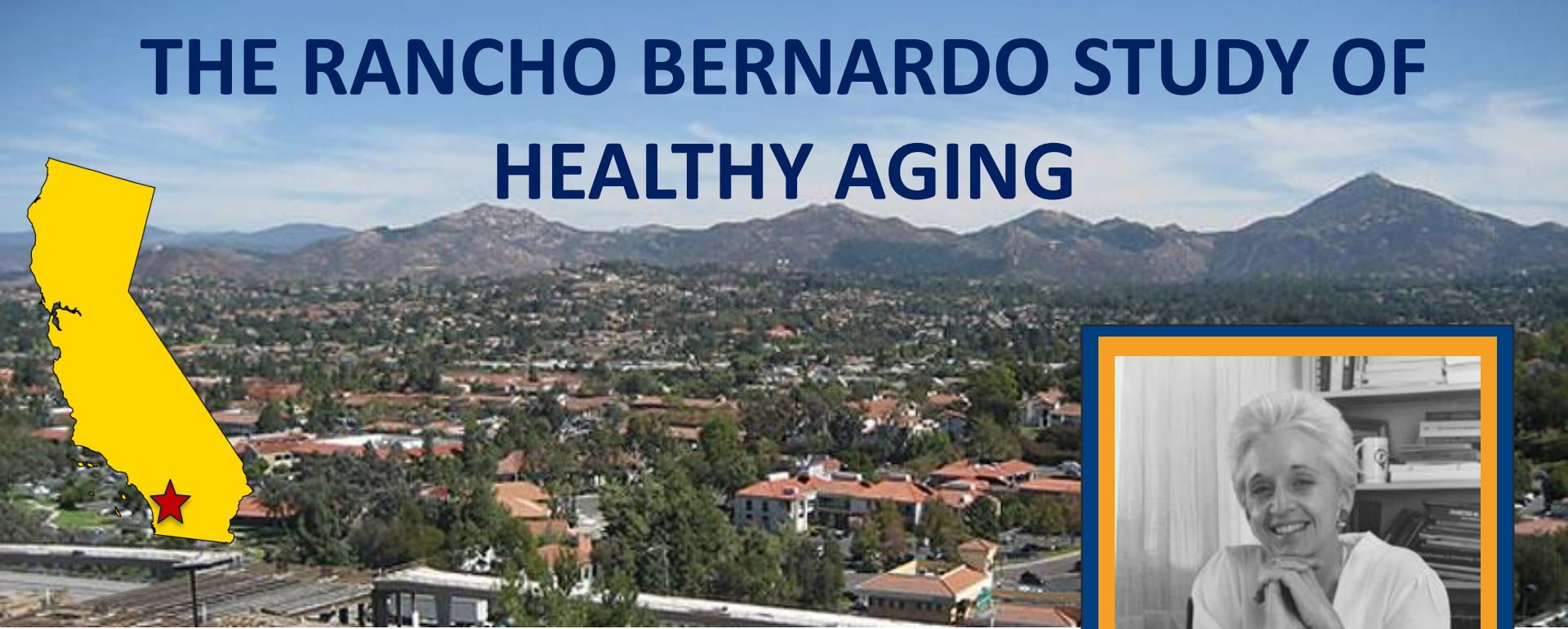


# THE RANCHO BERNARDO STUDY OF HEALTHY AGING

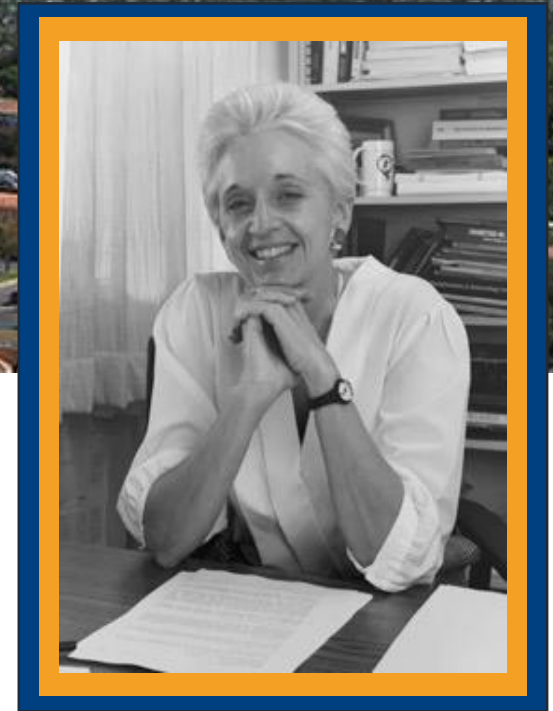


**Current Leadership:**

**Gail Laughlin, PhD**

**Linda McEvoy, PhD**

**Donna Kritz-Silverstein, PhD**



**Founder and Director:  
Elizabeth Barrett-Connor, MD**



# What is the RBS of Healthy Aging?

- ◆ A unique longitudinal cohort study that was initiated in 1972, originally as part of the Lipid Research Clinics Prevalence Study.
- ◆ >6300 residents of the community volunteered for the study – this included 82% of adults aged 30-79 – **Remarkable!**
- ◆ RBS has made fundamental contributions to our understanding of many diseases of aging, and of factors that contribute to healthy longevity.
- ◆ It was the result of good luck, Dr. Barrett-Connor's foresight and determination, hard work by many scientists, and most importantly, by the dedication of the RB participants – **Thank you!**



# How it all began....

- ◆ In 1970 high cholesterol was a known risk factor for heart disease, but the reason for this wasn't understood; and we weren't sure of the role of high density lipoprotein (HDL), triglycerides, or other lipoproteins in heart disease. We also didn't know how many people had high cholesterol.
- ◆ The National Heart Lung and Blood Institute (NHLBI) initiated a nationwide study, called the Lipid Research Clinics (LRC) Prevalence Study, to learn more about the prevalence, causes, and consequences of "hyperlipoproteinemias"
- ◆ They wanted the study to be done at different sites across the country to get a diverse sample.
- ◆ UCSD was chosen to lead data collection at one of those sites.



# The Lipid Research Clinics (LRC) Prevalence Study Sites

- University of Iowa: rural townships
- Johns Hopkins : East Baltimore & Columbia, Maryland
- University of Minnesota: suburb of Minneapolis: Richfield
- Oklahoma Medical Research Foundation – rural Oklahoma counties
- Baylor College of Medicine, Houston, TX
- University of Cincinnati, OH
- University of Washington (Seattle, WA)
- Stanford University (CA)
- University of Toronto & McMaster University in Canada



# In Southern California....

Dr. Elizabeth Barrett-Connor, a newly arrived epidemiologist at UCSD, was tapped to lead the local study. She chose Rancho Bernardo because:

- The community was the right size: 10,000 total population.
- It was the right distance from UCSD.
- Residents were of the right age (few other studies had “old people age > 50 years”)
- The population was fairly homogenous with regard to education and socioeconomic status, ensuring access to health care and a reliable medical history.
- The community and the developers were very supportive, including provision of free space for a trailer.



# The RB Heart Disease Survey Trailer





# A busy day at the RBS trailer...





# Characteristics of RBS Participants

“Community involvement is one of the outstanding characteristics of the present study population”





# Characteristics of RBS Participants

“Community involvement is one of the outstanding characteristics of the present study population”

“Because of repeated phone calls by one of us (E B-C), only 3 non-respondents contacted completely refused interviews”



# Why did the RBS continue when others didn't?

**Dr. Barrett Connor didn't stick to the script!**



# Why did the RBS continue when others didn't?

She did what she was required to do for the LRC study – following a standard protocol across sites was vital to the success of that study.

But that didn't mean she couldn't do more:

- she added a couple of pages of extra questions on other heart disease risk factors.
- she obtained separate funding to analyze fasting blood glucose levels.

The LRC study was funded by NHLBI, they were not interested in diabetes, because a different institute, NIDDK, was responsible for studies of diabetes. Our local Diabetes Association provided the money.



Elizabeth Barrett-Connor

## RBS Leadership



Mike Criqui  
UCSD professor



Kay Tee Khaw  
Cambridge Visiting Fellow



Debbie Wingard  
UCSD professor



**Rancho Bernardo Study faculty and staff - February 1995**

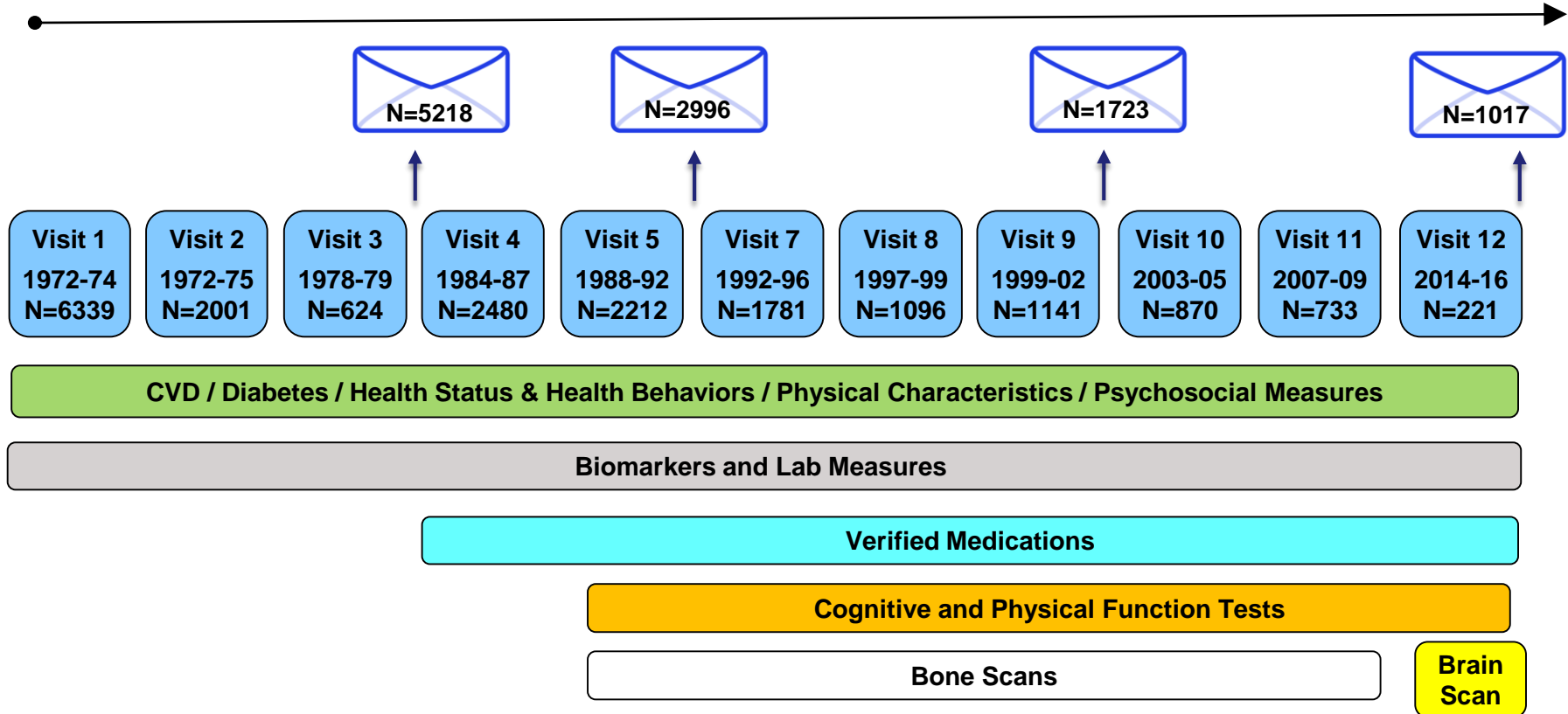
# RBS: Key Staff Members 2010





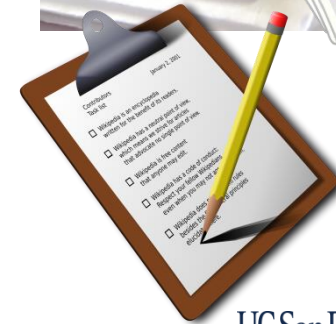
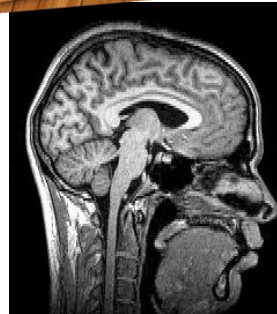
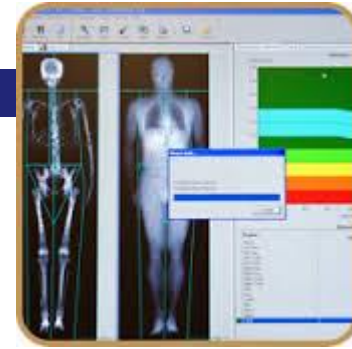
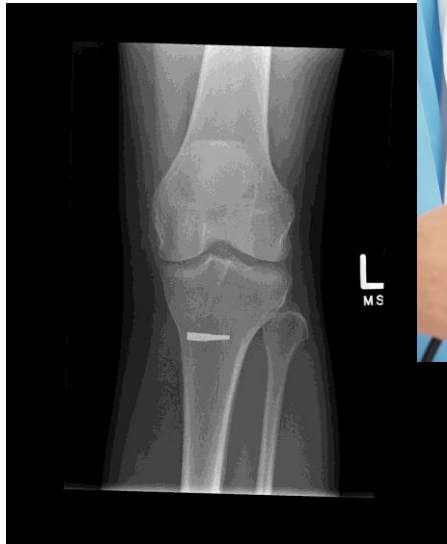
# RBS Timeline

32 ~Annual mailed surveys, follow-up for vital status (including cause of death)





# Across 12 visits, we measured almost everything imaginable

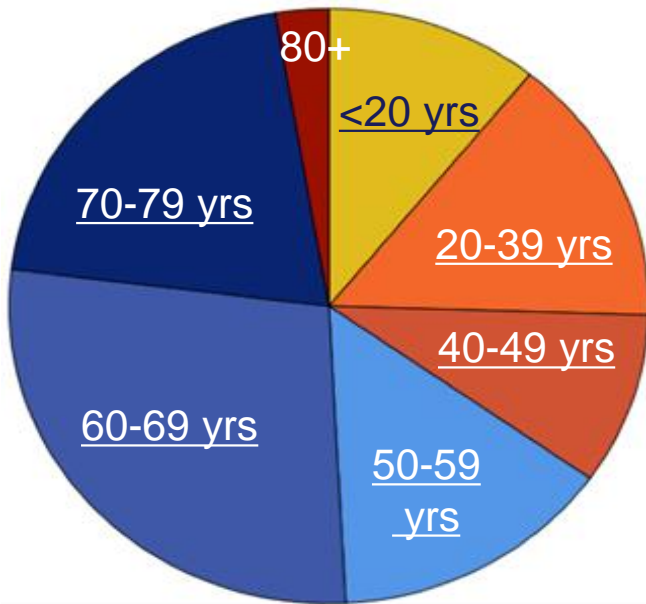






# Who are the RBS participants?

- Over time, a total of 6726 RB residents volunteered, almost all at the first RBS visit in 1972-74
- 11% were <20 yrs old, 65% were age 50 or older, 54% were women



Age at entry

- RB was marketed as a retirement community, participants had moved from across the U.S.
- Most were married, of Northern European ancestry, and middle to upper middle class
- 90% had health insurance and a high school education, 37% were college graduates



# The most important participant characteristic: *Dedication!*

- ❑ Most participants attended at least 4 research visits
- ❑ 25% replied to at least half of the 32 ~annual mailers
- ❑ Average length of follow-up was 28 years
- ❑ A participant once called Dr. Barrett-Connor after receiving the latest mailer and said:

*“When I joined this study, I didn’t know it was for life”*

--- to which Dr. B-C responded ---

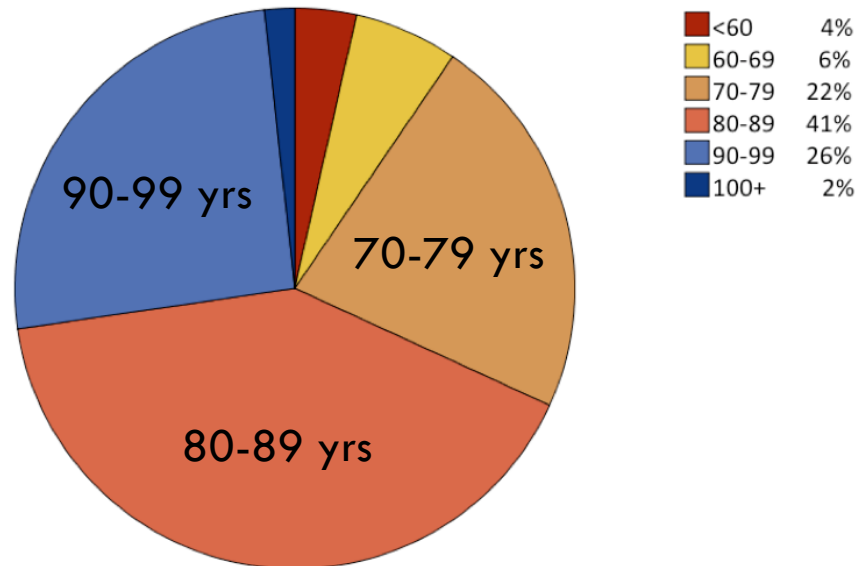
*“Neither did I” !!!*



# Longevity of the RBS Cohort

- ❑ Overall known mortality of the RBS participants who were age 50 or older at entry into the study is 96%.
- ❑ The average age at death is 86.4 yrs for women and 83.5 yrs for men, about 3 yrs longer than U.S. averages
- ❑ To date, 31% have lived to age 90 or older.

Age at Death for Entire RBS Cohort





# 47 Years of the Rancho Bernardo Study

## What have we learned?





# Rancho Bernardo Study Reports

## Women and men are not the same!





# Rancho Bernardo Study Reports

## Women and men are not the same!



*In a 1985 review of the literature on glycemia and coronary heart disease, only 4 of 29 studies included women.*

*In a 1999 review of glucose and heart disease, only 2 of 20 studies included women.*

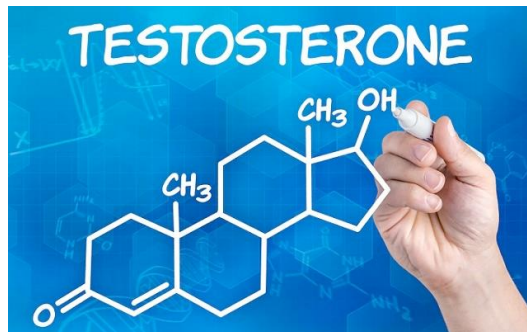


# Rancho Bernardo Study Reports ..... Sex differences in CVD risk

*Women have lower risk of heart disease than men, but this cardioprotective benefit is lost in women with diabetes. (1988)*



*Diabetes is a stronger risk factor for fatal ischemic heart disease in women than in men. (1991)*



*Older men with low testosterone are more likely to develop diabetes, and have a shorter lifespan. The same is true for older women with high testosterone. (2006)*



# Rancho Bernardo Study Reports ..... the early years



*Risk of heart attack is 2 times higher in non-smoking women married to smoking men (1984).*

*A high potassium diet (4-5 servings of fruit and vegetables/day) reduces stroke risk. A high sodium, low potassium diet increases blood pressure. (1987,1988).*







# Rancho Bernardo Study Reports ..... lifestyle and lipids

*Lipid levels in RBS are similar to those reported nationally, except that RBS participants have higher HDL cholesterol, perhaps reflecting their healthy lifestyle.*



*Drinking in moderation, exercise, not smoking and losing weight are all associated with higher HDL cholesterol levels ---- the “good” cholesterol (1990)*



*People who eat 3 to 4 meals per day have better lipid levels than those who eat the same number of calories in 1 or 2 meals (1992)*





# Rancho Bernardo Study Reports ..... psychosocial factors



*Women have more social connections than men, and larger social networks predict greater longevity (1990).*



*Women and men who are more optimistic have lower risk of death from coronary heart disease than those who are less optimistic (2016).*



# Rancho Bernardo Study Reports .... obesity and body size

*Men in RBS are about the same weight as men of same age in US, but RBS women are significantly leaner.*

*Overweight in adulthood increases the risk of heart disease and diabetes, especially if the woman was a thin child. (1989)*



*Weight loss begins to occur about 20 years prior to a diagnosis of dementia. (1996)*



*Weight tends to decrease after age 60, but central obesity tends to increase. RBS women with lower body fat tend to have a shorter lifespan. This isn't true for RBS men. (2006)*



# Rancho Bernardo Study Reports .... Physical activity

*Almost all men and women in RBS are physically active*



**“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”**

*Physically active older adults do better on cognitive tasks than those who are not physically active. This is especially true of older adults who were also active in their youth. (2019)*



# Watch for us in the news . . .



## UCSD researchers find correlation between hearing loss, cognitive decline

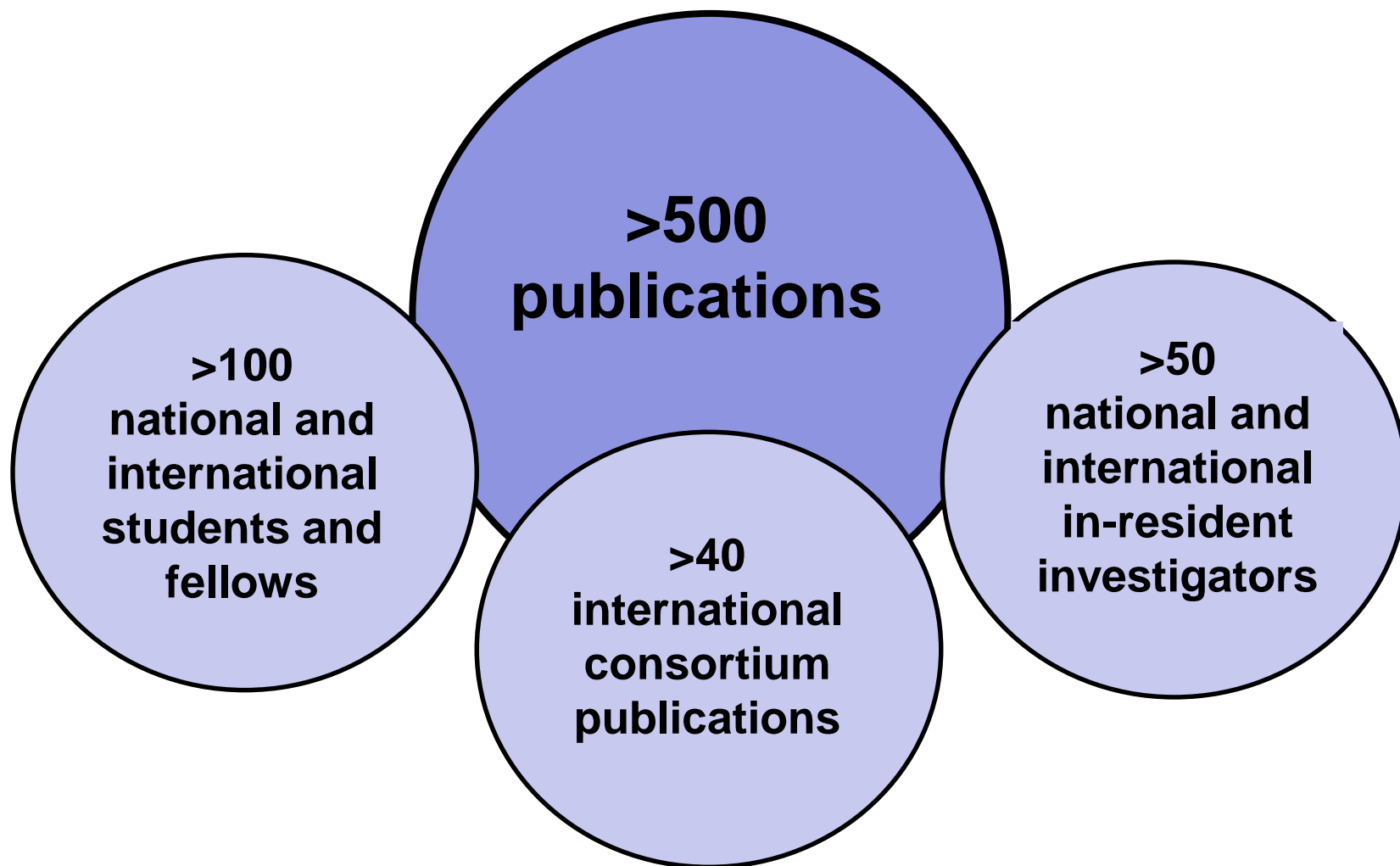
POSTED 10:52 AM, FEBRUARY 12, 2019, BY [CITY NEWS SERVICE](#)



Moderate to heavy drinkers are more likely to live to 85 without developing dementia



# Rancho Bernardo Study: Scientific and Educational Contributions





Claudia Langenberg



Sharon Soroko



Christa Scheidt-Nave



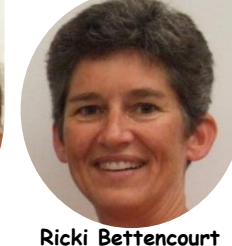
Ludmila Bakhireva



Lori Daniels



Nicole Wedick



Ricki Bettencourt



Assiamira Ferrara



Tyler Smith



Besa Smith



Wendy Carman



Gail Laughlin



Lucina Suarez



Sharon Edelstein



Caroline Kramer

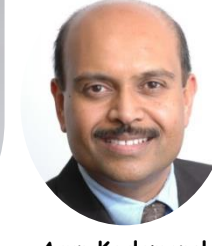


Alka Kanaya

# RBS



Deborah Kado



Arun Karlamangla



Melissa Austin



Denise von Mühlen



Johan Svartberg



Jee-Young Oh



Gail Greendale



Jeanette McCarthy



Robert Langer



Deborah Morton



Donna Kritz-Silverstein



Happy Araneta



Jared Reis



Andrew Krentz



Diane Schneider



Matt Allison



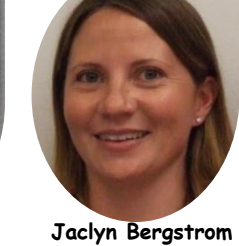
Cedric Garland



Simerjot Jassal



Rebecca Ferrini



Jaclyn Bergstrom



Deborah Goodman-Gruen



Dong-Jun Kim



# Rancho Bernardo Study: An International Resource

Inclusion in national and international collaborative analyses:

- ◆ Endogenous Hormones and Breast Cancer Collaborative Group (University of Oxford)
- ◆ Emerging Risk Factor Collaboration (University of Cambridge)
- ◆ Prospective Studies Collaboration (University of Oxford)
- ◆ Chronic Kidney Disease Prognosis Consortium (Johns Hopkins)

The invitations and data requests keep coming...





# RBS has been funded by:

- NIH – 5 different institutes, 4 Merit awards for EBC
- American Diabetes Association – San Diego branch
- American Heart Association
- Coffee Foundation
- Weight Watchers Foundation
- AARP
- Biotech – Amgen, Orion Diagnostica, diaDexus, etc, etc



# The Current RBS Team



**Elizabeth Barrett-Connor, MD**  
Family Medicine and Public Health  
46 years



**Gail A Laughlin, PhD**  
Family Medicine and Public Health  
20 years



**Linda K McEvoy, PhD**  
Radiology, FMPH  
10 years



**Donna Kritz-Silverstein, PhD**  
Family Medicine and Public Health  
32 years



**Jaclyn Bergstrom, MS**  
Family Medicine and Public Health  
14 years



**Ricki Bettencourt, MS**  
Family Medicine and Public Health  
21 years



# Thank you to the fabulous community of Rancho Bernardo!

In an interview published in the La Jolla Light, in 2009, Dr. Barrett Connor was asked to describe her greatest accomplishment:

*“That would have to be the Rancho Bernardo Study. That’s made my entire career and a lot of other people’s careers. The data just keeps coming in. Of course, we owe that success to the Rancho Bernardo participants. They’re still answering my letters after 37 years. It’s really a remarkable group of dedicated people” (La Jolla Light, 2009)*



# Questions?

