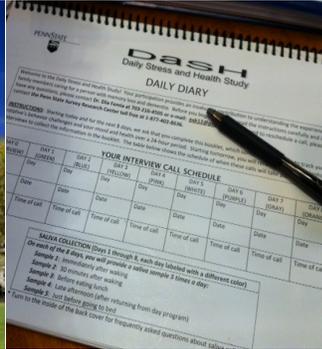
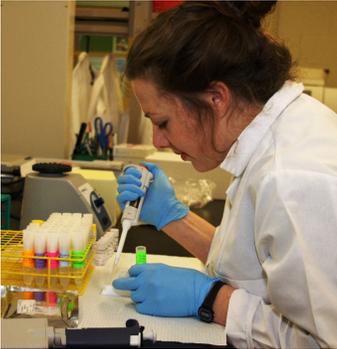


# DAILY STRESS AND HEALTH OF FAMILY CAREGIVERS STUDY

PENNSTATE



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## A FIRST LOOK: USE OF ADULT DAY SERVICES CAN NORMALIZE STRESS FOR FAMILY CAREGIVERS

**The Daily Stress and Health of Caregivers (DaSH) Study:** The study you participated in, DaSH, is nearly complete. We want to provide you with a first-look at the findings from the research. The participation of each and every one of you made the study possible.

**Adult day services (ADS)** play an important role for many families who care for a person with dementia. They help to support a person's health and well-being through a variety of daily activities, health, and nutritional programs. More and more, they also provide services to family caregivers, such as educational programs, support groups, and other helpful resources.

Caregivers often rely on ADS for

their peace of mind. On top of these benefits, we now know that ADS can have physiological benefits as well. In our research, the DaSH research team looked at how ADS affects the functioning of two hormones: Cortisol and DHEA-S. These hormones are used by the body in times of stress and can be tested in a person's saliva. In DASH, almost 200 family caregivers gave their saliva 5 times each day over an 8-day period.

After analyzing the data, the research team found that using ADS can restore a person's stress hormones to more normal levels and also leads to improved emotional well-being. The DaSH team is the first to report this discovery. "We know that the stress caregivers

experience puts them at risk for illness, but the changes we found in these two stress hormones when their relatives goes to ADS reduces that risk," says Dr. Zarit, Principal Investigator of the DaSH Study. He added, "At a time when funding for programs is limited, it's important to identify programs that can make a real difference. Adult Day Services can definitely make that difference." The study's findings are indeed important for several reasons:

**1) Stress Hormones Help the Body Function.** *Cortisol* is an important hormone used by the body to regulate normal body functioning such as blood pressure, metabolism, insulin, and immune functioning. Cortisol is...continued

The DaSH Study is a collaborative effort that involves many organizations across several states: Pennsylvania, New Jersey, Virginia, and Colorado. The research team would like to thank our study assistants and research interviewers for their tireless dedication to the project. We would also like to thank the adult day programs, their staff, and the almost 200 families who gave their time and effort generously to support the study. Thank you!

~The DaSH Research Team



## MEET THE DASH RESEARCH TEAM

The Daily Stress and Health Study brings together a collective expertise of over 100 years of experience. Meet them now!



### Principal Investigator

**Dr. Steven Zarit** is a renowned researcher in the field of caregiving with 35+ years of experience. He is the Principal Investigator of DaSH and our fearless leader.



**Dr. David Almeida** of Penn State has done groundbreaking work on studies that use daily diary approaches, including the diary interview that you completed for DaSH!



**Dr. Laura Klein** studies how stress affects health, in particular, the hormones that we use in the DaSH Study. She is our very own saliva specialist!



**Drs. Peter Molenaar and Michael Rovine** use mathematical models to test theories of health processes, including those that we study in DaSH.



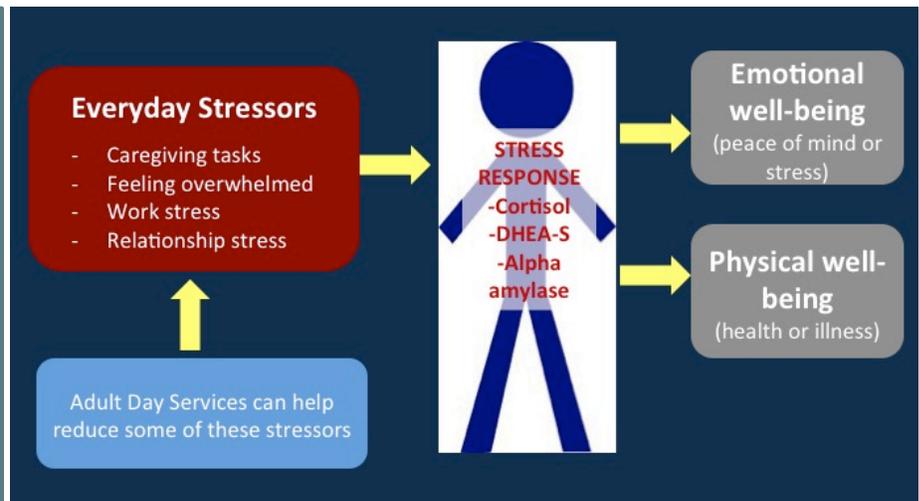
**Dr. Elia Femia** is DaSH's Project Manager, responsible for the day-to-day operations of the project. She makes sure things run smoothly.



**Dr. Caryn Goodman** is the study's Research Coordinator. She was the first voice that many of you heard from the DaSH Study.



**Madelyn Wagner** oversees the interviews conducted by the Penn State Survey Research Center. Her staff has enjoyed the privilege of working with you.



...known as the “stress hormone” because it is released when we experience stress. Throughout the day, cortisol follows a rhythmic pattern. It rises in the morning to activate the body’s systems and then gradually declines during the day. When a person experiences chronic stress, cortisol rhythms can be disrupted. Levels can stay high all day long or never reach a healthy peak. Too much production of cortisol can lead to tissue damage, immune system changes, and an increased risk of illness. The pattern of too little cortisol can also have harmful effects on the body’s immune system, which can make a person more susceptible to illness.

DHEA-S (short for dehydroepiandrosterone-sulfate) is another important hormone produced by the body. It counteracts the harmful effects that cortisol can have on the body. DHEA-S is also known as the “happy hormone” because its release in the body makes us feel relaxed, restored, and improves immune functioning and overall health.

In normal situations, DHEA-S and cortisol balance each other out in a healthy way. In moments of high stress or when chronically stressed,

however, this balance is not achieved. Over time, this imbalance leads to negative effects.

### 2) Using ADS Can Help Reduce the Amount of Stress that Caregivers Experience.

Caregivers who live with and care for someone with dementia can experience extraordinary amounts of stress. In our research, we found on average, the amount of physical time devoted to care tasks and other stressful situations was over 2 hours per day. It is exactly this type of stress that can disrupt the body’s cortisol and DHEA-S regulation.

By giving caregivers a scheduled break, ADS reduces the amount of daily stress that they experience. In DaSH, we found that lower stress on days the relative went to an ADS program was related to lower feelings of depression and anger and higher feelings of positive emotions.

### 3) Reducing Daily Stress Improves Hormone Responses.

On days when the person with dementia was at ADS, caregivers’ cortisol rhythms resumed a more normal pattern. For some caregivers, this meant lower daily levels of cortisol. For

other caregivers, this meant restoring the morning rise of cortisol. The morning rise is critical for helping the body prepare for the stresses of the day. Without it, the body is at risk for damage.

The story for DHEA-S is similar. Using Adult Day Services can have restorative effects on a caregiver's level of DHEA-S. But unlike cortisol, the effect doesn't come until the day after their relative used ADS. "The finding was very intriguing. It suggests that the benefits of ADS to caregivers are both immediate—on the day of use—and longer term—the next day," says Zarit.

**4) What Does this All Mean?** The findings we present here are an exciting first look at the ways ADS can benefit family caregivers. In earlier work that the DaSH team has done, caregivers whose relatives went to an ADS program reported a variety of emotional benefits, including less stress

and anger and better mood. Says Dr. Zarit, "This work adds to that body of research by showing other positive benefits: Reduced exposure to stress and a healthier hormone response."

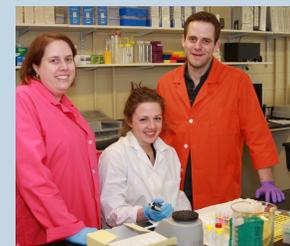
It is beyond the scope of this study to link these findings to actual health benefits. Still, the changes in stress hormones that occur with ADS use may lower the risk for illness. The study's results will help scientists understand the role that stress can play on health, and importantly the role that ADS can play in the lives of family caregivers.

**We couldn't have done this without you.** The DaSH project is nearing its end. There are just a handful of participants who need to complete their final interview. After that, we will begin the exciting step of looking at all of the information shared with us over our participants' year long participation. We are grateful and would like to thank each and every one of them.



## HOW WE MEASURED STRESS HORMONES IN DASH

To understand how people respond to stress, it is now possible to measure stress hormones in saliva. We cannot tell how someone is responding to stress from only one saliva sample. Rather, we need samples from several points during the day and across several days to understand how the body is responding. That is why we asked participants to give us 5 samples a day for 8 days. Your commitment to the study was outstanding. We received over 6,600 saliva samples from participants, which worked out to a 96% response rate!



Members of Dr. Klein's lab: left to right – Dr. Courtney Whetzel, Sarah Gildea, & Nathan Jones

The salivette tubes you used to give your samples were sent to Dr. Laura Klein's lab at Penn State. There the saliva was first separated from the cotton. It was then separated into several smaller samples, always keeping the day and time it was given. These smaller samples were tested for the presence of cortisol, DHEA-S, and a third hormone, Alpha Amylase. Often there was sufficient saliva to test each sample twice for a hormone to make sure the results were accurate.

Dr. Kyungmin Kim (on left) and Amanda Leggett are two members of Dr. Zarit's lab who contributed to the research. Not pictured are Allison Reamy, Yin Lieu, and Mary Jon Barrineau.



## REFERENCES

Our initial findings are in press and will be published soon in the premier journal, *The Gerontologist*.

## NEXT STEPS FOR THE DASH STUDY

The DaSH Research team presented these findings at the 2012 Annual Meeting of the Gerontological Society of America held in San Diego, CA. We will present additional findings at the 2013 meeting. In addition, reports are being prepared and further analysis of the data is continuing. As these reports go to press, we will let you and the ADS programs know.

**ADS Programs**

A Friend's House  
 Adult Care of Chester County  
 Anathan Club Adult Day  
 Beelong Adult Day:  
     Bristol, Warrington,  
     Huntingdon Valley, Fallsington  
 Birchwood ADC  
 Blue Mountain Health Services  
 Easter Seals, Pittsburgh  
 ElderWatch Plus Adult Day  
 Evergreen Adult Day  
 Mainline Adult Day  
 Mercy Neighborhood Ministries  
 Pittsburgh Care Partnership  
 Community LIFE  
 Riverview Adult Day Health  
 Sarah Care  
 Vintage Senior Services  
 Woodside Place  
 Bergen Family Center  
 Birchwood Adult Day Care  
 Christian Health Care  
 COPSA Institute for AD  
 Daughters of Miriam  
 Day Away Medical Day Care  
 Engel Senior Day Care

Friendship House  
 Gardens at Fair Oaks  
 Goodlife Adult Day Care  
 Guardian Programs  
 Haddon Renaissance  
 Herndon Harbor  
 Kaplen Adult Reach Center,  
 JCC on the Palisades  
 Jewish Home at Rockleigh,  
 Gallen ADP  
 Kensington Court Adult Day  
 New Life Adult Medical Day  
 Newark Beth Israel  
 Promise Adult Day Health  
 SAGE Spend a Day  
 Senior Care: Bergen,  
     Bridgeton, Trenton, Delran  
 Wheat Ridge Senior Res Ctr  
 Visiting Home Care Service of  
 Ocean City, A Friend's House  
 Sarah Care  
 St. Peter's University Hospital  
     Adult Day  
 Tender CARE Adult Day  
 The Regency at Dover  
 (Orchards at Dover)  
 Time Out Family Service of

Morris Co.: Madison &  
 Morris Plains  
 Victorian Gardens Adult Day  
 Wise Center, Union Hospital  
 Alzheimer's Family Day  
     Center, Fairfax  
 Fairfax County, Herndon  
 Fairfax County, Lewinsville  
 Fairfax County, Lincolnia  
 Fairfax County, Mount Vernon  
 Gardens at Fair Oaks  
 Pr. William Woodbridge Senior  
 Walter Reed Adult Day

**Our Interviewers**

Laura Anderson  
 Sherri Boxer  
 Mary Brodland  
 Joan Burns  
 Anthony Giannoumis  
 Nicole Greeland  
 Amy Klein  
 Judy Milio  
 Carol Sussman-Skalka  
 Rachel Thompson  
 Erica Zwilling



If you have any questions about our findings, please contact Dr. Steve Zarit at [z67@psu.edu](mailto:z67@psu.edu).



**THE DASH STUDY**

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[RECIPIENT]