

What to do for a Child with the first ever seizure and for one with epilepsy

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Learning objectives

- Define an Epileptic Seizure and Epilepsy and
- Classify Epileptic Seizures and Epilepsies according the ILAE
 - Appreciate the wide range of disorders that present with 'episodes' or 'attacks'
 - Illustrate some of these episodes with video
- Describe the assessment and care plan for the child with a first seizure
- Describe the assessment and care plan for a child with epilepsy



What is an Epileptic Seizure?

- ▶ An epileptic seizure is **a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain.**

Conceptual Definition of Epilepsy

Epilepsia

Official Journal of the International League Against Epilepsy



Epilepsia, **46**(4):470-472, 2005

Epileptic Seizures and Epilepsy: Definitions Proposed By the International League Against Epilepsy (ILAE) and the International Bureau for Epilepsy (IBE).

Fisher RS, van Emde Boas W, Blume W, Elger C, Genton P, Lee P, Engel J Jr.

Epilepsy is a disorder of the brain characterized by an enduring predisposition to generate epileptic seizures, and by the neurobiologic, cognitive, psychological, and social consequences of this condition. The definition of epilepsy requires the occurrence of at least one epileptic seizure

A practical clinical definition of epilepsy

*Robert S. Fisher, †Carlos Acevedo, ‡Alexis Arzimanoglou, §Alicia Bogacz, ¶J. Helen Cross, #Christian E. Elger, **Jerome Engel Jr, ††Lars Forsgren, ‡‡Jacqueline A. French, §§Mike Glynn, ¶¶Dale C. Hesdorffer, ##B.I. Lee, ***Gary W. Mathern, †††Solomon L. Moshé, ‡‡‡Emilio Perucca, §§§Ingrid E. Scheffer, ¶¶¶Torbjörn Tomson, ###Masako Watanabe, and ****Samuel Wiebe

Epilepsia, 55(4):475–482, 2014

Epilepsy is a disease of the brain defined by any of the following conditions

1. A least two unprovoked (or reflex) seizures occurring >24 h apart
2. One unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years
3. Diagnosis of an epilepsy syndrome

Epileptic Seizure versus Epilepsy

- **An epileptic seizure is the event**
- **Epilepsy is the disease associated with spontaneously recurring seizures.**
 - A single seizure does not mean a child has epilepsy: 1 in 20 people will have a seizure at some point in their lives, and 50% of these will never have another seizure.



New Onset Seizure Clinic

This clinic addresses:

- The patient's and family's immediate questions and medical needs.

Staffed by:

- Pediatric neurologist/
Pediatrician/MO
- Neuropsychologists/Psychologists
- Nurse
- Epilepsy Social Workers
and Educators

In the clinic, the following questions are answered:

- Was this a seizure?
- What was the type?
- What caused it?
- What is the risk of seizure recurrence?
- Are diagnostic tests needed?
 - What are the appropriate tests?
- Is treatment necessary?

ILAE 2017 Classification of Seizure Types Expanded Version ¹

Focal Onset

Aware

Impaired
Awareness

Motor Onset

automatisms
atonic ²
clonic
epileptic spasms ²
hyperkinetic
myoclonic
tonic

Nonmotor Onset

autonomic
behavior arrest
cognitive
emotional
sensory

focal to bilateral tonic-clonic

Generalized Onset

Motor

tonic-clonic
clonic
tonic
myoclonic
myoclonic-tonic-clonic
myoclonic-atonic
atonic
epileptic spasms

Nonmotor (absence)

typical
atypical
myoclonic
eyelid myoclonia

Unknown Onset

Motor

tonic-clonic
epileptic spasms

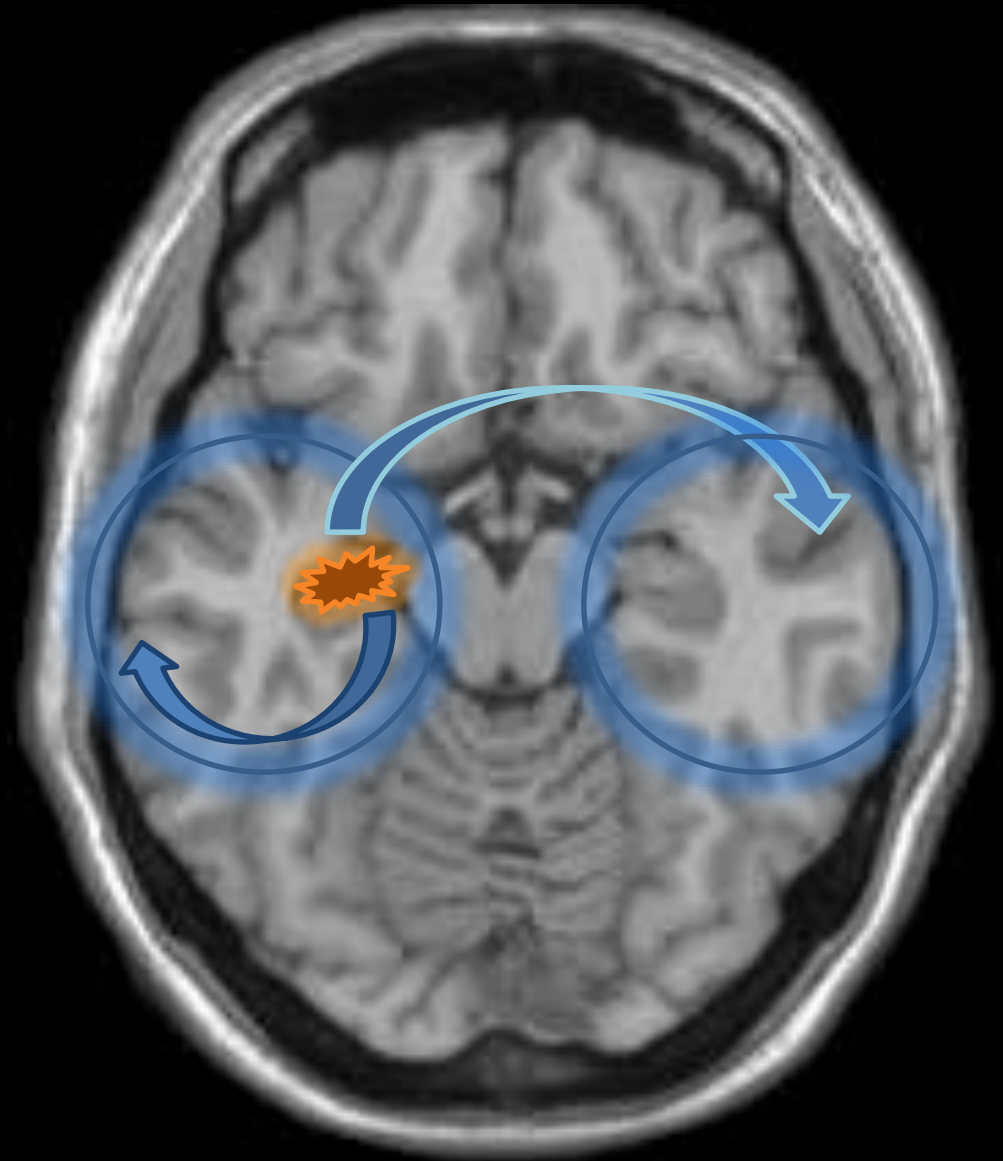
Nonmotor

behavior arrest

Unclassified ³

Focal seizures

- Originate within networks limited to one hemisphere
- May be discretely localized or more widely distributed....



Generalized seizures

- Originate at some point within and rapidly engage bilaterally distributed networks
- Can include cortical and subcortical structures but not necessarily the entire cortex



Terms no longer in use

- Partial
 - Simple partial
 - Complex partial
- Psychic
- Dyscognitive
- Secondarily generalized tonic-clonic

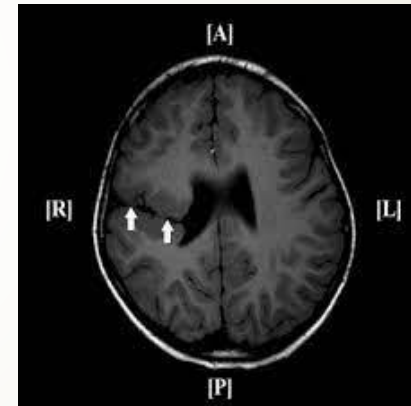


What causes epilepsy?

- ▶ Epileptic seizures mostly are a result of a defect in the control of electrical discharges in the brain.
- ▶ The propensity for recurrent fits may be:
 - ▶ Inherited (genetic – SCNA1, GABRA1)
 - ▶ A consequence of abnormal brain development
 - ▶ Be acquired later in life
 - ▶ Intrauterine brain injury or at birth
 - ▶ Infections of the brain,
 - ▶ TBI
 - ▶ Alcohol and substance abuse
 - ▶ Brain tumors and stroke
 - ▶ Unknown.



Electrical discharges spreading in the brain



Schizencephaly



Heterotopia



“Dear Doctor ...this child is having convulsions...”

What could the convulsions be?

Epileptic

- Generalised tonic clonic seizures
- Other epileptic seizures

Non-epileptic

- Simple faints (vasovagal attacks)
- Reflex anoxic seizures
- Breath-holding attacks
- Cardiac syncope
- Psychogenic/functional



“Dear Doctor... ...this child is having blank spells...”

What could the blank spells be?

Epileptic

- Typical absence seizures
- Atypical absence seizures
- Certain focal epileptic seizures (e.g. temporal and frontal lobe)

Non-epileptic

- Day-dreaming
- Childhood pre-occupation
- Self gratification
- Hyperventilation
- Psychogenic seizures



“Dear Doctor...

...this child is having attacks with funny movements...”

- ▶ *What could the attacks be?*



“Dear Doctor...
...this child is having attacks with funny movements...”

What could the attacks be?

Epileptic

- Focal motor seizures
- Myoclonic jerks
- Epileptic spasms

Non-epileptic

- Tics and mannerisms
- Paroxysmal dyskinesias
- Paroxysmal torticollis
- Non-epileptic myoclonus
- Shuddering attacks

Dear Doctor

Re: Jimmy Starbuck

- D** 1. Brief very frequent episodes of unresponsive stare with eyelid fluttering
- E** 2. Epileptic seizures
- S** 3. Typical absence seizures
- S** 4. Childhood absence epilepsy since age 5 (initial EEG showing 3Hz generalised spike and wave)
- C** 5. No further cause identified
- RIBE** 6. Attention and behaviour problems

I reviewed Jimmy aged 7 today in clinic with his mother. He has been well since...



DESCRIBE

Description

Epileptic or non-epileptic or uncertain episode(s)

Seizure type(s)

Syndrome?

Cause? (Genetic, Structural, Metabolic, Infectious, Immune, Unknown)

Relevant

Impairments

Behavioural & Emotional problems

Educational issues

What do I do if my child has another seizure?

Remember **TRAFFIC**

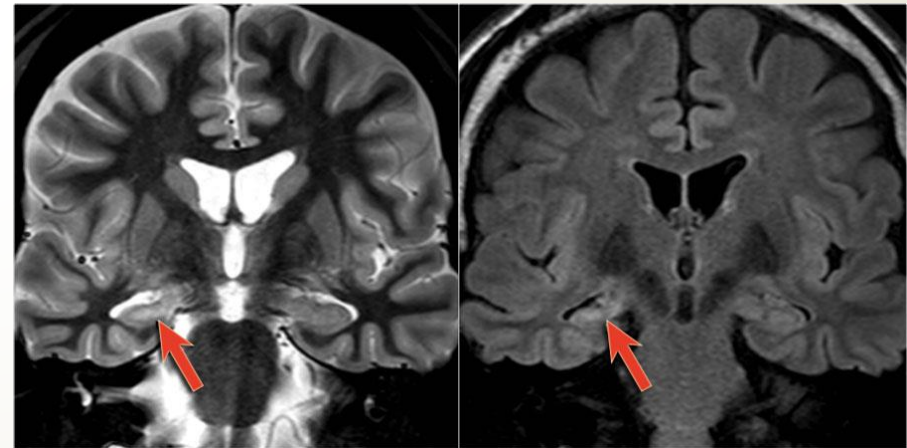
Film the
event

- T TIME** - try to note the time the seizure started and ended, and how long your child is sleepy after
- R RECOVERY** - try to cushion your child's head with a pillow or jumper, and if you know how, place your child in the recovery position.
- A AMBULANCE** - if the seizure is lasting longer than five minutes or your child appears blue, or like they aren't breathing call 999 and ask for an ambulance
- F FILM** - although this is often the last thing on your mind it may be useful to film the seizure to help doctors make decisions about treatment or diagnosis.
- F FREE FROM DANGER** - DO NOT attempt to move your child, unless there is a serious risk of danger, and do not restrain your child or put anything in their mouth.
- I IMPROVEMENT** wait for your child to fully recover before allowing them to eat, drink or move.
- C CALM** - although difficult, try to stay as calm as possible.

Diagnosis of epilepsy

- ▶ The diagnosis of epilepsy is clinical – depends on the clinical history
- ▶ Tests such as the EEG, brain CT scan and MRI support the classification

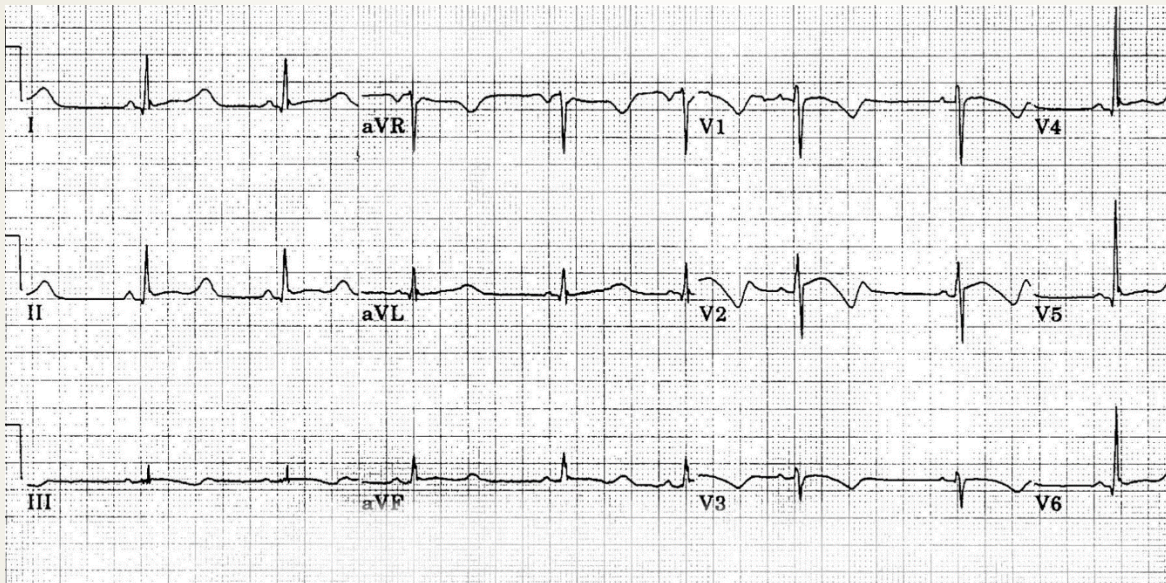
EEG testing in a Child
In a clinic in Swaziland.



A focal temporal lobe lesion on brain MRI that was excised surgically. Google image

Tests

- Film the event
- Blood pressure
- Blood sugar and electrolytes
- Infections
- ECG



Cardiac syncopes. E.g. long QT syndrome

These are not Epilepsy because there is small risk of a seizure in the absence of a precipitating factor

- Febrile seizures in children age 0.5 – 6 years old
- Alcohol-withdrawal seizures
- Metabolic seizures (sodium, calcium, magnesium, glucose, oxygen)
- Toxic seizures (drug reactions or withdrawal, renal failure)
- Convulsive syncope
- Acute concussive convulsion
- Seizures within first week after brain trauma, infection or stroke

Acute Symptomatic Epilepsy

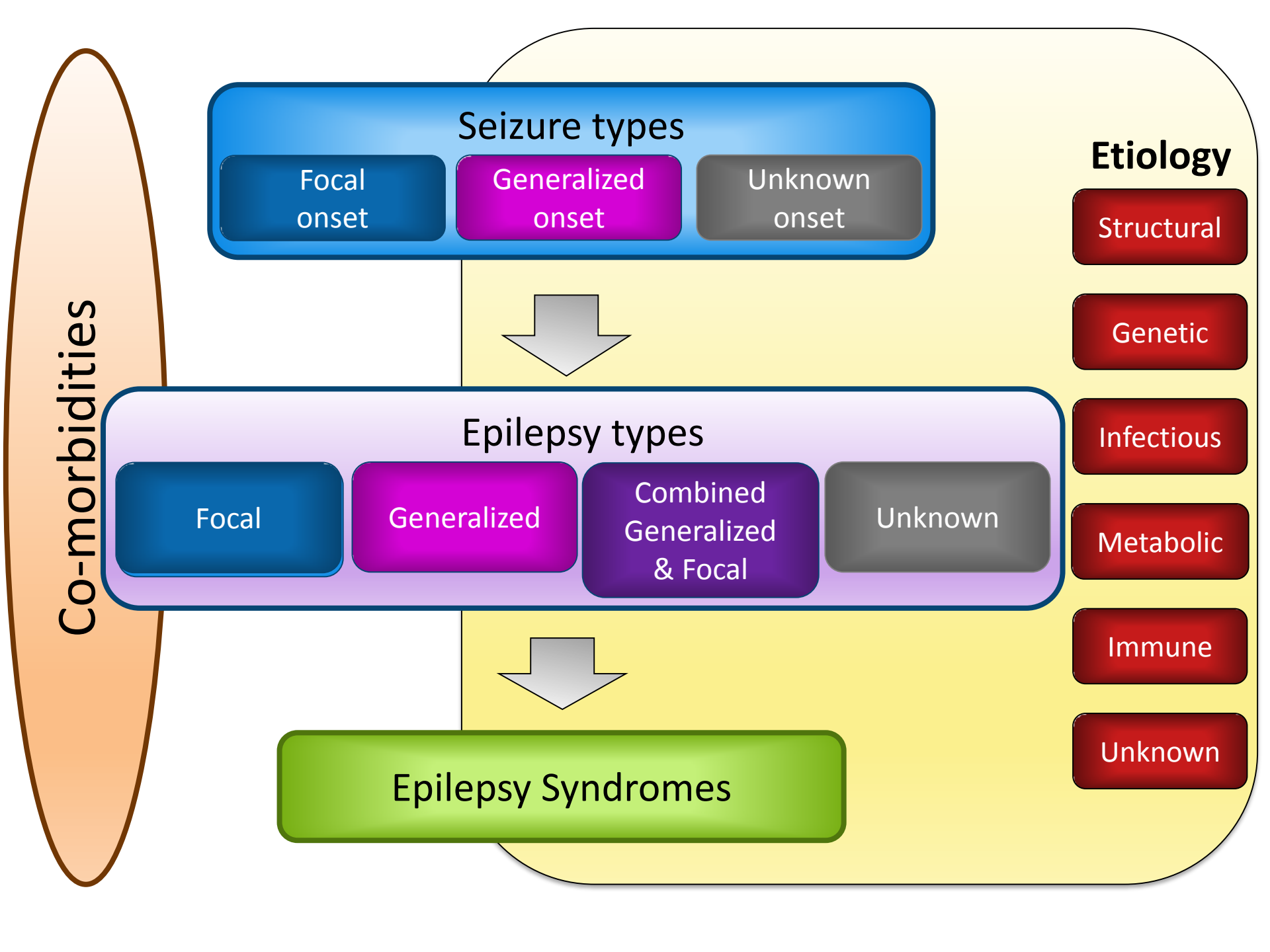
Acute symptomatic seizures are events, occurring in close temporal relationship with an acute CNS insult, which may be metabolic, toxic, structural, infectious, or due to inflammation. The interval between the insult and seizure may vary due to the underlying clinical condition.

- Acute symptomatic seizures have also been called:
 - Reactive seizures
 - Provoked seizures
 - Situation-related seizures

Defining time in acute symptomatic seizures

Events within 1 week of:

- Stroke
- TBI
- Anoxic encephalopathy
- Intracranial surgery
- First identification of subdural hematoma
- Presence of an active CNS infection
- During an active phase of multiple sclerosis or other autoimmune disease



Seizure types

Focal onset

Generalized onset

Unknown onset

Etiology

Structural

Genetic

Infectious

Metabolic

Immune

Unknown

Epilepsy types

Focal

Generalized

Combined
Generalized
& Focal

Unknown

Epilepsy Syndromes

Co-morbidities

Drug treatment for epilepsy

- ▶ Epilepsy is treatable.
 - ▶ Antiepileptic drugs are the main treatment modality.
 - ▶ Aim at monotherapy
 - ▶ Take the medicines consistently whether or not there seizures or not. Treatment is for several months or years.
 - ▶ The dose is adjusted with growth.
 - ▶ Only when a health worker should wean off the medicines. This is done slowly over several weeks or months.
 - ▶ Epilepsy in the remaining 20-30% may only be controlled with continuous treatment; others may require other treatments including surgery.
- ▶ 70/100 children with new onset epilepsy can have their seizures effectively controlled with current treatment modalities.

Other treatment modalities for epilepsy

- ▶ Epilepsy surgery
 - ▶ Surgical excision of a focal brain lesion
- ▶ Vagus nerve stimulator
- ▶ Deep brain stimulator
- ▶ Ketogenic diet
 - ▶ A diet rich in fat (*but low in carbohydrates*) that generates ketones and reduces seizures
- ▶ Medical marijuana for complex and difficult to control epilepsy
 - ▶ A lot of controversy



Ketogenic diet



What other precautions should you take?

- ▶ Children with epilepsy can engage in all activities as other children. Do not put unnecessary restrictions on them.
- ▶ **However, they should only swim in the presence of an adult and should not be left alone especially near water bodies or fire.**
- ▶ Heights may also be avoided.



Conclusions

- ▶ Many risk factors for epilepsy in Africa are preventable with inexpensive interventions –
 - ▶ Birth injuries
 - ▶ Parasitic infections
- ▶ Majority of the helminthic disorders are of local importance to selected geographic areas.
- ▶ Preventive public health measures against the parasites may reduce the burden of epilepsy.
 - ▶ It is expected the burden of epilepsy will decline with declining malaria and onchocerciasis burdens
- ▶ Should we not be performing diagnostic testing for these parasitic infections systematically in cases?



Questions



Summary

- There are many different types of epileptic and non-epileptic seizures
- Epilepsy is a leading chronic brain disorder in the world.
- With appropriate accuracy and expertise these can usually be distinguished and misdiagnosis avoided
- It is treatable and all affected persons should be offered treatment.
- We all can help. Learn what to do to make a child with epilepsy safe.