

Burdens of Disease: Disparities in Acute Healthcare

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Annette Langer-Gould, MD PhD

Regional Lead, Translational Neuroscience

Southern California Permanente Medical Group/Kaiser Permanente

Bernard J Tyson Kaiser Permanente School of Medicine

Overview

- Review definitions
- Drivers of Disparities and Inequities in Acute Healthcare
- Barriers to Timely & Accurate NMOSD diagnosis
- Global inequities in NMOSD treatments
- Patient example
- Suggestions for improving equity in acute NMOSD care

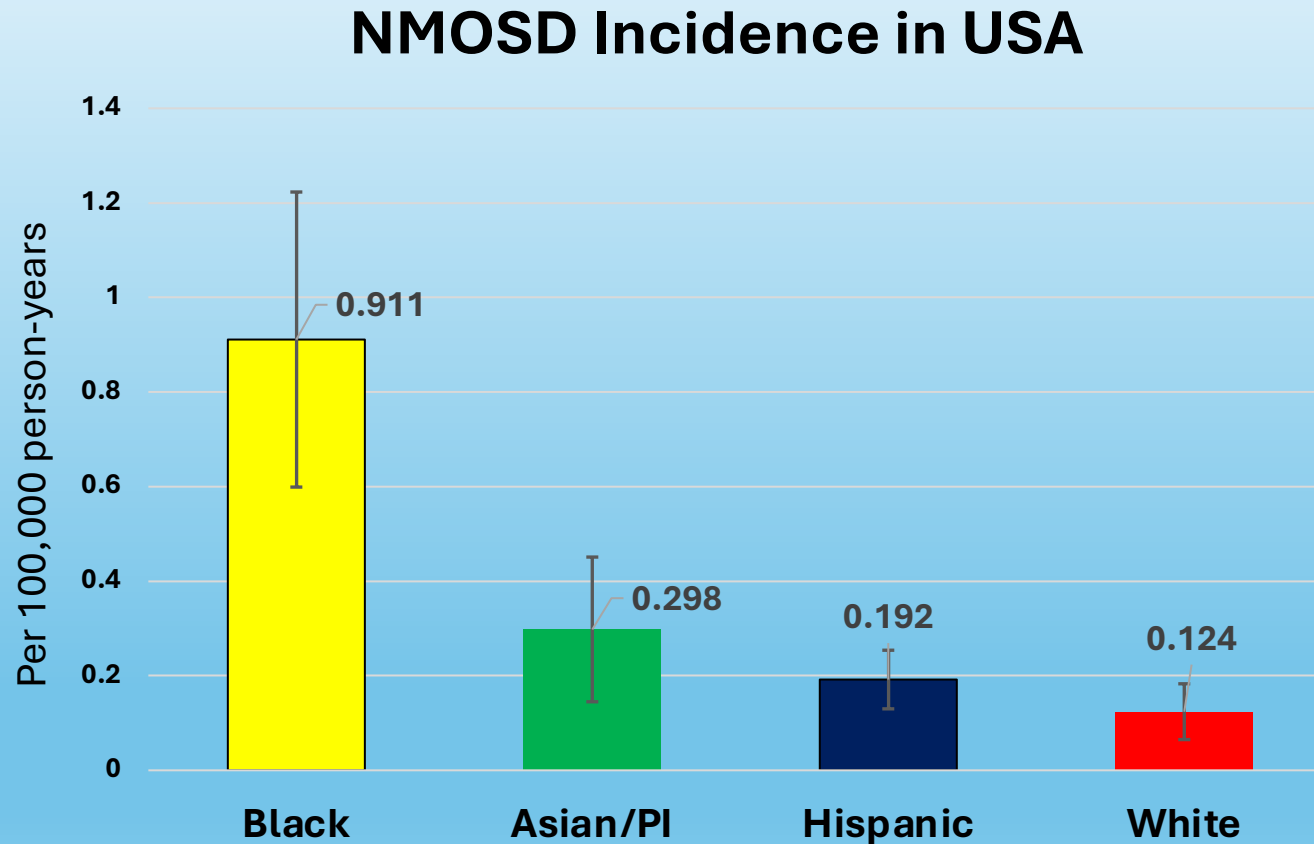
Definitions: Acute Healthcare, Disparities

Treatment of relapses

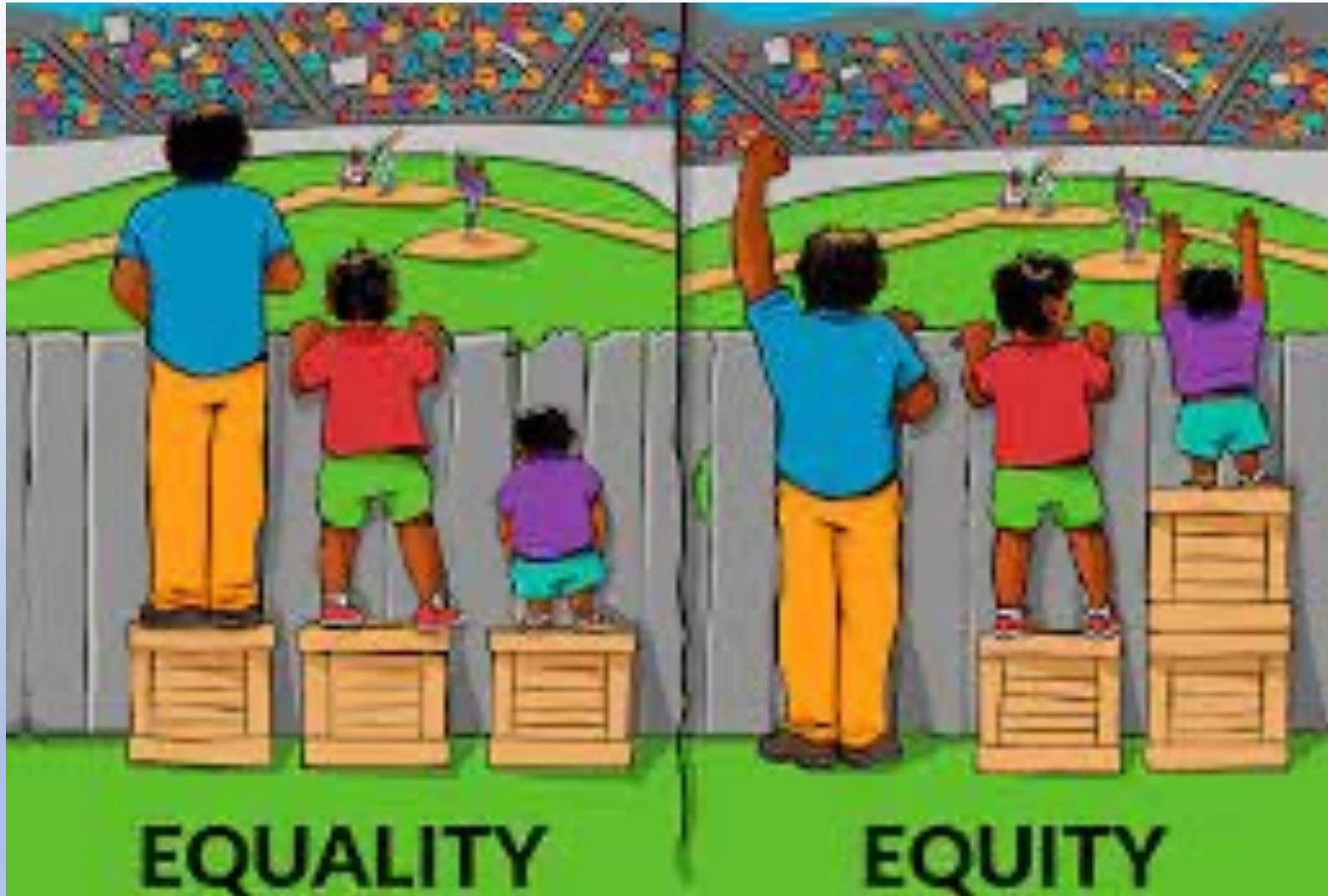
Disparity=difference in a characteristic [NMOSD incidence by a characteristic [race and ethnicity]

Group assignment can be race or ethnicity, age, gender, etc.

This pattern in NMOSD incidence is consistent with global studies



KP Southern California 2013-2022 age- and sex-standardized to the 2020 USA census, n=103



Wanting everyone to have the same good health outcomes = Health Equity

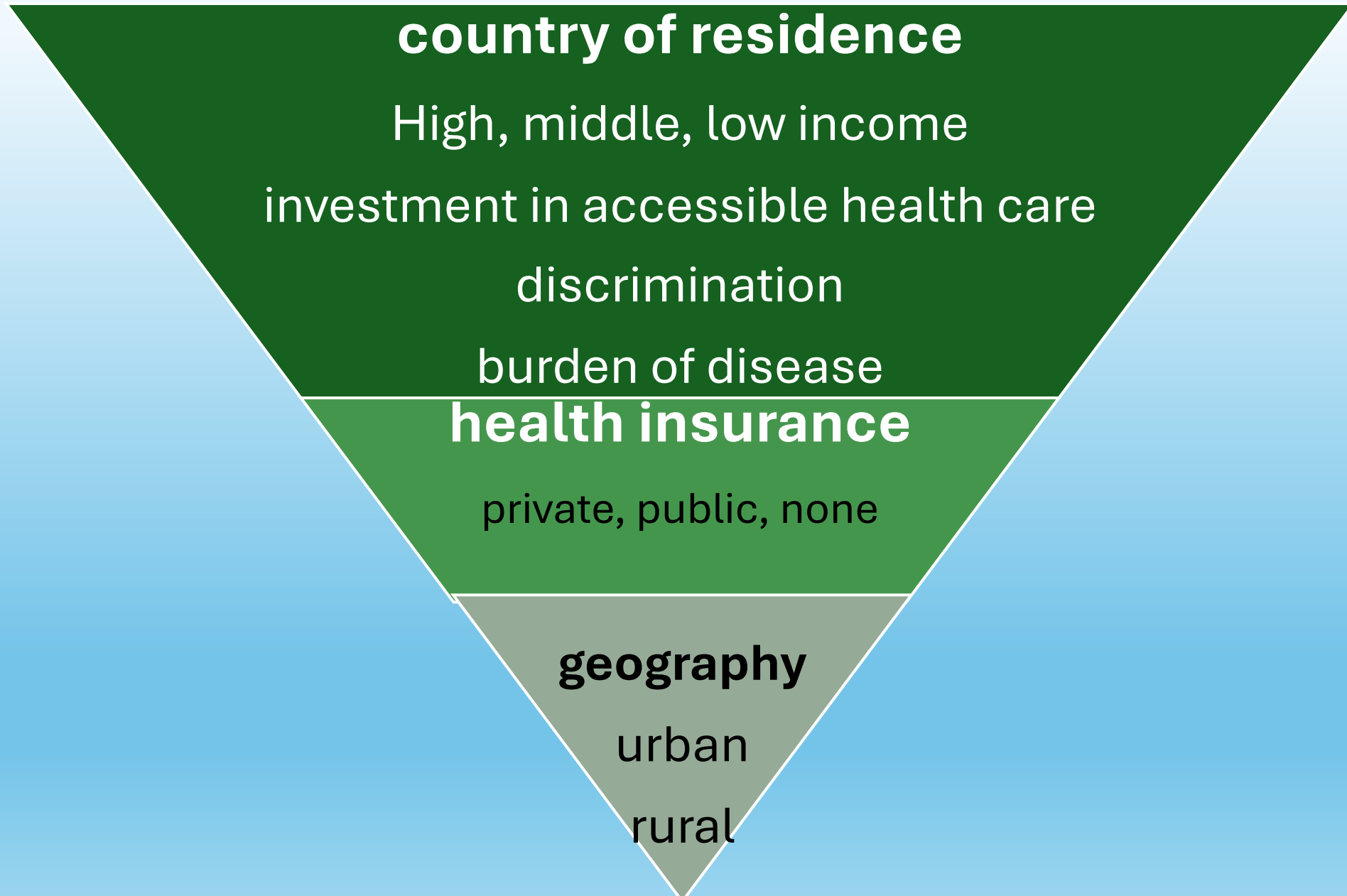
Why does equity in acute NMOSD care matter?

Disparities in NMOSD outcomes driven by

1. Misdiagnosis/diagnostic delays due to healthcare access and quality
2. Severity Relapse and access to acute treatments (e.g. plasma exchange/PLEX), especially in untreated patients (e.g. onset relapse)
3. Initiation of appropriately effective NMOSD treatments
4. Age, comorbidity burden
5. Clinical presentation other than optic neuritis or transverse myelitis contribute to diagnostic delays (e.g, area postrema syndrome, hypothalamic syndromes)

The magnitude of these contributors to outcomes is not well understood and worthy of further investigations

Drivers of Disparities in Acute Healthcare

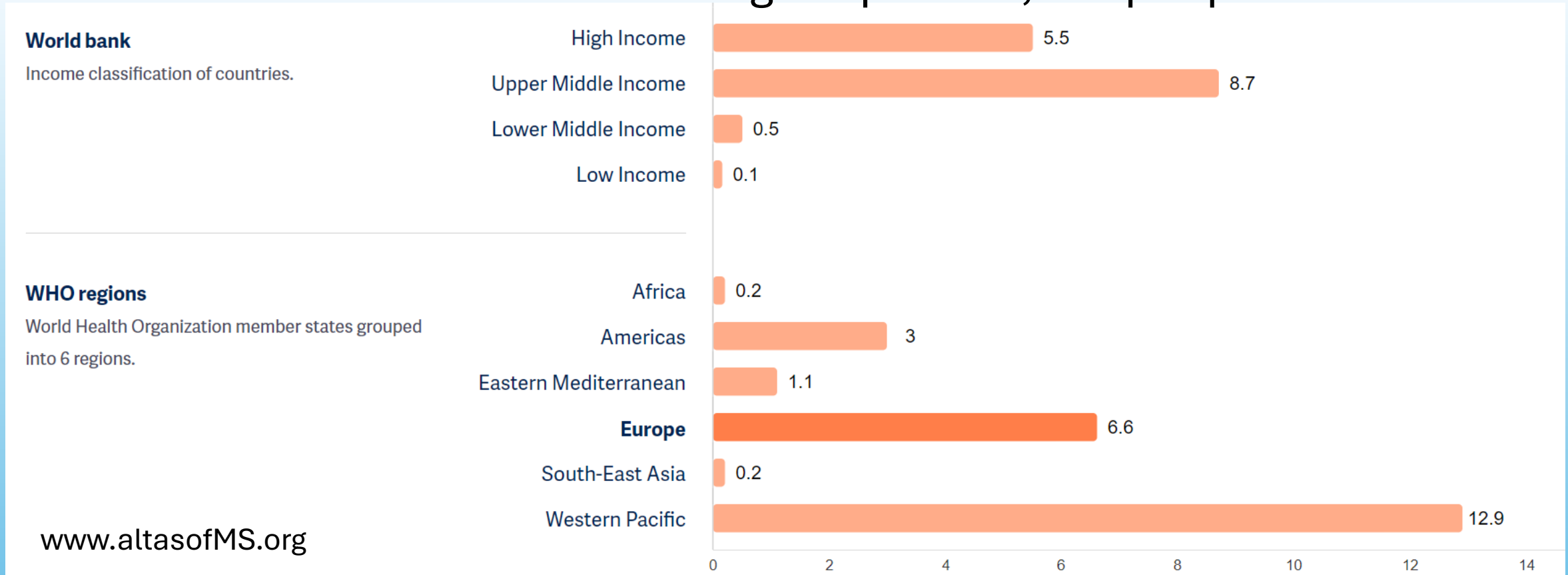


Timely & Accurate Diagnosis

Facilitated by neurologists, MRIs, AQP4 Ab testing

Global Inequity in Access to Neurologists:

Number of Neurologists per 100,000 people

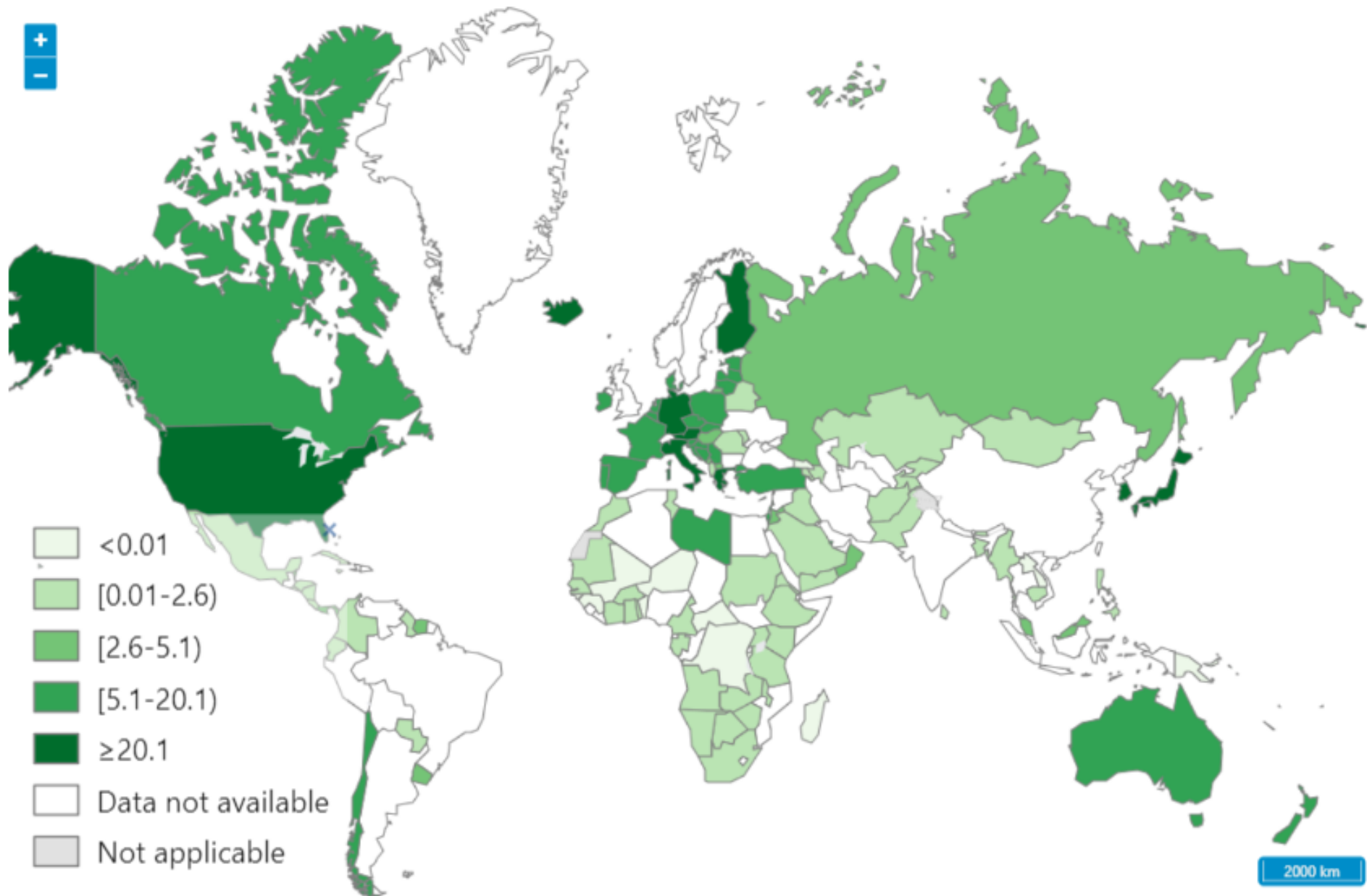


Varies widely within groups:

High Income: Germany 10, Japan 7.1 USA 5, Canada 2.8

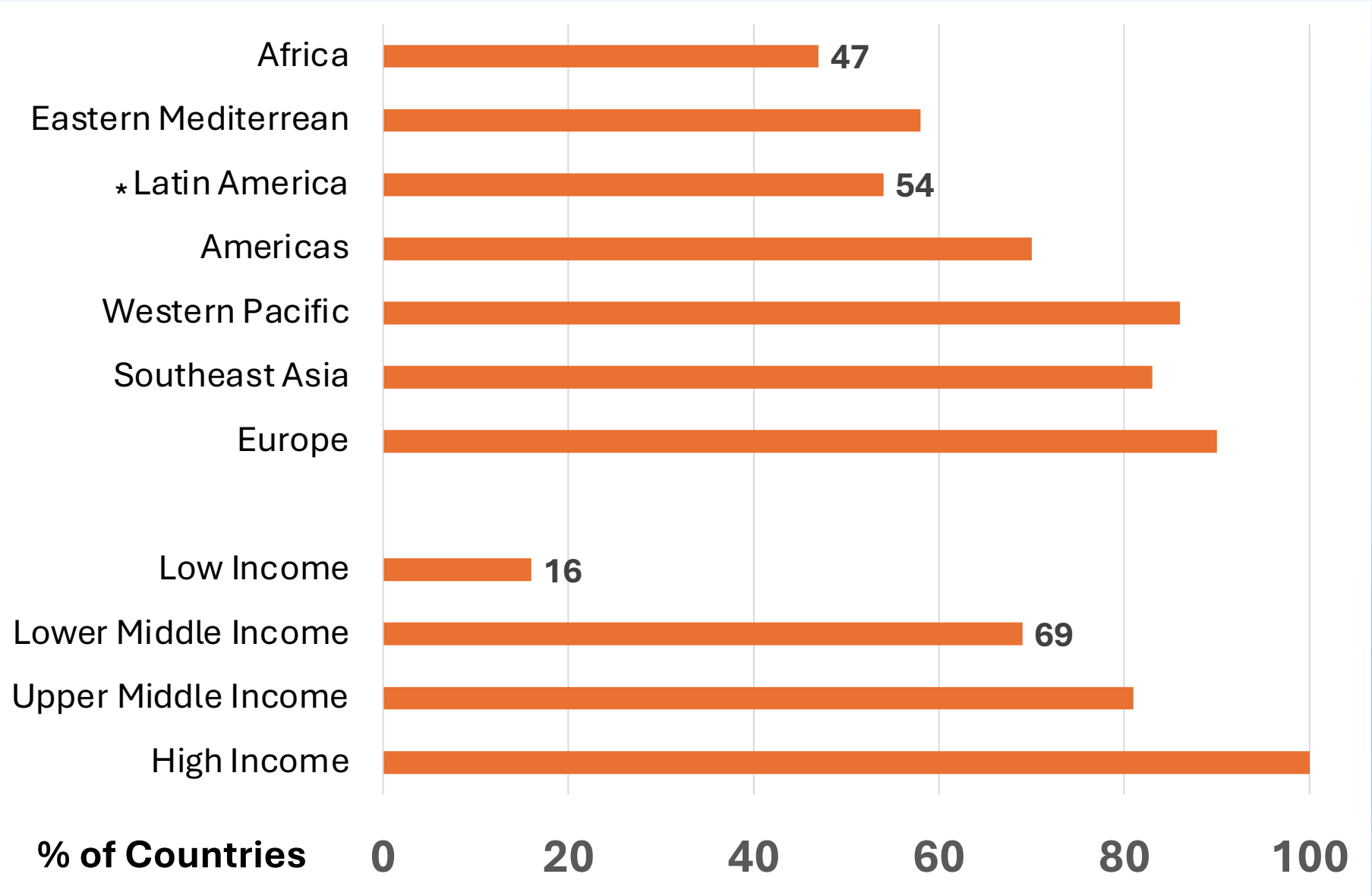
Upper Middle Income: Argentina 2.7, Brazil 2.5, Mexico 0.8; Armenia 10.1, China 14

Western-Pacific: China 14, Japan 7.1, Australia 2.1, New Zealand 1 (South Korea not reported)



Density of MRI machines per 1 million people: WHO 2024

Global Inequities in Availability of AQP4-Ab testing

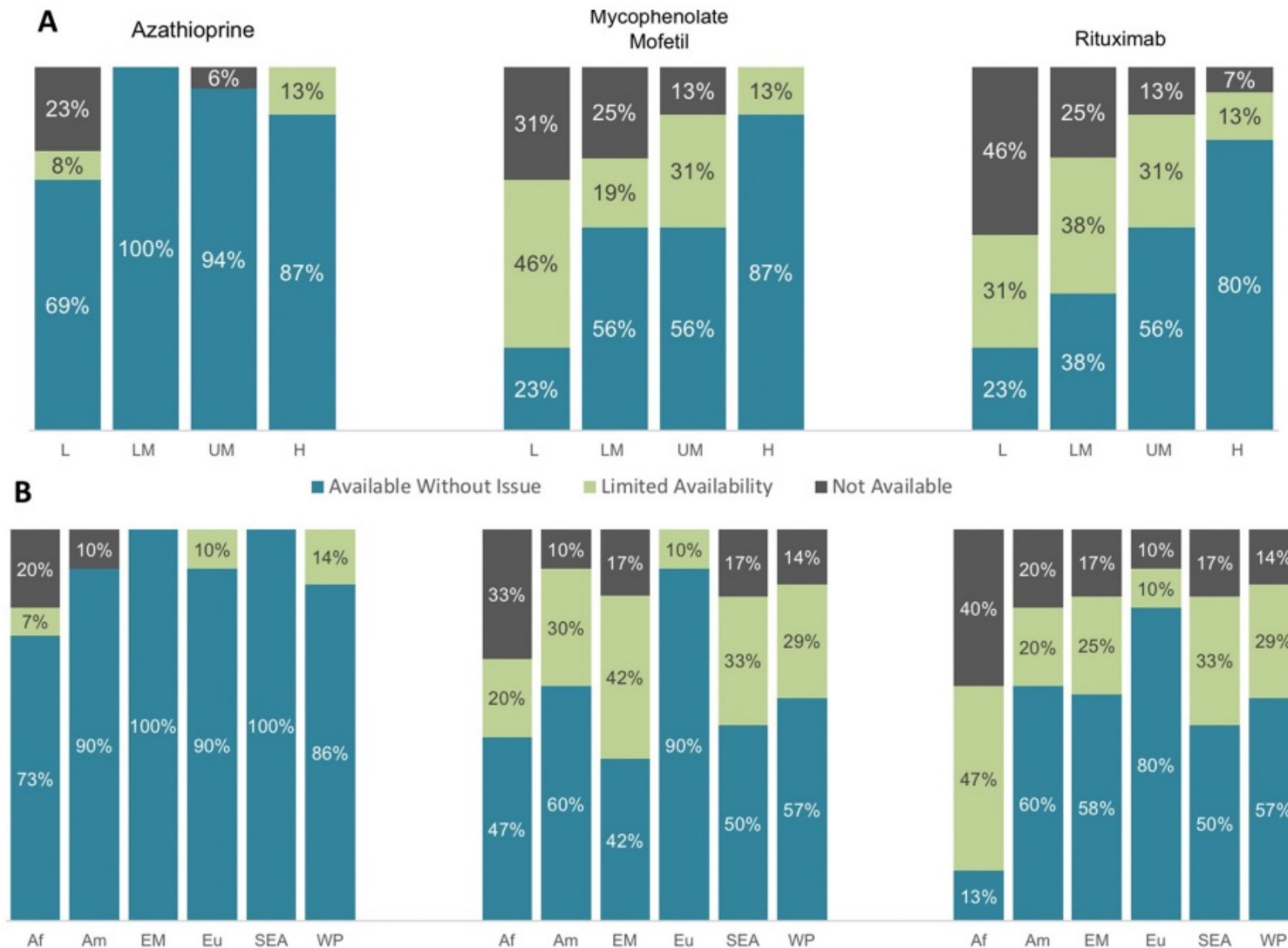


Survey study by K. Holroyd et al, MSARD, 2019

*Latin America survey study by Rojas II et. Al, Jrnl Neurol Research, 2021

Inequities in Access to NMOSD Treatments

Reduce the need for acute care by reducing the frequency and severity of NMOSD relapses



LIMITED
AVAILABILITY OF
LOW COST
NMO
TREATMENTS
GLOBALLY
Survey data from
2018

Advocacy needed,
worth repeating
this study

Fig. 3. Availability and accessibility of long-term NMO treatments by A) World Bank income status and B) WHO World Region of responding countries.

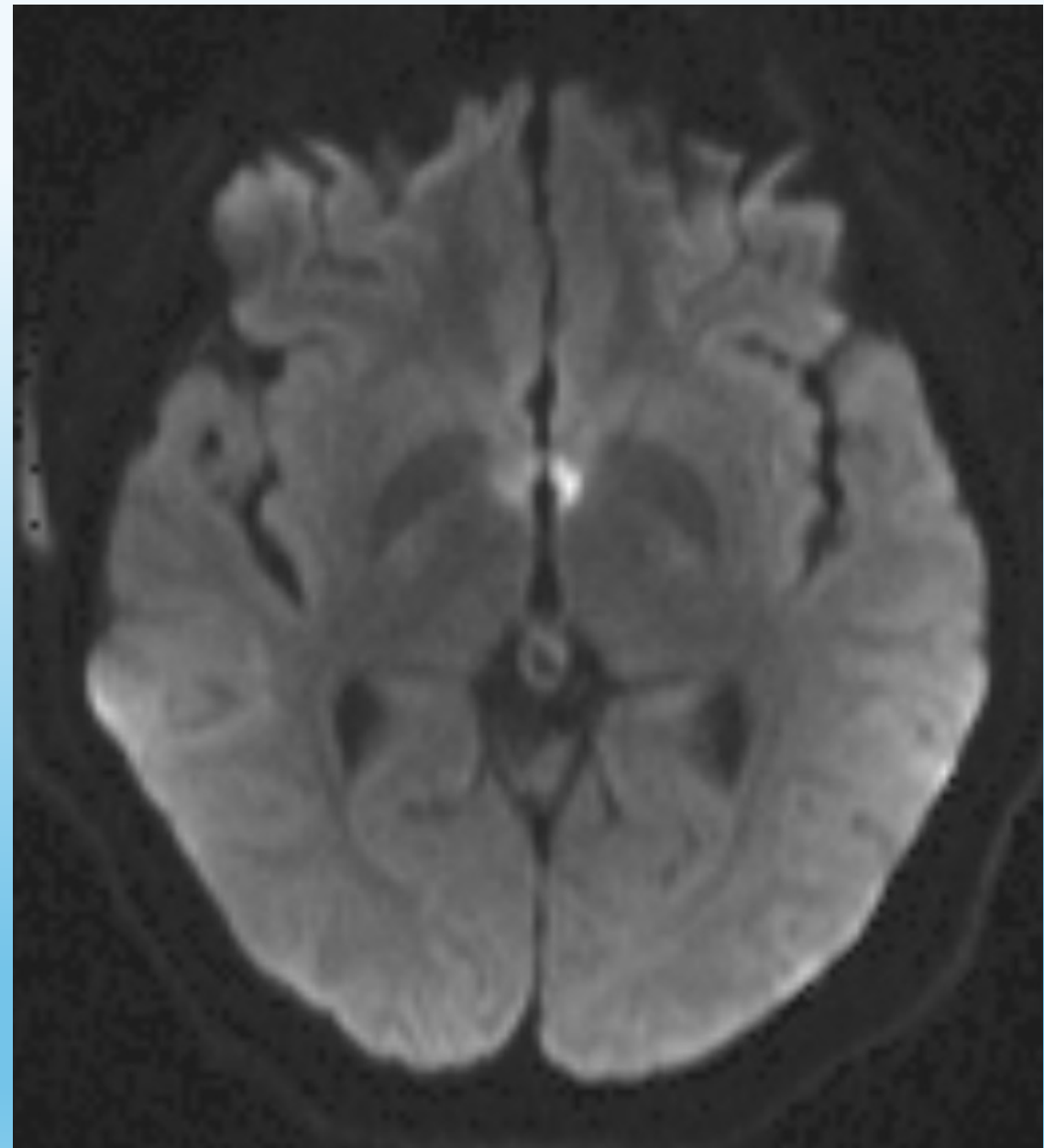
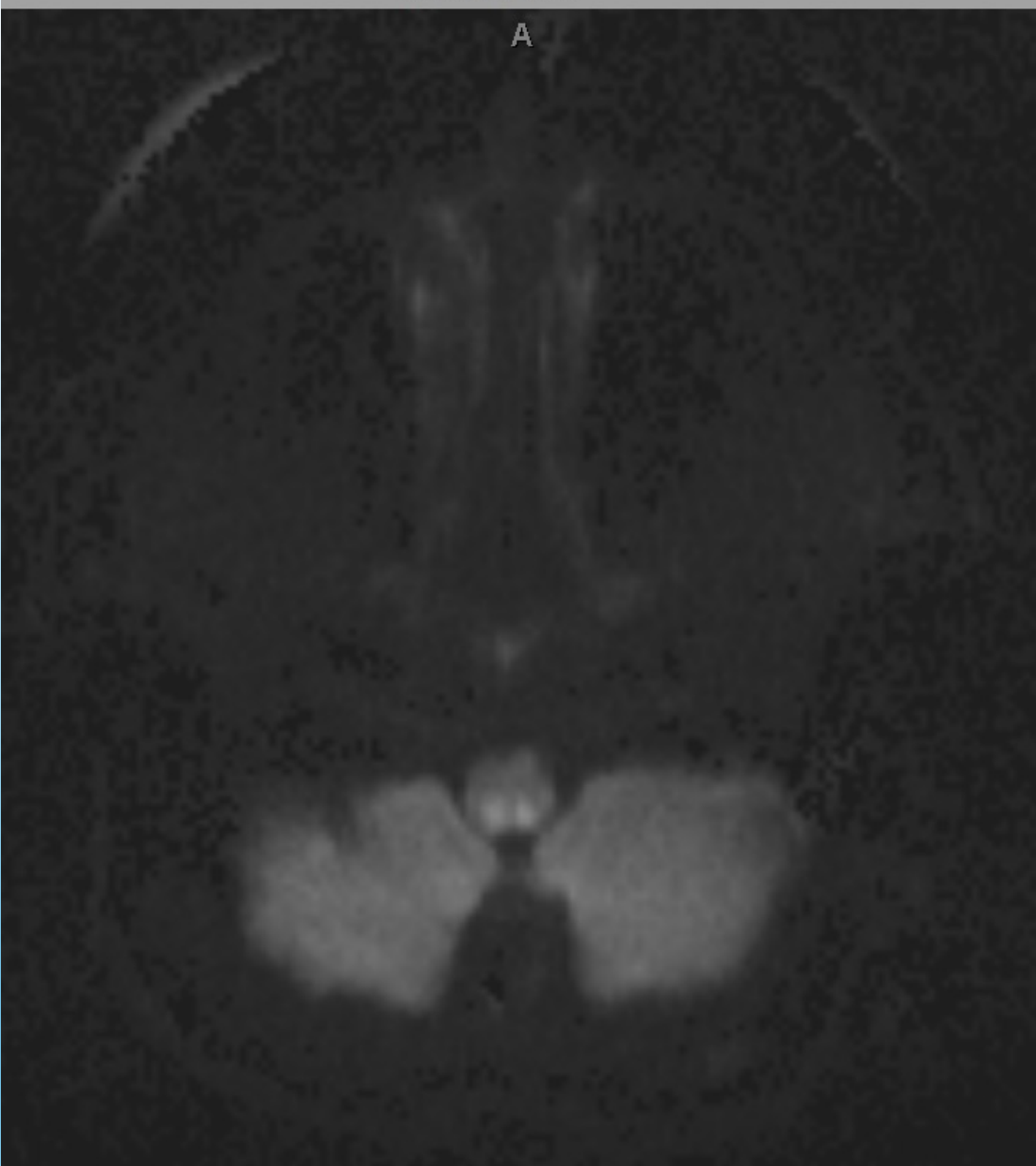
Patient example:

- 19 y/o female of Asian descent no significant PMH, lives in rural California, seen in urgent care for intermittent nausea and vomiting in late June after eating fast food with friends.
- Progressed to intractable N/V and hiccups
- 7/8 admitted to local hospital for GI work-up. Hyponatremic and briefly hypokalemic.
- During admission became increasingly lethargic and started hallucinating with dysphagia, difficulty handling secretions, NG tube placed and CSF was obtained.
- Revealed marked lymphocytic pleocytosis (580 wbc) and elevated protein. Started on antiviral, anti-fungals and antibiotics. EEG was normal. GI work-up negative. ANA 1:80 positive.
- Dx with acute encephalitis. Parents told prognosis very poor
- 7/11 brain MRI (~2 weeks after symptom onset and 2 days after acute decompensation) normal (not leptomeningeal enhancement) but sequences were limited

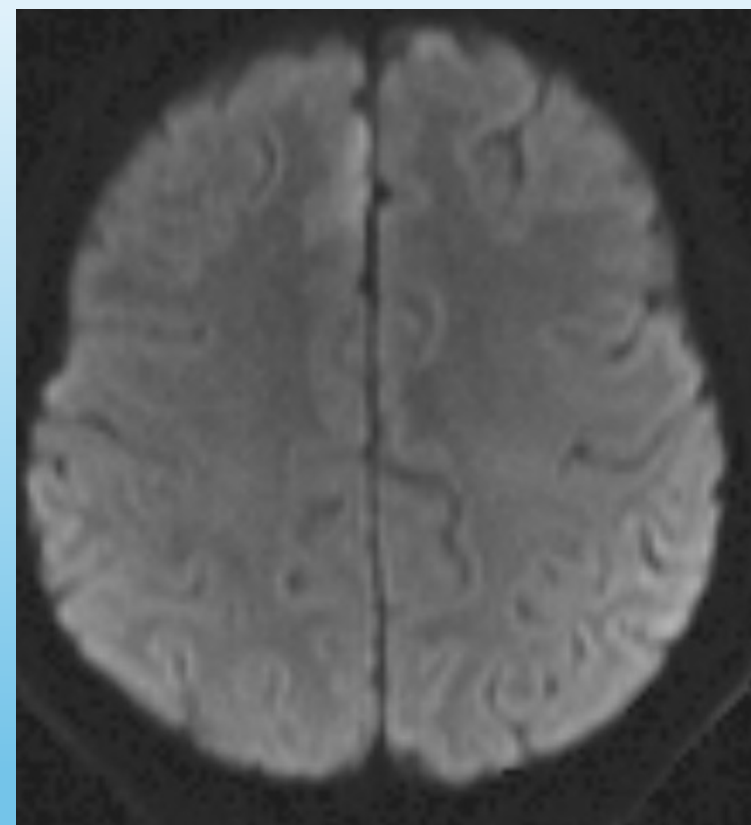
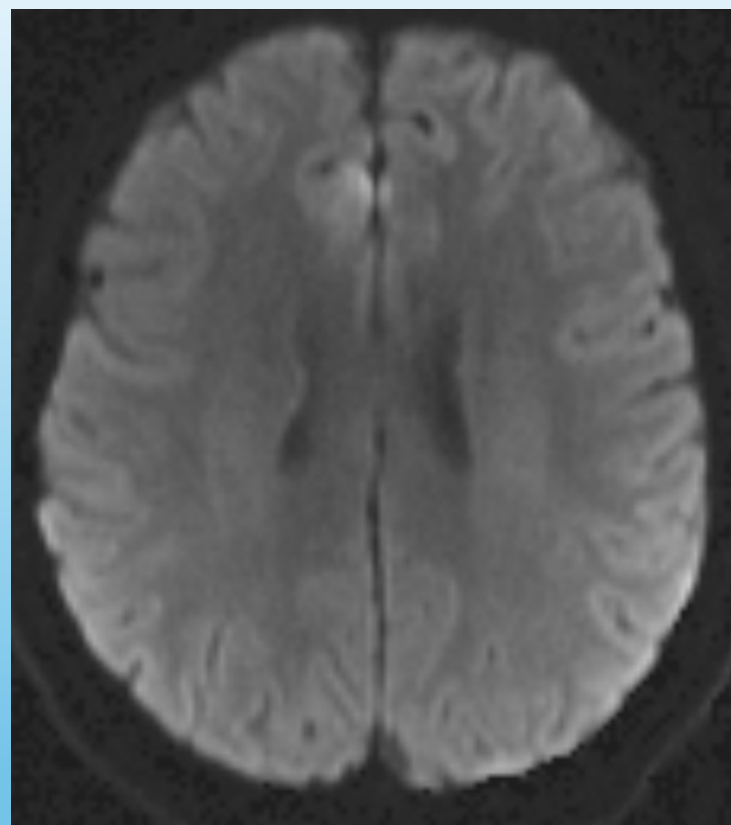
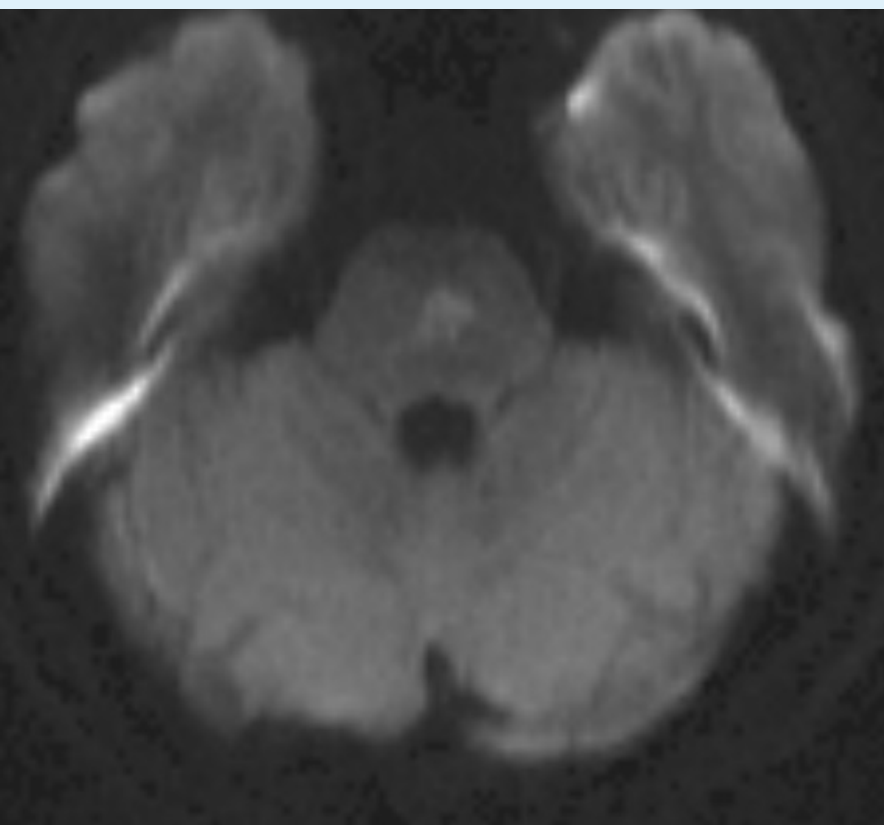
Patient example continued:

The NEXT DAY

- 7/12 developed weakness in hands and arms, iv solumedrol
- 7/14 transferred to Los Angeles Medical Center for higher level of care, profoundly lethargic, dysarthric, tetraparetic 5- to 4+ left arm, 4 both legs except 1 left dorsi- and plantar flexion. Seen by an MS specialist.
- 7/15 Foley placed, repeat CSF 92 WBC, 92% lymphocytes, protein wnl (43)
- 7/18 repeat brain MRI *“pt with no pmhx presented with altered mental status and b/l arm and leg weakness after possible viral infections, suspicious for autoimmune encephalitis.”*

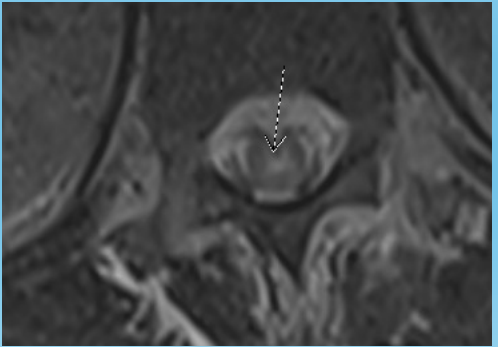
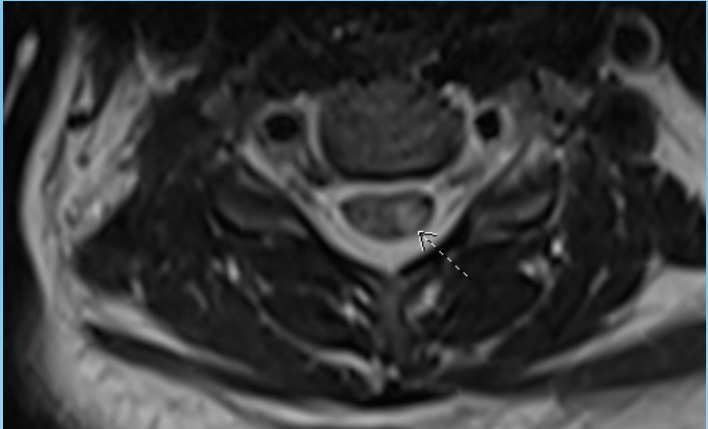
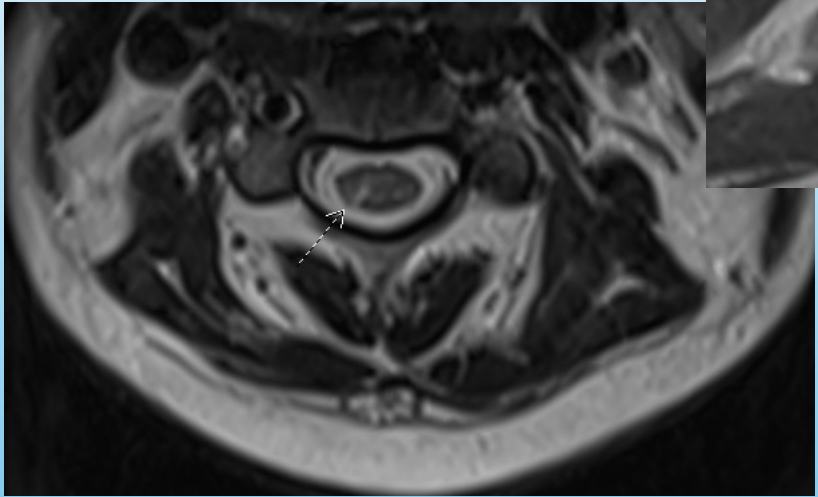
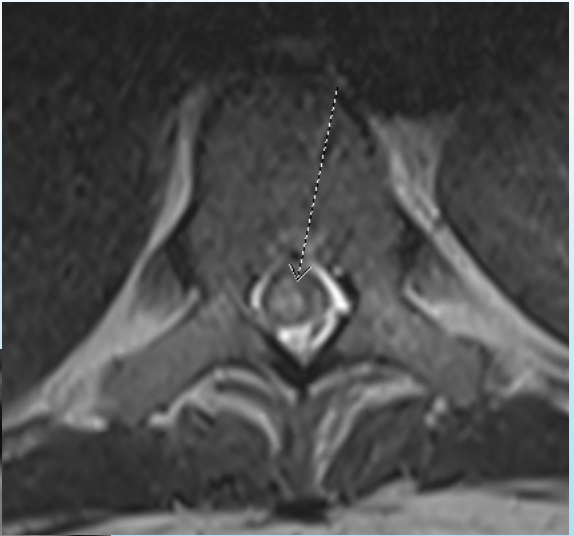
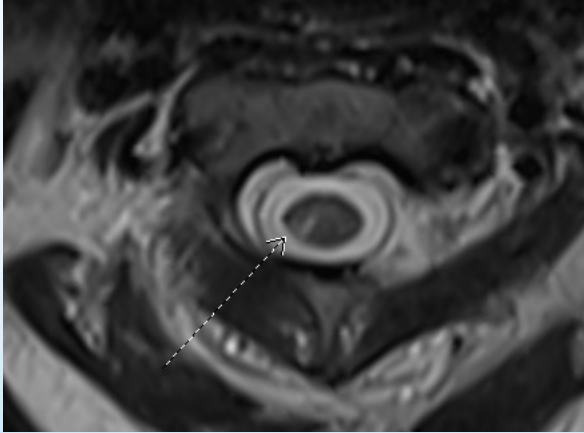
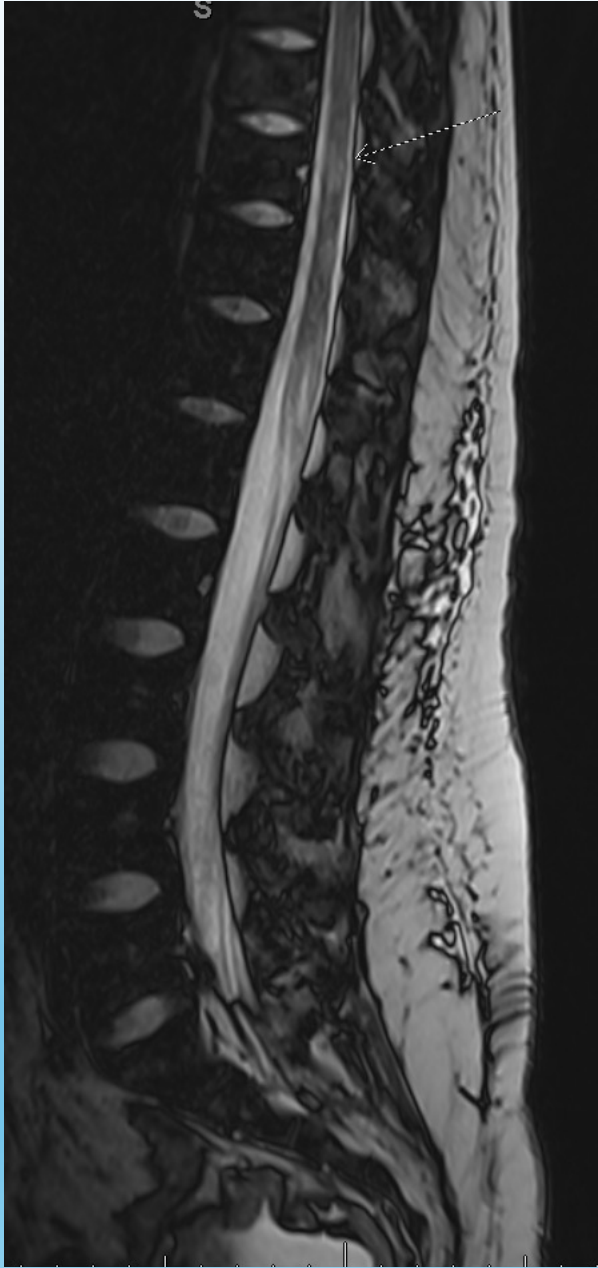


NMOSD not mentioned in differential diagnosis by radiologist

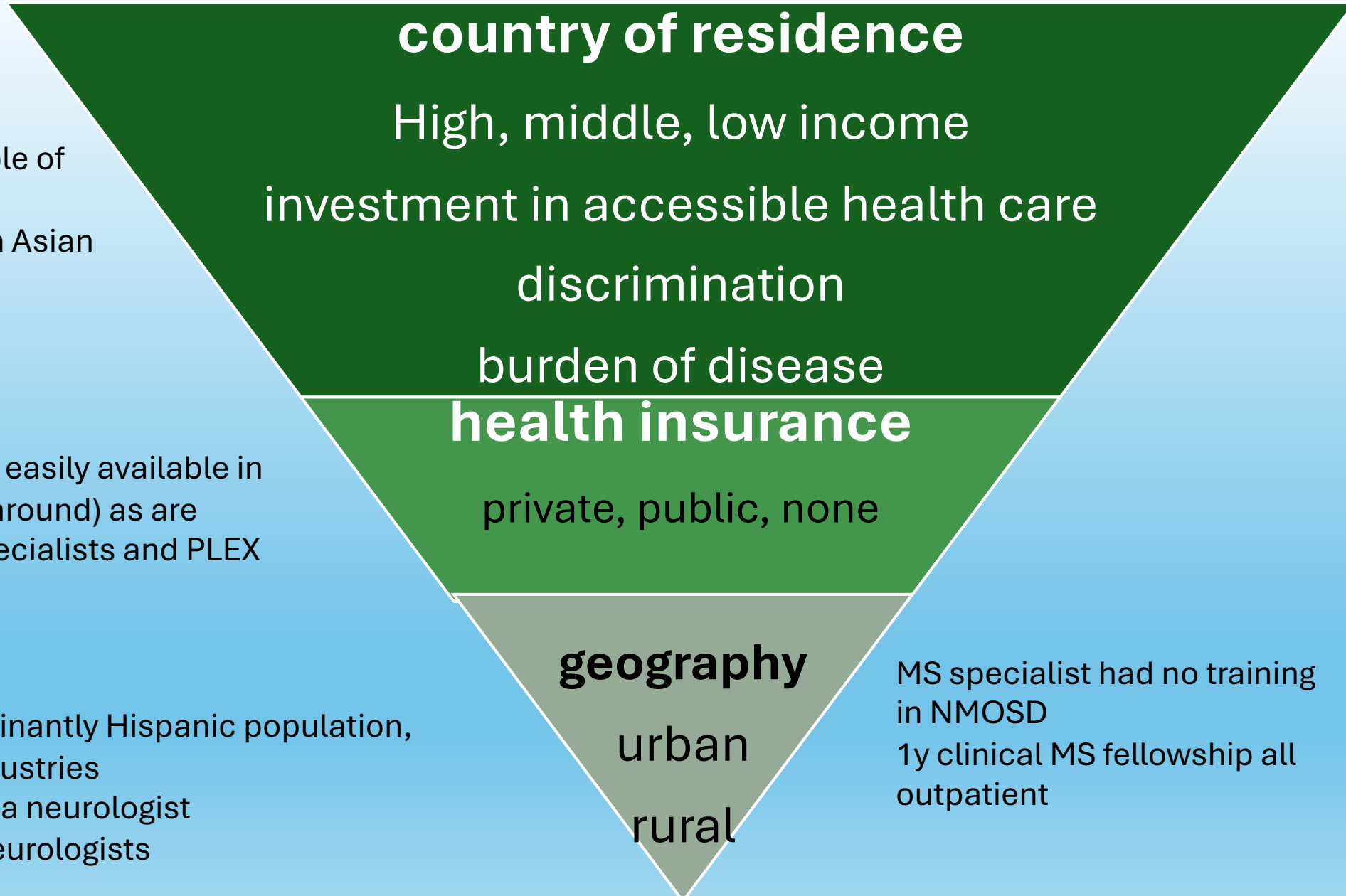


Patient example continued:

- PLEX started from presumptive diagnosis of autoimmune encephalitis
- ~1 month after symptom onset, s/p 10 days iv solumedrol and 5 rounds of PLEX, level of alertness has improved (intermittently briefly awake) but
- Paraparesis markedly worse, asymmetric left leg weaker (1) than right (2), areflexic in legs.
- urinary retention unable to sense need to urinate or defecate
- Spinal cord imaging obtained and AQP4 Ab returned positive CBA, confirmation testing sent to Mayo, titer 1:1000 (even after PLEX)
- Treated with RTX and Cytoxan (2 doses), maintained on RTX 1g q6mo
- 2 years later excellent recovery



Patient Example: Improving Equity



High income country
Discriminates against people of color
Higher burden of NMOSD in Asian Americans

Private health insurance
Cell-based AQP4 IgG testing easily available in main hospitals (~2 day turn around) as are neuroimmunologists, MS specialists and PLEX machines

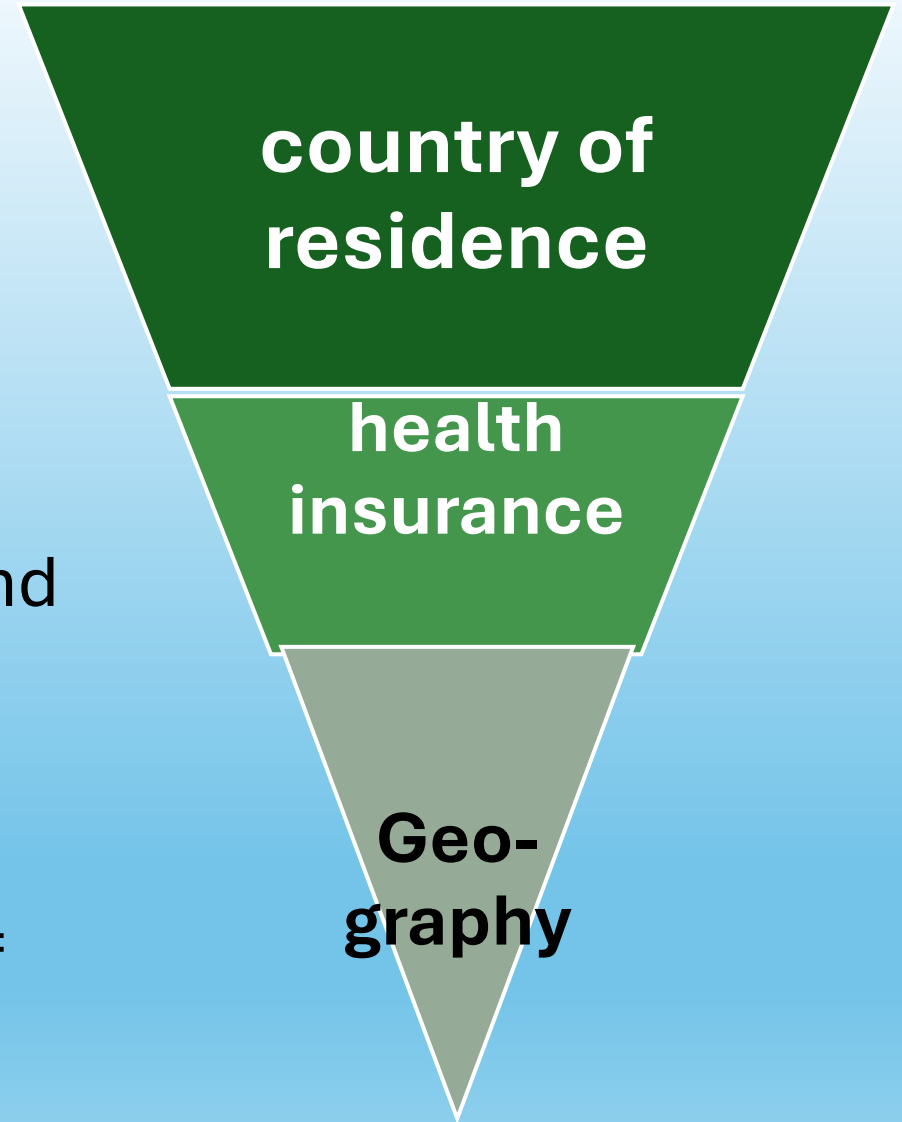
Residential segregation:

Lives in Rural Area, predominantly Hispanic population, agriculture and oil main industries
Local hospital did not have a neurologist
Community often has no neurologists

MS specialist had no training in NMOSD
1y clinical MS fellowship all outpatient

Improving Equity in Acute Care

- Training neuroimmunologists
 - Collaborating with NMSS, include inpatient experience
 - Board certification
- Raising awareness
 - Educating colleagues ICU, GI, Radiology
- Improving access to neuroimmunologists and neuroradiologists
 - Tele-health
- Access to acute care (PLEX, rituximab)
- Training patients in self-advocacy (in case of future relapses)



Thank you!

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