Place matters: Addressing Health Disparities in Central Nervous System Disorders

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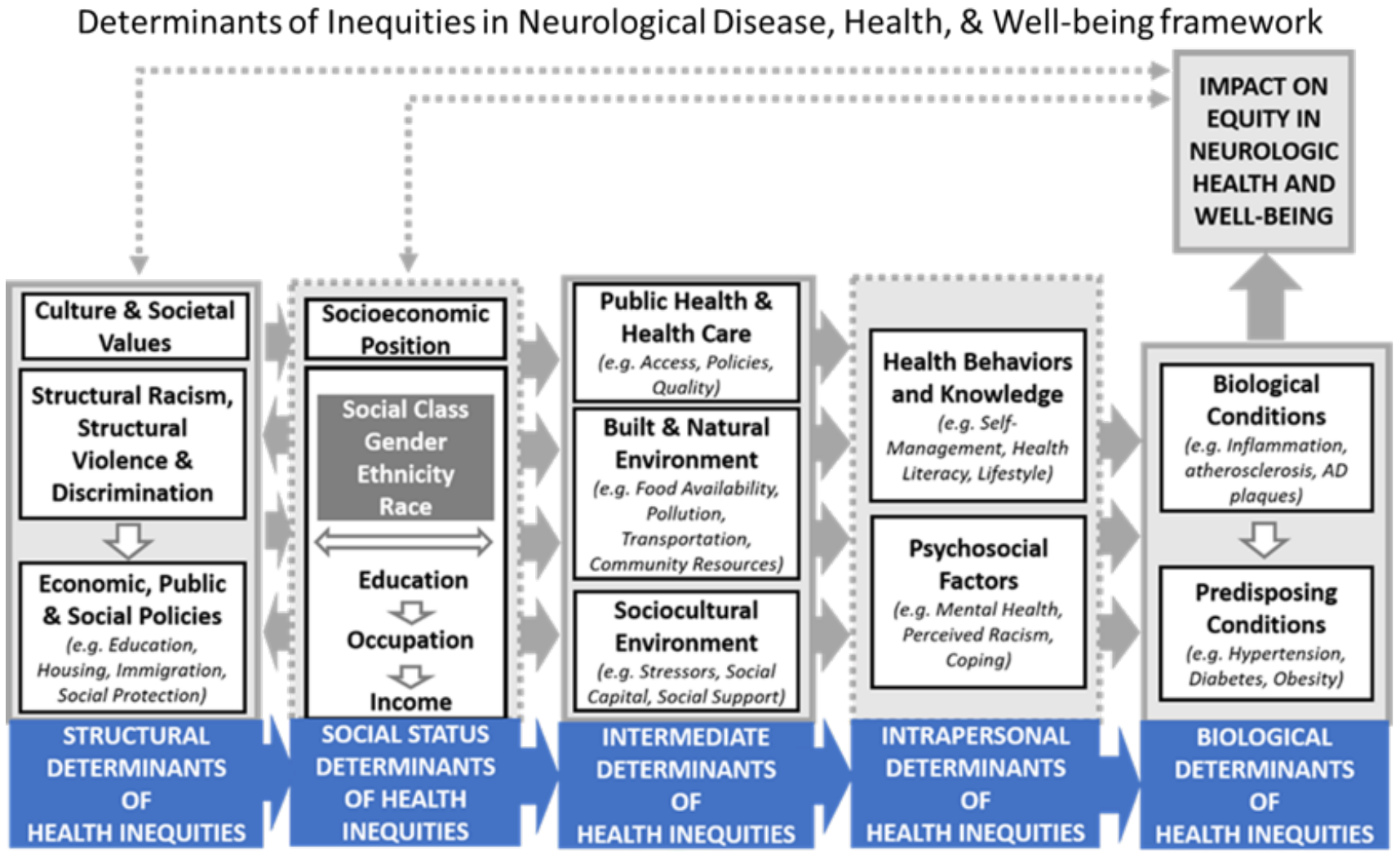
Determinants of Inequities in Neurological Disease



Manuscript title: Determinants of Inequities in Neurological Disease, Health, & Well-being: The NINDS Social Determinants of Health Framework

Griffith DM, et al. Neurology 2022. *In submission*

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Place Matters in CNS Disorders

Beyond the individual risk factors for various CNS disorders a new class has appeared, the environmental risk factors.

Stroke

- Research shows that there is an increased risk of ischemic stroke after short-term and long-term exposure to air pollution. Fine particulate matter (PM 2.5) has become the fourth-leading risk factor for ischemic stroke.
- With climate change, ambient temperature have been changing. Cold temperatures have a greater and long-lasting impact on stroke risk among elderly male patients..
- Neighborhood level social cohesion was independently protective against stroke mortality.
- Stroke prevalence was increased in areas with greater historical redlining practices.

Verhoeven et al., Lancet 2021
Chen et al., Environ Pollut 2022
Zhao et al., Front Public Health 2022
Lusk et al., Neurology 2023
Clark et al., AHA Journal 2010
Wing et al., J Stroke Cerebrovasc Dis 2022

Epilepsy

- Social determinants of health play a large role in epilepsy outcomes.
- Children with epilepsy living in disadvantaged areas were four times more likely to have diminished health related quality of life.
- Male sex and low socioeconomic status are positively correlated to incidence of epilepsy.
- At a national level, there is a shortage of neurologists especially in certain states that also happen to have a high burden of epilepsy. For example – in the Deep South the region is labelled as the “Epilepsy Belt”.

Chiang et al., Epilepsy & Behavior 2023
Hansen et al., Front Rehabil Sci 2022
Szaflarski et al., Epilepsy Behav 2021

Alzheimer’s Disease

- There is a strong association between accidental metal exposure and various neurodegenerative disorders, including Alzheimer’s Disease (AD). Chronic exposure to various metals is a well-known environmental risk factor.
- Fine particulate matter (PM 2.5) may contribute to racial/ethnic disparities in AD risk and its associated increase in AD risk was stronger among Black women.
- High neighborhood greenness may be associated with lower odds of AD and ADRD.

Islam et al., Front Pharmacol 2022
Younan et al., J Gerontol A Biol Sci Med Sci 2022
Aitken et al., J Alzheimers Dis 2021

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New Directions for Interventions

- **Identify and address structural barriers**
  - Redlining practices, NEJM justification around inclusion in trials

- **Engage in meaningful partnerships with the community**
  - Current community-engaged practices around neurological interventions:
    - Language translation
    - Improvement of accessibility of educational materials (mHealth)
    - Utilizing community health workers in delivery of interventions
    - Partnering with faith-based organizations and local businesses
    - Community advisory boards
    - **BUT need to include principles of CBPR**

- **Design innovative interventions**
  - Family networks, larger networks, caregiver models (SERVE OC)
  - Community health worker models
  - Multidisciplinary teams (civil engineers, gardeners, industry)
  - Focused life-course intervention - earlier disease states, prevention/adaptation.

Gabel et al., Alzheimer Disease & Associated Disorders 2022
Boden-Albala et al., JAMA Neurol 2019
Boden-Albala, et al., Neurology 2023

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