2023 GW Epilepsy Board Review & Best Practices

System-Based Practice Issues

Alexandra Eid, MD

The George Washington University

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Public policy issues
- Education
- Driving
- Research funding

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Public Policy Issues

Epilepsy: A Public Health Imperative

WHO, ILAE, IBE

*"Epilepsy is **one of the most common neurological diseases** worldwide, affecting around **50 million people** of all ages around the world. The risk of premature death in people with epilepsy is **up to three times** that of the general population. The lives of people with epilepsy are often impacted by **stigma**, **discrimination** and **human rights violations**.*

*We know that while 80% of people with epilepsy live in low- and middle-income countries, **most of them do not have access to treatment**. This is despite the availability of effective antiseizure medicines, which can cost as little as US$ 5 per year. A lack of action to address the **epilepsy treatment gap** has dire consequences for people's lives and well-being, and **impacts social and economic development**.*

*This report presents encouraging evidence that almost a quarter of epilepsy cases are preventable and **70% of people with epilepsy can live seizure free** with low-cost and effective medicines. As evidence from multiple countries shows, it is feasible to integrate epilepsy into primary health care and thereby ensure that all people with epilepsy have **access to quality and affordable treatment and services**."*

Epilepsy: A Public Health Imperative - WHO, ILAE, IBE. 2019

Epilepsy: A Public Health Imperative

Burden:

- ~50 million people

- Increased premature death

- ~1/2 with 1+ other health condition

- Significant economic implications

Stigma and discrimination:

- Discrimination/human rights violations

→ discourage from treatment

→ Consequences for QOL/social inclusion

- Improve knowledge, raise awareness, legislation to prevent rights violations

Treatment gap:

- ~3/4 in low-income countries do not get treatment needed

- Up to 70% could be seizure free with use of cost effective ASMs

- Scaling up routine availability of ASMs

Prevention:

- ~25% of cases preventable

- Major modifiable RF: perinatal insults, CNS infections, TBI and stroke

- Urgent unmet need

Action:

- Prioritize epilepsy in public health agendas

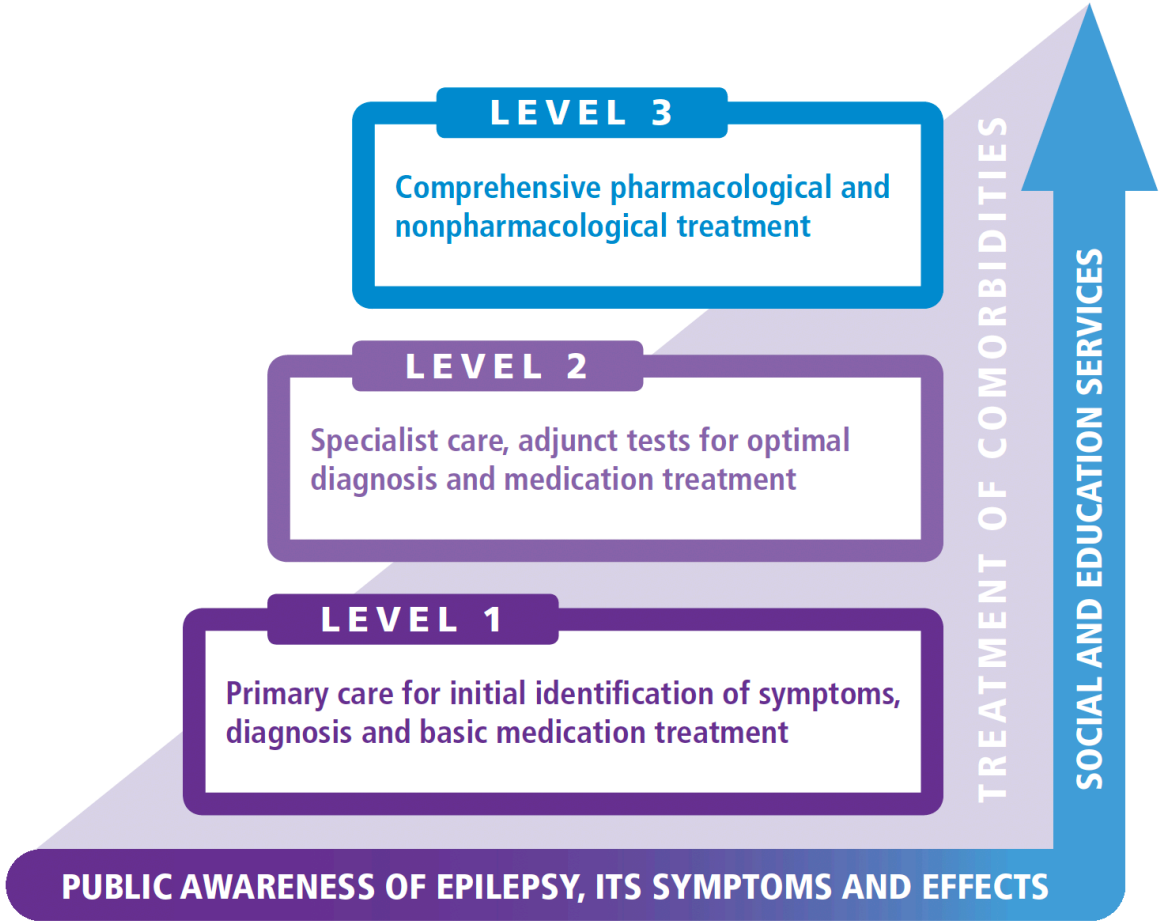
- Address health, social and public knowledge implications

- Increase investment in research

- Integration in primary health care

Epilepsy: A Public Health Imperative - WHO, ILAE, IBE. 2019

Stepped model to improve quality of care for people with epilepsy



Epilepsy: A Public Health Imperative - WHO, ILAE, IBE. 2019

Education

Directed at many levels:

- Patients, families and caregivers
- Healthcare teams
- School/daycare staff
- Employers
- General public/community

Can be provided by:

- Physician, nursing staff, social workers
- Pamphlets
- Websites/online resources
  - Epilepsy foundation
  - AES website
  - CDC website
- Support groups

Driving

- Balance between public safety and excessive restrictions for people with epilepsy affecting QOL
  - Top concern in QOL questionnaires

- Driving rules widely variable in different states
  - States restrictions ranging from 3 – 12 months
  - Variability in terms of requirement for physician to report
  - Largely based on expert opinion, practical experience, and political necessity rather than on strong scientific evidence

Kumholz et. al, 2009

Risks of Driving with Epilepsy

- Poses some driving risk – limited and relatively small
- Sheth et. al, 2004: only 0.2% of fatal car crashes caused by seizure vs. 30% by alcohol
- Risk for any type of crash ~ 2x higher for people with epilepsy vs. general population

  HOWEVER:

  Risk based on crashes for ALL causes not just seizure-related crashes

  Only 11% due to seizures vs. most due to driver error (Hansotia et. al, 1991)

  Risk of crashing not substantially higher than other chronic medical conditions (Taylor et al. 1996)
- Duration of seizure-free interval → strongest predictor of risk of seizure-related crash (Krauss et. al, 1990)

Risks of Driving with Epilepsy – Krauss et. al, 1999

- 12-month seizure-free requirement:
  - Prevents ~80% of crashes associated with seizures
  - Prohibits driving for about 50% of people with epilepsy who would not crash

Vs.

- 3-month seizure-free requirement:
  - Prevents ~50% of crashes
  - Prohibits driving for only 25% of people with epilepsy who would not crash

→ AAN/AES/EF Consensus Statement – 1994:
3 months restriction preferred

Research Funding

- Progress in understanding etiologies and mechanisms of epilepsy
- New interventions/treatments to improve management of seizures
- HOWEVER:
  - Dramatic inequality in access and utilization of resources and expertise
  - Insufficient investment in research for epilepsy
- Only small proportion of overall funding:
  - US: NIH support for epilepsy research <0.09% of total NIH budget for research
  - Budget stagnating over last few years vs. other neurological conditions which attract more research support
- Barriers higher in low and middle income countries

Epilepsy: A Public Health Imperative - WHO, ILAE, IBE. 2019

2021 AES/NINDS Epilepsy Research Benchmarks

Area I	Area II	Area III	Area IV
Understand the causes of the epilepsies and their relationship to epilepsy-associated neurologic, psychiatric, and somatic conditions	*Prevent epilepsy and its progression*	*Improve treatment options for controlling seizures and epilepsy-related conditions while limiting side effects*	*Limit, treat, or prevent co-occurring conditions associated with epilepsy across the lifespan in general and special epilepsy populations.*

https://www.ninds.nih.gov/about-ninds/strategic-plans-evaluations/strategic-plans/epilepsy-research/2021-aesninds-epilepsy-research-benchmarks

ICARE

- Interagency Collaborative to Advance Research in Epilepsy
- Group lead by NIH:

NIH	Other Federal agencies:	Nongovernmental Research and patient advocacy communities:
•NINDS •Other broad representation from NIH	•CDC •DOD •FDA •HRSA •VA	•AES •AES/NINDS Epilepsy Research Benchmarks Stewards •CURE •Dravet Syndrome Foundation •EF •Epilepsy Leadership Council •Epilepsy Study Consortium •Patient Centered Outcomes Research Institute •PERF •Tuberous Sclerosis Alliance

- Annual meetings – share information about ongoing and planned epilepsy research activities, highlight advances, discuss needs and opportunities, and promote increased collaboration

https://www.ninds.nih.gov/current-research/trans-agency-activities/icare-interagency-collaborative-advance-research-epilepsy

Working with Educational Systems

Education

- More likely than others to have learning problems that will affect school performance – despite average IQ
- Important to educate school staff about seizure first aid and seizure action plan
- 1973 Rehabilitation Act – Section 504:
  - *Provide to students with disabilities appropriate educational services designed to meet individual needs of such students to the same extent as needs of students without disabilities are met*
  - *An appropriate education could consist of education in regular classrooms, education in regular classes with supplementary services, and/or special education and related services*
- Section 504 Education Plan:
  - *Classroom accommodations, related services, testing accommodations, assistive technology, and/or behavior management plan determined necessary for the student to access the general education curriculum to the same extent as nondisabled students*

https://www2.ed.gov/about/offices/list/ocr/504faq.html

https://dcps.dc.gov/page/section-504-process#:~:text=504%20Plan%3A%20Within%20five%20(5,student%20to%20access%20the%20general

Individuals with Disabilities Act (IDEA)

- Federal law – free, appropriate education in least restrictive (most “normal”) setting possible for children with disabilities

- Ensures special education and related services:
  - Infants and toddlers with disabilities – birth through age 2 – and families receive early intervention services
  - Children and youth ages 3-21 receive special education and related services

- Requires appropriate health services to be provided when needed

https://sites.ed.gov/idea/about-idea/#Rehab-Act

Individualized Education Program

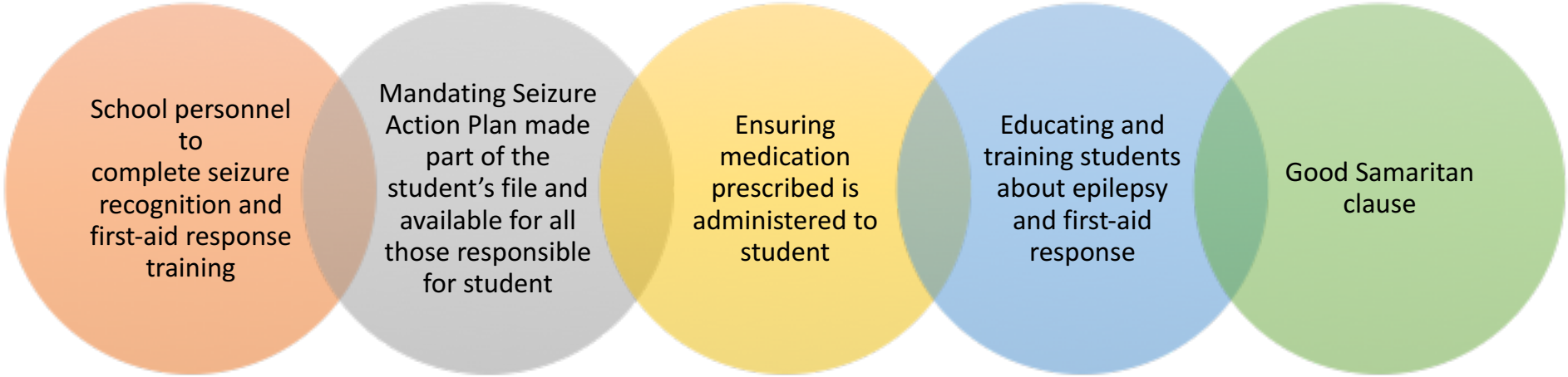
- Students with special education services must have an IEP
- Written plan that outlines needs and goals for the school year
- Parents, teachers, other school staff come together to look at student's unique needs
- Guides delivery of special education and services
- Progress toward annual goals measured and parents regularly informed of child's progress
- Goals reviewed yearly

https://www2.ed.gov/parents/needs/speced/iepguide/index.html#closer

Seizure Safe Schools

- ~470,000 children with epilepsy in the U.S
- Important to have tools necessary for a safe and enriching environment
- Direct access to school health services and disease-specific education
  - → Improve health and academic outcomes

- Nationwide initiative by the Epilepsy Foundation to pass legislation in all states
- 5 key components – state variation regarding number of components included in the bill



https://www.epilepsy.com/advocacy/priorities/seizure-safe-schools

Employment Issues

Employment

- People with epilepsy have twice the unemployment rate of the general population
- Up to 50% of people with uncontrolled epilepsy are unemployed
- Due to limitations in certain occupations, as well as inequality in workplace policies and procedures

Americans with Disabilities Act

- Americans with Disabilities Act (ADA) passed by Congress in 1990
- “Law that protects the civil rights of people with disabilities in many aspects of public life”
- Amended by Congress in 2008 → “ADA Amendments Act of 2008 or ADAAA"
- Disability defined as:
  A. “A physical or mental impairment that substantially limits one or more major life activities of such individual;
  B. A record of such an impairment; or
  C. Being regarded as having such an impairment”

https://www.ada.gov/law-and-regs/

ADA and Job Applications

Before an offer is made:

- May not ask questions about medical condition or require a medical exam before making a conditional job offer
- Not required to voluntarily disclose they have epilepsy or another disability unless they need a reasonable accommodation for the application process
- May not ask applicant who has voluntarily disclosed they have epilepsy any questions about their epilepsy, its treatment, or its prognosis – but may ask whether they will need accommodations and what type

After an offer is made:

- May ask questions about health and epilepsy and may require a medical exam, as long as all applicants treated equally
- Provide reasonable accommodations unless doing so would be an undue hardship
- Choose voluntary disclosure to create an action plan in case of a seizure

https://www.ada.gov/law-and-regs/

Some Employment Accommodations

- Breaks to take medication
- Leave to seek or recuperate from treatment or adjust to medication
- Private area to rest after having a seizure
- Rubber mat or carpet to cushion a fall
- Checklist to help remember tasks
- Adjustments to work schedule, consistent start time or schedule change
- Permission to bring a service animal to work
- Someone to drive to meetings and other work-related events
- Permission to work at home
- Reassignment to a vacant position if no longer able to perform current job

https://www.eeoc.gov/laws/guidance/epilepsy-workplace-and-ada

Disability Criteria for Epilepsy

- *"GTCs at least 1 per month for at least 3 consecutive months despite adherence to prescribed treatment*
- *Dyscognitive seizures at least 1 per week for at least 3 consecutive months despite adherence to prescribed treatment*
- *GTCs at least 1 every 2 months for at least 4 consecutive months or dyscognitive seizures at least 1 every 2 weeks for at least 3 consecutive months despite adherence to prescribed treatment and a marked limitation in one of the following:*
  - *Physical functioning*
  - *Understanding, remembering, or applying information*
  - *Interacting with others*
  - *Concentrating, persisting, or maintaining pace*
  - *Adapting or managing oneself"*

https://www.ssa.gov/disability/professionals/bluebook/11.00-Neurological-Adult.htm#11_02

Clinical Trials of New Therapies

Clinical Trials of New Therapies

Phase I:

- Small group of healthy volunteers (20-80)
- Evaluate a safe dosage range, dosage frequency, maximal tolerated dose
- Identify harmful side effects

Phase II:

- Larger group of human subjects (100-300)
- Determine effectiveness
- Further study safety

Phase III:

- Larger populations and in different regions and countries (1000-3000)
- Confirm effectiveness, monitor side effects, compare with standard or similar treatments
- Collect more information on safety
- Often the step right before a new treatment is approved

Phase IV:

- After approval
- Safety tracking in the general population
- Obtain more information about a drug's benefits and optimal use

https://www.nih.gov/health-information/nih-clinical-research-trials-you/basics

Trial Design

Single-arm trials:

- Group of people receiving a drug and monitored → usually used for prelim evidence

Placebo-controlled:

- Comparing with placebo can be the fastest and most reliable way to show effectiveness
- Cannot ethically give placebo only when studying treatments for serious illnesses

Crossover design:

- Sequence of treatments that will be sequentially administered during treatment periods (A then B or B then A)

Non-inferiority = "active-controlled trials"

- Existing effective therapy is selected to be the "active" control group to compare to the drug being tested

Clinical Trials Structure. Evans. S. 2011.

Additional Terminology

- Randomization: treatments are assigned to participants by chance
  - To avoid any bias in assigning volunteers to get one treatment or another
  - If one treatment is found superior, trial is stopped so most volunteers receive the more beneficial treatment

- Blinding: prevent members of the research team and study participants from influencing the results
  - Single-blind: study participant is blinded, but research team knows
  - Double-blind study: neither study participant nor research team know

https://www.nih.gov/health-information/nih-clinical-research-trials-you/basics

Limitations of Clinical Trials

- Can be specific to certain syndromes
- Limitations regarding monotherapy applications
- Ability to extrapolate to patients with new onset seizures vs. refractory epilepsy
- Determination of safety in pregnancy, breastfeeding
- Trials in children vs. extrapolation from trials in adults

Clinical Trials Risk for Patients

- May be no better or worse than standard of care
- May not be effective
- May be in control group and receive standard treatment
- Risk of unpleasant, serious, or even life-threatening side effects
- Potential inconvenience of the protocol

https://www.cureepilepsy.org/for-patients/understanding/clinical-trials/faq/

Forensic Epilepsy

Arrest for Seizure-Related Behaviors

- Major problem with focal impaired awareness seizures: recognition of unusual behaviors
- Can be misinterpreted as caused by intoxication or mental illness, and perceived as aggression
- Can lead to unfair arrest, injury or prosecution
- Postictal confusion, aphasia, fear, aggression
- Important for the person seizing not to be restrained
- Neurologist most familiar with individual's seizure characteristics to corroborate whether behavior was seizure-related
- Witness reports particularly helpful
- May end up in jail without medications increasing the risk of further seizures with unusual behaviors

https://www.epilepsy.com/sites/default/files/atoms/files/Criminal%20Justice%20Seizure%20Arrest%2012.%202014.pdf

Training for Police and First Responders

- EF discussed need for training in seizure recognition and management with House of Representatives Judiciary Committee
- Training curriculum for police containing detailed information on seizure recognition and management developed by the EF
- Distributed to over 20,000 police departments nationwide
- Now in process of developing updated training curriculum for police and other first responders

https://www.epilepsy.com/sites/default/files/atoms/files/Criminal%20Justice%20Seizure%20Arrest%2012.%202014.pdf

Ethics

Ethics

- Ethical Principles:
  - Autonomy: longer driving restrictions vs. limitations of personal freedom
  - Beneficience: need to provide best medical management to patients vs. limitations by insurance coverage and access to epilepsy surgery
  - Non-maleficience: minimization of risks and possible adverse effects resulting from treatment; especially important in clinical trials
  - Justice: availability of resources for everyone

Additional Principles

- Confidentiality: ensuring confidentiality vs. providing information for employment/education to ensure safety or accommodations
- Genetic testing: what to do with the VUS
- Human dignity vs. stigma and discrimination
- Human rights vs. need to ensure safety of the greater number
- Clinical trial participation:
  - Informed consent
  - Risks for children: consent vs. assent
  - Risks for women of childbearing age/pregnancy
  - Use of placebo

THANK YOU!