

# Disparities in epilepsy mortality in the United States

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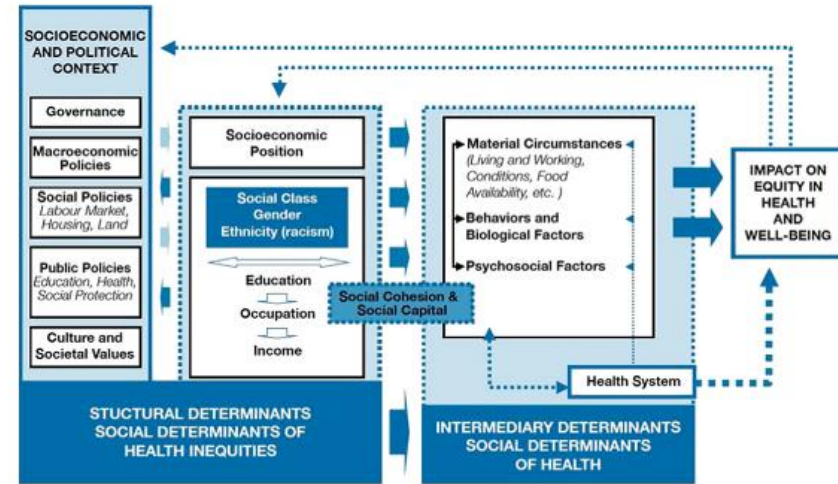
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# Disclosures

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- Ownership interest: Neuroview Technology

# Introduction – Social Determinants of Health & Epilepsy

- Social determinants of health are strongly related to access and quality of epilepsy care
  - Factors may include socioeconomic status, insurance status, race/ethnicity, gender, geographic location
  - May also include community and individual factors – social support, stigma, housing status, beliefs about medications



Borneo et al, Disparities in epilepsy: report of a systematic review by the North American Commission of the ILAE, *Epilepsia* 2009

Szaflarski, Social determinants of health in epilepsy, *Epilepsy Behav* 2014

Schiltz et al, Disparities in access to specialized epilepsycare, *EpilepsyRes* 2013

Kroner et al. Racial and socioeconomic disparities in epilepsy in the District of Columbia, *EpilepsyRes* 2013

Nathan & Gutierrez, FACETS of health disparities in epilepsysurgery and gaps to be addressed, *Clin Pract Neurol* 2018

Szaflarski et al, Poverty, insurance, and region as predictors of epilepsy treatment among US adults, *Epilepsy Behav* 2020

# SDOH and epilepsy care/outcome disparities

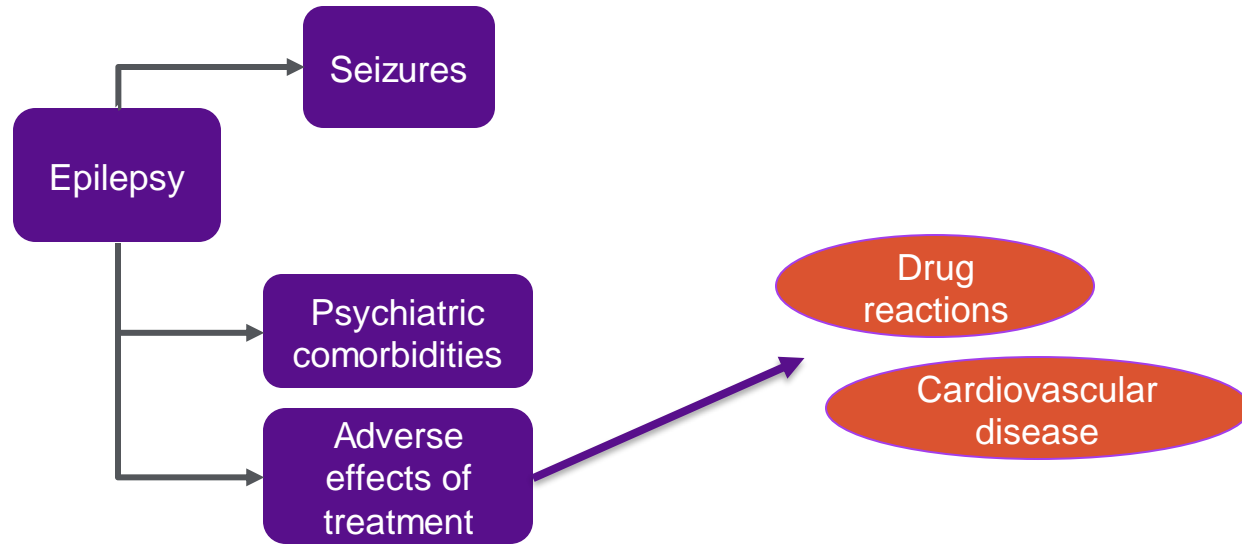
- Studies have linked lower SES, insurance status, immigration status, geography race/ethnicity with disparities in:
  - Access to outpatient specialist care
    - Black pts ~30% and Hispanics pts~50% less likely to see neurologists compared to whites
  - ASM use
    - Medication use is 30-40% less among pts living in poverty
  - Epilepsy surgery
    - Black pts 50% less likely to receive temporal lobectomy
  - All cause mortality
    - 60% higher age-adjusted mortality rates among Black pts with epilepsy compared to non-Hispanic White pts
    - Pts with Medicaid have higher rates of overall mortality compared to commercial insurance pts

Saadi et al. Racial disparities in neurologic health care access and utilization in the United States. *Neurology*. 2017;88(24):2268-75.

Greenlund et al. Epilepsy by the numbers: epilepsy deaths by age, race/ethnicity, and gender in the United States significantly increased from 2005 to 2014. *Epilepsy Behav*. 2017;69:28-30

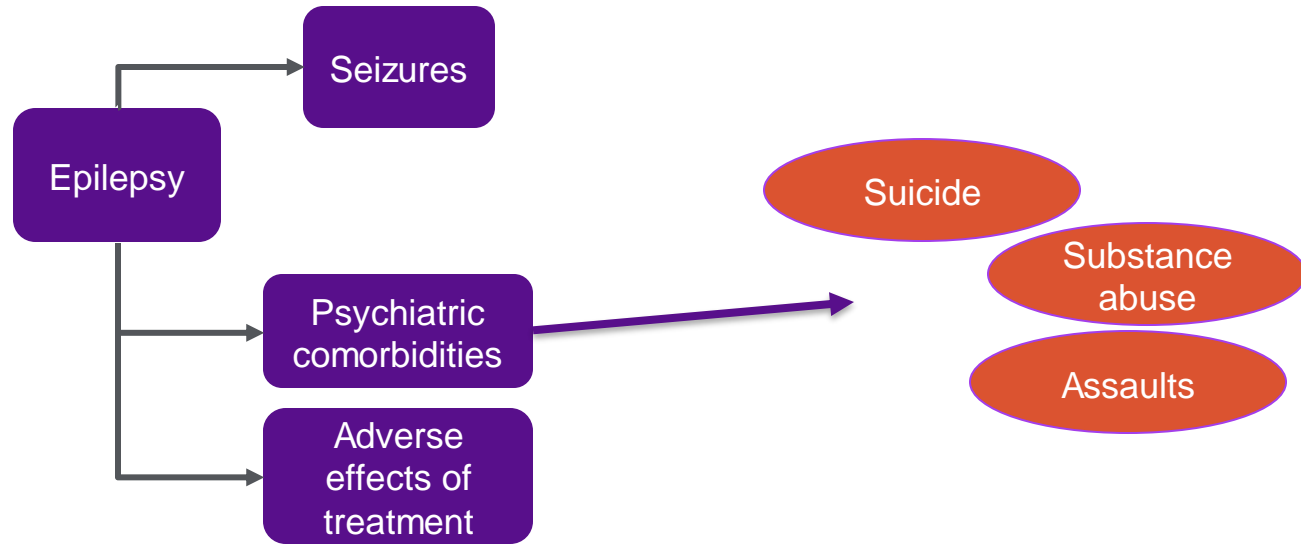
McClelland et al. Racial disparities in the surgical management of intractable temporal lobe epilepsy in the United States: a population-based analysis. *Arch Neurol*. 2010;67(5):577-83..

# Epilepsy can be a deadly disorder



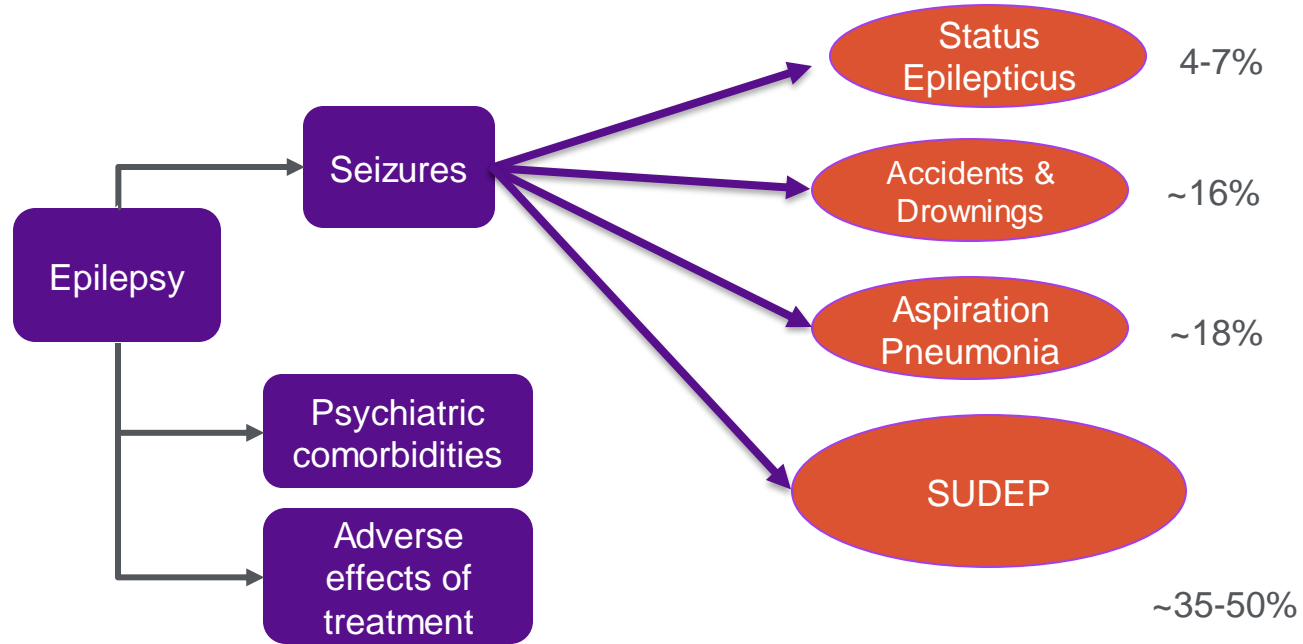
Devinsky et al. Neurology. 2016;86(8):779-86.

# Epilepsy can be a deadly disorder



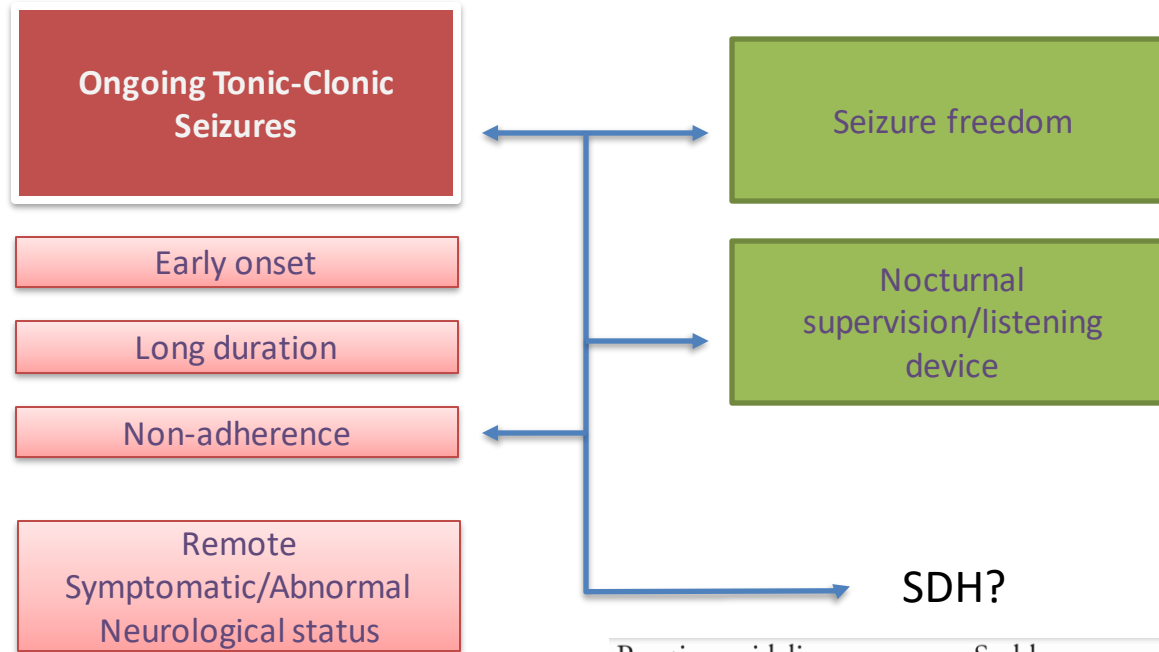
Devinsky et al. Neurology. 2016;86(8):779-86.

# Epilepsy can be a deadly disorder



Devinsky et al. Neurology. 2016;86(8):779-86.

# Risk Factors



Practice guideline summary: Sudden unexpected death in epilepsy incidence rates and risk factors

Report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology and the American Epilepsy Society

Harden et al, Neurology 2017



# Socioeconomic disparities in SUDEP in the US

Esma Cihan, MD, Dale C. Hesdorffer, PhD, Michael Brandsoy, BA, Ling Li, MD, David R. Fowler, MB ChB, Jason K. Graham, MD, Michael Karlovich, BS, Elizabeth J. Donner, MD, Orrin Devinsky, MD, and Daniel Friedman, MD

*Neurology*® 2020;94:e2555-e2566. doi:10.1212/WNL.00000000000009463

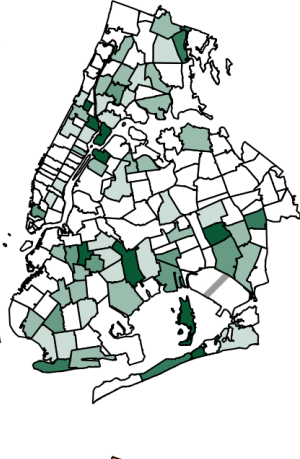
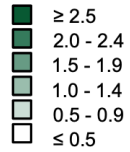
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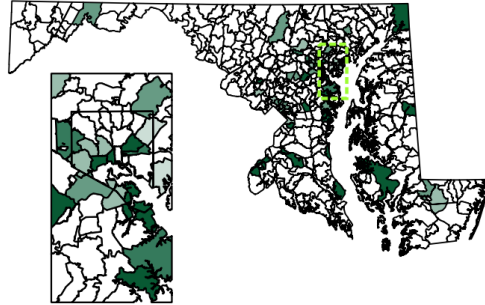
- Reviewed SUDEP deaths that underwent MLI in 3 ME offices: NYC, Maryland, San Diego Co
  - Population: ~17 million, Prevalent epilepsy ~ 160-201k
- Reviewed all deaths 2009-10 and 2014-15
- Independent adjudication of epilepsy and SUDEP by 2 experts + 1 for disagreements
- Definite/Probable/Near-SUDEP = **217** in 2009-10 and **173** in 2014-15

## NYC

SUDEP Incidence  
(per 1000 pt-yr)

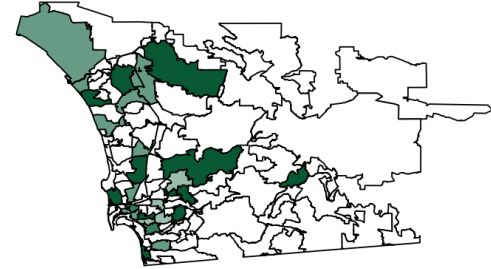


## Maryland

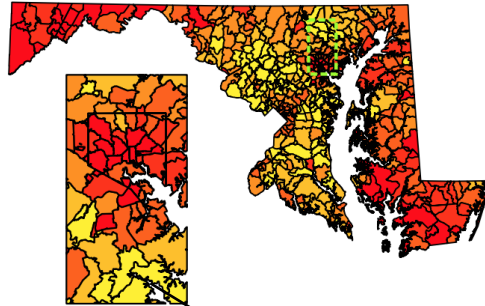
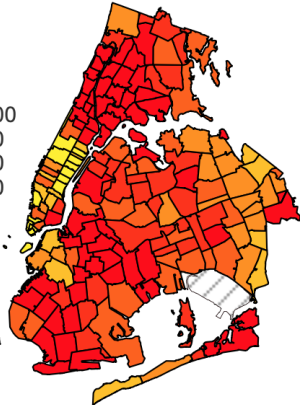
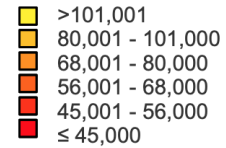


age/region/income adjusted epilepsy  
prevalence estimate (ACS/NHIS)

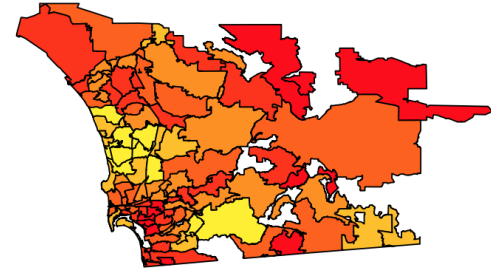
## San Diego Co

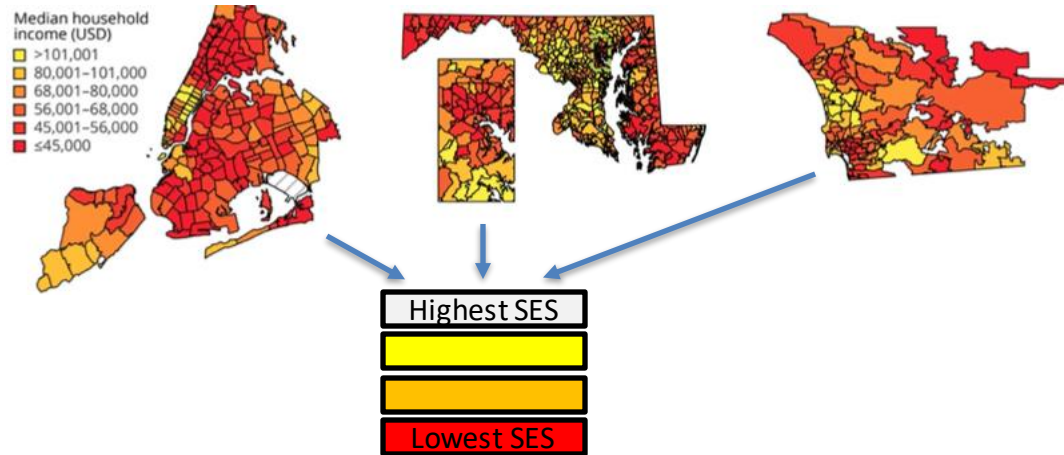


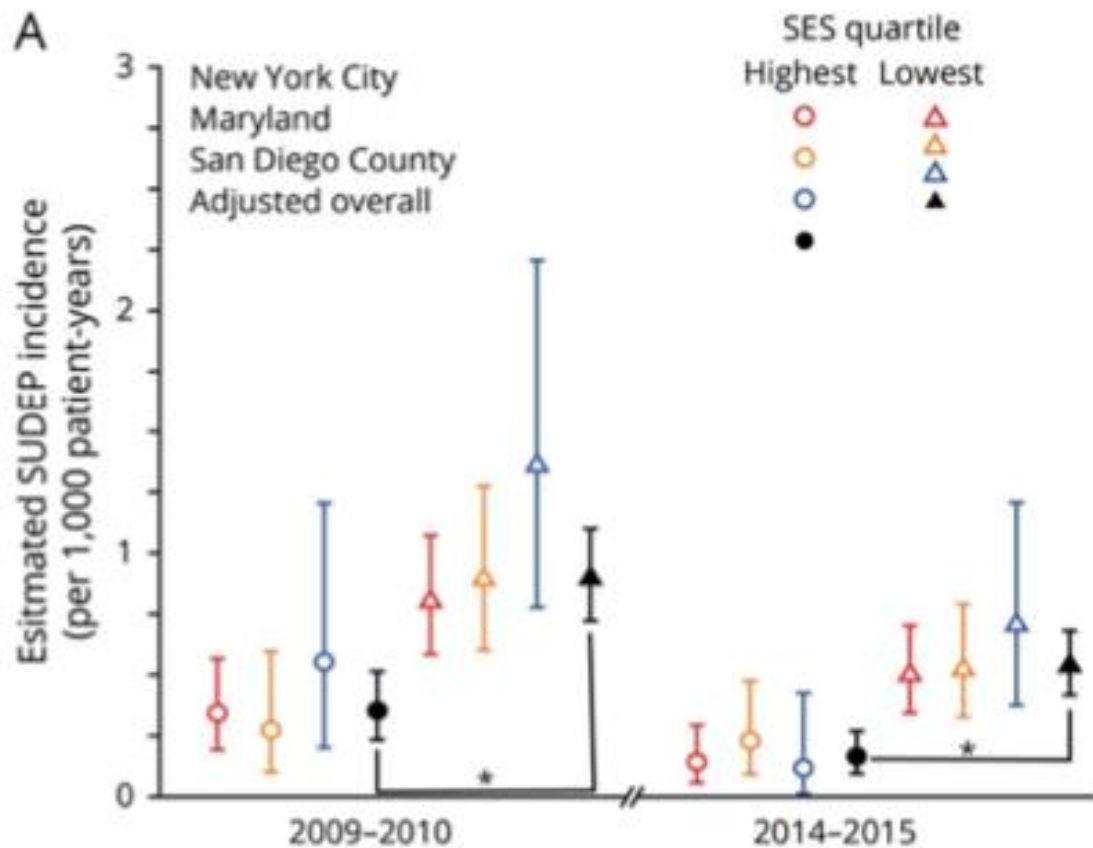
Median Household  
Income (USD)



Baltimore & environs







## Results

- SUDEP incidence among residents of poorest ZIP codes is **2.6-3.3x** that of residents of wealthiest ZIP codes
- Overall, **36% decline** in ME-investigated SUDEP btwn 2009/10 and 2014/15 (!) but disparities persisted
- No difference between lowest and highest quartile decedents in: age, sex, comorbidity index, psychiatric comorbidities or substance abuse.
- Only difference is % non-white (40% in highest, 80% in lowest).
- Unable to determine insurance status. All regions participated in Medicaid expansion under Affordable Care Act.

# Conclusions

- Living in **poorer communities** is associated with increased rates of SUDEP identified through medical examiner offices
- Multiple social determinants of health are associated with lower income communities: including worse **access to care, access to medications, less social support, stress, environmental factors, housing stability.**
- These factors can affect seizure control and lead to SUDEP
- Addressing these issues through awareness, recognition by clinicians and policy could reduce SUDEP
- 36% reduction in SUDEP rates in studied communities without any *specific* anti-SUDEP intervention suggests that we already have some of the tools at hand

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