parker’s gift is one of the largest private donations to allergy research in the United States. Mr. Parker is founder and president of the Parker Foundation, which focuses on life sciences, global public health, and civic engagement.

Scott Boyd, MD, PhD
Dr. Boyd is an associate professor of pathology at Stanford School of Medicine, former Rhodes Scholar, and MD/PhD graduate of the Harvard/MIT Health Science and Technology program. His laboratory studies B cells, the immune cells that form antibodies involved in the development of allergic diseases and the response to allergic immunotherapies.

Howard Y. Chang, MD, PhD
Dr. Chang is director of the Center for Personal Dynamic Regulomes, Virginia and D.K. Ludwig Professor of Cancer Genomics, and professor of dermatology at Stanford School of Medicine. He earned a PhD in biology from MIT and an MD from Harvard Medical School, and completed dermatology residency and postdoctoral training at Stanford. His research addresses how large sets of genes are turned on or off together, which is important in normal development, cancer, and aging.

Mübeccel Akdis, PD, MD, PhD
Dr. Akdis is head of the cellular immunology department in the Swiss Institute of Allergy and Asthma Research and a professor at Zurich University. She has received numerous awards, including the Ferdinand Wortman Prize, the Professor Hans Stock Scientific Award, and the Sedat Simavi Medicine Award. She is also a board member of the World Allergy Organization.

Cezmi Akdis, MD, PhD
Dr. Akdis is director of the Swiss Institute of Allergy and Asthma Research, a professor of Zurich University Medical Faculty, past president of the European Academy of Allergy Clinical Immunology, and director of the Christine Kühne-Center for Allergy Research and Education. He is among the Thomson Reuters/Clarivate most cited and most innovative minds. He is editor-in-chief of Allergy and a senate member of the Swiss Academy of Medical Sciences.

Katrina Allen, MBBS, PhD
Dr. Allen is a pediatric gastroenterologist and allergist practicing in the field of food allergy at the Royal Children’s Hospital, and director of Population Health at the Murdoch Children’s Research Institute in Melbourne, Australia. She is director of the Australian Centre for Food & Allergy Research.

Carlos Camargo, MD, DrPH
Dr. Camargo is a professor of emergency medicine, medicine, and epidemiology at Harvard University, and the John A. Lorentz ‘38 Chair in Emergency Medicine at Massachusetts General Hospital. He founded and leads the Emergency Medicine Network, an international research collaboration with a mission to advance public health through diverse projects in emergency care.

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issues with food allergy.

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She seeks to better understand how biology and immunology at Stanford.

Dr. Chien is a professor of microbiology and immunology at Stanford. She seeks to better understand how the immune system clears infection and avoids autoimmune diseases, and also how infection impacts the development of autoimmunity.

Manisha Desai, PhD

Dr. Desai is a professor of medicine and of biomedical data science, and, by courtesy, of health research and policy at Stanford School of Medicine. She is director of the Quantitative Sciences Unit at Stanford. She is interested in the design of observational and experimental trials for studying therapies for addressing issues with food allergy.

R. Sharon Chinthrajah, MD

Dr. Chinthrajah, director of the Clinical Translational Research Unit of the Sean N. Parker Center, is a clinical assistant professor in the Division of Pulmonary and Critical Care and Allergy and Immunology at Stanford School of Medicine, and associate director for the FARE Clinical Center of Excellence at the Center. She oversees clinical trials, sees patients, teaches fellows, and is an investigator on many clinical trials in food allergy and asthma.

Mark M. Davis, PhD

Dr. Davis is the Burt and Marion Avery Family Professor in microbiology and immunology at Stanford School of Medicine, and director of the Stanford Institute for Immunology, Transplantation, and Infection. He is also director of the Stanford Human Systems Immunology Center.

Yueh-Hsiu Chien, PhD

Dr. Chien is a professor of microbiology and immunology at Stanford. She seeks to better understand how the immune system clears infection and avoids autoimmune diseases, and also how infection impacts the development of autoimmunity.

These tiny things that others take for granted can open their social world.”

A trial conducted at our Center last year has pioneered a promising treatment for children with multiple food allergies.

In the study, our scientists combined the asthma drug omalizumab (Xolair), an antibody medication that ramps down allergic response, with oral immunotherapy for 48 children with more than one food allergy. Taking omalizumab made it safer and faster for the patients to be desensitized to multiple foods simultaneously. On December 11, 2017, our work was published in The Lancet Gastroenterology & Hepatology.

R. Sharon Chinthrajah, MD, the Carell Family Endowed Faculty Scholar for Food Allergy and Immunology Research, is the study’s senior author and director of clinical translational research at our Center. She had this to say: “This could be a very promising way to decrease the burden of living with food allergies. Patients and families say they’re so grateful. They can broaden their food variety and participate in more social activities without fear of a bad allergic reaction. Kids say things like, ‘I no longer sit at the allergen-free table at lunch; I can sit with my usual friends.’ These tiny things that others take for granted can open their social world.”

Christopher Gardner, PhD

Dr. Gardner is a professor of medicine at the Stanford Prevention Research Center and a member of the American Heart Association councils on Epidemiology and Prevention, and Lifestyle. His research is focused on two key areas: identifying what people can eat and drink, as well as what they should avoid and limit, to optimize their health; and identifying forces and factors that successfully motivate people to improve food and beverage choices.

Jacob Glanville

Jacob Glanville is co-founder and chief science officer of Distributed Bio, and is the first PhD candidate in Stanford’s Computational and Systems Immunology program. He works on fundamental questions of the systems biology of human immune components.

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Rohit Gupta

Rohit Gupta began his research at Stanford Medicine in 2003 and now serves as executive director of the Stanford Biobank. He is also executive director of Spectrum’s Clinical & Translation Research Unit, the institute’s largest research-focused ambulatory care group. He has established a biorepository and an associated big-data infrastructure for multiple large-scale biobanks, and designed innovative cost-recovery business models for clinical- and lab-related research services at the university.

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Theodore Jardetzky, PhD
Dr. Jardetzky is a professor of structural biology at Stanford School of Medicine and a member of Bio-X, the Child Health Research Institute, the Stanford Cancer Institute, and the Program in Immunology.

Purvesh Khatri, PhD
Dr. Khatri is an assistant professor in the Institute for Immunity, Transplantation, and Infection and of medicine (biomedical informatics) and biomedical data science at Stanford. His lab develops novel bioinformatics approaches for accelerating translational medicine to identify disease signatures that are diagnostic, prognostic, and therapeutic across a broad spectrum of diseases.

Chaitan Khosla, PhD
Dr. Khosla is the Wells H. Rouser and Harald M. Petiprin Professor in the Stanford School of Engineering and professor of chemistry and, by courtesy, of biochemistry. He is also director of Chemistry, Engineering, and Medicine for Human Health.

Holden Maecker, PhD
Professor (research) of microbiology and immunology at Stanford, Dr. Maecker is director of the Human Immune Monitoring Center. He earned a BS in microbiology at Purdue University and a PhD in cancer biology at Stanford.

Lloyd B. Minor, MD
Dr. Minor is a scientist, surgeon, and academic leader. He is the Carl and Elizabeth Naumann Dean of Stanford School of Medicine, a position he has held since December 2012. He is also a professor of otolaryngology—head and neck surgery, and a professor, by courtesy, of bioengineering and of neurobiology at Stanford.

Garry Nolan, PhD
Dr. Nolan, the Rachford and Carlota A. Harris Professor in the Department of Microbiology and Immunology at Stanford School of Medicine, trained with Nobelist David Baltimore, PhD, making important discoveries in immunology and microbiology. He has published more than 220 research papers, is the holder of 20 U.S. patents, and has been honored as one of the top 25 inventors at Stanford.

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Donald Y.M. Leung, MD, PhD
Dr. Leung, a professor of pediatrics at the University of Colorado School of Medicine, earned a PhD and an MD from the University of Chicago. Dr. Leung is now head of Pediatric Allergy-Immunology and director of the University of Colorado Clinical Translational Research Center Satellite at National Jewish Health in Denver. Recently, he was editor-in-chief of The Journal of Allergy and Clinical Immunology.

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Julie Parsonnet, MD
Dr. Parsonnet is the George DeForest Barnett Professor in Medicine and a professor of health research and policy epidemiology at Stanford, with a specialty in infectious diseases epidemiology. She directs a birth cohort that collects deep demographic, clinical, and biological information on Bay Area babies as they grow.

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Michael Snyder, PhD
Dr. Snyder, Stanford W. Ascherman Professor, is chair of genetics and director of the Center for Genomics and Personalized Medicine at Stanford. He is a leader in the field of functional genomics and proteomics, and one of the major participants of the ENCODE project.

Bali Pulendran, PhD
Dr. Pulendran is the Violette L. Horton Professor and a professor in the Department of Pathology, and the Department of Microbiology and Immunology, at Stanford School of Medicine.

Stephen Quake, MS, PhD
Dr. Quake, Lee Otteson Professor in the School of Engineering, is a professor of bioengineering at Stanford School of Medicine, as well as a professor of applied physics and, by courtesy, of physics at Stanford.

Maria Grazia Roncarolo, MD
Dr. Roncarolo is co-director of the Institute for Stem Cell Biology and Regenerative Medicine, the George D. Smith Professor in Stem Cell and Regenerative Medicine, chief of the Division of Pediatric Stem Cell Transplantation and Regenerative Medicine, and professor of pediatrics (translational and regenerative medicine) and of medicine (blood and marrow transplantation) at Stanford.

Justin L. Sonnenburg, PhD
Dr. Sonnenburg is an associate professor in the Department of Microbiology and Immunology at Stanford School of Medicine, where he studies the gut microbiota in health and disease and co-directs the Center for Human Microbiome Studies. He and his wife, Erica, are the authors of the book The Good Gut: Taking Control of Your Weight, Your Mood, and Your Long-Term Health.

Steven F. Ziegler, PhD
Dr. Ziegler is director of the Immunology Research Program at Benaroya Research Institute at Virginia Mason in Seattle. His research focuses on the factors that control normal immune regulation and those that contribute to disease development and progression. He is currently investigating how epithelial cytokines regulate barrier responses to infection and allergen challenge.

The Good Gut: Taking Control of Your Weight, Your Mood, and Your Long-Term Health.

Select Peer-Reviewed Journal Articles

**2017 Publications**

Feasibility of sustained response through long-term dosing in food allergy immunotherapy.

Observational long-term follow-up study of rapid food oral immunotherapy with omalizumab.

Effect of varying doses of epicutaneous immunotherapy vs placebo on reaction to peanut protein exposure among patients with peanut sensitivity: a randomized clinical trial.

Elimination diet and the development of multiple tree-nut allergies.

Mechanistic correlates of clinical responses to omalizumab in the setting of oral immunotherapy for milk allergy.

Association of clinical reactivity with sensitization to allergen components in multifood-allergic children.

EAACI guidelines on allergen immunotherapy: IgE-mediated food allergy.
Traffic-related air pollution and telomere length in children and adolescents living in Fresno, CA: a pilot study.
Lee EV, Lin J, Nath EM, Hammond SK, Nadeau KC, Eisen EA, Balmes JR.
JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE.
2017 May;59(5):446-452.

Purification and characterization of a black walnut (Juglans nigra) allergen, Jug n 4.
JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY.
2017 Jan 18;65(2):454-462.

Deciphering the black box of food allergy mechanisms.
Sampath V, Tupa D, Graham MT, Chatila TA, Spergel JM, Nadeau KC.
ANNALS OF ALLERGY, ASTHMA & IMMUNOLOGY.

Jan 2018 Publications

Food allergy and omics.
JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY.
2018 Jan;141:20-29.

Exposure to NO2, CO, and PM2.5 is linked to regional DNA methylation differences in asthma.
CLINICAL EPIDEMIOGENICS.

Peanut-specific Tr1 cells induced in vitro from allergic individuals are functionally impaired.
JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY.

Human mast cells as antigen-presenting cells: when is this role important in vivo?
Galli SJ, Gaudenzi N.
JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY.
2018 Jan;141(1):92-93.
Global Vision
Our philanthropic community enables our Center to address the worldwide epidemic of allergies and asthma, connecting with an international network.

International Action
Some examples of how we are influencing policy and changing lives on a global scale:

- Dr. Nadeau chaired the inaugural Gordon Research Conference on Food Allergy, featuring presentations by leading investigators representing 15 countries.
- With international partners in England, France, Japan, Switzerland, South Africa, and other countries, we are exploring exciting new allergy research at the molecular level. A recent meeting with investigators from the Swiss Institute of Allergy and Asthma Research (SIAF) resulted in eight planned collaborations, including an investigation of the effects of detergents on protective skin linings.
- During a speech on the Senate floor in 2017, U.S. Sen. Sheldon Whitehouse quoted data from a slide presentation by Dr. Nadeau on the link between climate change, air pollution, and asthma and allergies.

- We continue to actively work with global health agencies at the United Nations and the World Health Organization.
- We have been designated a Center of Excellence by the World Allergy Organization, an international umbrella organization of 97 regional and national allergology and clinical immunology societies from around the world.

Our Partners Around the World
Key collaborators in research studies, outreach programs, and clinical trials.

United States
1. West Coast: Seattle—Seattle Children’s Hospital, Benaroya Research Institute, Northwest Asthma & Allergy Center, Virginia Mason Medical Center (Oral immunotherapy [OIT] clinical trials, basic science research; Los Angeles—Children’s Hospital Los Angeles, University of California, Los Angeles (OIT clinical trial to determine optimal dosing)
2. Rocky Mountain Region: Scottsdale, Arizona—Mayo Clinic (Research on the role of eosinophils in food allergies); Denver—National Jewish Health (Skin allergy research)
3. Midwest: Chicago—Northwestern University, Lurie Children’s Hospital, Rush University, University of Chicago (Microbiome research, OIT clinical trials, underserved/community outreach programs); Cincinnati—University of Cincinnati (Study to determine thresholds for food allergen reaction and how exposures affect allergy progression in children)
4. New England: Hanover, New Hampshire—Dartmouth College (Research on pollution and asthma); Boston area—Broad Institute, Harvard University, Boston Children’s Hospital (Basic science research, OIT clinical trials)
5. East Coast: New York—Icahn School of Medicine at Mount Sinai, Columbia University (Basic science research, clinical trials, and community outreach); Philadelphia—Children’s Hospital of Philadelphia, University of Pennsylvania (OIT clinical trials); Pittsburgh—University of Pittsburgh (Study of how severe asthma affects blood and bronchial cells)

International
6. London, England: King’s College, National Jewish Health (Research study on the role of allergic inflammation in skin allergies)
7. Davos, Switzerland: Swiss Institute of Allergy and Asthma Research (SIAF) (Various basic research studies on the molecular causes of allergies and asthma)
8. Cape Town, South Africa: SIAF, University of Cape Town, Red Cross War Memorial Hospital (Study of molecular pathways in eczema)
9. Melbourne, Australia: Centre for Food & Allergy Research, Murdoch Children’s Research Institute (Cell studies on young children with food allergies)
We also:

• Have treated and trained more than 700 patients in underserved communities across the United States through clinical trials in asthma and/or food allergy and collaborations with our partners in distributing educational resources and injectable epinephrine to those most at risk. We continue to refine materials to provide allergy and asthma education and guidance to reach many more through innovative technology.

• Are conducting 20 clinical trials around the world—with more to come—to find the best medications and dosing strategies to prevent food allergies.

• Are helping to test and establish immunotherapy trial protocols across the United States, giving more people access to potentially life-changing therapy.

• Share our work with the scientific and patient communities through peer-reviewed studies and talks at national and international conferences.

• Have set up ways to share crucial information with our research partners, including data from clinical trials; tissue and blood samples from patients; and images of molecular changes involved in allergic reactions that we can observe with advanced technology available at Stanford.

• Are working on new diagnostics to apply to small amounts of blood to detect allergies with an easy at-home device.

HISTORICAL HIGHLIGHTS

Our Center is helping to accelerate allergy and asthma science.

400 BC

Scientists in the U.S. and Sweden discover immunoglobulin E (IgE), the antibody that mediates most allergic reactions, the so-called “holy grail” of allergy.

1906

First report of oral immunotherapy (OIT) for allergy is published in The Lancet, for a boy with an egg allergy, with a starting dose of 1/10,000 of an egg.

1908

Clemens Von Pirquet coins the term “allergy” and develops the skin prick test for diagnosis.

1956

Dr. Nadeau raises funding through private philanthropy to launch two multiallergen clinical trials for children at Stanford University School of Medicine, the first time OIT is attempted for more than one allergen simultaneously.

1966

The Sean N. Parker Center for Allergy & Asthma Research at Stanford is established with a $24 million pledge from Mr. Parker.

1998

First OIT study with a control group.

2011

Our Center successfully enrolls adults and children in a total of 20 ongoing clinical trials, with research and clinical partners across the country and around the world.

2014

Many more exciting discoveries, collaborations, improvements, and new treatments as our Center and the field continue to grow!

2017

Hippocrates uses the term “asthma” medically to indicate respiratory distress, and connects breathing problems to environmental causes.
We need your help to discover the best treatments and bring them to patients in the following ways:

**Basic Science Studies and Clinical Trials: Translating New Discoveries into New Treatments**

Omics Program
- This basic science program would bring many types of molecular research examining the human immune system under one umbrella research group devoted to studying the cellular mechanisms leading to allergies and asthma and testing promising therapies to interrupt the chemical reactions causing those diseases.

Microbiota Study
- Support for this study will allow us to expand our preliminary research showing how probiotics may help increase tolerance in patients with milk allergies.

**Endowment Opportunities: Attracting and Supporting Top Talent**

Senior Faculty Scholars
- A dedicated senior faculty member would focus on finding biomarkers for allergies and asthma and explore therapies to cure or prevent these diseases. Dr. Nadeau has identified several top-level candidates she would like to recruit. An endowed position would help attract these world-class physician-scientists to our Center team.

Junior Faculty Scholars
- Endowed junior faculty members at our Center provide excellent care to patients while gathering and analyzing data important for allergy and asthma research. They also provide education and outreach to underserved patients outside of our Center clinics.

Women in Science Fund
- This fund helps the School of Medicine attract the most talented female faculty in any field, including immunology, allergy, and asthma. An endowed professorship is $4 million, and an endowed scholar award is $2 million. Matching funds are available for professorship positions at a 3:1 ratio.

Pediatric Clinical Trial Fund
- The best way to get the latest therapies to children is through clinical trials. This fund ensures there will always be resources, including drugs, trial coordinators, and lab work, to conduct trials designed to bring relief to children with asthma or food allergies.

**Worldwide Collaborations: Working Together to Find a Common Molecular Thread**

The Broad Institute of MIT and Harvard
- This partnership between Dr. Nadeau and Aviv Regev, PhD, computational and systems biologist at MIT, will use highly sophisticated imaging and sorting tools available to both institutions to examine molecular interactions using samples of gut tissue taken from patients with food allergies.

The Swiss Institute of Allergy and Asthma Research (SIAF)
- Two weeks of discussions between Center and Swiss Institute researchers recently ended with a planned pipeline of collaborative research that would lead to cures for allergies. In these projects, postdoctoral fellows from both institutions will be examining new targets for drug therapies that might be common to all types of allergies.

King’s College London and National Jewish Health in Denver
- Understanding how and why chronic allergic inflammation occurs in all areas of the body is critical to treating and preventing allergic diseases—and possibly other autoimmune disorders. This collaborative study of eczema further examines the hypothesis that sensitization occurs through the skin.

You are providing the support and leadership. Stanford is providing the resources and environment. Our Center is providing the clinicians, scientists, databases, and direction. Our connection brings us closer to a cure.

Funding Needs

Our Center and its work would not exist without your generosity and thoughtfulness. Thank you for bringing hope to millions of people with allergies and asthma worldwide.
Capital Support: Expanding and Modernizing Our Space

Building a new home for our research and clinical teams.

New Allergy and Asthma Laboratories Under Construction

The main basic science research labs for the Sean N. Parker Center for Allergy & Asthma Research will move to the Biomedical Innovation (BMI) Building in early 2020. Currently under construction, this new facility will house both “wet” research using tissue and blood samples to determine molecular changes, and “dry” studies using databases to test hypotheses about factors that affect allergies and asthma. The new facility will allow Dr. Nadeau and her team to collaborate with other scientists working in complementary disciplines, including pediatrics, immunology, and genetics.

To learn more about plans and funding needs for Dr. Nadeau’s new lab and available naming opportunities, please contact Dwone Anderson at dwonea@stanford.edu or by calling (650) 724-5542.

Our New Clinic in Lucile Packard Children’s Hospital Stanford

Thanks to a generous donation from David and Julia Koch, our Center will have clinical space in the West building of Packard Children’s following renovations to this part of the hospital. The expanded clinic will give us more immediate access to our laboratory research partners, connecting us and helping close the loop between the laboratory bench and the bedside. We need partners to help provide us with supplies and support as well as staffing for clinical trials so we can speed the process of getting therapies to our patients—and ultimately all those with allergies and asthma.
You are making a global impact, allowing us to bring the results of our research and patient care to millions of people worldwide.

To Our Donors from All of Us

On behalf of our team, our research partners, our patients, their families, and all those who will benefit from our Center’s work to investigate, treat, and safely prevent allergies and asthma, we offer our deepest gratitude.

Thank you

Your generosity gives people peace of mind to live full and healthy lives.
Allergy and Asthma Update

Transforming lives with innovative science and compassionate care.

For more information about our Center or how to participate in this important work, please contact:

Lindsey Hincks
Associate Director, Major Gifts
Lucile Packard Foundation for Children’s Health
(650) 736-1021, Lindsey.Hincks@lpfch.org
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Allergy and Asthma Update

We are: Scientists. Clinicians. Patients. Families. Philanthropists. With research partners around the world. Working together to prevent and cure allergies and asthma.

Connected by our commitment to end allergic disease.