

# Health and Prevention

## **Outline**

Types of prevention

Primary prevention

Secondary prevention

Tertiary prevention

Alzheimer's Disease

## Health and Prevention

Primary prevention – prevent onset

Avoid smoking to reduce risk of lung cancer

Secondary prevention – prevent more serious disease consequences early

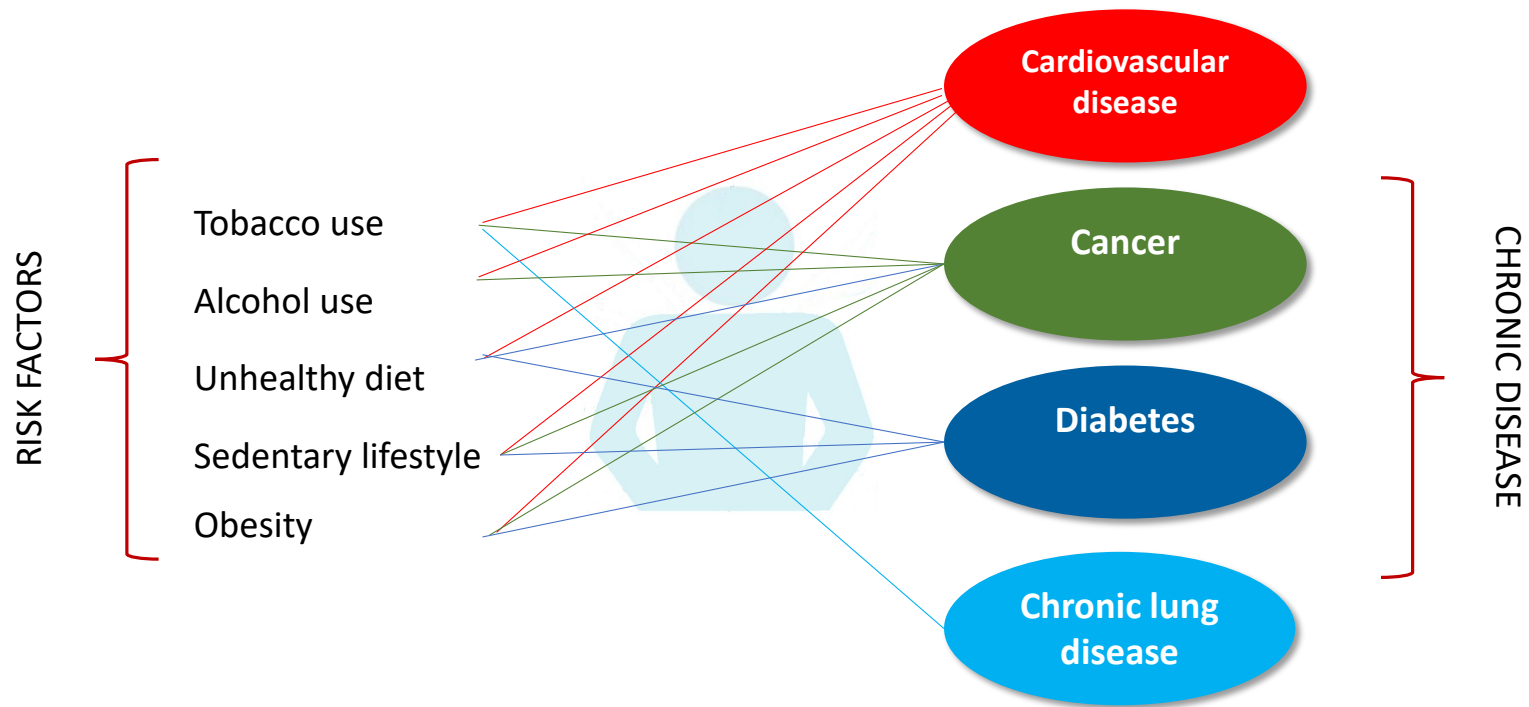
Control high blood pressure to reduce risk of stroke

Tertiary prevention – reduce damage from symptomatic disease

Quit smoking after a heart attack to reduce risk of another heart attack

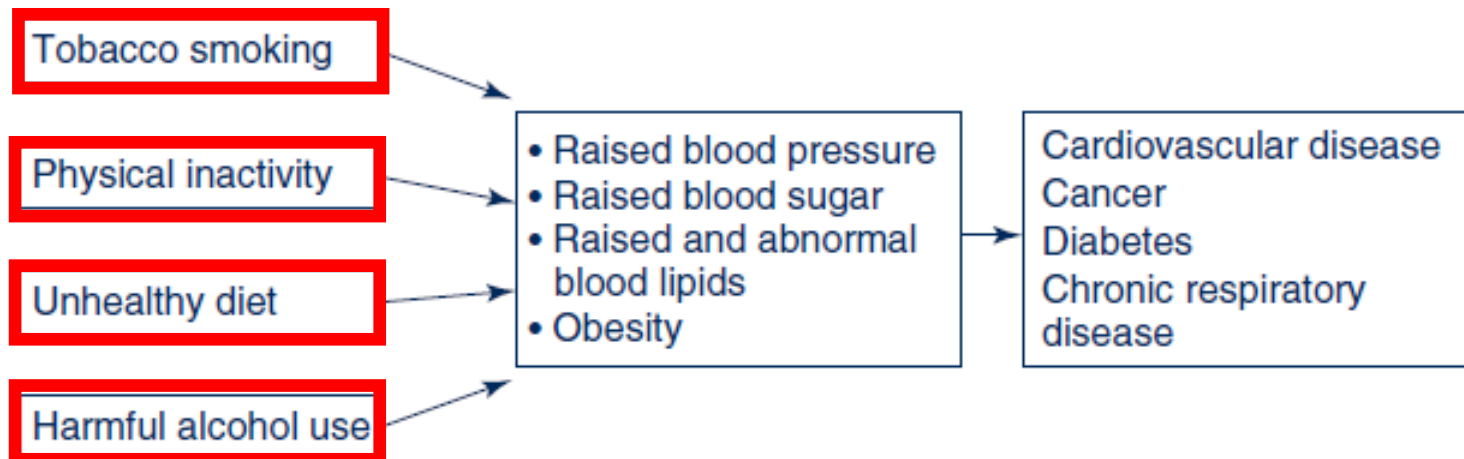
# Primary Prevention

# Primary Prevention



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## Primary Prevention



## Smoking Risk Factor for...

- Cancer (bladder, blood, cervix, colon/rectal, esophagus, kidney, larynx, liver, lung, mouth, pancreas, stomach)
- Heart disease
- Chronic obstructive pulmonary disease (COPD: emphysema, chronic bronchitis, asthma)
- Type 2 diabetes
- Reproductive health (premature rupture of membranes, placenta previa, placental abruption, and ectopic pregnancy, stillbirth, low birth weight, fetal growth, premature birth, sudden infant death syndrome, birth defects, child organ damage)
- Rheumatoid arthritis

<https://www.cdc.gov/tobacco/about/index.html>

## Quitting Smoking

Counseling (online support, telephone support)

Nicotine replacement (nicotine patch, lozenge, gum, oral inhaler, nasal spray, pill)

Combination of above

<https://www.cdc.gov/tobacco/about/index.html>

## Physical Activity Protective for...

Obesity

Osteoporosis

Arthritis

Cardiovascular disease

Hypertension

Stroke

Respiratory functioning

Diabetes

Urinary incontinence

Menopause symptoms

Immunosenescence

Sleep dysfunction

Balance problems



## Weight Gain Risk for ...

Diabetes

Cardiovascular disease

Hypertension

Sarcopenia

Immunosenescence

Respiratory functioning

Sleep apnea

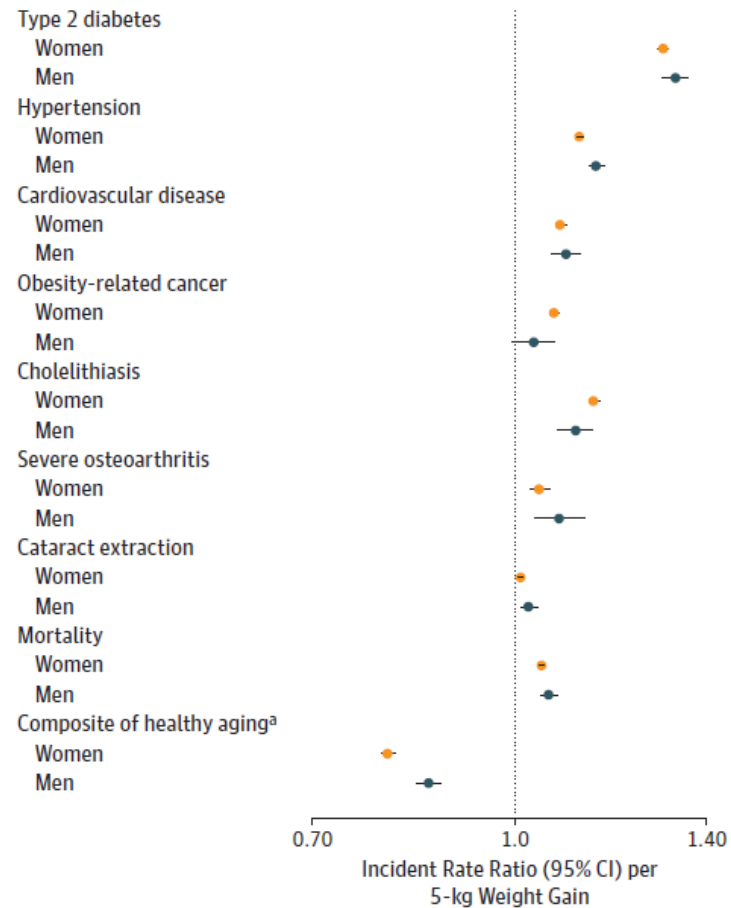
Balance problems

Stroke

Cancer

# Weight Gain Risk for ...

Figure 2. Associations of Weight Gain From Early to Middle Adulthood With Risk of Individual Health Outcomes



## Body Mass Index (BMI)

$$BMI = \frac{kg}{m^2}$$

**Table 1. Body mass Index (BMI) values for healthy weight, overweight, and c**

<i>Weight</i>	<i>BMI values</i>
Healthy weight . . . . .	18.5–24.9
Overweight . . . . .	25.0–29.9
Obese . . . . .	30 and above

## Lifespan Weight Gain

Longitudinal studies suggest that adults gain about 1.5 lbs per year on average

Likely causes: higher caloric intake, reduced physical activity, higher alcohol consumption

Rate of obesity is 40.%, overweight or obese 73.4%

[https://www.cdc.gov/nchs/products/databriefs/db508.htm#:~:text=Examination%20Survey%20\(NHANES\)-](https://www.cdc.gov/nchs/products/databriefs/db508.htm#:~:text=Examination%20Survey%20(NHANES)-,What%20was%20the%20prevalence%20of%20obesity%20in%20adults%20during%20August,or%20in%20any%20age%20group.)

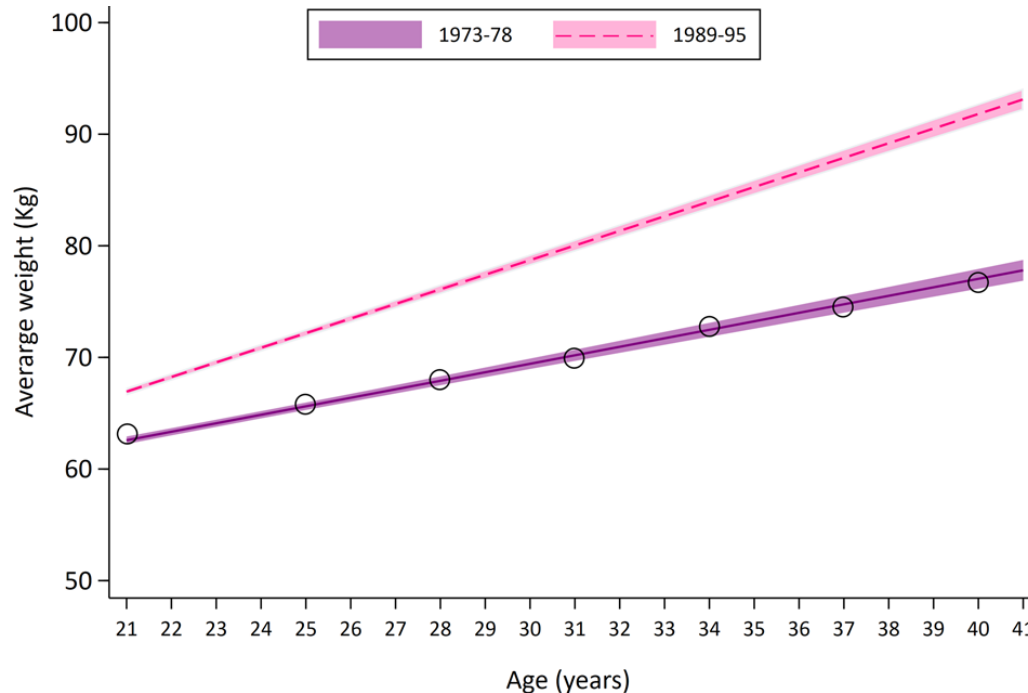
[,What%20was%20the%20prevalence%20of%20obesity%20in%20adults%20during%20August,or%20in%20any%20age%20group.](https://www.cdc.gov/nchs/products/databriefs/db508.htm#:~:text=Examination%20Survey%20(NHANES)-,What%20was%20the%20prevalence%20of%20obesity%20in%20adults%20during%20August,or%20in%20any%20age%20group.)

<https://nutritionsource.hsph.harvard.edu/healthy-weight/#:~:text=Most%20adults%20gain%20on%20average,one%20or%20more%20chronic%20diseases.>

See, for example, Willett WC, Manson JE, Stampfer MJ, Colditz GA, Rosner B, Speizer FE, Hennekens CH. Weight, weight change, and coronary heart disease in women: risk within the 'normal' weight range. JAMA. 1995 Feb 8;273(6):461-5.

## Lifespan Weight Gain

This rate has increased more recently through 1992–2010  
(from age 21 beginning in 1973 vs. beginning in 1989-1995)



“These could include changes in the food environment, physically inactive lifestyles, and the rise in environmental endocrine disrupting chemicals.” (Stenholm et al, 2015; p.167 )

Stenholm, S., Vahtera, J., Kawachi, I., Pentti, J., Halonen, J. I., Westerlund, H., ... & Kivimäki, M. (2015). Patterns of weight gain in middle-aged and older US adults, 1992–2010. *Epidemiology*, 26(2), 165-168.

# Strategies to Prevent Weight Gain

## Self-mangement

regulating the time spent watching television or sleeping,  
enhancing self care, or acquiring social support.

## Diet

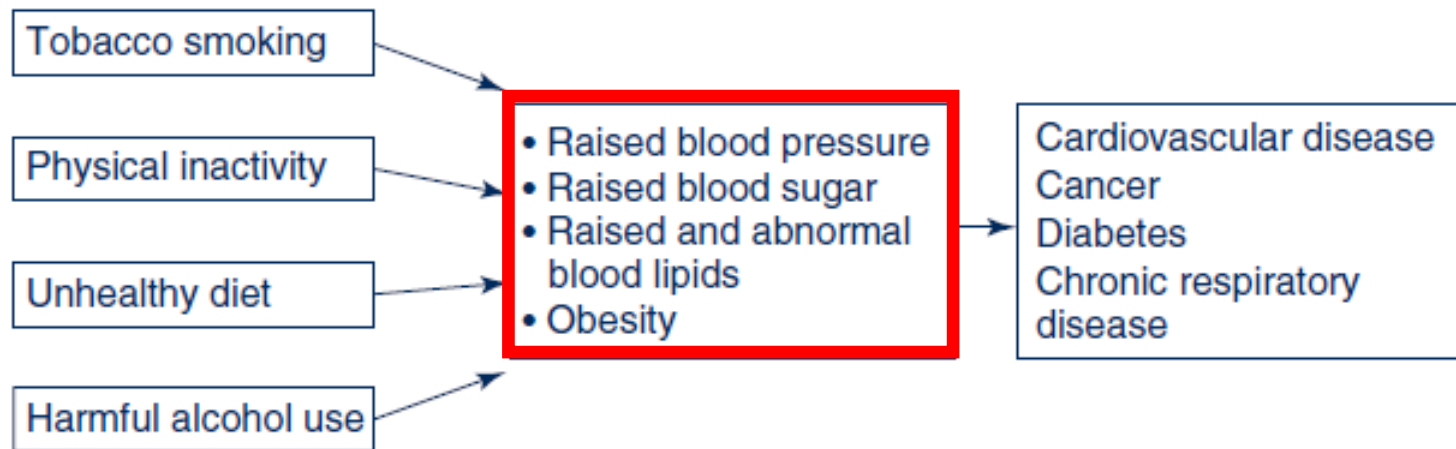
consistent intake of adequate, rather than excess, kilocalories,  
develop good long-term habits.

## Physical activity

making time for exercise in the daily routine, develop a long-  
term habit

# Secondary Prevention

## Secondary Prevention





## Secondary Prevention

Detect and intervene before disease develops

Most in need may be least likely to receive care – inverse care law

Most effective means of reducing mortality

Much more cost effective than treatment of disease

<https://www.kingsfund.org.uk/projects/gp-commissioning/ten-priorities-for-commissioners/secondary-prevention>

## Secondary Prevention

### Blood pressure

Lower weight, reduce stress, exercise, diet, moderate alcohol,  
sleep, medication

### Blood sugar

Lower weight, reduce stress, exercise, diet, moderate alcohol,  
sleep, medication

### Lipids (cholesterol)

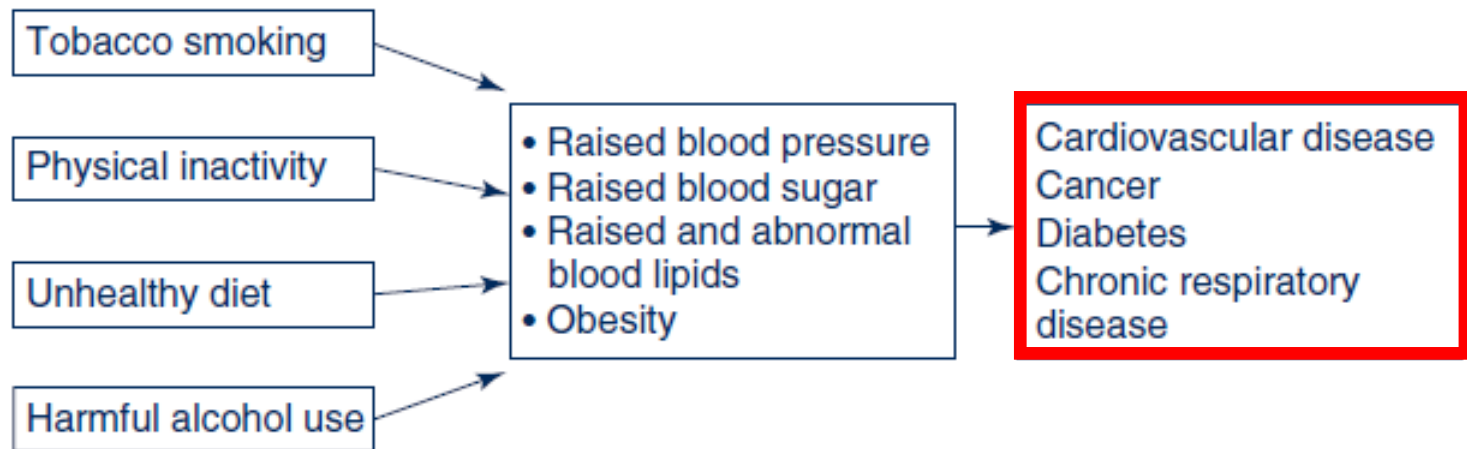
Lower weight, reduce stress, exercise, diet, moderate alcohol,  
sleep, medication

### Obesity

Lower weight, reduce stress, exercise, diet, moderate alcohol,  
sleep

# Tertiary Prevention

## Tertiary Prevention



## Tertiary Prevention

### Benefits of Health Behavior Change Following Chronic Illness

- Reduce risk of recurrence
  - e.g., quitting smoking cuts risk of second heart attack in half (Ronnevik et al., 1985)
- Reduce severity of disease
  - e.g., improved blood sugar levels for diabetics
- Increase functioning
  - e.g., improve mobility, subjective well-being, strength
- Extend longevity
  - e.g., prolong/prevent death from heart disease, cancer, diabetes, lung disease,

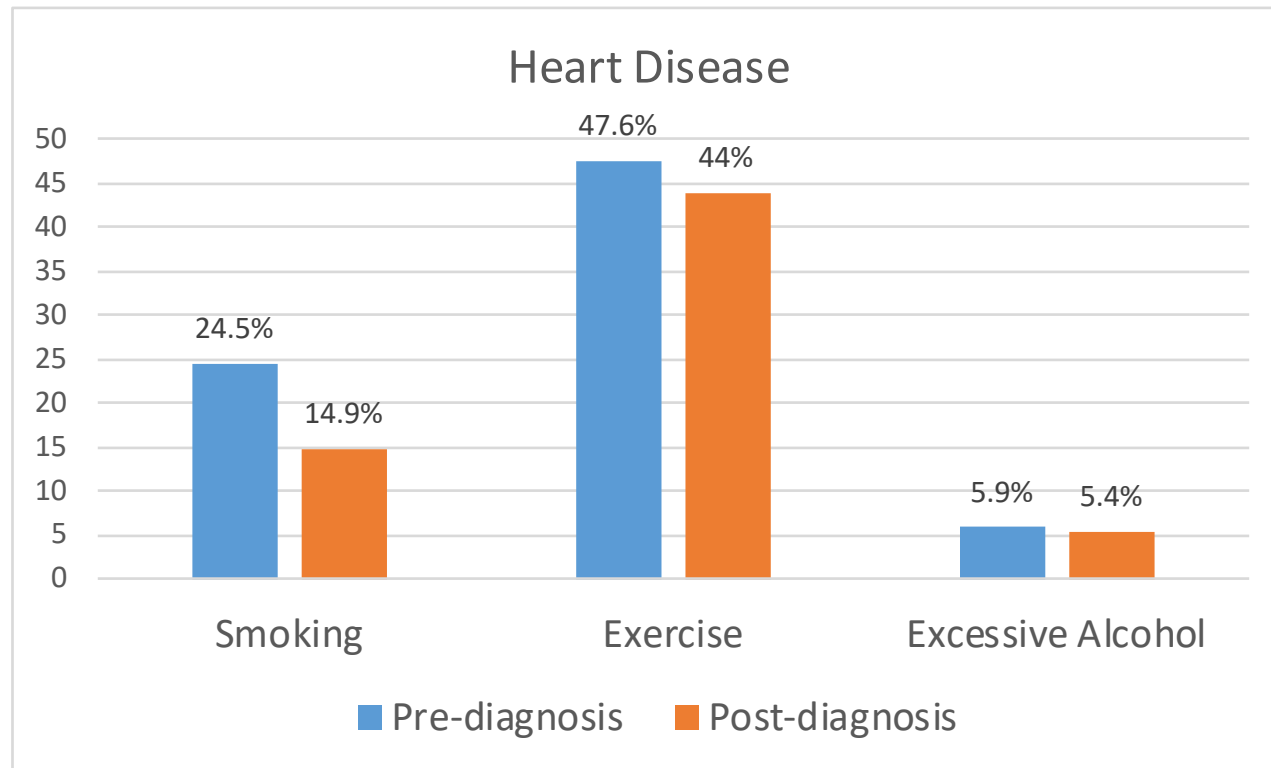
## Tertiary Prevention

### Study Example: Health Behavior Change Following Chronic Illness (Newsom et al., 2012)

- Health and Retirement Study (HRS; Heeringa & Connor, 1995)
- 11,191 U.S. residents
- Aged 50–85 years
- Longitudinal, every 2 years
- Health behaviors before and after diagnosis
- Smoking, exercise, alcohol consumption
- Participants who began the study without **heart disease**, cancer, stroke, respiratory disease, and **diabetes**

Newsom, J.T., Huguet, N., McCarthy, M.J., Ramage-Morin, P., Kaplan, M.S., Bernier, J., McFarland, B.H., & Oderkirk, J. (2012). Health behavior change following chronic illness in middle and late life. *Journals of Gerontology: Psychological Sciences*, 67, 279-288.

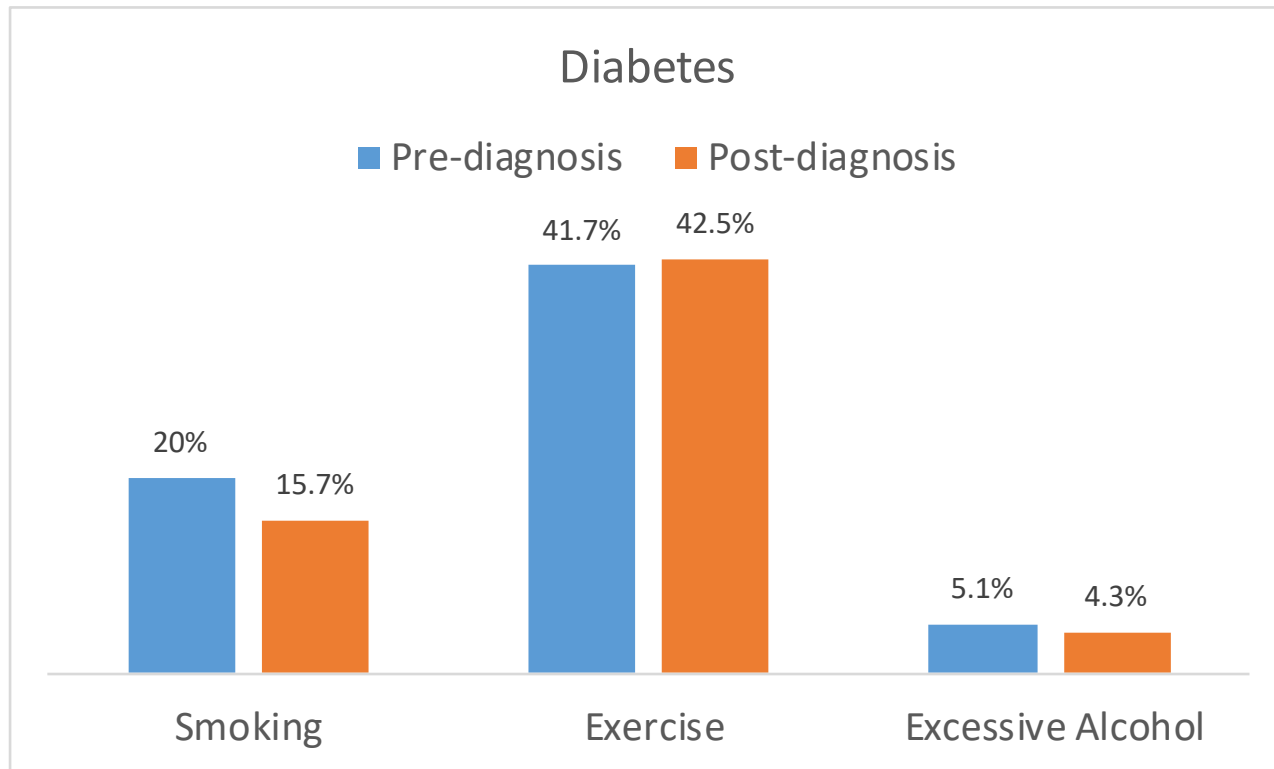
## Tertiary Prevention



Only 43% of smokers quit; **57% continued to smoke**

Newsom, J.T., Huguet, N., McCarthy, M.J., Ramage-Morin, P., Kaplan, M.S., Bernier, J., McFarland, B.H., & Oderkirk, J. (2012). Health behavior change following chronic illness in middle and late life. *Journals of Gerontology: Psychological Sciences*, 67, 279-288.

## Tertiary Prevention



< 2% of patients increased activity

Newsom, J.T., Huguet, N., McCarthy, M.J., Ramage-Morin, P., Kaplan, M.S., Bernier, J., McFarland, B.H., & Oderkirk, J. (2012). Health behavior change following chronic illness in middle and late life. *Journals of Gerontology: Psychological Sciences*, 67, 279-288.



# Tertiary Prevention

## Possible reasons for so little change

- Lack of awareness of potential benefits of behavior change
- Possible lack of confidence or sense of control in ability to change (Fishbein & Cappella, 2006)
- Patients may misattribute symptoms/disease to old age (Leventhal, Leventhal, & Breland, 2011)
- Past behavior tends to predict future behavior (Azjen, 2002)
- Behaviors repeated frequently over a long period of time become habits which are difficult to change (Ouellette & Wood, 1998)
  - “Nearly 9 out of 10 smokers started smoking by age 18, and 99% started by age 26.” (US Surgeon General’s office, [surgeongeneral.gov](http://surgeongeneral.gov))

Newsom, J.T., Huguet, N., McCarthy, M.J., Ramage-Morin, P., Kaplan, M.S., Bernier, J., McFarland, B.H., & Oderkirk, J. (2012). Health behavior change following chronic illness in middle and late life. *Journals of Gerontology: Psychological Sciences*, 67, 279-288.

# Alzheimer's Disease

[https://www.alz.org/documents\\_custom/2016-facts-and-figures.pdf](https://www.alz.org/documents_custom/2016-facts-and-figures.pdf)

## Alzheimer's Disease

- Progressive disease that eventually causes severe memory impairment
- Not normal aging, but risk increases with age
  - early onset, ages 30-60, 1-6% of all cases
- Not all older people get Alzheimer's
- Progression can be slow or rapid (average 8-10 years)
- About 50% of dementia cases, but only one of many types of dementia
  - e.g., multi-infarct dementia (stroke-related), Parkinson's, Wernicke's/Korsakoff's syndrome
- Causes are generally unknown

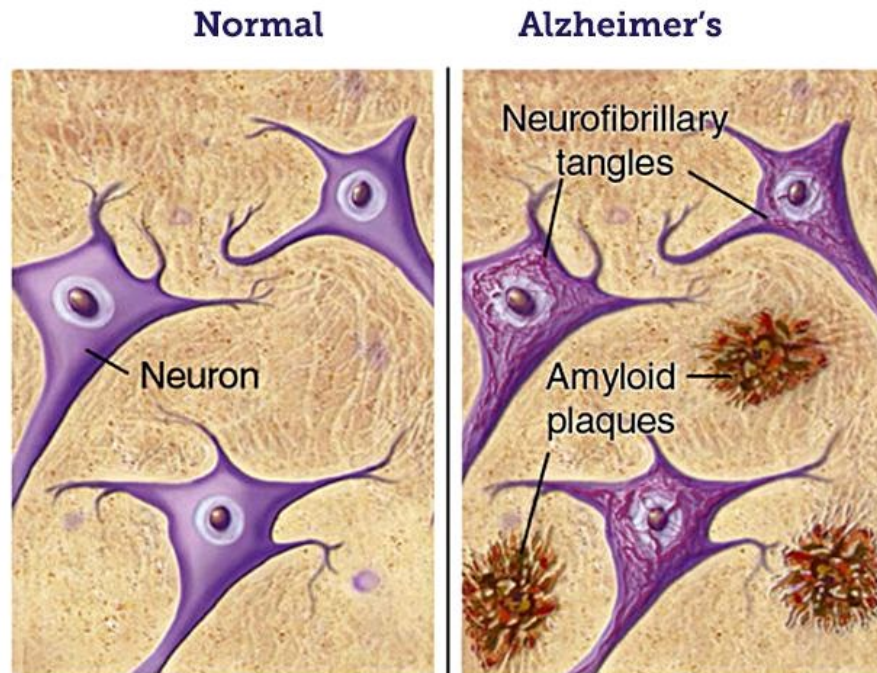
## Alzheimer's Disease

- Clinical diagnosis of probable Alzheimer's disease (AD)
- Characterized by **neurofibrillary tangles** and **amyloid plaques**.
  - Neurofibrillary tangles—insoluble twisted protein (tau) fibers, part of microtubules that transport nutrients to the cell
  - Amyloid plaques—protein fragments between neurons, beta amyloid are protein fragments that are normally broken down and removed from the brain

<http://www.brightfocus.org/alzheimers/infographic/amyloid-plaques-and-neurofibrillary-tangles>

# Alzheimer's Disease

## Normal vs. Alzheimer's Diseased Brain



© 2000 by BrightFocus Foundation



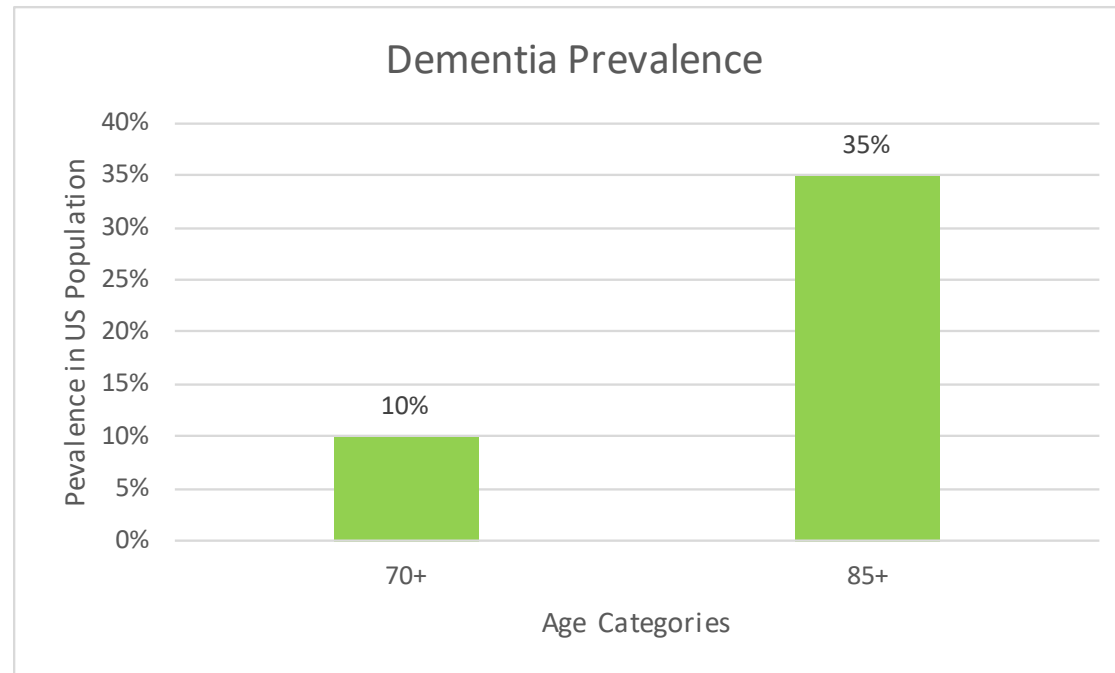
<http://www.brightfocus.org/alzheimers/infographic/amyloid-plaques-and-neurofibrillary-tangles>

## Alzheimer's Disease

- 90% late onset (> 60-65 yrs) Alzheimer's disease (LOAD)
- Twin studies suggest genetic component, no one genetic cause has been identified
- apolipoprotein E (APOE) with risk allele risk allele epsilon 4 ( $\epsilon 4$ ), or APOE $\epsilon 4$
- First-degree relatives of a person with LOAD have a cumulative lifetime risk of approximately 20% to 25%, lower risk otherwise
- the number of additional affected family members most likely increases the risk in close relatives.

Bekris et al (2010) J Geriatr Psychiatry Neurol. 2010 December ; 23(4): 213–227

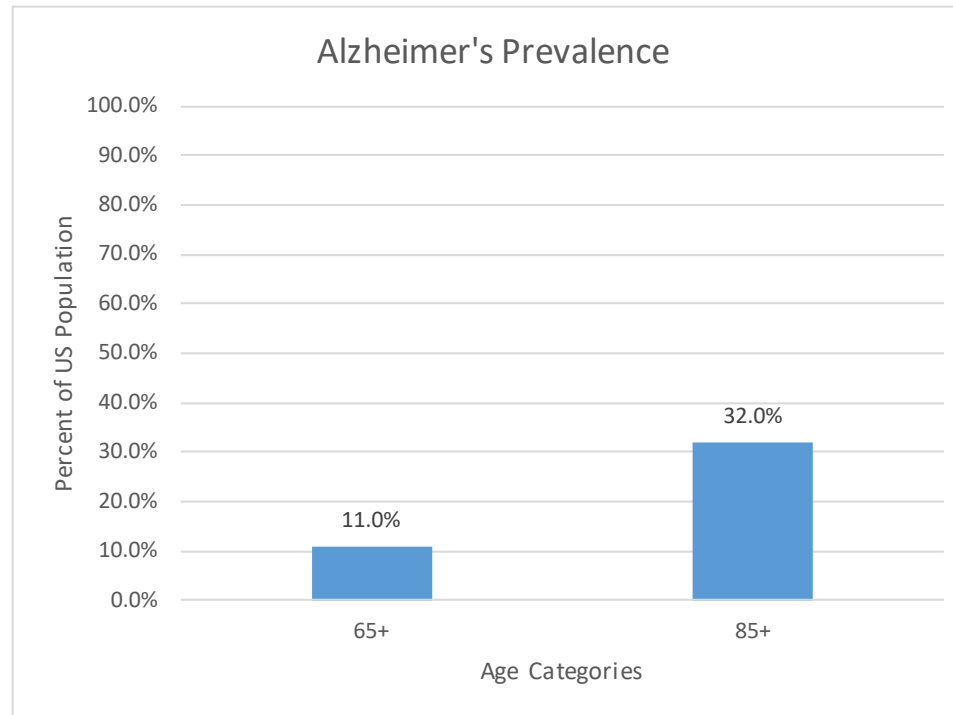
# Alzheimer's Disease



- According to Bekris et al., about half of the 10% dementia cases for 70 yrs and over are Alzheimer's cases
- Estimates of dementia for 85 yrs and over range from 25% to 45%

Bekris et al (2010) J Geriatr Psychiatry Neurol. 2010 December ; 23(4): 213–227

# Alzheimer's Disease

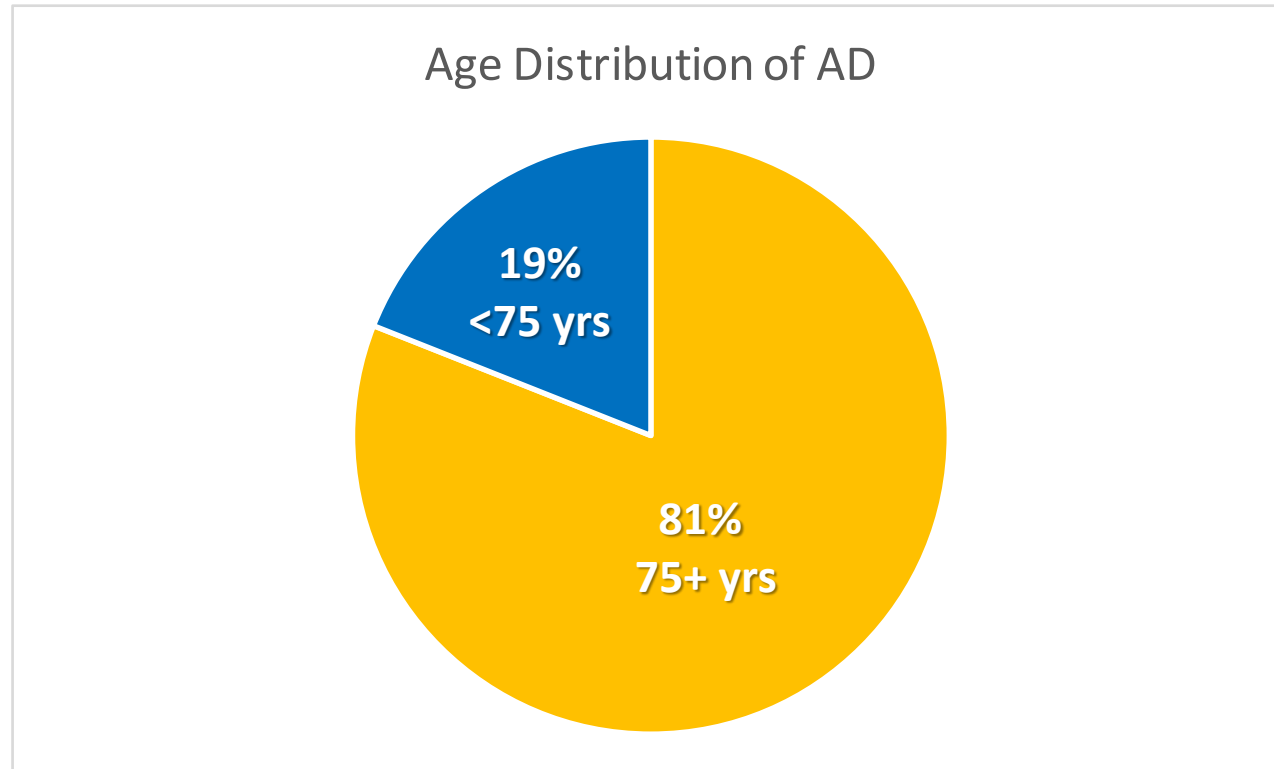


- Note these estimates from the Alzheimer's Association are higher than those discussed by Bekris and colleagues (almost double), so this may be an upper estimate of prevalence.

Alzheimer's, A. (2015). 2015 Alzheimer's disease facts and figures. *Alzheimer's & dementia: the journal of the Alzheimer's Association*, 11(3), 332.



# Alzheimer's Disease



Alzheimer's, A. (2015). 2015 Alzheimer's disease facts and figures. *Alzheimer's & dementia: the journal of the Alzheimer's Association*, 11(3), 332.

## Cognitive Symptomatology

### Aphasia

Loss of language ability

### Apraxia

Loss of ability to carry out coordinated movement

### Agnosia

Loss of ability to recognize familiar objects

### Disturbance in executive functioning

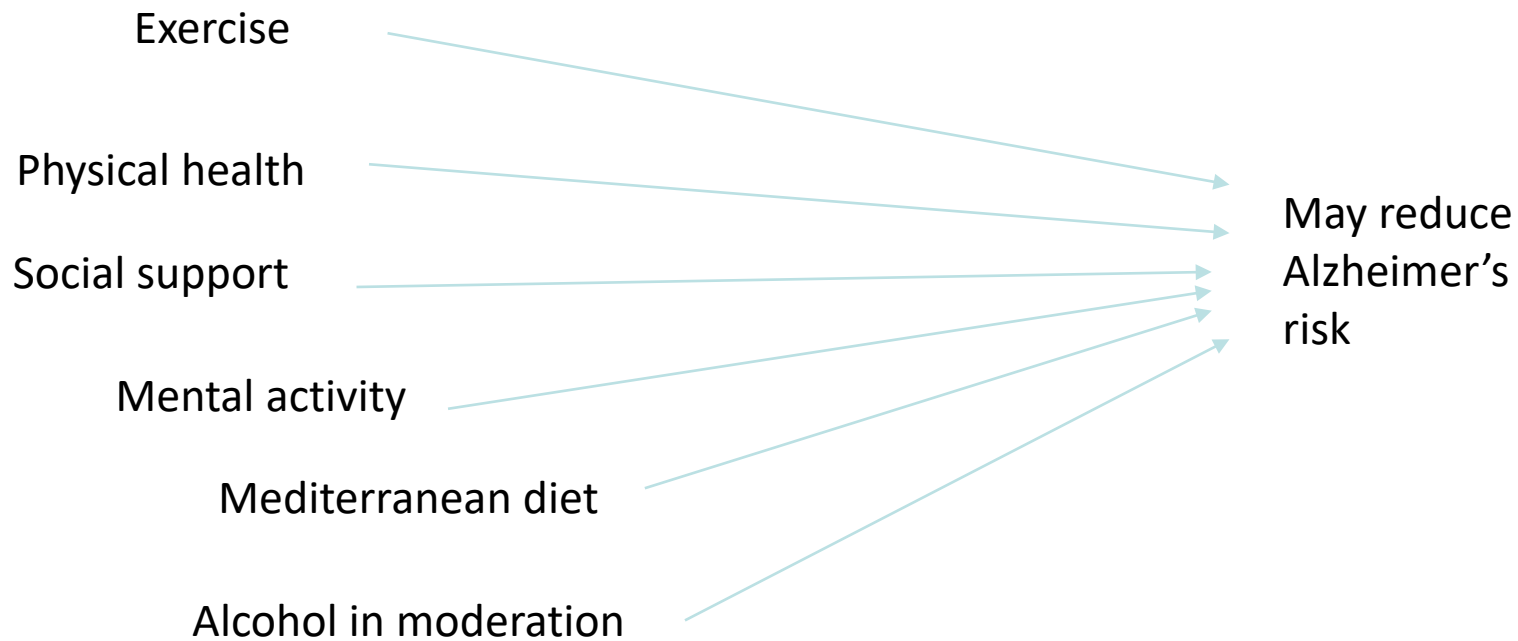
Loss of ability to plan and organize

# Psychological symptoms develop in stages

<i>Not Alzheimer's</i>	<i>Early-stage</i>	<i>Middle-stage</i>	<i>Late-stage</i>
<ul style="list-style-type: none"> <li>• Forgetting things occasionally</li> <li>• Misplacing items, like keys, eye glasses, bills, paper work</li> <li>• Forgetting the names or titles of some things, like movies, books, people's names</li> <li>• Some reduction in ability to recall words when speaking</li> <li>• Being "absent-minded" or sometimes hazy on details</li> <li>• "Spacing things out," such as appointments</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term memory loss, usually minor</li> <li>• Being unaware of the memory lapses</li> <li>• Some loss, usually minor, in ability to retain recently learned information</li> <li>• Forgetting things and unable to dredge them up, such as the name of a good friend or even family member</li> <li>• Function at home normally with minimal mental confusion, but may have problems at work or in social situations</li> <li>• Symptoms may not be noticeable to all but spouse or close relatives/friends</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term memory loss deepens, may begin to forget conversations completely or name of street where you live, names of loved ones or how to drive a car</li> <li>• Mental confusion deepens, trouble thinking logically</li> <li>• Some loss of self-awareness</li> <li>• Friends and family notice memory lapses</li> <li>• May become disoriented, not know where you are</li> <li>• Impaired ability to perform even simple arithmetic</li> <li>• May become more aggressive or passive</li> <li>• Difficulty sleeping</li> <li>• Depression</li> </ul>	<ul style="list-style-type: none"> <li>• Severe cognitive impairment and short-term memory loss</li> <li>• Speech impairment</li> <li>• May repeat conversations over and over</li> <li>• May not know names of spouse, children, or caregivers, or what day or month it is</li> <li>• Very poor reasoning ability and judgment</li> <li>• Neglect of personal hygiene</li> <li>• Personality changes; may become abusive, highly anxious, agitated, delusional, or even paranoid</li> <li>• May need extensive assistance with activities of daily living</li> </ul>

Source: "Evaluating Prescription Drugs used to Treat: Alzheimer's Disease Consumer Reports Best Buy Drugs" Copyright 2012 by Consumers Union of U.S., Inc. Yonkers, NY 10703-1057, a nonprofit organization. Reprinted with permission from Consumer Reports Best Buy DrugsTfor educational purposes only. www.CRBESTBUYDRUGS.org. Copyright © 2014 John Wiley & Sons, Inc. All rights reserved.

## Possible Protective Factors



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## Medical treatments for Alzheimer's disease

- **Anticholinesterases:** Decreases action of cholinesterases, allowing more acetylcholine to remain in brain
- **Memantine:** Block glutamate receptors, which reduces neuronal death
- **Antioxidants:** Make oxygen more available to neurons

# Psychosocial Actions for Alzheimer' Caregivers

## Caring for yourself

Taking care of yourself is one of the most important things you can do as a caregiver. This could mean asking family members and friends to help out, doing things you enjoy, using adult day care services, or getting help from a local home health care agency. Taking these actions can bring you some relief. It also may help keep you from getting ill or depressed.

## How to take care of yourself

Here are some ways you can take care of yourself:

- Ask for help when you need it.
- Join a caregiver's support group.
- Take breaks each day.
- Spend time with friends.
- Keep up with your hobbies and interests.
- Eat healthy foods.
- Get exercise as often as you can.
- See your doctor on a regular basis.
- Keep your health, legal and financial information up-to-date.



Source: National Institute of Aging. (2009). Caring for a person with Alzheimer's Disease. NIH Publication Number: 09-6173. Retrieved from <http://www.nia.nih.gov/NR/rdonlyres/6A0E9F3C-E429-4F03818ED1B60235D5F8/0/100711LoRes2.pdf>.

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