Social Security Administration

National Disability Forum

Compassionate Allowances and Rare Diseases

November 7, 2017

Glut1 Deficiency Foundation

www.G1DFoundation.org

Thank You!

Glenna Spencer Steele

Glut1 Deficiency parent and founding board member of the Glut1 Deficiency Foundation

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Our Mission

The Glut1 Deficiency Foundation is a non-profit family organization dedicated to improving the lives of those in the Glut1 Deficiency community through its mission of:

increased awareness

so more patients can get a life-changing diagnosis and find support on this journey

improved education

so patients and families know what to expect and doctors know how to diagnose and treat

advocacy for patients and families

so rights are protected, voices are heard, and lives are valued

support and funding for research

for better understanding, better treatments, and ultimately a cure

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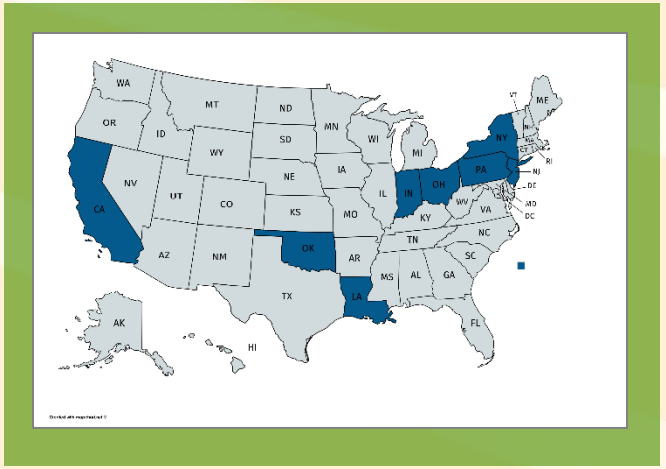
Board of Directors

all are parents of Glut1 Deficiency patients



President: Jason Meyers
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Advocacy Director: Erin Meisner
Communications Director: Kelly Jones
Education Director: Maria Rebbecchi
Fundraising Director: April Breen

along with several committees and volunteers

founded in 2011

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name of the medical condition or disease:

Glut1 Deficiency

alternate names of the condition or disease:

Glucose Transporter Type1 Deficiency Syndrome, G1D, Glut1 DS, Glut1D, De Vivo Disease

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condition description:

CAUSES

a rare genetic condition affecting brain metabolism caused by mutations in the SLC2A1 gene

SLC2A1 regulates production and function of the glucose transporter protein type 1 (Glut1)

Glut1 moves glucose across the blood brain barrier

glucose is the primary fuel source for the brain

glucose is vital for brain metabolism and neural function

impaired glucose transport results in abnormal brain growth and function in G1D patients

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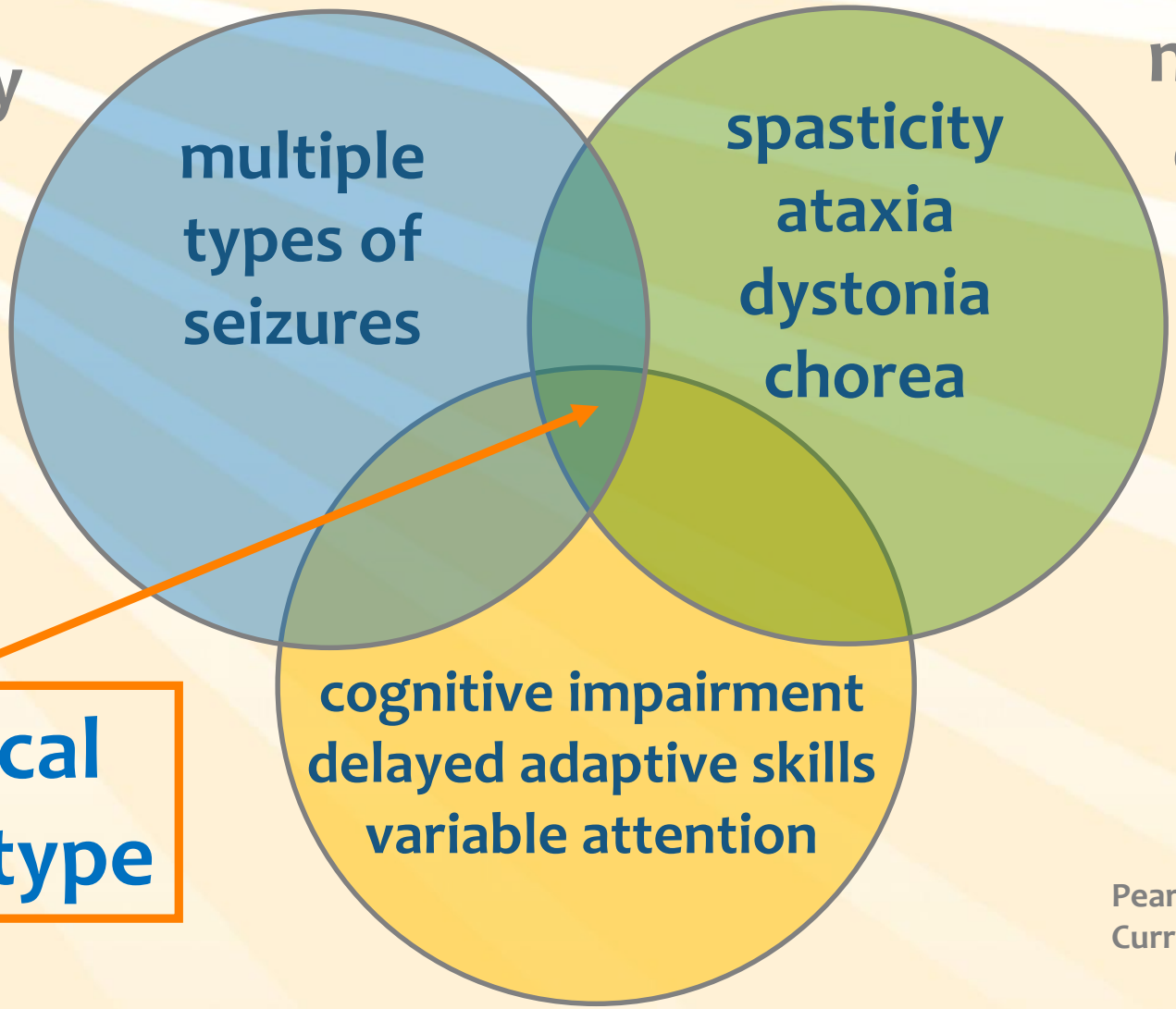
condition description:

SYMPTOMS

- begin within the first year of life
- evolve and fluctuate during the life span
- nearly all patients experience
  - complex movement disorder
  - cognitive impairments
  - speech and language disorder
- 90% have seizures
  - varying types and severity

symptoms



Pearson TS. 2013
Curr Neurol Neurosci Rep

cognitive and behavioral issues

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diagnostic testing:

lumbar puncture

low CSF glucose

absolute levels below 60 mg/dL
ratio to blood glucose below .4

genetic testing

SLC2A1 gene mutations 85%

over 100 different mutations identified, most de novo

EEG recordings

seizures of varying types

PET scan

irregular brain glucose uptake patterns

red blood cell uptake assay (research only)

blood test in development in France

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physical findings:

- seizures
- abnormal eye movements
- complex movement disorders
- dysarthria
- microcephaly
- paroxysmal events

alternating hemiplegia stroke-like symptoms migraines

paroxysmal exercise-induced dyskinesia (PED)

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ICD9-CM coding:
no specific code

ICD-10 G93.4 - H00836
other disorders of brain, unspecified encephalopathy

ICD-10 E88.09
other disorders of plasma-protein metabolism

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prevalency:

500
cases diagnosed in North America

- - - - - - - -

less than 1,000 worldwide

4,000 - 6,000
actual cases in US alone

diagnosis is life-changing

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onset of the condition:

- normal at birth
- signs and symptoms within first year
  - - seizures
  - - abnormal eye movements
  - - changes in muscle tone or strength
  - - abnormal breathing patterns

progression of the condition:

CHILDHOOD

- delays in motor and cognitive development
- attention deficits and anxiety
- microcephaly becomes evident
- seizures may change frequency or type
- symptom triggers:

heat fatigue anxiety sickness hunger

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progression of the condition:

PUBERTY

- challenging time period
- worsening of symptoms
- some loss of treatment effectiveness
- treatment compliance issues

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progression of the condition:

ADULTHOOD

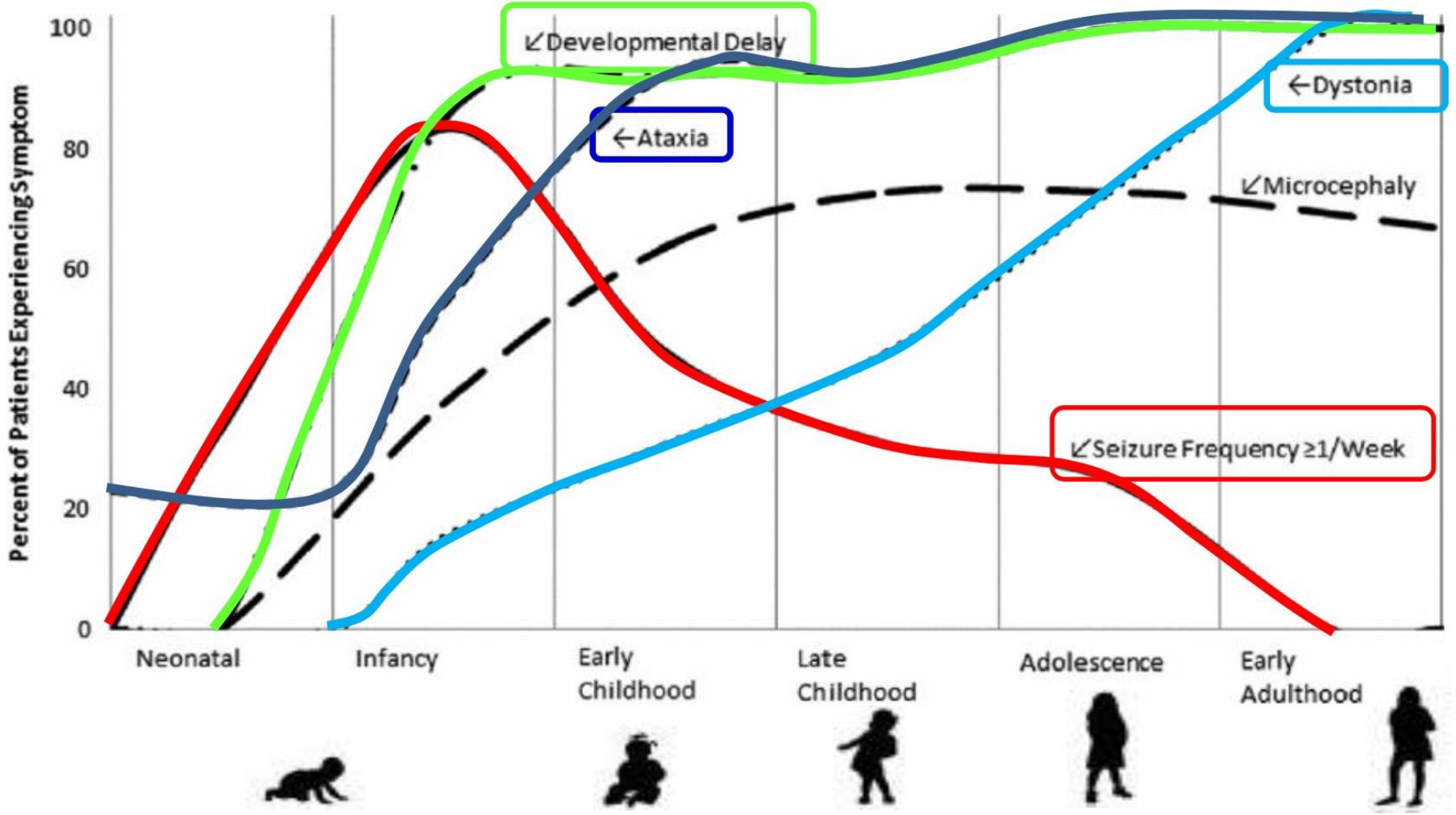
- increase in severity and frequency of movement issues and paroxysmal events
- patients unable to successfully live, work, and function independently

Long-Term Clinical Course of Glut1 Deficiency Syndrome

Journal of Child Neurology
2015, Vol. 30(2) 160-169

Aliza S. Alter, MD[1], Kristin Engelstad, MS[1], Veronica J. Hinton, PhD[1,2], Jacqueline Montes, PT, EdD[1], Toni S. Pearson, MD[1], Cigdem I. Akman, MD[1], and Darryl C. De Vivo, MD[1]

slide courtesy of
Prof. Dr. Jörg Klepper



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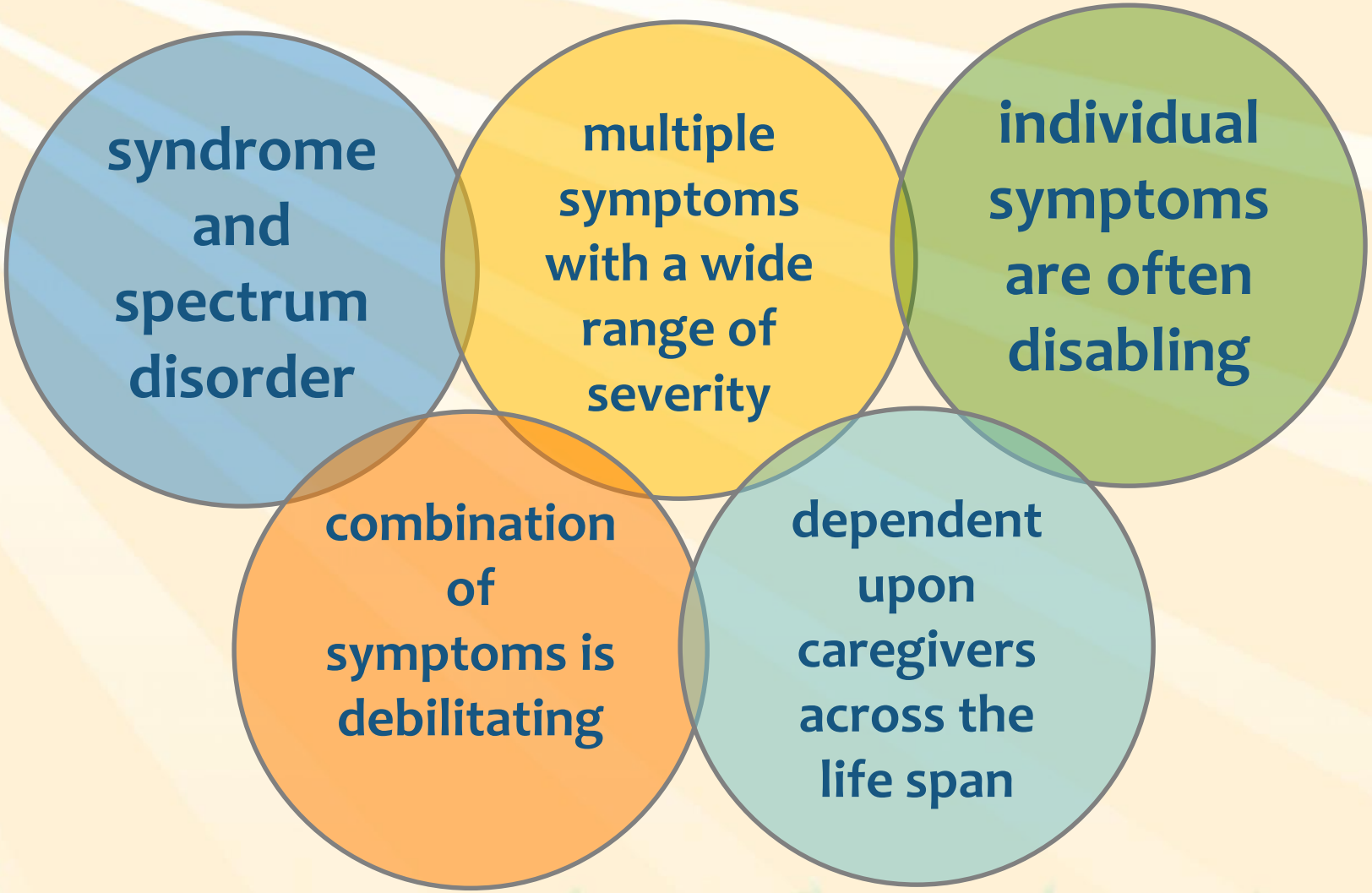
severity:



treatment of the condition:

- symptoms refractory to medications
- anti-seizure medications can exacerbate
- movement disorder medications ineffective

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treatment of the condition:

ketogenic diets - treatment of choice

classical keto, MCT diet, Modified Atkins

ketones – alternate source of brain energy
neuroprotective benefits

therapies

speech occupational physical

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response to treatment:

2/3 respond favorably to a ketogenic diet

seizures typically the most-improved
cognitive and movement disturbances less so

ketogenic diet can present challenges

earlier treatment = better outcome

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current research:

expanding phenotype
- patient registry
- natural history studies
- individual case studies

mechanisms
- glucose roles
- glucose transport
- metabolic processes

treatments
- drug screenings and interactions
- triheptanoin (C7 oil)
- ketogenic diets
- exogeneous ketones
- iPCS models
- gene therapy

over $500,000

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help and hope for the Glut1 Deficiency community

thank you!

Glut1 Deficiency Foundation Conference

July 2017 Nashville, Tennessee