Alzheimer’s Disease and What All of Us Should Know
Presentation Agenda

- AD and Dementia: The Difference
- Early Detection
- Why Study Genetics of AD
- Prevention
- AD Support and Going Forward
Alzheimer’s is present among all races, ethnicities, socioeconomic classes, geographic regions, political affiliations, religions. It is just more prevalent in some

**All of Us Can Help Find the Answers!**
Most common form of dementia

Primary risk factor: age

Every 65 seconds

No cure

No Drug to Slow Progression
Dementia is an umbrella term for various conditions, including:

- Alzheimer’s disease
- Vascular dementia
- Parkinson’s disease dementia
- Dementia with Lewy body’s
- Corticobasal degeneration
- Frontotemporal dementia
- Mixed dementia
Leading cause of death in the U.S. and 5th in N.C.
## Significant Increase in Alzheimer’s Expected in NC

<table>
<thead>
<tr>
<th>Year</th>
<th>Ages 65 - 74</th>
<th>Ages 75 - 84</th>
<th>Ages 85+</th>
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<tbody>
<tr>
<td>2015</td>
<td>25,000</td>
<td>69,000</td>
<td>63,000</td>
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<tr>
<td>2020</td>
<td>31,000</td>
<td>79,000</td>
<td>69,000</td>
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<tr>
<td>2025</td>
<td>35,000</td>
<td>100,000</td>
<td>77,000</td>
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Source: alz.org 2016 Facts and Figures
5+ million Americans living with the disease
A Few Statistics about Alzheimer’s

1 in 8 Baby boomers will be diagnosed in their lifetime
A Few Warning Signs

a) Getting upset, worried, and angry more easily
b) Hiding things or believing other people are hiding things
c) Imagining things that aren’t there
d) Wandering away from home
e) Excessive pacing
f) Repeating the same thing over and over
g) Unusual sexual behavior
h) Increased violent behavior
i) Misunderstanding what he or she hears
j) No interest in how he or she looks (e.g. stops bathing, wears the same clothes every day).
k) Increased feelings of sadness, fear, stress, confusion, or anxiety
• Suspected risks:
  • Heart disease
  • High blood pressure at mid-life
  • Lack of physical activity
  • Depression
  • Diabetes
Progression

Pre-Dementia

Mild Cognitive Impairment

Mild

Moderate

Severe

Alzheimer’s Dementia

7 years

2 years

2 years

3 years

Courtesy: Dr. Rahn Bailey Wake Forest Medical Center
Progression

Mild
Cognitive
Impairment

Pre-Dementia

Alzheimer’s Dementia

Mild

Moderate

Severe

Memory Loss
Confusion of Familiar places
Taking longer to accomplish tasks

Trouble with paying bills
Poor Judgment
Loss of initiative

Courtesy: Dr. Rahn Bailey Wake Forest Medical Center
Progression

Pre-Dementia — Mild Cognitive Impairment

Alzheimer’s Dementia — Mild — Moderate — Severe

Increased Memory loss
Shortened Attention Span
Inappropriate outbursts of anger
Problems recognizing friends

Difficulty with language
Difficulty organizing thoughts
Restlessness, agitation, tearfulness,
Repetitive statements or movements

Courtesy: Dr. Rahn Bailey Wake Forest Medical Center
Progression

Pre-Dementia
Mild Cognitive Impairment

Alzheimer’s Dementia
Mild
Moderate
Severe

Weight loss
Seizures
Skin infections
Difficulty Swallowing
Groaning, Moaning, Grunting

Increased sleeping
Lack of bladder/bowel control
Extended stays in bed
Aspiration pneumonia

Courtesy: Dr. Rahn Bailey Wake Forest Medical Center
EARLY DETECTION
ALZHEIMER’S DISEASE AFFECTS MULTIPLE AREAS OF THE BRAIN
ALZHEIMER’S DISEASE DESTROYS BRAIN CELLS THAT DO NOT COME BACK!

Crosstalk between Neurons  
Normal Neurons  
Diseased Neurons
Biomarkers

Can be measured to accurately and reliably indicate the presence of disease
- fasting blood glucose (blood sugar) level, which indicates the presence of diabetes if it is 126 mg/dL or higher.

Several potential biomarkers are being studied
- beta-amyloid and tau levels in cerebrospinal fluid (CSF)
- Blood and urine test
- brain changes detectable by imagining
Brain Imaging/Neuroimaging

- Magnetic Resonance Imaging (MRI) and computed tomography (CT) scan
  - provides information about the shape, position or volume of brain tissue.

- Positron Emission Tomography (PET)
  - reveals how well cells in various brain regions are working by showing how actively the cells use sugar or oxygen.

![Visualizing Brain Changes with a PET Scan](image_url)
Death of a Healthy Brain
Due to Alzheimer’s Disease
• Annual Check up
  • Vital Check signs
    • BP, heart rate and respiratory rate

• Physical Exam
  • palpating,” parts of your body (like your abdomen) to feel for abnormalities
  • checking skin, hair, and nails
  • possibly examining your genitalia and rectum
  • testing your motor functions and reflexes

• Visual Exam
  • Head, eyes, chest, muscoskeletal system and nervous system

• Cognitive Exam
  • Memory
  • Executive functions
  • Delayed recall
  • Immediate recall
GENETICS OF AD
Dr. Francis Collins:

“Except for some cases of trauma, it is fair to say that virtually every human illness has a hereditary component”.

ALZHEIMER’S DISEASE RUNS IN OUR FAMILIES

• ALZHEIMER’S RUNS IN OUR FAMILIES
AD Genetics: 1988

Unknown: 100%
The discovery of ApoE as a genetic risk factor in Alzheimer Disease revolutionized the field of complex disease genetics.

Late Onset Alzheimer’s was not thought to have a genetic component until...
Apolipoprotein E (APOE) Gene

- Gene identified in 1993 by Dr. Pericak-Vance and colleagues
- APOE protein is involved in cholesterol storage, transport, and metabolism
- Most common known genetic determinate of susceptibility to AD
- Found in both familial and sporadic AD
- **Risks are sex and race dependent:** APOE has a smaller effect on African Americans than in individuals of European heritage.
We all inherit 2 forms or copies of the APOE gene

**GOOD COPY**
- it appears to decrease risk, and increases age of onset

**NEUTRAL COPY**
- it is the most common form
- neither increases nor decreases risk

**BAD COPY**
- it increases risk, and decreases age of onset
Risk and Age at Onset of AD Depends on APOE allele

Risk of AD by age 75

Number of copies of APOE-4

AAO = average age at onset

AAO=86
AAO=74
AAO=68
Why Study Genetics of Alzheimer’s Disease in Underrepresented Groups?

• Alzheimer’s disease is a health disparity
• Genetics of AD and Hispanics in African Americans is unclear and underrepresented in literature
• First degree relatives are more likely to get AD
• \textit{apoE} genotype is elusive in African Americans and Hispanics
• Until recent years no URMs were included in large genetic studies of AD!
PREVALENCE OF AD
Neighborhood Disadvantage is a Social Determinant of Health

• Alzheimer’s disease and other chronic diseases disproportionately impact racial/ethnic minorities and the socioeconomically disadvantaged populations – populations often exposed to neighborhood disadvantage

• Neighborhood disadvantage influences many factors including health behaviors, access to food, toxic exposures and personal safety

• Living in a disadvantaged US neighborhood is strongly linked to increased mortality and disease
Alzheimer’s Disease and Care -- A Health Disparity

2 out of 3 are
Understanding Alzheimer’s as a Health Disparity

1.5x Hispanics
Understanding Alzheimer’s as a Health Disparity

African Americans

2x
We Are Living Longer!
African Americans (AA) are more likely to develop AD and dementia compared to non-Hispanic white (NHW) populations

- Greater familial risk for AD
- Limited health care access
- AD patients identified at later stages
- Poorer treatment outcomes

Genetic distinctions

- Minority populations are underrepresented in genetic studies
- Ethnic-specific alterations and effect sizes
  - **APOE ε4**
    - More frequent in AA
    - Relative risk is lower
  - **ABCA7**
    - Relative risk is greater in AA
    - Different genetic variant

http://www.socialgradient.org/alzheimers-center-aids-african-americans/
http://www.poststat.net/pwp008/pub.49/issue.350/article.528/
Expanding Genetics of Alzheimer’s Disease in African Americans

Intentionality: Seeking African Americans

Wake Forest University-(MACHE)
The University of Miami
Columbia University
Case Western Reserve University
PREVENTION
Reduce Risk of AD
• Combining five controllable lifestyle habits such eating healthier, exercising regularly, and refraining from smoking reduced risked of AD by 60%.

• Researchers found that people who reported healthier lifestyles overall—those who stuck to a low-fat diet, did not smoke, exercised at least 150 minutes each week at moderate-to- vigorous levels, drank moderately and engaged in some late-life cognitive activities—had lower levels of Alzheimer’s dementia.

• Those following two or three of the healthy lifestyle factors reduced their risk of developing Alzheimer’s dementia by 39%.
AD SUPPORT
COAACH AND MACHE: MODELS OF COLLABORATIVE RESEARCH, TRAINING AND COMMUNITY ENGAGEMENT
Educational Initiatives

- Pipeline programs
  - American Indian Biomedical Summer Academy (AIMS), Medical Careers and Technology (MedCaT)
  - Career development and cross-disciplinary trainings
  - Research Ambassadors

Community Partnerships

- NC American Indian Health Board (funded by KBR)
- Native Pathways to Health (funded by KBR, NC Office of Minority Health & Health Disparities, BCBS)
- Carolina Geriatric Workforce Enhancement Project for memory loss (funded by UNC-CH)
- Community Engagement: All of Us, Cultural Heritage Celebrations
- Integrating Special Populations
  - Research navigation, Translation services, Consultations, Study Coordinator Research Forum (SCaRF)

Translational Research

- Dr. Irby
  - Native Pathways to Health
  - Understanding community engagement within learning healthcare systems
  - Behavioral self-management of chronic pain among special populations
- Dr. Byrd
  - Alzheimer’s disease and genetics in African American and Puerto Rican populations (funded by NIH)
  - Brain Health and Prevention Registry (funded by the State of NC)
Attended and/or hosted ~40 events

Connections made with ~2,500 individuals

- UNC Minority Health Conference
- NC American Indian Unity Conference
- Building Integrated Communities Symposium
- Juneteenth Festival
- Winston-Salem Hispanic League Fiesta
- Southeast American Indian Studies Conference
- State of Black NC Conference
- Hispanic Heritage month (Sept) event
- American Indian Heritage month (Nov) event
- Triad Gentrification Symposium
- Planning for Healthy Communities Conference
- Domestic Violence month Silent Witness Exhibit
- “All of Us” Community Event
Alzheimer’s Disease Research Center
Support Groups

Annual Caregiver Education Conference

Lunch and Learns

Educational Awareness Galas

Town Hall Meetings

Volunteer Program

Celebrity Luncheon

Purple Saturday

Faith-Based Tool-Kit and Events

Monthly Electronic Newsletter

Family Navigation Program

Caregivers’ College
How we Can Help

• Become an Advocate

• Provide respite for a loved one or friend

• Join A Research study
  • www.wakehealth.edu/mache

• Increase Awareness

• Volunteer
Words of Dr. Angelou

"I believe the responsibility for tomorrow is in our hands today!"
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