



Figure 2. (Barnett, 2013). Factors that impact risk occur at the earliest stages of life well into late adulthood

## RISK FACTORS

### Obesity

- Obesity is associated with risk for vascular conditions such as cardiovascular disease, high blood pressure, and diabetes (Michel, 2016).

### Sedentary Lifestyle/Less Leisure Participation

- Less participation in leisure/cognitive/physical activities is associated with increased risks of dementia. Participation in cognitive activities is the biggest predictor of those who developed dementia later on in life (Verghese et al., 2003).

### Poor Diet

- Consuming a diet high in processed foods and one that is less nutrient dense, leading to nutritional deficiency, increases the risk for vascular disease and is associated with an increased risk of Alzheimer's disease and mild cognitive impairment (Barnett, Hachinski, Blackwell, 2013).
- High/simple carbohydrate diets may lead to high blood glucose which has been associated with a decrease in memory and reaction time (Seetharman et al., 2015).

### High Blood Pressure/Hypertension

- Uncontrolled High blood pressure narrows the blood vessels in the brain, and it is associated with increased risk of cognitive decline and dementia. Individuals with hypertension are at greater risk for vascular dementia and Alzheimer's disease (Michel, 2016).

### Diabetes

- Type 2 Diabetes Mellitus can lead to abnormal brain aging with brain degeneration, cognitive decline, and an increased risk of dementia. Individuals with high blood glucose have a poorer overall performance on perceptual speed including greater rates of decline in general cognitive ability, perceptual speed, verbal ability, and spatial ability (Seetharman et al., 2015).

### Depression

- Older adults with moderate or high levels of depressive symptoms are more likely to develop dementia than adults with minimal symptoms (Kaup et al., 2016).
- Individuals with mild cognitive impairment and depression are at more than twice the risk of developing dementia of Alzheimer type vs. those without depression (Modrego & Ferrandez, 2004).

### Smoking, Alcohol & Drug Use

- All increase risk for developing cognitive impairment and cardiovascular disease (Smith, 2016).

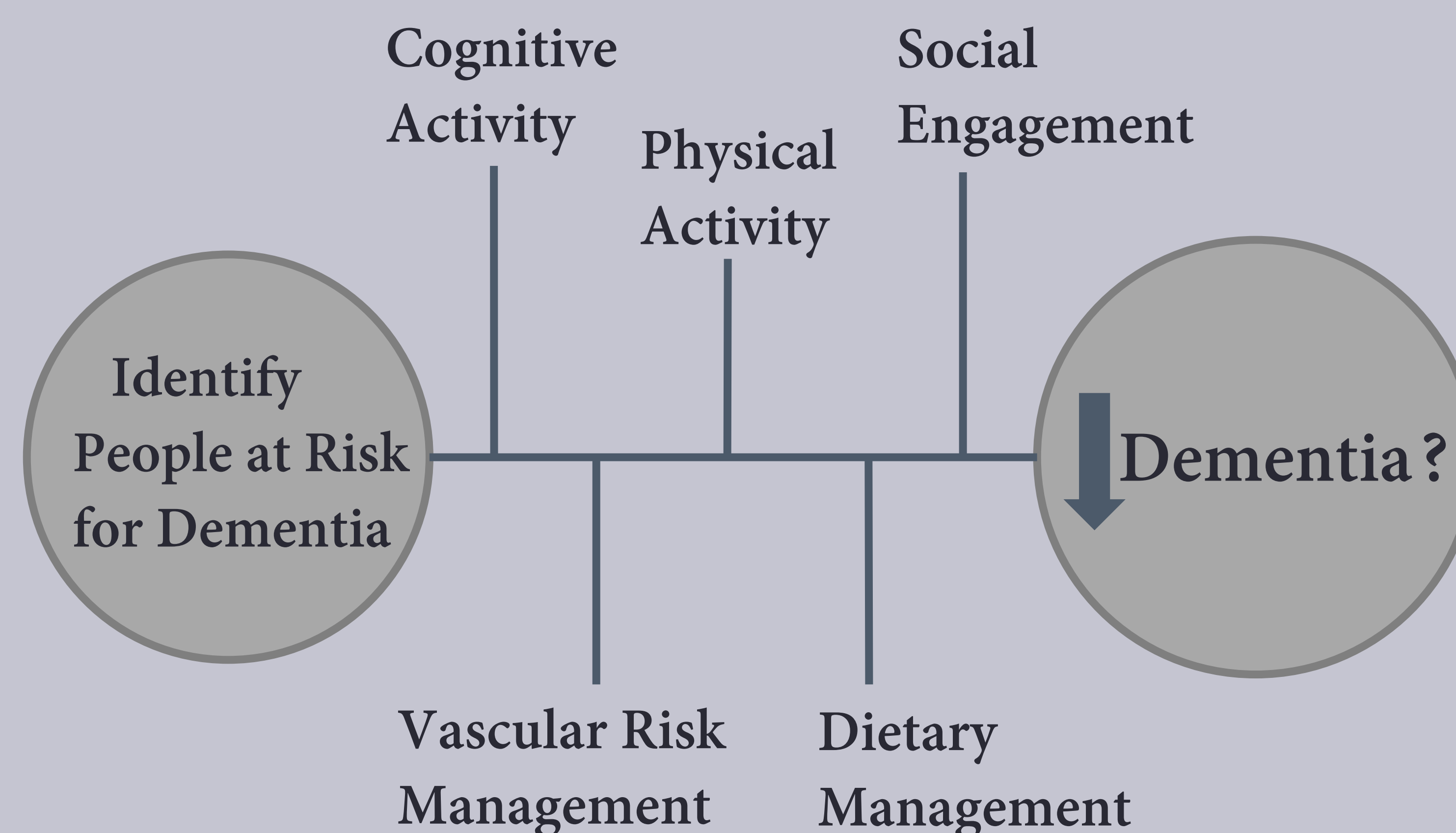
### Low Education

- Having a higher level of education and occupational employment, higher IQ, and performing complex mental activities in older age can slow cognitive decline and decrease risk (Barnett, Hachinski, Blackwell, 2013).

*Development of dementia is a lifelong, multi-step process*

## Protection Strategies

- Twice weekly exercise via resistance training reduces the rate of cognitive decline in seniors with mild cognitive impairment.
- Adhering to a Mediterranean-style diet, consuming mostly plant based foods (fruits, vegetables) whole grains, healthy fats (nuts, seeds, oils) and less processed food, meat, dairy, and unhealthy fats (butter, trans fat) reduces risk for dementia.
- Leisure participation may protect against dementia by lowering the risk of dementia via improved cognitive reserve.
- The combination of exercise, diet, and cognitive activities have the greatest benefit (Middleton & Yaffe, 2010).



## INTERVENTIONS TO REDUCE RISK AND PREVENT DEMENTIA

### Physical Activity

- Physical exercise enhances new brain cell growth and reduces the risk of cardiovascular disease, one of the vascular factors that leads to the development of dementia (Smith, 2016).
- Seniors without dementia show better preservation of gray matter in the brain after 1 year of exercise. Larger hippocampal volume and better spatial memory are also found (Ahlskog et al., 2011).
- Physically fit seniors perform more favorably than less fit seniors, on memory, attention, processing speed, and executive function (Nagamatsu et al., 2012).
- Physically fit seniors have stronger cortical connectivity in cognitive tasks (Gagliardi et al., 2016).
- Aerobic training improves balance, mobility, and cardiovascular capacity more than tone training only (Nagamatsu et al., 2012).
- Resistance training impacts on selective attention/conflict resolution, associative memory, and regional patterns of functional brain plasticity (Nagamatsu et al., 2012).

### Diet

- Diet is closely linked to vascular dementia risk; nutritional deficiency is associated with improved cognitive outcomes (Scarmeas et al., 2009).
- Mediterranean diet and consumption of fruits and vegetables is associated with decreased likelihood of Alzheimer's disease, dementia, and cognitive decline (Middleton & Yaffe, 2010).
- Antioxidant and polyunsaturated fat intake reduce oxidative stress, reducing Alzheimer's disease pathology (Gu et al., 2010).
- Combined Mediterranean-type diet and higher recreational activity lowers risk for AD and mild cognitive impairment (Scarmeas et al., 2009).
- High physical activity and plant based diet is associated with decreased risks for AD compared to a diet consisting of meat, dairy, and unhealthy fats and low physical activity scores (Gu et al., 2010).
- Food associated with decreased risk: salad dressing, nuts, fish, tomatoes, poultry, cruciferous vegetables, fruits, and dark and green leafy vegetables. Food associated with increased risk: high-fat dairy, red meat, organ meat, butter (Gu et al., 2010).

### Cognitive Activity/Leisure

- Mentally challenging or stimulating activity (reading, learning, playing games) is associated with decreased development of dementia (Middleton, Yaffe, 2010).
- Larger social connections and social involvement in leisure activities (visiting friends, church, movies, clubs, volunteering) are associated with lower risk for dementia (Middleton, Yaffe, 2010).
- Those with high level of cognitive activity (90<sup>th</sup> percentile) showed a substantial reduction in risk of developing Alzheimer's disease (Wilson et al., 2002).
- Cognitive activities associated with reduced dementia risk: watching TV, listening to radio, reading newspapers, magazines, books; playing games like cards or checkers, going to museum (Wilson et al., 2002).
- Leisure activities associated with reduced dementia risk: reading, playing board games, playing musical instruments, dancing (Verghese et al., 2003).
- Repetition of cognitive skills is useful to preserve function (Wilson et al., 2002).