Risk For Alzheimer’s, Dementia & Cognitive Decline
OUR VISION: A world without Alzheimer’s disease®.

OUR MISSION: To eliminate Alzheimer's disease through the advancement of research; to provide and enhance care and support for all affected; and to reduce the risk of dementia through the promotion of brain health.
We Fund ...

$160 million in 21 countries
Our Time Today …

• Cognitive function and early warning signs
• Influence of our genes on risk
• Lifestyle/behaviors that influence risk
• Future of research and potential impact
• What to do today
Developing Brain Gives Clues to Brain Change with Age

FIGURE 3:
Synapse Density Over Time

Source: Corell, JL.
The postnatal development of the human cerebral cortex.
Age Related Changes

• Many changes of our bodies as we age, including our brains

• Examples of changes in brain with age:
  – Shrinkage of specific parts of brain, especially prefrontal cortex, hippocampus.
  – Changes in how brain cells communicate.
  – Changes in the brain’s blood vessels/ blood flow.
  – Damage by free radicals increases.
  – Increase in inflammation.

Adapted from NIA/NIH's Alzheimer's Disease: Unravelling the Mysteries
Impact of Alzheimer’s

- Total cost of care for those with Alzheimer’s, with more than two-thirds paid by Medicare and Medicaid.

- $277 billion in 2018
- $1.1 trillion in 2050

Facts & Figures 2018
Alz.org/FACTS
Definitions: Dementia & Alzheimer’s

Dementia: An “umbrella” term used to describe a range of symptoms associated with cognitive impairment.

- **Alzheimer’s**: 50%-75%
- **Vascular**: 20%-30%
- **Lewy Bodies**: 10%-25%
- **Frontotemporal**: 10%-15%

**Mixed Dementia**: >1 neuropathology - prevalence unknown

- **Plaques**
- **Tangles**
Biology Impacts Behavior

Brain cell death
Role of Our Genes in Alzheimer’s Risk

• **Deterministic Genes**
  – Autosomal Dominant Alzheimer’s Disease (ADAD) or Dominantly Inherited Alzheimer’s Disease (DIAD)
  – Down syndrome

• **Risk Genes** (ex. APOEe4)

• **Sex Genes** (XX, XY)
Understanding Genetics: Deterministic

23 Chromosome Pairs

Relatively rare: 1-3% of all cases of Alzheimer’s
Observations from Individuals with Dominantly Inherited Alzheimer’s

**Logical Memory**

- **Mutation Carriers**
- **Non-Carriers**

**Beta-Amyloid Deposition**

- **Mutation Carriers**
- **Non-Carriers**

Est. Years Before Clinical Onset

Down Syndrome & Alzheimer’s Research
Understanding Genetics: Risk

- Approximately ~40 variations of genes associated with increased risk identified to date
- Most well known: APOeE4
Hispanics/Latinos: as likely as non-Hispanic white to develop dementia

African Americans: 2X as likely as non-Hispanic white to develop dementia
Funding by the Alzheimer’s Association advanced initial and validation of these findings in independent populations.
Understanding Genetics: Protection

LETTER

doi:10.1018/nature11283

A mutation in APP protects against Alzheimer’s disease and age-related cognitive decline

Thordur Jonsson1, Jasminder K. Atwal2, Stacy Steinberg3, Jon Snaedal2, Palmi V. Jonsson2,5, Sigurbjorn Bjornsson1,
Hreinn Stefansson1, Patrick Salem1, Daniel Gudbjartsson1, Janice Maloney2, Kwame Hoyte2, Amy Gustafson2, Yichin Liu2,
Yanmei Lu2, Bashar Bhangale2, Robert R. Graham2, Johanna Hattenlocher2,5, Gydja Bjornsdottir2, Ole A. Andreassen2,
Erik G. Jonsson2, Aarnio Patole2, Timothy W. Behrens2, Olafur T. Magnusson1, Augustine Kong1, Unnur Thorsteinsdottir2,5,
Ryan J. Watts2 & Karl Stefansson1,5

Views of the Earth. Copyright © 2010 by Christoph Hormann. http://earth.imaggeo.de/
2/3 of Americans with Alzheimer's are women.

alzheimer's association®
alz.org/facts
Underlying Biology of Alzheimer’s: Women and Men

- X/ Y chromosomes
- Brain function & networks
- Hormonal pathways
- Metabolism pathways
- Lifestyle

Funded $3M+ to 13 projects in 2017 and 2018 to help answer why!
A Woman’s Reproductive History and Risk for Dementia

- Lower dementia risk associated with:
  - Number of children
    - Months spent pregnant
  - History of miscarriage
  - Age of first menstrual period
  - Age of menopause
Duration & Course of Illness Different for Men and Women

- Duration of AD: Women 5.3, Men 4.7
- Nursing Home Stay: Women 5.0, Men 2.8
- Community: Women 0.3, Men 2.0
Underlying Biology of Alzheimer’s: Women and Men

- Diagnosis
- Treatment
- Society impact
Summary of the evidence on modifiable risk factors for cognitive decline and dementia: A population-based perspective

Matthew Baumgart\textsuperscript{a}, Heather M. Snyder\textsuperscript{b,\#}, Maria C. Carrillo\textsuperscript{b}, Sam Fazio\textsuperscript{c}, Hye Kim\textsuperscript{a}, Harry Johns\textsuperscript{d}

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\textsuperscript{d}President & CEO, Alzheimer’s Association, Chicago, IL, USA
Risk Factors for Cognitive Decline

Fig. 1. Strength of evidence on risk factors for cognitive decline.
Risk Factors for Dementia

Fig. 2. Strength of evidence on risk factors for dementia.
Risk Related to Cognitive Decline: Possibly Able to Modify Behaviors

- Cardiovascular Risk Factors:
  - Diabetes
  - Mid-Life Obesity
  - Mid-Life Hypertension
  - Cholesterol
SPRINT-MIND Study: First Study to Demonstrate Reduction of New Cases

• 9,000+ ppl; std vs intensive
• Intensive treatment:
  – 19% reduced risk for MCI
  – 15% reduced combined MCI and dementia
• Dramatic reduction of small vessel disease on MRI
• Immediate opportunity with life changing impact potential
Risk Related to Cognitive Decline: 
Possibly Able to Modify Behaviors

- **Lifestyle Risk Factors:**
  - Current Smoking
  - Physical Activity
  - Diet
  - Cognitive training/ lifelong learning
Lifestyle Risk Factors: Current Smoking

- Over 25 studies (n>50,000) show current smoking linked to increase risk of cognitive decline, possibly increase risk of dementia.

Sleep

• Sleep disturbances, sleep apnea, less sleep linked to increased risk
• Associated with clearance mechanisms of the brain
• Hints of treating sleep may be beneficial
Depression

• 1 in 5 experience depressive symptoms in a lifespan
• 20+ studies of 100,000+:
  – History of depression linked to increase risk
• Mid-life vs late life
• Non-cognitive symptoms

Byers AL and Yaffe K, Nat Rev Neurol 2011, 7 (6).
Li, G et al. JAMA Psychiatry 2011, 68 (9)
Global Dementia May be Preventable

- **Early life**
  1. Education to age 15

- **Mid-life**
  2. Hypertension
  3. Obesity
  4. Hearing loss

- **Later life**
  5. Depression
  6. Diabetes
  7. Physical inactivity
  8. Smoking
  9. Low social contact

35%
Does a recipe that combines lifestyle interventions prevent or delay cognitive decline?

U.S. POINTER will evaluate two lifestyle interventions:

- Physical Exercise
- Nutritional Counseling & Modification
- Cognitive & Social Stimulation
- Improved Self-Management of Health Status
If we **delay** onset by 5 years...

**DELAYED ONSET**
If we develop a treatment by 2025 that delays the onset of Alzheimer’s by just five years, then:

5.7 MILLION people expected to develop Alzheimer’s would not in 2050.
10 Ways to LOVE Your Brain

1. **Break a Sweat**
   - Engage in regular cardiovascular exercise that elevates heart rate and increases blood flow. Studies have found that physical activity reduces risk of cognitive decline.

2. **Hit the Books**
   - Formal education will help reduce risk of cognitive decline and dementia. Take a class at a local college, community center or online.

3. **Butt Out**
   - Smoking increases risk of cognitive decline. Quitting smoking can reduce risk to levels comparable to those who have not smoked.

4. **Follow Your Heart**
   - Risk factors for cardiovascular disease and stroke — obesity, high blood pressure and diabetes — negatively impact your cognitive health.

5. **Stump Yourself**
   - Challenge your mind. Build a piece of furniture. Play games of strategy, like bridge.

6. **Heads Up!**
   - Brain injury can raise risk of cognitive decline and dementia. Wear a seat belt and use a helmet when playing contact sports or riding a bike.

7. **Buddy Up**
   - Staying socially engaged may support brain health. Find ways to be part of your local community or share activities with friends and family.

8. **Fuel Up Right**
   - Eat a balanced diet that is lower in fat and higher in vegetables and fruits to help reduce the risk of cognitive decline.

9. **Catch Some Zzz’s**
   - Poor sleep can affect memory and thinking. Get at least 7-8 hours of sleep a night.

10. **Take Care of Your Mental Health**
    - Some studies link depression with cognitive decline, so seek treatment if you have depression, anxiety or stress.
2018 Charlotte Walk Event Information

When: Saturday, October 13, 2018
Where: BB&T Ballpark – 324 S. Mint Street
When: Registration: 9:00 a.m., Walk: 10:30 a.m.

Register today! Visit alz.org/walk or call 800.272.3900
In Summary …

• Multiple factors are linked with risk – spanning the life of an individual, including modifiable factors

• Advances in understanding of how these link together, and how we may design interventions at any time

• Launch of U.S. POINTER study – first of its kind & will start in North Carolina!

• We ARE making significant advances … There is HOPE in research!!!
thank you!
TOGETHER, WE CAN END ALZHEIMER’S DISEASE.™

ALZHEIMER’S IS RELENTLESS. SO ARE WE.

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2018

Register today! Visit alz.org/walk or call 800.272.3900

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