Autism Intervention Research Network on Physical Health

AIR-P LEND Seminar Series

Neurology

UC-LEND

RUJUTA B. WILSON, MD, MS
UCLA DAVID GEFFEN SCHOOL OF MEDICINE, ASSISTANT PROFESSOR IN PEDIATRIC NEUROLOGY AND PSYCHIATRY,
AIR-P NEUROLOGY NODE DIRECTOR
UC-LEND FACULTY

GARY STOBBE, MD, UNIVERSITY OF WASHINGTON AIR-P CRE LEAD, CLINICAL PROFESSOR NEUROLOGY AND PSYCHIATRY, MEDICAL DIRECTOR UW ADULT AUTISM CLINIC

ANDREA (DEA) DEISHER, MPH, RN, BSN PROJECT DIRECTOR OF CYSHCN AND VAXFACTSDDNY PROJECTS, ALBERT EINSTEIN COLLEGE OF MEDICINE AIR-P CRE COORDINATOR

ZACHARY J. WILLIAMS, BS, MD/PHD CANDIDATE (YEAR 6), VANDERBILT UNIVERSITY, AUTISTIC SELF-ADVOCATE, MEMBER, AIR-P AUTISTIC RESEARCHER REVIEW BOARD

NANCY BURKE-HALL, PARENT ADVOCATE & CAREGIVER

Agenda

Agenda: In this video, the AIR-P Neurology Research Node leaders will discuss topics related to neurology and autism, including: (1) the “big” topic areas this node covers (2) gaps in the field (3) and a more in-depth discussion of the intersection between epilepsy and Autism.

Learning Objectives

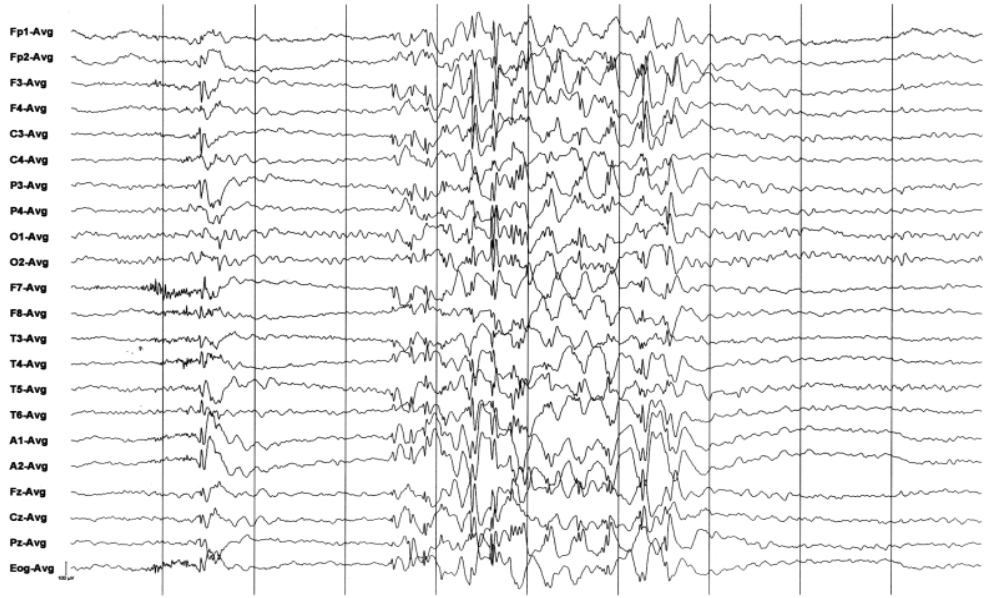
Learning objectives:

- Understand what a seizure and epilepsy is.
- Understand how epilepsy intersects with autism.
- Brief overview of transition to adulthood in autism.

Neurology Research Node: Overview of Epilepsy

Epilepsy: What is it and how is it diagnosed?

- More than one unprovoked seizure in a lifetime
- Diagnosed by clinical events and also by EEG (electroencephalogram)
- EEG picks up neural activity at the surface of the scalp



Definitions

Seizure

- A transient occurrence of signs and/or symptoms due to abnormal excessive or asynchronous neuronal activity in the brain.

Epilepsy

- 2 or more *unprovoked* seizures > 24 hours apart.

Epilepsy syndrome

- A complex of signs and symptoms that define a unique epilepsy condition with different etiologies.
- Defined by age of onset, seizure type, electroencephalogram (EEG) pattern.

Epilepsy Epidemiology in Autism

- Occurrence of Epilepsy is 1-2% in the general population
- Prevalence in autism estimates range from 2-60% (agree upon 10-20%)
- Prevalence increases with age
- No primary seizure type: includes absence, generalized, focal
- Abnormal EEGs reported in up to 60% of the autism population (no consistent data on whether these abnormalities lead to higher risk for epilepsy)

(Viscidi et al, PLOS One 2013;Achkar & Spence, 2015)

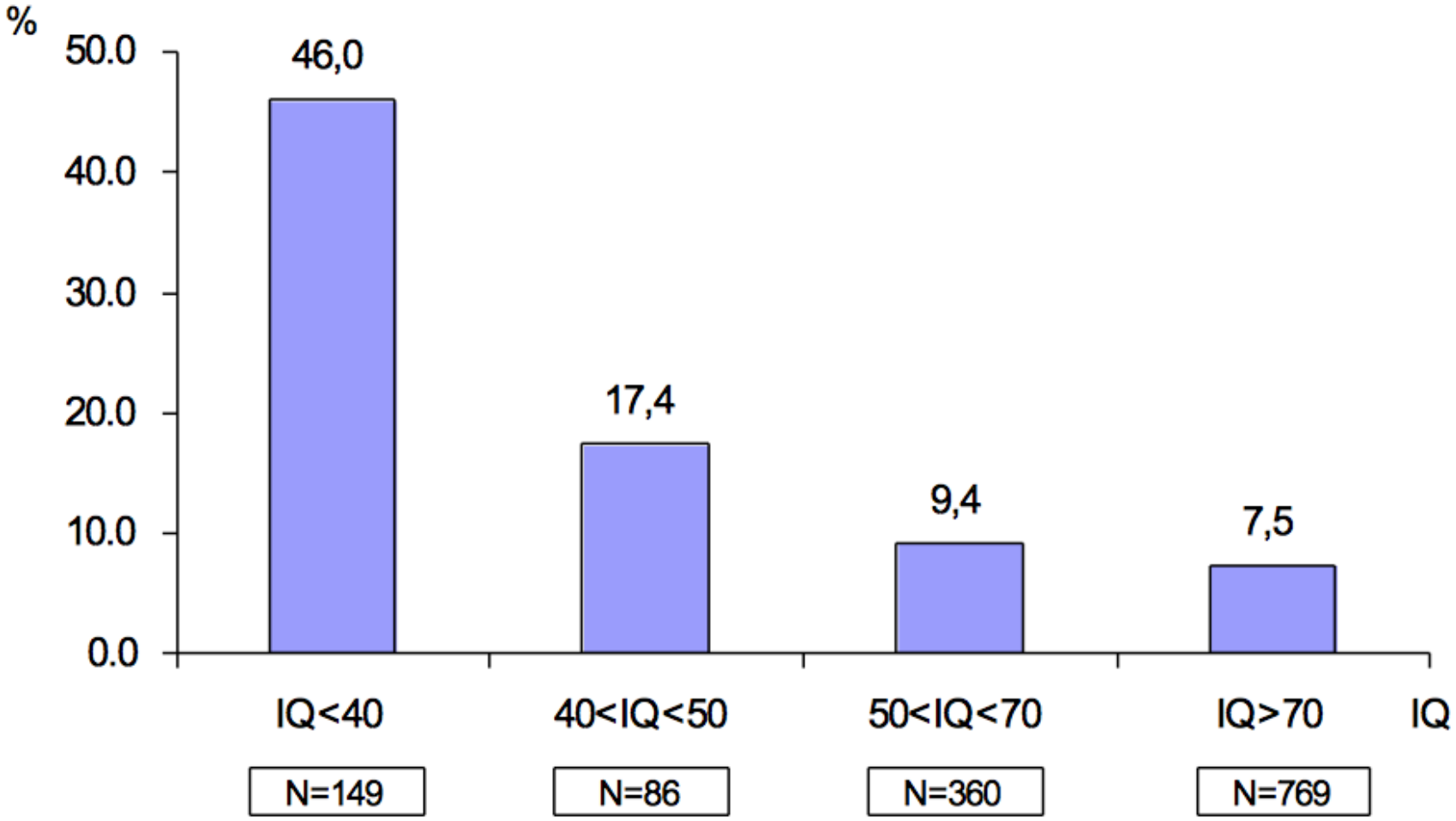
Why the higher risk in Autism?

- Two potential hypotheses:
    - Dysregulation of excitation/inhibition, either due to defects in GABAergic fibers or in (GABA) receptor function. Several genetic syndromes and variants that cause such dysregulation lead to epilepsy and to ASD
    - Primary epilepsy may impact synaptic plasticity and cortical connectivity, which, in turn, may predispose a developing brain to cognitive delays and behavioral impairments

(Brooks-Kayal, 2010)

Epilepsy in Autism is Associated with Intellectual Disability and Gender: Evidence from a Meta-Analysis

Claire Amiet, Isabelle Gourfinkel-An, Anissa Bouzamondo, Sylvie Tordjman, Michel Baulac, Philippe Lechat, Laurent Mottron, and David Cohen



(Amiet et al, 2008, Bolton et al, 2011)

Epilepsy in Autism is Associated with Intellectual Disability and Gender: Evidence from a Meta-Analysis

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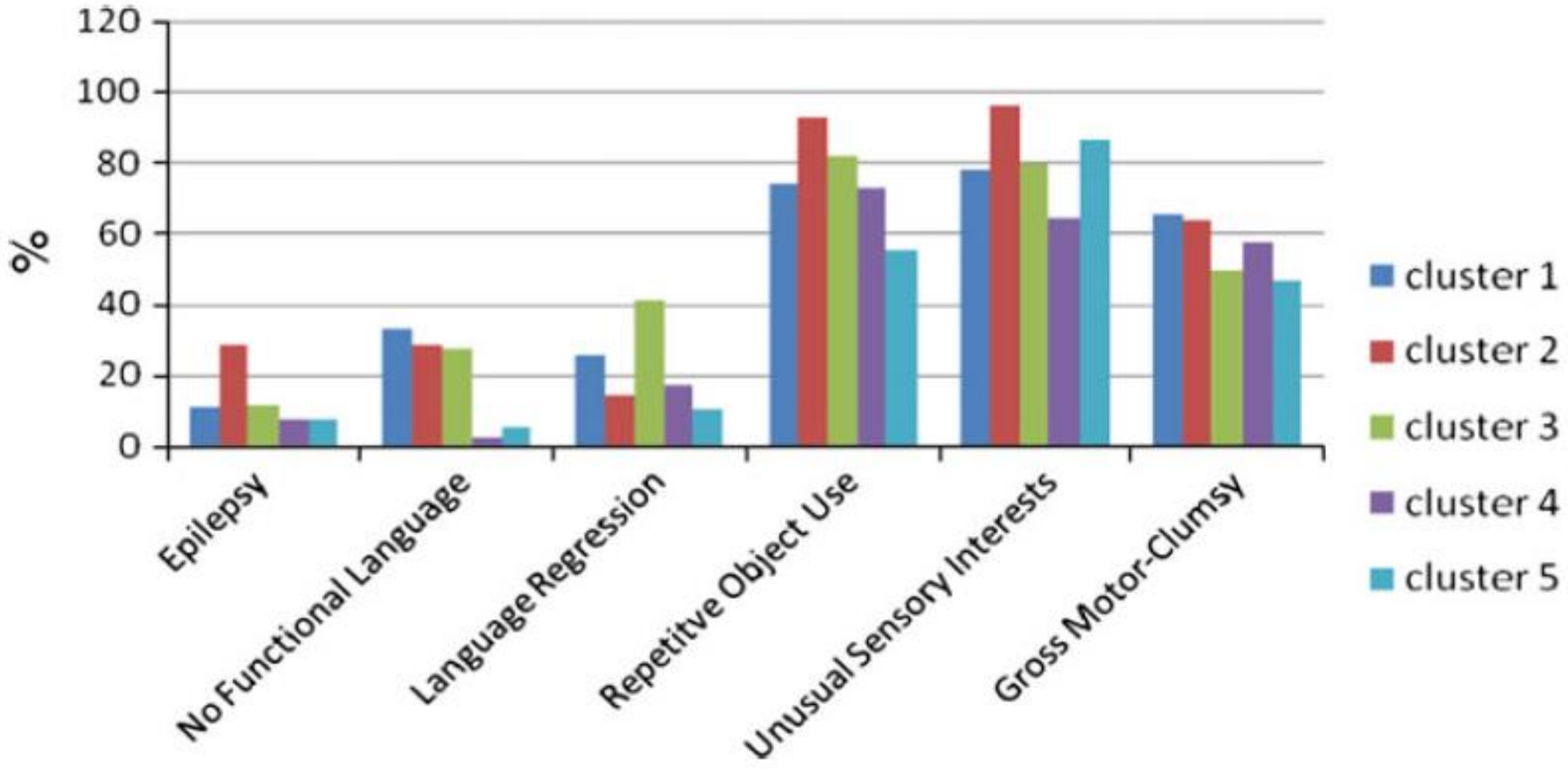
- Counseling on Epilepsy Risk
- There is a clear link to intellectual disability
  - Double the rate of epilepsy in children with Autism and Intellectual Disability
- More common in female gender
- Higher rates in genetic neurodevelopmental conditions
- Higher rates with greater autism severity, and poor adaptive function

(Amiet et al, 2008, Bolton et al, 2011)

Latent Class Cluster Analysis



(McCue et al, BMC Neurol, 2016, Cuccaro et al, 2012)

Latent Class Cluster Analysis

- Cluster with highest rate of epilepsy:
    - earlier onset of autism
    - greater autism severity
    - greater gross motor abnormalities

(McCue et al, BMC Neurol, 2016, Cuccaro et al, 2012)

What can help determine seizures vs no seizure

We are often asked about “daydreaming/zoning out/absence seizures”

Video of the event

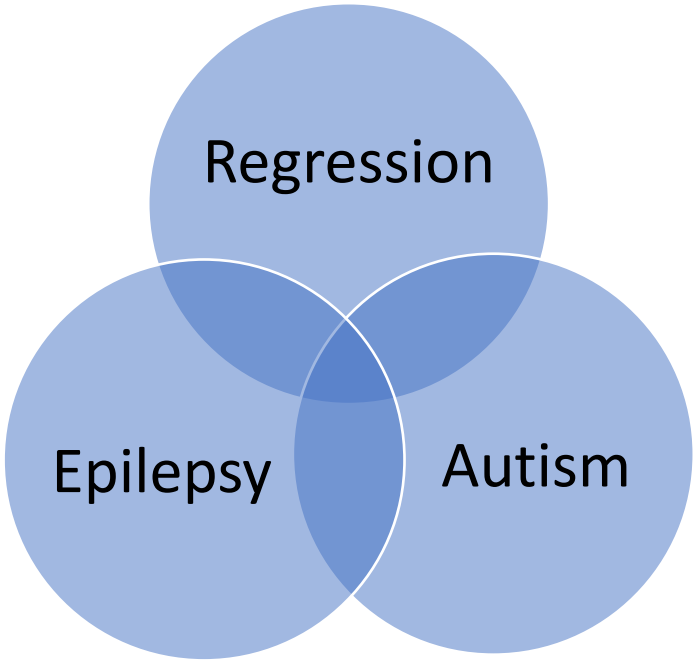
How often is it occurring and for how long

Confusion during or after the event

Decline in school function or development

School teachers/therapists have noted the events/changes

Regression and autism



- Variables to Consider:

- Type of regression (language vs behavioral)
- Age of onset of seizures or epileptiform activity

Why do we treat Seizures

- Untreated seizures can lead to cognitive decline, developmental delays, behavioral difficulties, and poor long-term neurodevelopmental outcomes
- Concern for worsening of seizures if initial seizures are not treated in certain conditions
- Concern for “Sudden Unexpected Death in Epilepsy” (SUDEP) – rare, but increased in autism with epilepsy
- In **most** cases, good prognosis if seizures are treated early

Treatment of Seizures in ASD

Decision is multifactorial: seizure type, co-morbidities, behavioral difficulties, other medications

Anti Seizure Medications

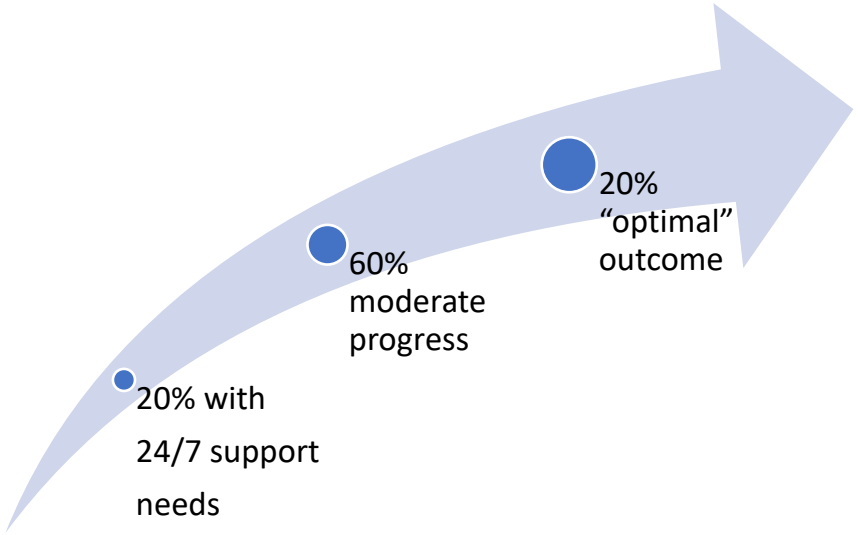
- Levetiracetam (Keppra): Can cause irritability and aggression
- Valproic Acid: might aid in mood stabilization
- Benzodiazepines: (Clonazepam, Clobazam)-sedation, behavioral difficulties
- Lamotrigine: might aid in mood stabilization

Health and Health Care Outcomes in Autism

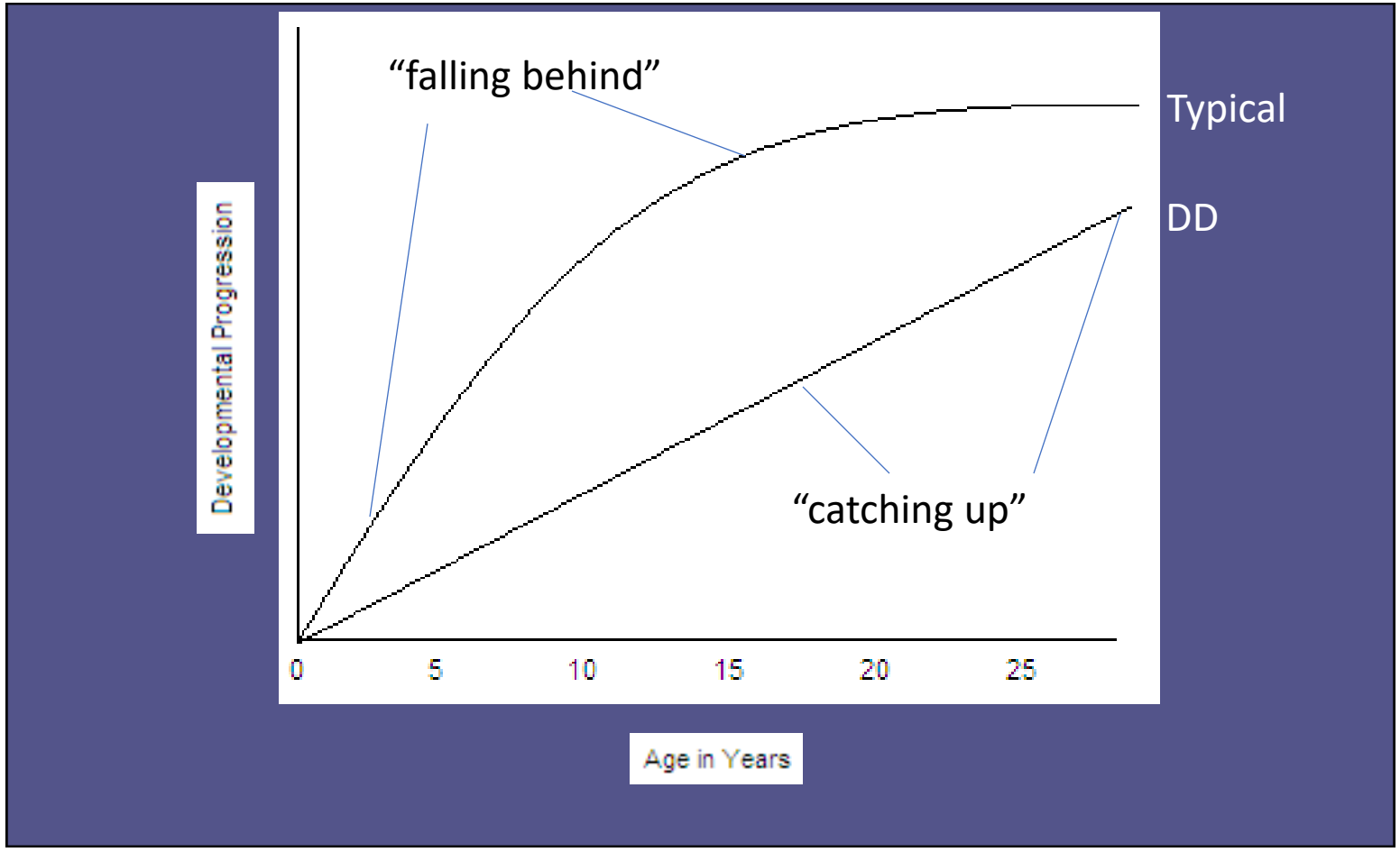
- Increased ED visits for children and adults compared to peers (Liu *et al*., 2017)
- Adults more likely to be admitted to the hospital than peers (Vohra et al., 2016)
  - Inpatient stays longer and more expensive (Lockhandwala et al., 2012)
- Higher health care costs and utilization for children and adults (Croen, 2006; Zerbo, 2019)

Outcome Trajectories in Autism

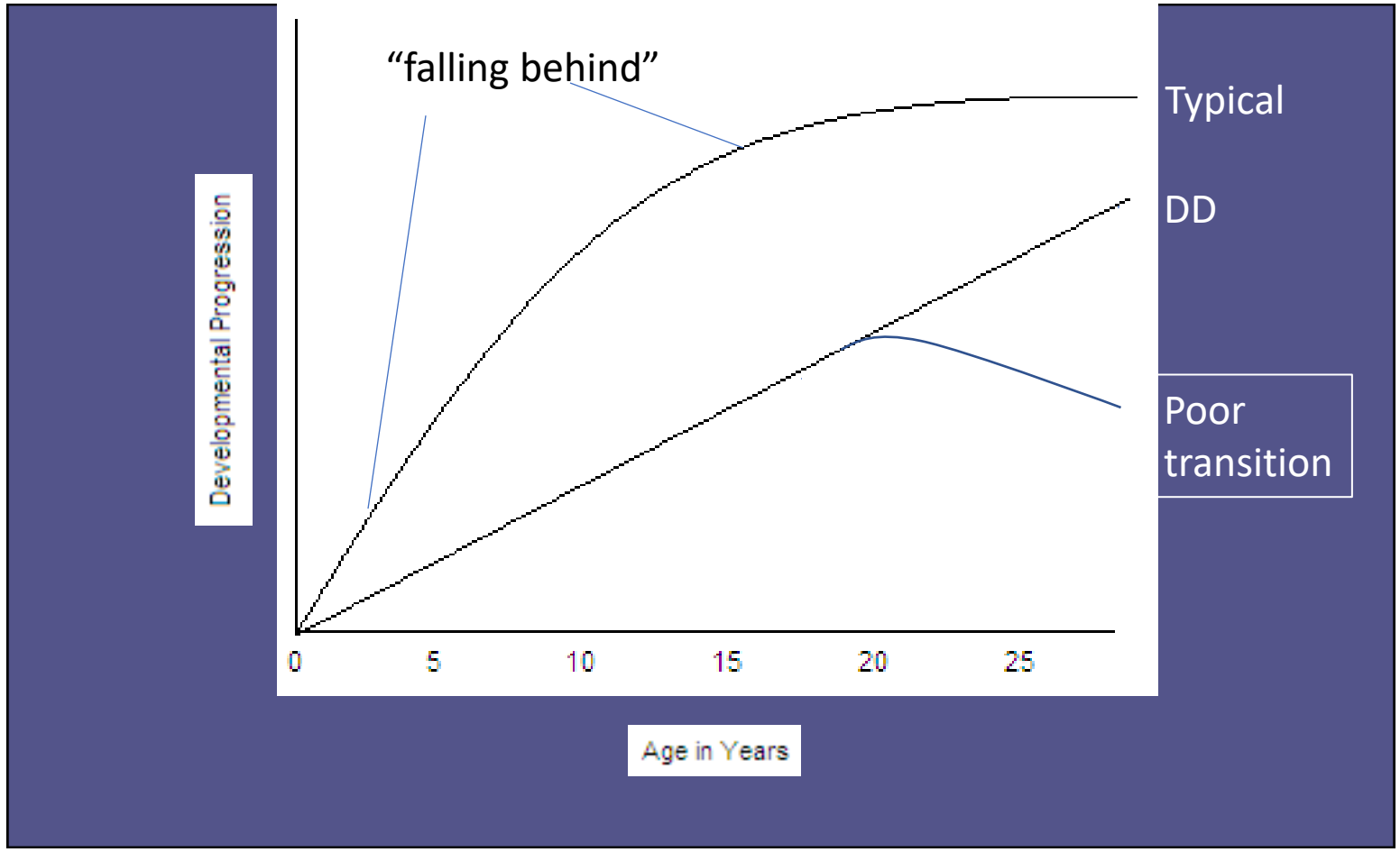
- 3-25% “optimal” outcome (Helt, 2008)
- Roughly 60% make progress but continue to require some types of support
- Approximately 20% remain severely impacted requiring 24/7 supports (Seltzer, 2004)



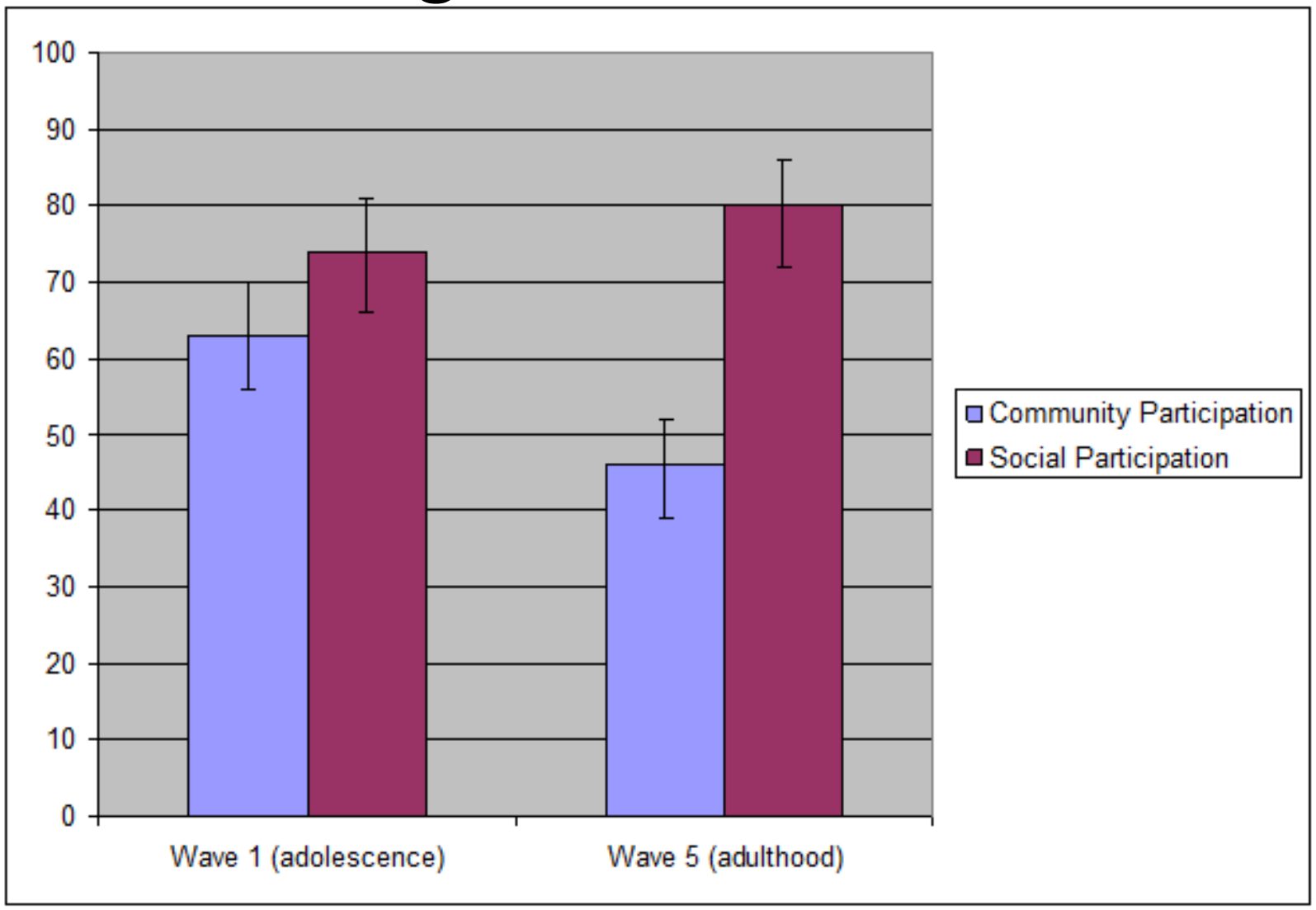
“Catching up” in young adulthood



The “risk zone” of transition



Successful Transition – Importance of "Case Management"



Myers, 2015

Successful Transition – Importance of "Case Management"

- **National Longitudinal Transition Study (NLTS-2)**
  - **Household income** and **"case manager"** at wave 1 influenced community participation as an adult
  - **"case manager"** at wave 1 influenced social participation as an adult

Myers, 2015

Factors Impacting Outcome

- Intrinsic
  - Cognitive ability
  - Severity of core autistic features – communication, social, restricted interests (motivation)
  - Medical health (epilepsy, sleep disorders, GI, “syndromic”)
  - Mental health (depression, anxiety, etc.)
  - Specific disruptive behaviors (hygiene, aggression, etc.)

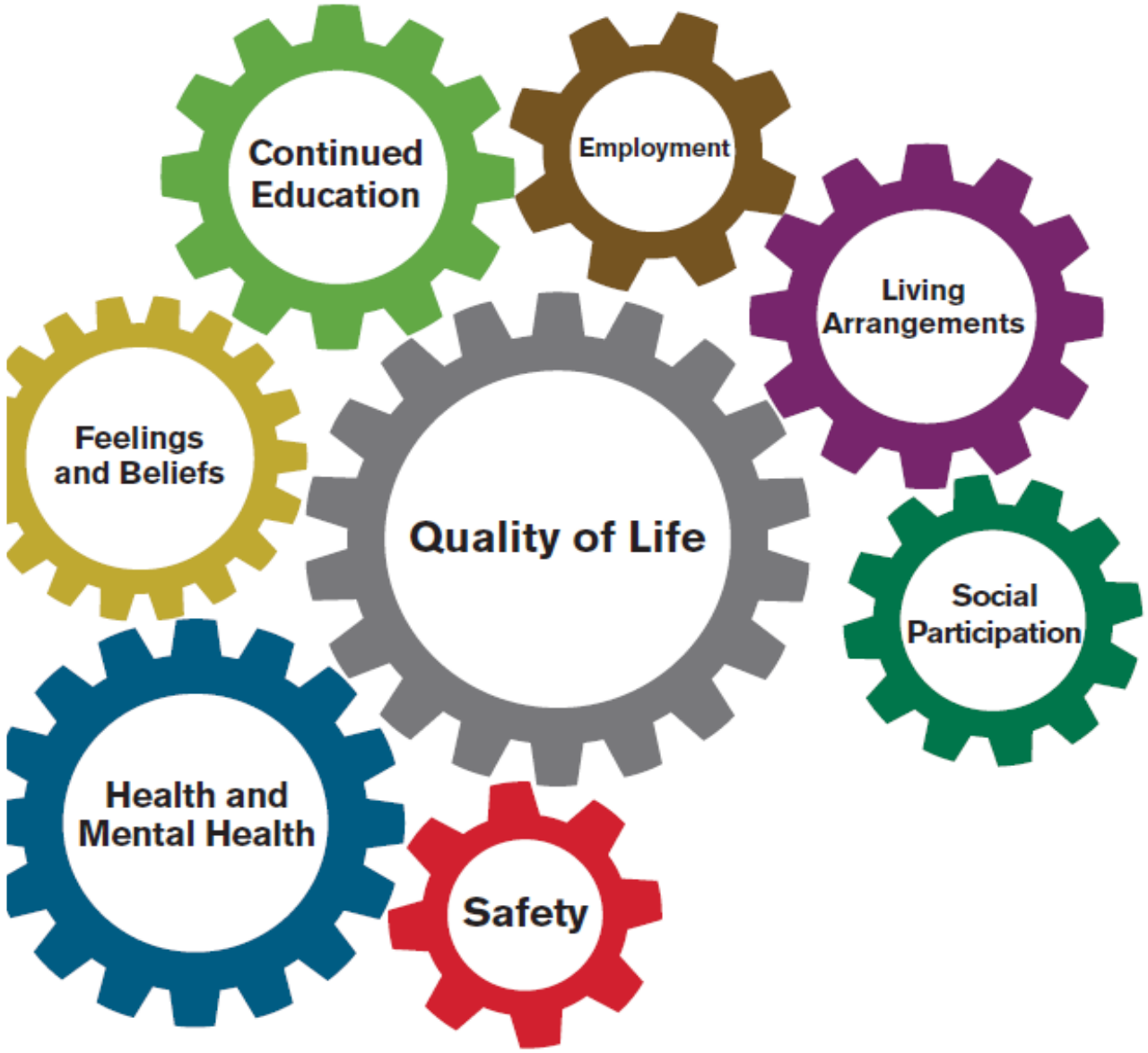
Extrinsic

Socioeconomic

Access to services/early intervention

“Case management” and transition planning

Autistic QoL



Neurology Research Node: Panel Discussion

Neurology Research Node: Closing Summary

Connect with folks from this seminar!

Rujuta B. Wilson, MD: RBhatt@mednet.ucla.edu

Gary Stobbe, MD: gastobbe@uw.edu

Andrea (Dea) Deisher, MPH, RN, BSN: andrea.deisher@einsteinmed.edu

Zachary (Zack) Williams, BS: zachary.j.williams@vanderbilt.edu

@QuantPsychiatry

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The structure, instructions, and accessibility guidelines of this AIR-P LEND Seminar Series were developed in part based on existing processes and content used to develop the PacWest ITAC LEND Learning Modules.