



NAPA Risk Reduction Subcommittee Session

Place: Built and Natural Environment

Tuesday, January 31, 2023

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Speakers Bureau

N/A

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N/A

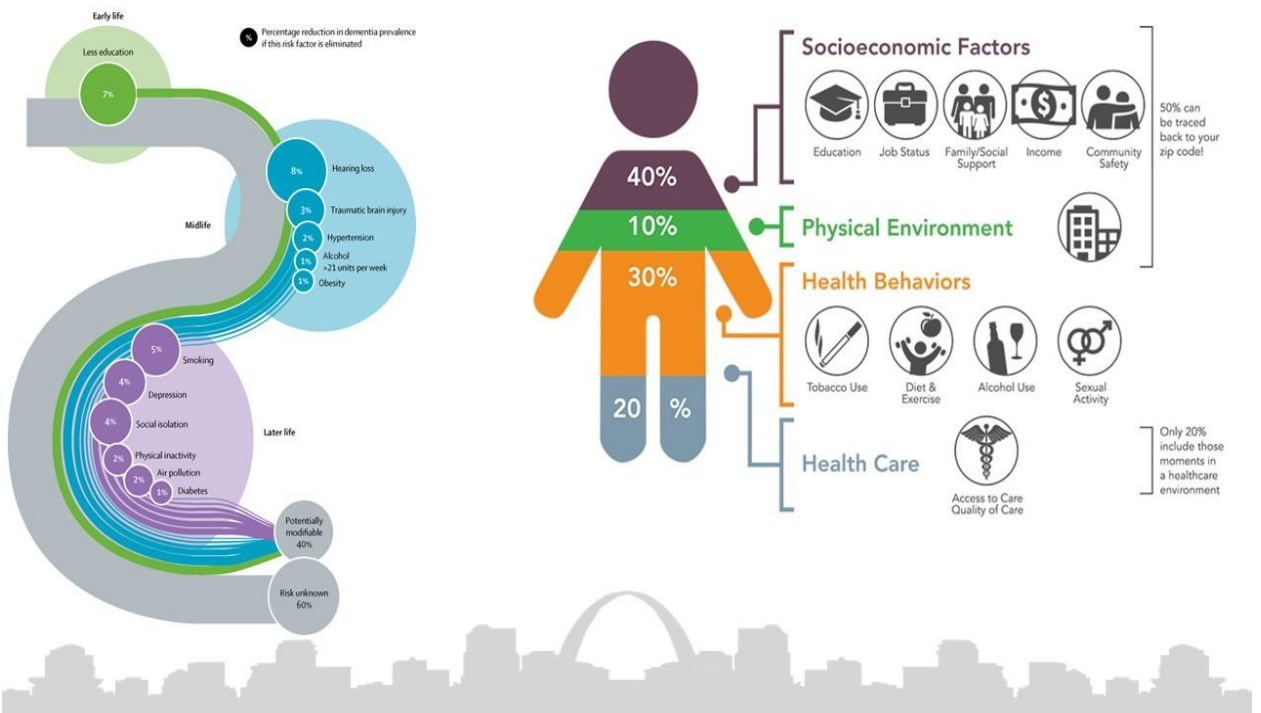
Consultant

N/A

I own no stocks or equity in any pharmaceutical company



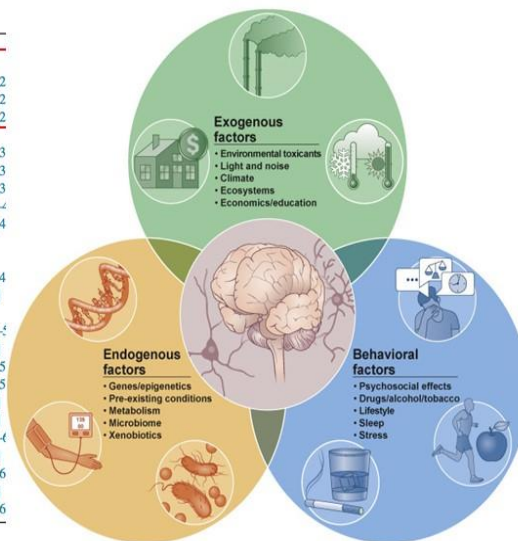
The Environment & Health Outcomes



Examining the AD exposome

Domains of the AD exposome

Domain/exposures	[7]
Exogenous macrolevel	
Air pollution	[23,2
Rural versus urban	[27,2
Socioeconomic status (SES)	[16,2
Exogenous individual	
Cigarette smoking	[32,3
Diet	[34,3
Exercise	[36,3
Infections	[38,4
Surgery and anesthesia	[44,4
Endogenous individual	
Biome	
Gut	[42,4
Periodontal gingiva	[41]
Blood	
Cells: mast cells, monocytes, T-lymphocytes	[48,4
Glucose	[51]
Hypertension	[52,5
Inflammatory factors	[54,5
Lipids and other metabolites	[56]
Sex steroids	[57]
Fat deposits	[58,4
Stress	[62]
Gender	[63,6
Thyroid	[67]
Traumatic brain injury (TBI)	[68,6



Alzheimer's & Dementia

The Alzheimer's Disease Exposome

Caleb E. Finch^{1,2*}, Alexander M. Kulminski^{1,3,4*}

Neighborhoods: Urbanicity vs. Rurality on Cognitive Function

Mental stimulation

- Residing in neighborhoods with medium-to-high population density: ↑ global cognition, memory, processing speed, and executive function (MoCA, MMSE, Coloured Trail Making Test; TILDA & LASA Cohorts). *Cassarino et al., 2018; Wörn et al., 2017.*
- Residing in rural communities with a smaller number of residents: ↓ performance in verbal tasks (learning, memory, fluency), attention, and orientation (Cross Cultural Cognitive Examination; Mexican Health and Aging Study). *Saenz et al., 2018.*



Community engagement/Land Use

- Neighborhood resource availability: socioeconomically advantaged neighborhoods → > physical/mental health resources leads to ↑ cognitive function. *Katayama et al., 2020.*
- Advantages of residing in neighborhoods with more resources (e.g., schools, libraries, churches) were only found for white but not Black residents. *Clarke et al., 2012; Chen et al., 2022.*



Neighborhoods: Cohesion vs. Disorder on Memory

Perceived neighborhood quality:

- ↑ neighborhood physical disorder associated with worse episodic memory and ↓ neighborhood social cohesion associated with poor semantic fluency cognitive performance in older age. *Zaheed et al., 2019.*



Subjective vs. objective:

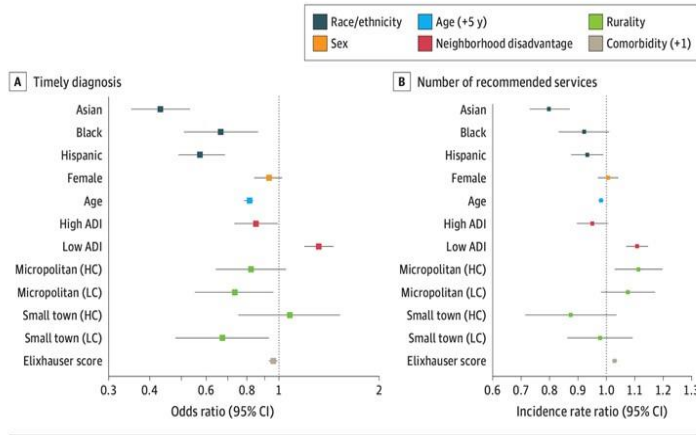
- Lived experience (subjective) had more direct effects on cognition than objective measures. Individuals residing in more violent neighborhoods reported more cohesion and less perceived danger had ↑ global cognition. *Lee & Waite, 2018.*



Assessment of Racial/Ethnic Disparities in Timeliness and Comprehensiveness of Dementia Diagnosis in California

Elena Tsou, PhD; Rachel E. Kiekhoefer, BA; Elan L. Guterman, MD; Boon Lead Tee, MD; Charles C. Windon, MD; Karen A. Dorsman, BA; Sergio C. Lanata, MD; Gil D. Rabinovici, MD; Bruce L. Miller, MD; Amy J. H. Kind, MD, PhD; Katherine L. Possin, PhD

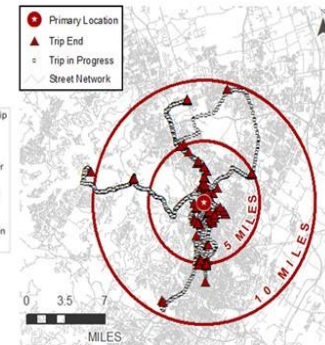
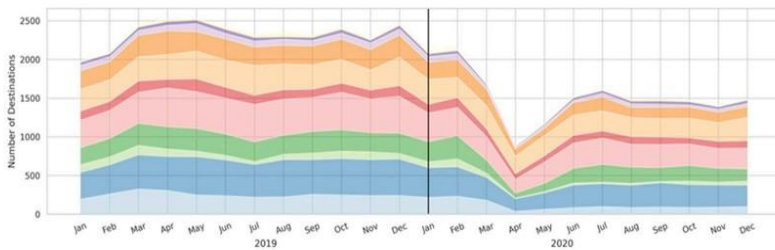
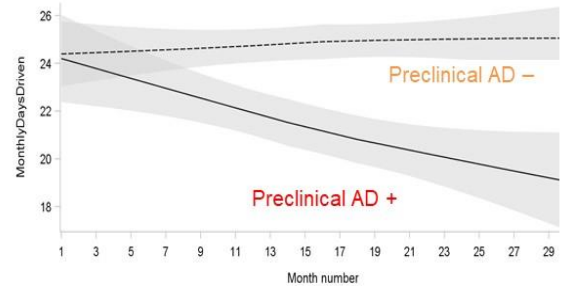
Healthcare inequality & ADRD



Dotted line indicates the reference group estimate (White, male, mid-area deprivation index [ADI], and metropolitan). HC indicates high commute; LC, low commute.

Driving, built environment, and preclinical AD

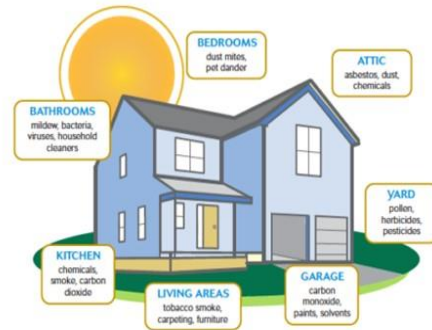
- Driving reduction and cessation leads to ↑ rates of depression, institutionalized care, social isolation, and morbidity.
- Minoritized groups face a greater risk for driving reduction, mobility restriction, and driving cessation.
- E-hail (Uber, Lyft) is the least relied upon mode of transportation among older adults.



Air Pollution

World Health Organization (2021)

- 2.6 billion people cook using polluting open fires or simple stoves
- ~4 million deaths
 - 27% are due to pneumonia
 - 18% from stroke
 - 27% from heart disease
 - 20% from COPD
 - 8% from lung cancer
- Gathering by women and children
- We are a social but “inside” species
- Sick Building Syndrome
- Off-gassing due to multiple sources



Pollution (Air & Noise) & ADRD

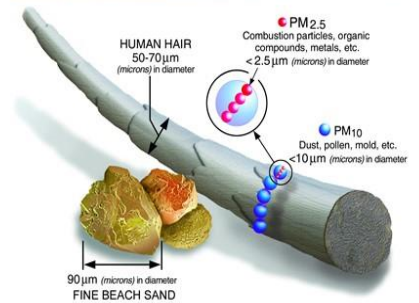
Exposure to Air Pollution in Relation to Risk of Dementia and Related Outcomes: An Updated Systematic Review of the Epidemiological Literature

Jennifer Weuve,¹ Erin E. Bennett,² Lysie Ranker,¹ Kan Z. Gianattasio,² Meredith Pedde,³ Sara D. Adar,³ Jeff D. Yanosky,⁴ and Melinda C. Power^{1,2}

Journal of Alzheimer's Disease 70 (2019) S145-S163
DOI 10.3233/JAD-180631
IOS Press

Air Pollution and Dementia: A Systematic Review

Ruth Peters^{a,b,*}, Nicole Ee^b, Jean Peters^c, Andrew Booth^c, Ian Mudway^d and Kaarin J. Anstey^{a,b}



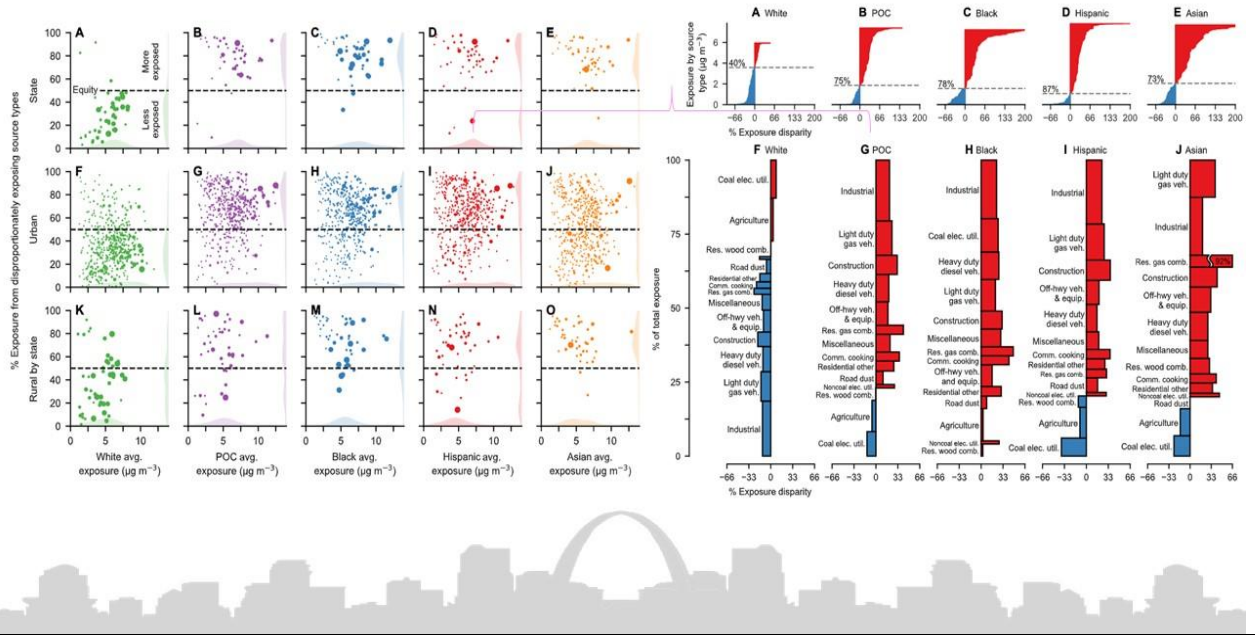
Are noise and air pollution related to the incidence of dementia? A cohort study in London, England **BMJ Open**

Iain M Carey,¹ H Ross Anderson,^{1,2} Richard W Atkinson,¹ Sean D Beevers,² Derek G Cook,¹ David P Strachan,¹ David Dajnak,² John Gulliver,³ Frank J Kelly^{2,4}

Air Pollution & Health Disparities

PM_{2.5} pollutants disproportionately and systemically affect people of color in the United States

Christopher W. Tessum^{1*}, David A. Paolella^{2*}, Sarah E. Chambliss³, Joshua S. Apte^{4,5}, *Sci. Adv.* 2021; 7 : eabf4491 28 April 2021
Jason D. Hill⁶, Julian D. Marshall²



Green Space on Cognition

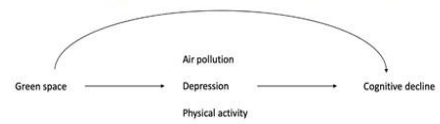
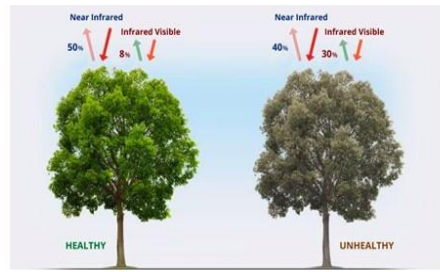
April 27, 2022

JAMA Network Open

Residential Green Space and Cognitive Function in a Large Cohort of Middle-Aged Women

Marcia P. Jimenez, MSc, MA, PhD^{1,2}; Elise G. Elliott, PhD^{1,4}; Nicole V. DeVille, PhD^{1,4}; Francine Laden, ScD^{1,3,4}; Jaime E. Hart, ScD^{1,4}; Jennifer Weuve, ScD⁵; Francine Grodstein, ScD⁶; Peter James, ScD^{1,7}

- Nurses' Health Study II: 116,429 US nurses ages 25-42
- 2014-16: 40,082 women completed Cogstate Brief Battery online (3 composites: psychomotor speed/attention, learning/working memory, overall cognition)
- NDVI [-1 (water) 0 (rock/sand) 1 (grassland)] to classify residential green space (RGS)
- CVs: race, childhood SES, parents (education, occupation, home ownership), ppt & neighborhood SES, age, marital status
- N=13,594 women; 61.2±4.6 (98% nHW)
- nHW > likely to live in RGS
- ↑ RGS = ↑ PS/Attn, ↑ Cog → 1.2 years younger



Environmental Racism (ER): A Source of Disparities

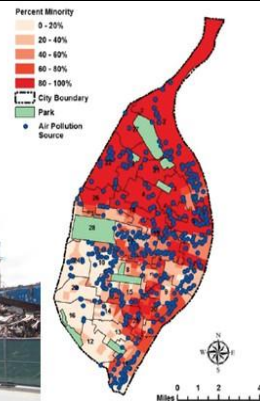
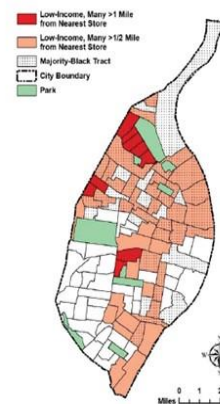
- ER is 40 year old concept; term coined by Benjamin Chavis
- A disproportionate burden of environmental hazards is placed on minoritized populations/communities of color.
- Policies and practices that systematically burden low-income and communities of color in close proximity to polluters.
- Examples
 - Toxic waste facilities (Houston, TX)
 - Garbage dumps (Dallas, TX)
 - Oil refineries (NO- Baton Rouge)
 - PFOA plants (Parkersburg, WV)
 - Major highways (Bronx, NY)
 - Hazardous waste sites (Cheraw, SC)
 - Battery recycling plants (Long Beach, CA)
 - Agricultural/animal farms (Pahokee, FL)
- Causes
 - Classism
 - Discrimination
 - Alienation of low-income groups
 - Industrialization
 - Capitalism avarice
 - Slow (er) government intervention



Compared to non-Hispanic whites...

An ER case study: St. Louis MO

- Black children are 2.4x > likely to test positive for lead in blood.
- Black children make roughly 10x > ER visits for asthma annually (42 vs 4 per 1000).
- Mold complaints are more common in majority-black areas than elsewhere in the city.
- Most of the city's air pollution sources are located in black neighborhoods of color.
- More building demolitions, containing asbestos and lead occur in majority-black neighborhoods.
- Black households in St. Louis are disproportionately affected by energy burdens.
- Black residents of St. Louis are 2x > likely to have limited access to healthy food limited access to a vehicle or adequate public transit.
- Majority-black neighborhoods experience most of the city's illegal trash dumping.
- More than 90% of the city's inventory of vacant properties are located in majority-black neighborhoods.



Source: <https://www.environmentalracismstl.com/>

Recommendations

Policy: Opportunities

- Prioritize early childhood education
- Increase green space and access
- Invest BACK into deprived neighborhoods
- Limit VOCs (finishing and furnishings)
- Invest in > locally/ethically sourced food
- Divert waste from landfill by disinvesting and keeping them as designated zones
- Policies need to be disseminated at a minimum the 7/8th grade reading level

Researchers: You cannot manage what you don't measure

- What is the culture you are studying?
- Is it monocultural (WEIRD)?
- What aspects of the environment are you measuring (built, natural, both)?
- Are the findings scalable to other cultural environments?

Clinicians: EMR and Healthcare

- Integrate SCDOH measurement into EMR/HER and into routine visits.

