

APP Grand Rounds

Integrative Health Case Study: Cognitive Impairment

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Case Study

CC: progressive cognitive decline with increasing physical frailty x 18 months

- ▶ HPI: MT is a 78 y.o Hispanic Female with an 18 mos history of progressive memory loss, who has experienced 2 recent falls without injury. Husband described the falls as unprovoked and without obvious cause.
 - ▶ MT reported that she recently stopped driving because she would get lost and unable to “find her way home” .
- ▶ PMH: HTN, Hypothyroid, Hypercholesteremia, depression
- ▶ Social HX: Widowed age 25, Stillborn delivery age 23, lost her mother at age 11
- ▶ Family HX: Mother deceased age 48 Uterine Ca, (-) dementia

Diagnostic studies: Recent MRI which demonstrated mildly dilated ventricles: Follow up PET scan revealed Amaloid –B deposition.

Epidemiology: Cognitive Decline a/w normal aging:

- ▶ The overall rate of **cognitive impairment** among community-dwelling elderly is 23.4%.
- ▶ Age-specific rates indicate increasing **prevalence** with increasing age:
 - ▶ 19.2% for ages 65 to 74 years,
 - ▶ 27.6% for ages 75 to 84 years,
 - ▶ 38.0% for ages 85+ years.

Cognitive Decline

- ▶ Mild cognitive decline (MCI) is an intermediate state between normal aging and dementia
- ▶ Alzheimer's Disease (AD) is the most common form of dementia
 - ▶ 70-90% of all dementia cases
 - ▶ 44 million people world wide with AD
 - ▶ 5 million in the US
- ▶ Alzheimer's Disease presents as a progressive cognitive decline affecting memory, language, and social functioning.
- ▶ Later Stages of AD lead to complete dependency for basic ADL and premature death

Population Health- Significance

- ▶ Annual Cost of AD care in the US is thought to be \$150-\$215 billion (\$600 Billion Globally)
- ▶ Dementia is one of the most expensive diseases in the US
- ▶ Annual cost of formal dementia care exceeds the direct healthcare expenditures for heart disease or cancer.
- ▶ It is projected that by 2040 nearly 10 million Americans will have dementia, 30% of those age more than 80

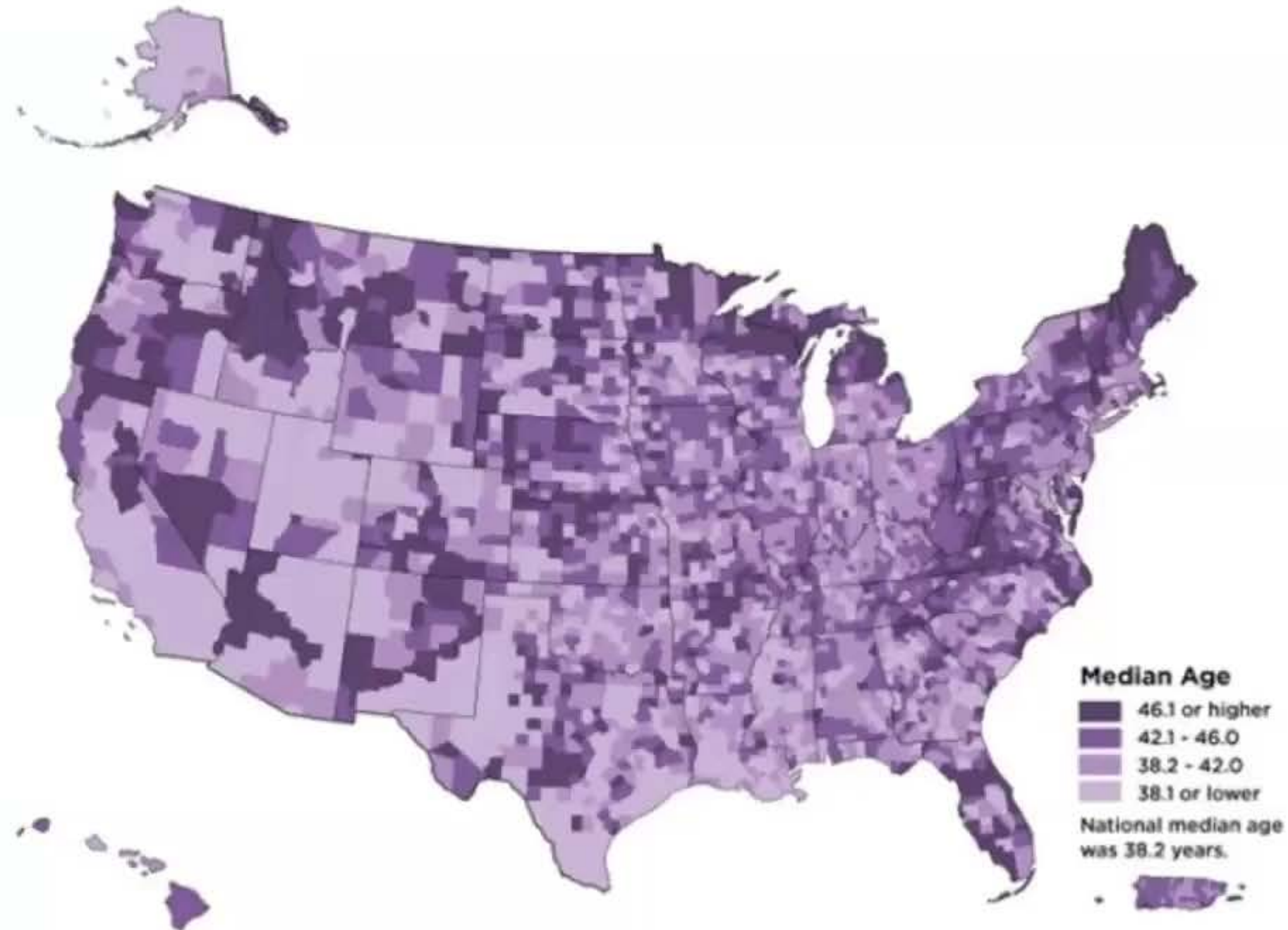
Population Health- Significance

- ▶ The size of the elderly population has been dramatically increasing worldwide.
- ▶ In 2017, people aged 60 or older accounted for 13% of the global population at about 962 million people.
- ▶ The size of this population is predicted to rise to 1.4 billion, 2.1 billion, and eventually 3.1 billion people by 2030, 2050, and 2100, respectively.¹

1. The National Median Age is 38.2 Years Old

Youngest and Oldest Counties

Median Age of U.S. Counties in 2018



CENSUS.GOV

2018 Population Estimates, released June 20, 2019

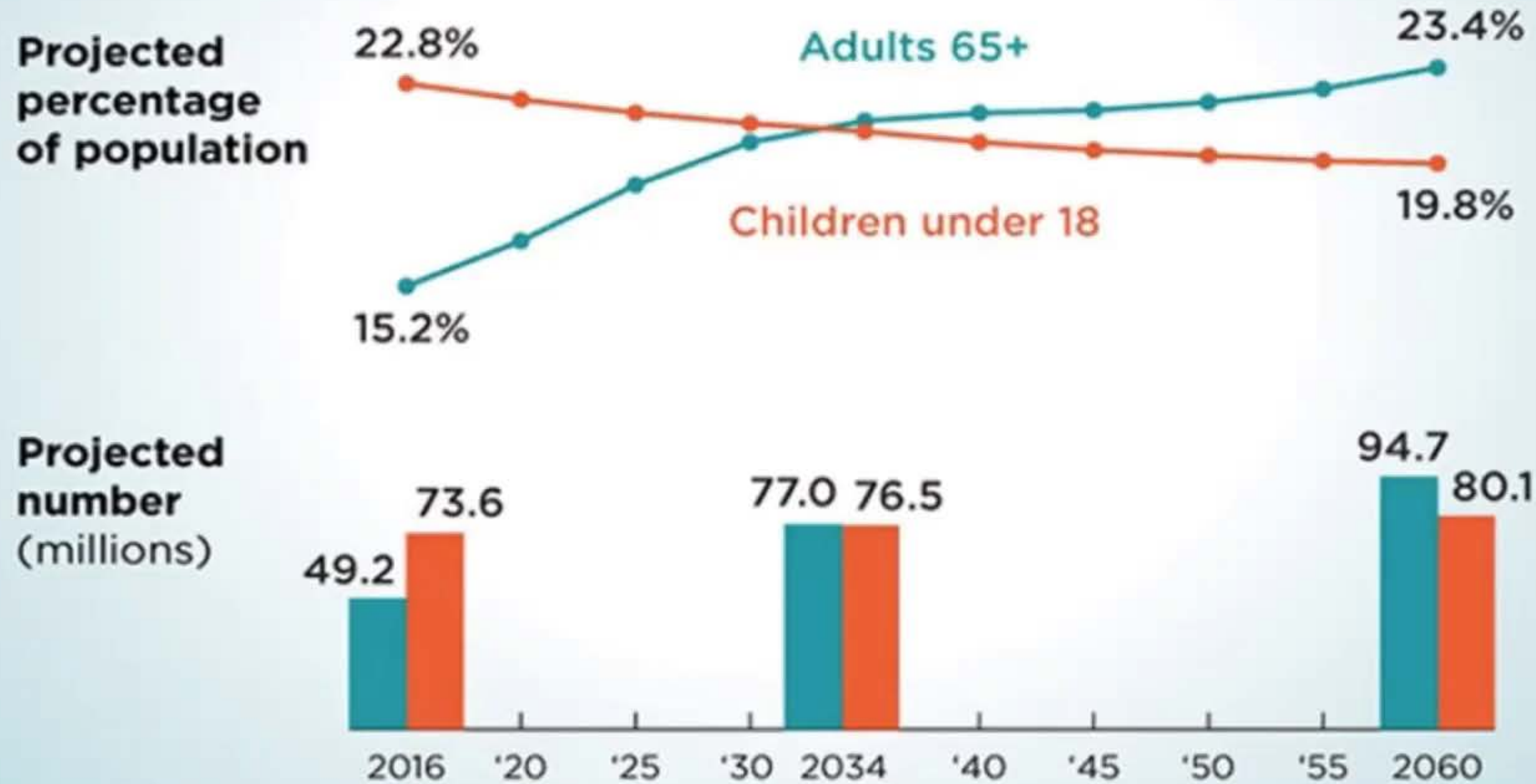
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2. The Number of Older Adults Will Soon Outnumber Children

For the First Time in U.S. History Older Adults Are Projected to Outnumber Children by 2034



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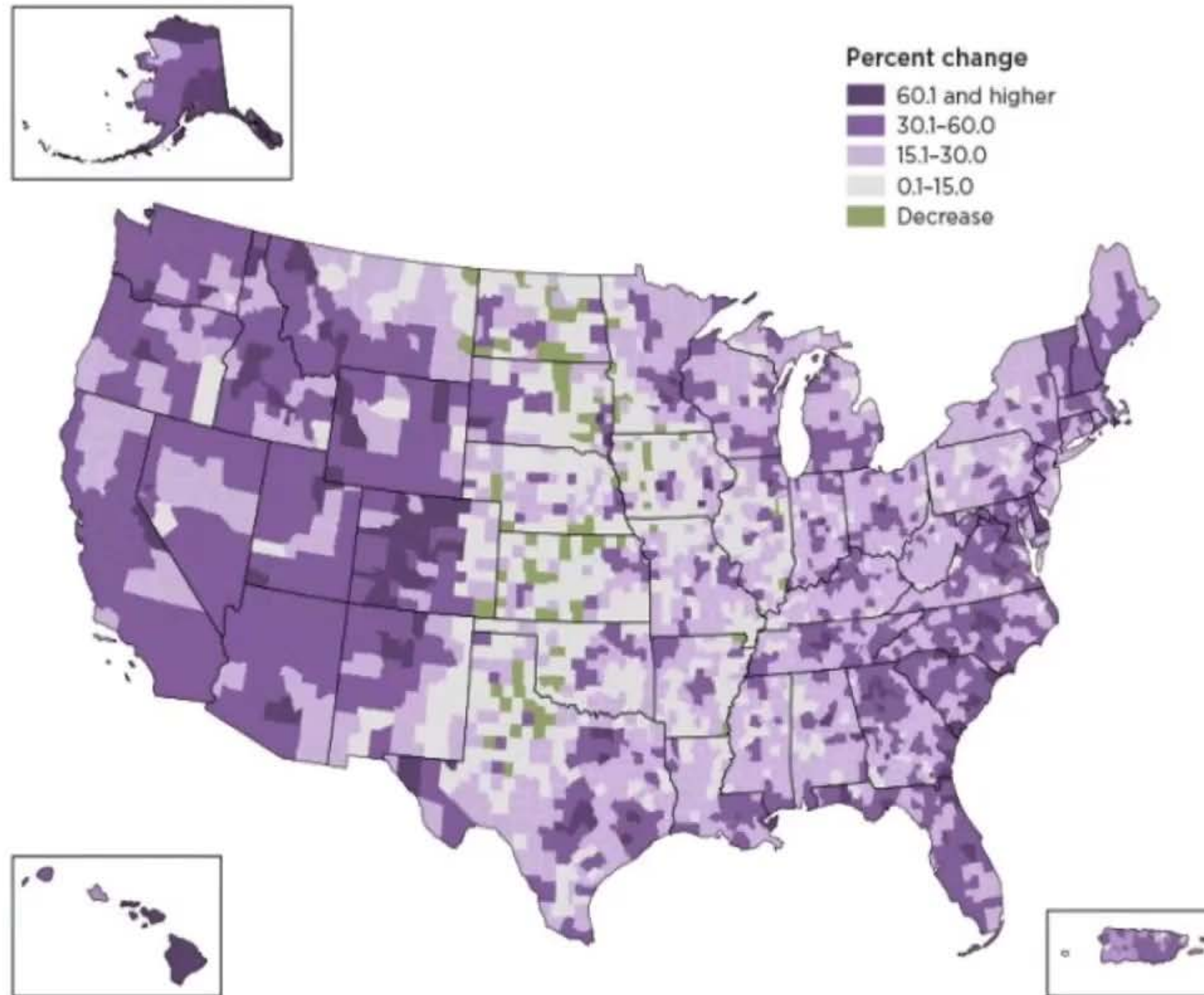
2017 National Population Projections, updated October 8, 2019

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3. The 65+ Population Increased During the Past Decade



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"Percentage Change 65+ Population from 2010 to 2019," 2019 Population Estimates, Released June 25, 2020

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Normal aging can cause

- ▶ psychomotor slowing
- ▶ decreased visual and auditory acuity
- ▶ decreased vibratory sensation,
- ▶ smaller pupil size
- ▶ upward gaze paresis
- ▶ decreased muscle bulk
- ▶ decreased Achilles tendon reflex
- ▶ minimal swaying as measured by the Romberg test,
- ▶ mild lordosis
- ▶ and limitation of movement in the neck and back.

Pathophysiology of Cognitive Impairment

- ▶ Scientists have long understood that the most severe form of cognitive impairment - AD - is caused by brain lesions (plaques)- beta-amloid clusters
- ▶ As plaques accumulate, they block cell to cell signaling and trigger an inflammatory response which lead to nerve cell death.
- ▶ Twisted strands of dead nerve cells, known as tangles, provide stimulation for inflammation
- ▶ Neurons contain large amounts of metabolically active mitochondria, and synaptic activity depends on good mitochondrial function

Risk Factors

- ▶ Advanced Age >65
- ▶ APOE-e4 gene- 8 X likely of developing AD
- ▶ Body Weight- low and high
- ▶ Chronic Stress
- ▶ CVD- hypoperfusion, mitochondrial death
- ▶ Fam Hx AD: 10-fold increased risk 1st degree relative
- ▶ Glutathione low
- ▶ Education- >high school education =lower risk
- ▶ HTN- midlife HTN inc. risk
- ▶ Hormone Imbalance: low estrogen, cortisol deregulation, low DHEA and pregnenolone, hypothyroid
- ▶ Methylation defects- MTHFR mutations and high homocysteine levels
- ▶ Sleep Apnea- Inc. risk
- ▶ Chronic Stress- inc. risk
- ▶ Toxicities
- ▶ Traumatic Brain Injury (TBI)
- ▶ Vit/Mineral deficiencies.

Risk factors: Nutritional and Mineral/Vitamin

- ▶ High glycemic index foods
- ▶ Low omega 3 dietary content
- ▶ Low B 12 and B6
- ▶ Niacin Deficiency
- ▶ Thiamine Deficiency
- ▶ Selenium Deficiency
- ▶ Vitamin E Deficiency
- ▶ Copper excess
- ▶ Zinc insufficiency
- ▶ Vitamin D insufficiency

Established biomarkers associated with the progression from Mild Cognitive Impairment to Alzheimer's disease

- ▶ a positive amyloid positron emission tomography (PET) scan
- ▶ apolipoprotein E4 genotype
- ▶ abnormal cerebrospinal fluid (CSF) tau levels
- ▶ a positive PET scan due to tau deposition into the lateral temporal lobe structures

Integrative Therapy- Lifestyle factors

Aerobic exercise- a/w with improvement in memory, executive function, attention, and processing speed. In AD=increase cognition and independence with ADL

Cognitive Exercise- board games, puzzles, musical instruments

Yoga and Tai Chi- Mind body practices that combine physical and cognitive exercises for stress reducing effects

Optimizing Vascular Disease Risk Factors-treat HTN sooner than mid life

Optimize gut health-
dysbiosis=inflammation

Nutrition-

- Mediterranean diet with mixed nuts (30 g /day or 1 liter olive oil per week) –
- MIND Diet (hybrid Mediterranean and DASH diet)- 53% lower risk of dev. AD
- Intermittent fastin
- Omega 3 fatty acids- ALA, EPA, DHA

Integrative Therapies: Mind Body Techniques

Chronic Stress- Memory function influenced by stress- inc. cortisol-irreversible hippocampal damage- increased glutamate- oxidative stress- neuronal death

Meditation-transcendental meditation and mindfulness practiced twice daily for 20 minutes

Sleep- 7-8 hours of good quality sleep . Treat Sleep apnea and supplement with melatonin in AD patients with insomnia.

Other Integrative therapies/ whole person approaches

- ▶ Music Therapy
- ▶ Animal assisted therapy
- ▶ Spirituality
- ▶ Access to Nature
- ▶ Health promotion-Wellness of the caregiver
- ▶ Advocate building strong social support systems to avoid isolation later in life
- ▶ Optimize vascular risk factors: avoid smoking, excessive ETOH, obesity, prevent/ control hypertension and diabetes.

Integrative Approach for MN



Intervention

- ▶ **1. Human Beings are whole being's inseparable from their environments**
- Encourage structured routines
- Minimize stress within the household- MBSR
- Recommend Integrative Psychology consultation
- Safety Assessment of home environment
- Biofeedback/Neurofeedback
- Emphasize importance of natural light, access to nature images form inside of house

2. Human Beings have an innate capacity for health and wellbeing

Lifestyle recommendations

1. **Optimize Brain Health : Physical and Cognitive**
 - ▶ Tai Chi and or Yoga at community center
 - ▶ Meditation
 - Daily Walks around the block or to the park
 - Reading, Board games, Puzzles,
2. **Optimize Gut Health**
3. **Optimize Vascular Health- minimize CV and NV risk factors**
4. **Optimize Nutrition: Omega 3, Vit B,C,E,D ,selenium Zinc, Copper**
5. **Mitochondrial Health: ALA, Glutathione CoEnzyme Q**

3. Nature has healing and restorative properties that contribute to health and wellbeing

- ▶ **Botanical Medicines: Tumeric, Green Tea, Huperzine A (anticholinesterase Inhibitor)**
- ▶ **Melatonin 0.5- 10 mg at bedtime**
- ▶ **Animal Assisted Therapy**
- ▶ **Home Environment which promotes access to nature**
- ▶ **Mountain picnics with the dogs**

4. Integrative approaches are person centered and relationship based

- ▶ Encourage Spirituality:
 - ▶ Encourage Prayer, Meditation, and yoga
 - ▶ Relationship with self=self awareness
 - ▶ Access to Nature
- ▶ Connection with a spiritual presence includes promoting relationships with family members & close friends (*congregation*)
- ▶ *Mindbody Stress Reduction or Mindfulness and self-compassion*

5. Integrative Approaches are informed by evidence and use the full range of therapeutic modalities the support the healing process



Address systemic issues: sleep apnea, toxin exposure, nutritional deficiency, oxidative stress and inflammation, chronic stress, insulin resistance



Medications (Acetylcholinesterase inhibitor, N-methyl-D-aspartate NMDA antagonist)



Interprofessional Team Approach: PT/OT/ , Geriatric Case Manager, homecare agency, Neurologist &Primary Care coordination

Resources for Professional Development

- ▶ Nutritional Supplements
- ▶ [https://urldefense.com/v3/_https://us.fullscript.com/welcome/ucirvine_!!OLgoXmg!BQt_SmEa6Hv4ksElTQxTI9_VGaJf3kLUEe3dgliwUBk-bUjDjdzPEpPpToiYavtVdA\\$](https://urldefense.com/v3/_https://us.fullscript.com/welcome/ucirvine_!!OLgoXmg!BQt_SmEa6Hv4ksElTQxTI9_VGaJf3kLUEe3dgliwUBk-bUjDjdzPEpPpToiYavtVdA$)
- ▶ Ruppa Health
- ▶ <https://www.rupahealth.com/post/introducing-rupa>
- ▶ Rankel, D. (2018) Integrative Medicine 4th edition Elsevier. Philadelphia

