



# Air Pollution and Alzheimer's: Sound the Alarm

by David Shenk

New evidence—funded by Cure Alzheimer's Fund (CAF) and others—has emerged suggesting a strong connection between air pollution and Alzheimer's disease. "These findings underscore the complexity of this disease," says CAF President and CEO Tim Armour, "and emphasize the need for a comprehensive approach to stop it."

While Alzheimer's researchers have theorized for a more than a generation that environment and lifestyle play a significant role in the development of Alzheimer's, only now are they learning about pollution's important role. "In the last five years," said University of Southern California gerontologist Caleb Finch, Ph.D., "it's become very clear to me and others that air pollution is a likely risk factor in Alzheimer's, as well as in other changes in brain aging that slow our cognitive processes. This is a very large issue that we face globally."

Thankfully, it's also an issue researchers are beginning to address seriously. "There are now more than ten labs working on this around the world," says Finch. "Five years ago, there were just a few. The topic is catching up to the recognition that it merits."

Finch is helping to lead the way. A widely acclaimed biomedical gerontologist who specializes in environmental effects on brain aging, he has received numerous scientific awards and has authored 500 research studies, as well as several major books on aging. In 1984, Finch was the founding director of the University of Southern California's Alzheimer Disease Research Center, funded by the National Institute on Aging. He joined Cure Alzheimer's Fund's Scientific Advisory Board in 2014.

Finch's recent attention to pollution was stimulated by emerging epidemiological studies from USC and elsewhere showing the following:

- A strong association between urban pollution and shorter life expectancy: about 1.5 years shorter in the U.S. and five years shorter in China.
- A direct correlation between urban pollution and a dangerous thickening of the walls of the carotid artery, limiting blood flow to the brain.

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# \$10 Million

## in Funded Research in 2015

Thanks to the generosity of our growing donor base, in 2015 Cure Alzheimer's Fund reached \$10 million in research grants in a single year for the first time. Since our inception, we have provided \$38 million to the field's top scientists to accelerate their pursuit of a cure. We are thrilled with their progress and honored by our donors' trust in us, but there is still much work to be done.

The launch of the Genes to Therapies™ (G2T) program far exceeded our expectations, helping us to immediately investigate a larger number of Alzheimer's-linked genes than originally planned. Researchers at a variety of world-class institutions are investigating how the functions of these genes increase or decrease risk

of disease and affect age of onset, and how their different variants alter those functions. Being able to pursue these strong leads simultaneously, rather than sequentially, greatly accelerates our progress toward a cure for this highly complex disease. Thanks to the generosity of our supporters, we will continue to deepen and increase our current investigations as the Alzheimer's puzzle picture emerges from all its different genetic pieces.

While annual funding activity has grown, Cure Alzheimer's Fund's commitment to funding *only* the most promising research has not changed. CAF's proposal reviewers, all world-class scientists, will continue to assess each research project with the same rigor and scrutiny they

always have. We will continue to recruit top researchers who have emerged as leaders in their field and who bring relevant experience to our team. And we will continue to explore new areas of inquiry, which will help us develop successful therapies faster.

"Our Research Consortium and Scientific Advisory Board members are to be applauded for their increasing responsibilities and involvement," said Meg Smith, senior advisor, strategy and special projects, Cure Alzheimer's Fund. "We would not be where we are today without their dedicated volunteer efforts." And thanks to our donors' generous support, we are more optimistic than ever about getting to a cure.

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- A strong connection between air pollution and inflammation in parts of the brain affected by Alzheimer's disease.
- A direct correlation between urban pollution and decreases in verbal learning, logical reasoning and memory, and executive function in middle-aged and older adults, both in the Los Angeles area and across the U.S.

From all of this, Finch concludes, "It looks to me that air pollution contributes to at least five percent of Alzheimer's, and it may be much more."

His own research on pollution's effect on aging has been spurred in two ways by a 2014 CAF research grant to examine the effect of nano-sized particulate

matter (derived mostly from automobile traffic in urban environments) on the creation of Aβeta in mice. Small particle air pollution is particularly worrisome, because that is the material that finds its way into the bloodstream. "We're not worried about the particles larger than 2.5 microns, such as fireplace smoke," Finch explains. "Those are trapped in the upper airways. The ones that we're really concerned about are invisible to the human eye — smaller than 2.5 microns. They penetrate deeply into the lung, and they reach the brain."

That 2014 CAF-funded project, says Finch, developed in conjunction with his USC associate Mafalda Cacciottolo, later led to a substantial grant from the National Institutes of Health. Together, their research established strong evidence that urban pollution is contributing to a toxic increase in Aβeta, which in turn leads to the development of Alzheimer's.

"This sort of leveraging of small, privately funded projects into much larger, public-

funded research is central to the Cure Alzheimer's Fund mission," says Armour.

While the news about air pollution's neurotoxicity is stunning and worrisome, there is some reassuring news. These nanoparticles though abundant around the world, are on the decline in some nations. The U.S., for example, has seen a 35 percent decrease in the concentration of small airborne particles from 2000 to 2014. "Fifteen years ago, the bulk of the country was over the EPA safety standard," Finch says. "Now, more than half of the country is under the safety standard. So we're making progress."

"This is a key piece of the puzzle," says CAF Research Consortium Chair Rudy Tanzi, Ph.D. "Alzheimer's emerges more than a decade before symptoms begin, with the over-accumulation of Aβeta in the brain. As we aggressively move toward therapies to control that process, we need to expand our understanding of the contributing factors."



## Rozann Newman Gives Back

Rozann Newman of Beverly Hills, Calif. was married for 47 years before her husband, Bill Newman, passed away at age 93 after suffering from Alzheimer's disease. Bill graduated from UCLA in 1939 with Phi Beta Kappa junior-year honors. He served in World War II as a Japanese language officer for the U.S. Navy. He was president of Newman Importing Company and was an outstanding tennis player who served as president of Beverly Hills Tennis Club for a number of years. "What Bill accomplished in the outside world was important to him, but he'd want to be

remembered for his humanity. He was the least judgmental person I knew," said Rozann. "This was a man of great character," wrote Bill's daughter, Laura, about her father.

Rozann was by Bill's side through his final days, and she was his caregiver for more than a decade. "I was very fortunate to have a lot of support and help when my husband was ill, but a lot of people are not so fortunate. I know what this disease did to me *with* help, and I can't imagine what it would do to a person *without*," said Rozann. "Alzheimer's is so vicious,



and it hits so many families—it needs more attention." That's why she chose to donate Cure Alzheimer's Fund. "I want to help find a cure for Alzheimer's quickly, so no one else has to go through what we've been through," she added.

## Local Fundraisers

Educating people about Alzheimer's disease and raising funds for research takes tireless commitment by many dedicated individuals. Many key influencers are using their reach to help others understand the urgent need for a cure and what is required to get there.

At the Angler's Club in Key Largo, Fla. this past February, Linda Kendall, Gail Moss and Jean Murphy hosted a wine reception with a special presentation, entitled "Making a Difference in the Fight Against Alzheimer's," by Cure Alzheimer's Fund Co-Founders Jeff and Jacqui Morby. In March, Joseph Reilly Jr., an advisor to the Family Wealth Report Awards Gala in New

York City, wanted to spotlight CAF after attending the 2014 symposium. He invited Jeff and Jacqui Morby to address a crowd of 450 people who work with high net worth individuals and families, to educate them and raise money for research. Later that month, Peter and Missy Crisp of Jupiter Island, Fla. hosted a presentation by CAF Co-Founder Henry McCance and CAF Research Consortium Chair Rudy Tanzi at the Tangerine Theatre, which brought in a packed house.

A huge thank you goes out to these individuals for helping us in the fight against Alzheimer's disease.



Left: Jacqui and Jeff Morby address the crowd.

Right: Supporters gather at the Family Wealth Report Awards Gala.

## Research Consortium Annual Meeting

This year, the Cure Alzheimer's Fund Research Consortium had its annual meeting in San Diego to discuss and debate the latest research progress. About 15 scientists attended, along with the entire CAF board and key staff members. "The group's discussion was wide ranging and spirited," said Meg Smith, CAF's senior advisor for strategy and special projects. Consortium members asked each other tough questions, talked through future implications, and shared prepublication data, which rarely happens in the world of science. "A wide variety of investigative areas were discussed, but there was particular energy around

inflammation, how beneficial microglial activity can become toxic, and the intermediating activities of CD33 and TREM2," Smith said.

Cure Alzheimer's Fund was founded to empower leading researchers to pursue novel and groundbreaking ideas. The free flow of conversation among our researchers helps hone and advance these ideas faster than would otherwise be possible. This year at the meeting, researchers from different institutions worked together to hatch new projects that, upon appropriate review, will be fostered by Cure Alzheimer's Fund in the year ahead. "Research Consortium

Research Consortium members told us how valuable they found the opportunity to collaborate at our meeting, and we're proud and grateful that such progress could take place in only a couple of days.

members told us how valuable they found the opportunity to collaborate at our meeting, and we're proud and grateful that such progress could take place in only a couple of days," added Smith.

## Financial Update

	This Quarter*	YTD*	Inception to Date
<b>Fundraising</b>	\$2.0M	\$2.0M	\$62.0M
<b>Expenses paid for by the board</b>	\$0.6M	\$0.6M	\$12.6M
<b>Funded research</b>	\$0.5M	\$0.5M	\$38.5M

\*Numbers shown are preliminary for the period and are rounded to the nearest \$100,000.

## Research Update

Research funded during the first quarter of 2016

Project/Researcher	Distribution Amount
<b>G2T Research Models and Materials</b> Taconic Biosciences	\$150,973
<b>In Vitro and In Vivo Analysis of APP Variants</b> Sangram S. Sisodia, Ph.D., University of Chicago	\$250,000
<b>A Combination of Anti-Abeta and Growth Factor Therapy for Alzheimer's Disease</b> Mark H. Tuszynski, M.D., Ph.D., University of California, San Diego	\$125,000
<b>Total Distributed to Research for Q1 2016</b>	<b>\$525,973</b>



**NEW PATHS TO DISCOVERY**

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6th Annual  
Symposium  
on Alzheimer's  
Research

**SAVE THE DATE : Wednesday, Oct. 19, 2016**  
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For gifts of securities or direct wire transfers, please contact Tim Armour at **877-CURE-ALZ (287-3259)** for further information.

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### MISSION

Fund research with the highest probability of preventing, slowing or reversing Alzheimer's disease.

### RESEARCH CONSORTIUM

Develops and updates a "roadmap for research" for the most effective and efficient route to preventing, slowing or reversing Alzheimer's disease. Members research their own projects and recruit others whose work will hasten development of effective therapies for and prevention of Alzheimer's disease.

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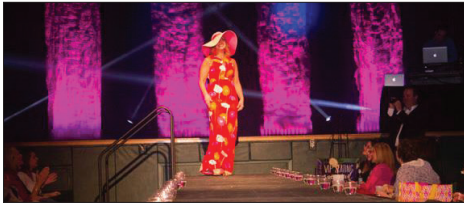
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Cure Alzheimer's Fund is fortunate to have a great number of heroes with a generous spirit of giving who are helping to spread the word about Alzheimer's and raise money for research. Thank you for all that you do.



*A model at the DKJ Fashion Show*

## From Fairway to Runway

For the last 16 years, Gregg Johnson and his brother Bruce of Reading, Mass. have been hosting Alzheimer's research fundraisers for the DKJ Foundation on the golf course—in honor of their father, David K. Johnson, who was diagnosed with the disease at age 60. This past March, the brothers partnered with Aine's Boutique in Reading for their third annual fashion show to benefit the DKJ Foundation. The boutique owner, Julie Centrella, named the store after her mother, Aine, who currently suffers from Alzheimer's. Aine is one of 16 children, and five of her sisters also have the disease. The fundraiser was held at the Austin Preparatory School in Reading. More than 450 women attended the event, which included fashions from beach wear to evening wear, raising \$18,000 for research.



*Lieutenant Blight and fellow firefighters present a check to CAF*

## Firefighters Strike Against Alzheimer's

Lieutenant Blight of the Quincy, Mass. firefighters association has a personal connection to Alzheimer's disease, as do many of his colleagues. So this past February, they decided to come together to raise money for research at O'Lyndi's bowling alley in Quincy. There was a huge turnout as firefighters, families and friends gathered for an evening of fun and friendly competition, all to raise money for Alzheimer's research. Together they raised \$6,000.

## From Savannah to San Diego on Two Wheels

Last winter, Max Needham, now 23, left Savannah, Ga. on Nov. 1 and biked for 55 days across America, arriving in San Diego on the day after Christmas. "There were so many times where I was absolutely at the end of my physical and mental rope, and I pushed past it," said Max. "A journey like that puts a lot of things in perspective." But it still can't compare to pain of watching his grandmother suffer from Alzheimer's disease when he was a child. He chose to raise money for Cure Alzheimer's Fund because, "they fund novel programs/ concepts in Alzheimer's research that might not otherwise get off the ground." With a degree in biology from Washington University in St. Louis, Max is hoping to attend medical school next fall. He raised more than \$2,000 for research.



*Max at the "finish line"*

## Sweet 16

When Gabi Lanza of Middletown, Conn. turned 16 last November, she wasn't thinking about herself. She requested contributions to Cure Alzheimer's Fund in lieu of Sweet 16 gifts to help raise money for a cure. "My grandfather has suffered from Alzheimer's for the last ten years, and his situation has really shown me what matters in life," she said. "My grandmother's patience and love as a caregiver is such a great example for the rest of us. I hope the \$800 I raised will help find a cure for this heartbreaking disease and prevent others from having to go through what we have."



*Gabi, her older brothers Zack and Ben, and her parents*

## Fashion Fundraiser

People love to shop, but when they know that a portion of their purchases will go to a good cause, it's even more satisfying. Jason Mabel and Maxine Quinn, from the St. John Boutique in New York City, hosted a wine and hors d'oeuvres event this past February during Fashion Week for their customers. The guests were treated to a fashion show of the new spring line, exhibited by national stylist Jennie Perrine, and the store gave a portion of the proceeds sold over a four-day period to Alzheimer's research.



*St. John customers and models*

## An Ultramarathon

Kendra Blankenship, 40, of San Juan Capistrano, Calif., has run six marathons and three 50K races. But she had never run 50 miles in one day until this past April, when she finished the Prairie Spirit Trail Run in Ottawa, Kan. in 12 hours and 13 minutes. "It was a tough journey, both mentally and physically, but I did it! And it was all for a worthy cause," she said. When her grandmother passed away from Alzheimer's on National Running Day in June a year ago, Kendra wanted to run in her honor. At the time, 50 miles seemed like an impossible challenge. "There were hours when I couldn't see anybody else on the trail...but I knew my grandma was there in spirit, because I got a burst of energy at the end," she said. "I'm glad I could help support Cure Alzheimer's Fund. Together, I know we can make a difference!" She raised \$450 for research.



*Kendra before the race*

For more information on our events, go to [curealz.org/events](http://curealz.org/events).





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Check out our Facebook page for our most recent posts, photos, videos and more! Go to [facebook.com/CureAlzheimers](https://facebook.com/CureAlzheimers).

## Before I Forget

Barbara "B." Smith was one of the first supermodels. She wrote three highly acclaimed cookbooks, founded three restaurants, and launched a nationally syndicated television show and magazine. But now she's facing the biggest challenge of her life: early onset Alzheimer's disease. B. and her husband Dan Gasby are going public with their fight and have written a new book, "Before I Forget," documenting their day-to-day struggles and providing insight into the devastation of the disease. Both B. and her husband are advocating for additional research and have listed Cure Alzheimer's Fund as an organization people can support to help "Join the Fight."

The following excerpt is from Rudy Tanzi's foreword for the book:

*Alzheimer's is a hard, hard diagnosis to cope with, and I have enormous empathy with those who are doing it. Perhaps it will seem of little comfort to them, but the fact is, I have never been more optimistic about the prospect of treating this disease. It will take time—too much time. Heartbreaking time. But we will get there. Of that, I have no doubt.*

