RESULTS: Seizures Primary Outcomes Survey

AUGUST 2016

Statistical analysis

Descriptive statistics were used to describe the characteristics and responses of the respondents overall and split by specialty (neonatologist/non-neonatologist). Categorical data was described numerically using frequency and percentage (%) and graphically using barcharts. Continuous data was described using the median (interquartile range, IQR) and minimum and maximum. Histograms were used to describe the continuous data graphically.

The chi-squared test or Fisher's exact test (in the case of low expected counts) was used to compare responses between neonatologists and non-neonatologists. All tests were two-sided and a p-value<0.05 was considered to be statistically significant.

Total number of respondents: n=87

SECTION 1: BACKGROUND OF RESPONDENTS

1.1 PRIMARY SPECIALTY

Table 1. Primary specialty, n=87

	n (%)
Neonatology	44 (50.6)
Pediatric Neurology/Neurology	34 (39.1)
Neurophysiology	4 (4.6)
Other	5 (5.7)

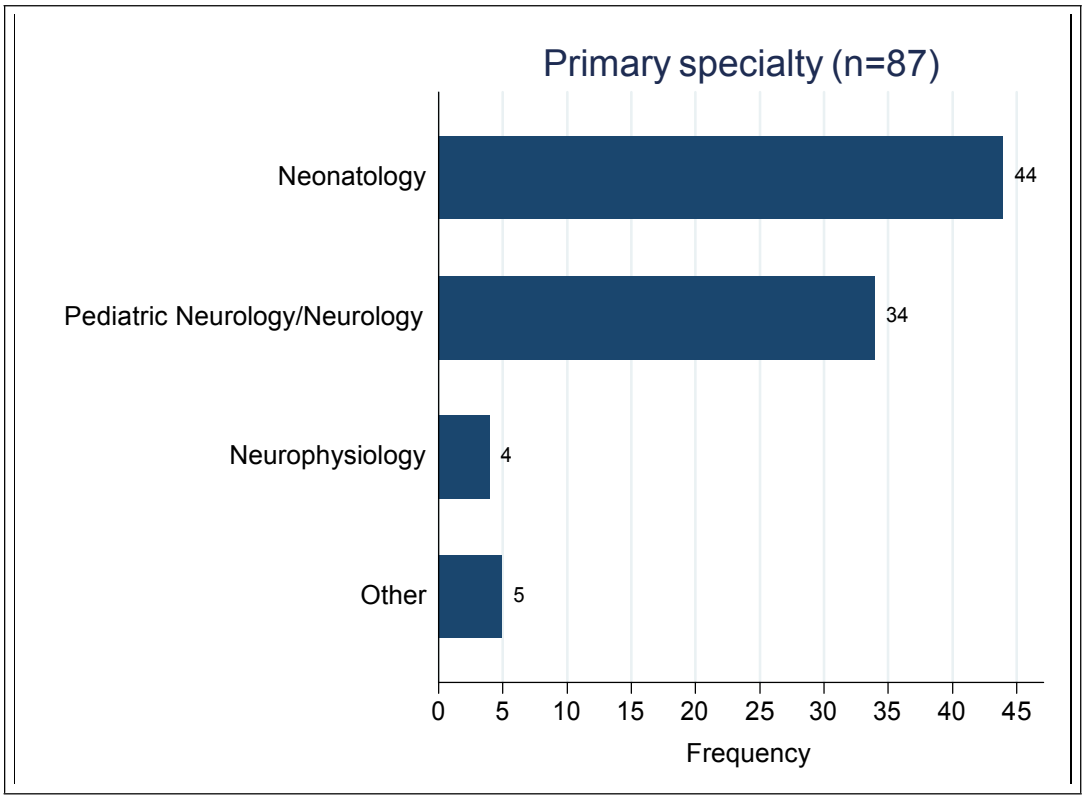

Figure 1. Bar chart of primary specialty of respondents, n=87.

Table 2. Other specialties stated, n=5

	n
General Paediatrics	1
Neonatal Neurology	1
Neonatal neurology and Neurophysiology	1
Pediatric Epilepsy/Neonatal Neurology	1
Perinatal neurology	1

Note:

(1) 1 respondent had ticked "other" but then stated "pediatric neurology" – that respondent's specialty was changed to this.

NUMBER OF YEARS TREATING NEWBORNS WITH SEIZURES AFTER COMPLETION OF TRAINING

The number of years treating newborns with seizures after completion of training ranged from 1 year to 50 years with a median(IQR) of 15(8 to 28) years.

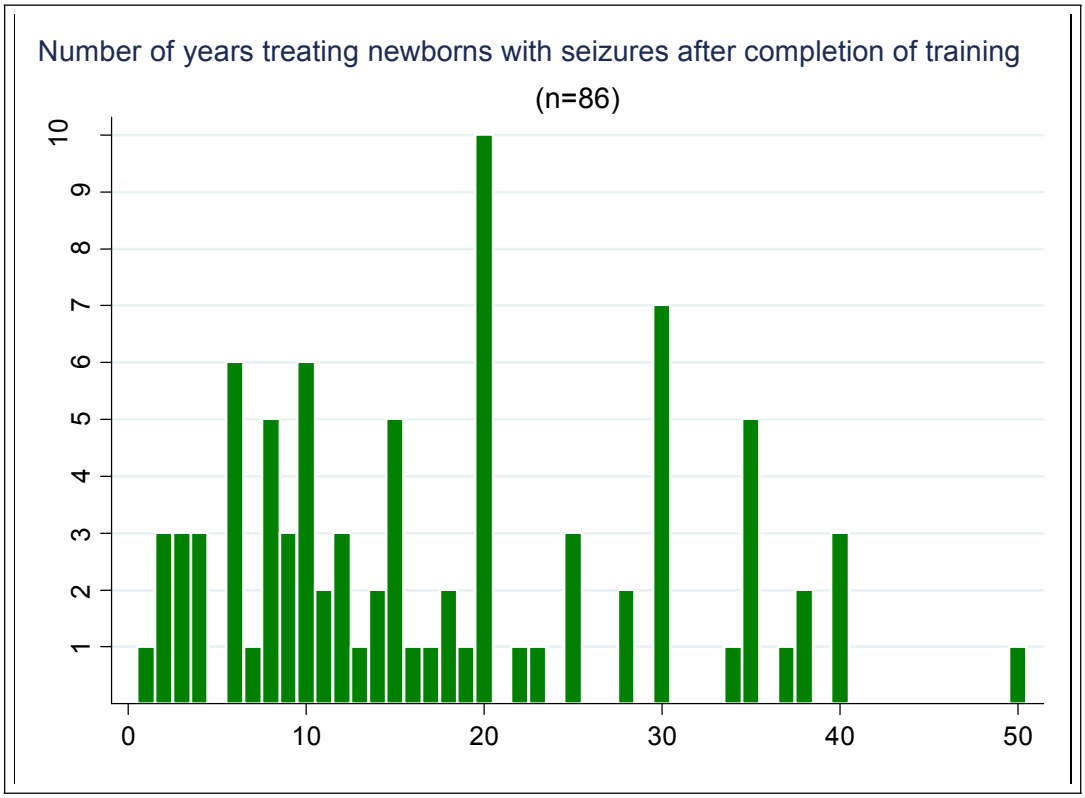

Figure 2. Bar chart of number of years treating newborns with seizures after completion of training, n=86.

Note:

(2) 1 respondent stated ">25 years" and this was changed to 25 years for the data analysis.

(3) 1 respondent stated "Hundreds" and this response was removed prior to data analysis.

SECTION 2: RESPONSES TO QUESTIONS BASED ON "ASSUMING THAT CONTINUOUS EEG/aEEG MONITORING IS ONGOING"

2.1 HOW DO YOU TREAT SEIZURES IN NEONATES?

Table 3. Treatment of neonatal seizures, n=87

		Primary specialty		
	Overall n (%)**	Neonatologist (n=44) n (%)	Other* (n=43) n (%)	p-value***
I treat all seziures that have…….				
A clear EEG seizure signature - clinical correlates do not need to be present	76 (87.4)	33 (75.0)	43 (100.0)	<0.001
Clinical signs and an EEG correlate	52 (59.8)	29 (65.9)	23 (53.5)	0.238
Clear clinical signs (even if no EEG correlate)	25 (28.7)	16 (36.4)	9 (20.9)	0.112

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**adds to more than 100% as respondents can select all options that apply

**from chi-squared test

Comment on Table: Neonatologists were less likely to answer "I treat all seizures that have a clear EEG seizure signature – clinical correlates do not need to be present" than non-neonatologists (75% vs 100%).

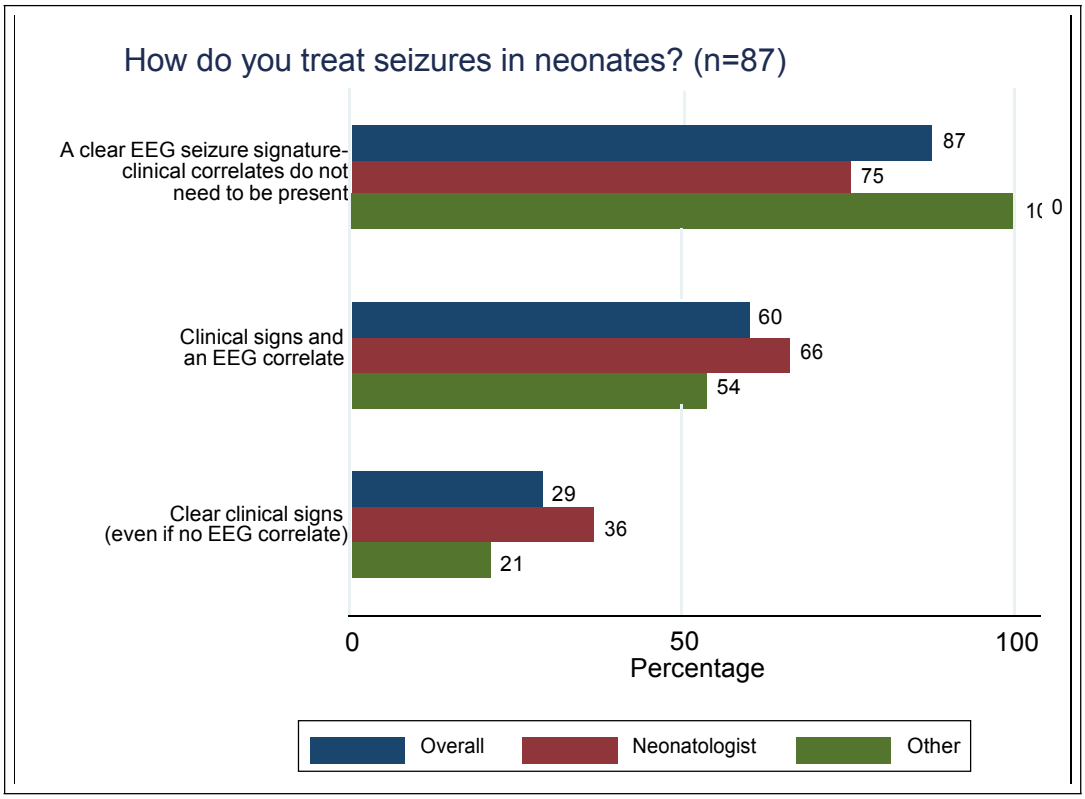

Figure 3. How respondents treat seizures in neonates overall and by specialty.

2.2 IN DECIDING TO START TREATMENT, I CONSIDER THE FOLLOWING VERY IMPORTANT….

Table 4.1. Factors considered very important in deciding to start treatment, n=87

	Overall n (%)	Primary specialty: Neonatologist (n=44) n (%)	Primary specialty: Other* (n=43) n (%)	p-value***
In deciding to start treatment, I consider the following very important…….				
Number of seizures recorded	31 (35.6)	18 (40.9)	13 (30.2)	0.299
Duration of a single seizure	31 (35.6)	18 (40.9)	13 (30.2)	0.299
Both the number and duration of seizures in a specific time period (i.e. the seizure burden)	69 (79.3)	36 (81.8)	33 (76.7)	0.559
Other	16 (18.4)	5 (11.4)	11 (25.6)	0.087

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**adds to more than 100% as respondents can select all options that apply

**from chi-squared test

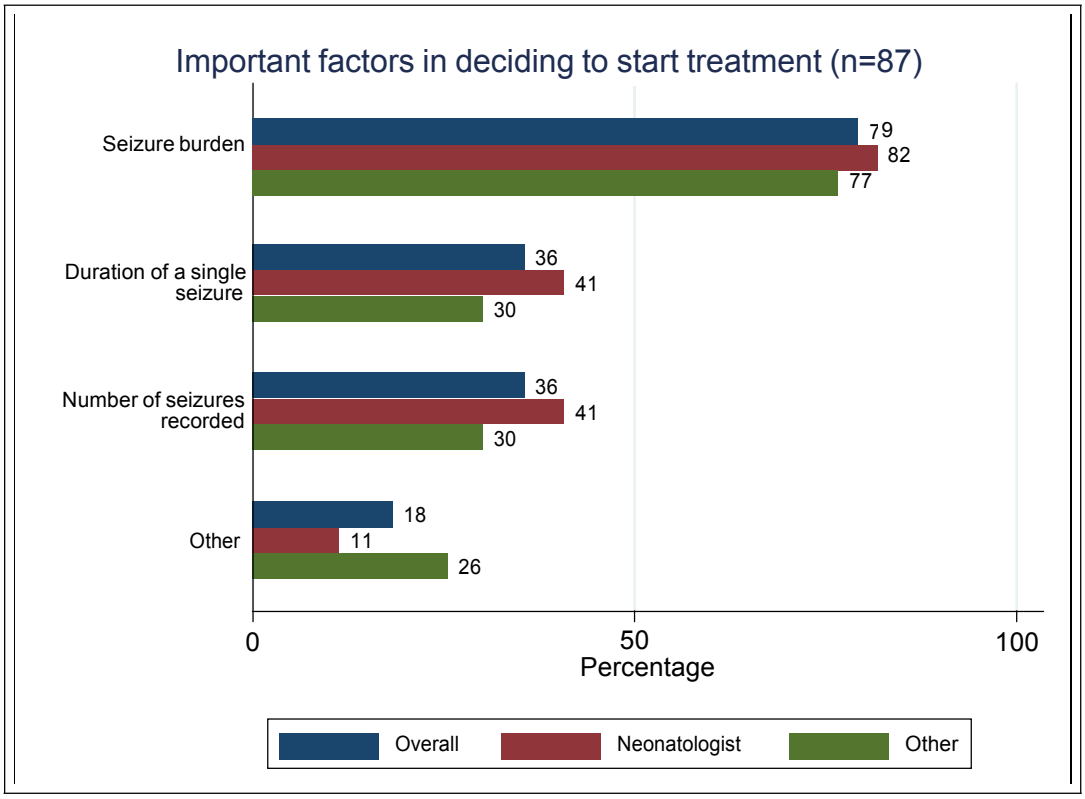

Figure 4. Factors respondents consider important in deciding to start treatment overall and by specialty.

Table 4.2. Other responses, n=16

	n
Any clinical seizure confirmed on EEG	1
Any seizures	1
clinical stability/status of the baby	1
Diagnosis and etiology	1
Etiology	1
I decide to treat if clinically indicated, after ruling out other causes (potentially treatable) of abnormal behavior that may resembel a seizure	1
I start treatment with the initial clinical seizure	1
I treat nearly all seizures.	1
Likelihood of recurrence based on clinical scenario and EEG background	1
Need >2 seizures/hour of at least 10 seconds each	1
presence of recurrent seizures, i.e a single short seizure may not need to be treated, however if more than one I'm more likely to treat.	1
stability of neonate	1
the presence of seizures	1
Type of seizure	1
very epileptiform background even if single seizure	1
would give meds for any seizures	1

2.3 HOW SEIZURE NUMBER IS USED IN TREATMENT DECISIONS

Table 5.1. How seizure number is used in treatment decisions, n=80

	Overall n (%)	Primary specialty: Neonatologist (n=41) n (%)	Primary specialty: Other* (n=39) n (%)	p-value**
				0.269
I treat any EEG confirmed seizures, irrespective of duration	32 (40.0)	12 (29.3)	20 (51.3)	
I treat if there are more than 2 seizures per hour	20 (25.0)	13 (31.7)	7 (17.9)	
I treat if there are more than 3 seizures per hour	5 (6.3)	2 (4.9)	3 (7.7)	
I never consider seizure number in my treatment decisions	6 (7.5)	4 (9.8)	2 (5.1)	
Other	17 (21.3)	10 (24.4)	7 (17.9)	

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**from Fisher's exact test

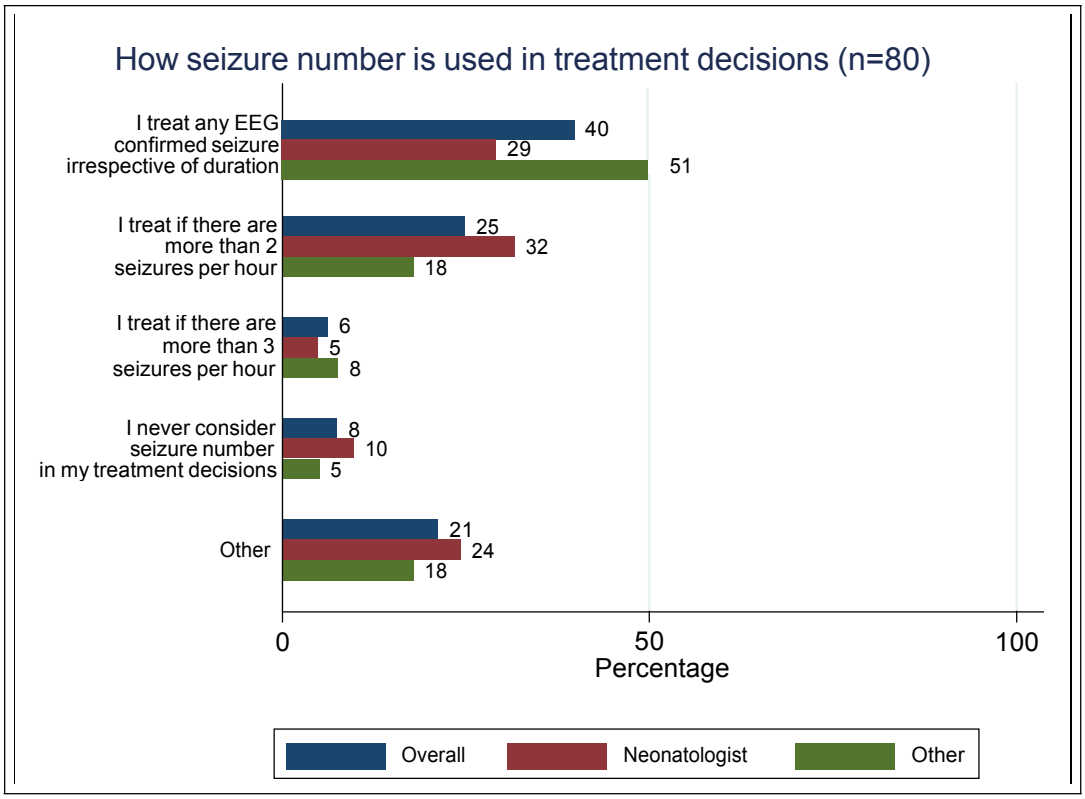

Figure 5. How respondents use seizure number in treatment decisions overall and by specialty.

Table 5.2. Other responses, n=17

	n
I do not treat the first seizure, only if they are repeated	1
A baby who has 5-6 seizures in a day, for example, does not fit into any of the above categories but would be a child that I would treat.	1
any recurring seizures in the setting of an acute event	1
Consider etiology, neonatal stability in addition to number and duration of seizures; discuss with neurologist	1
depends on case and length of seizure	1
Depends on clinical context (critical illness, severity of brain injury, number of medications,...)	1
Depends on etiology. If reversing hypoglycemia coincides with no further sz, don't treat	1
I treat if there are 2 seizures in a 24 hour period of > 10 sec duration	1
I treat if there is a second seizure irrespective of time between seizures (usually within a few hours)	1
i treat more than 1 seizure	1
Idont really have a specific number in a specific, i dont treat every single seizure and i dont really think in sz per hour	1
In new onset seizures, I treat any EEG-confirmed seizure, irrespective of duration. If diagnosed seizure disorder, usually treat >3 seizures per hour, or different depending on existing seizure burden.	1
it depends od the duration of the seizure	1
one spontaneously resolving seizure might not get treated, but if there are several, they will, number of seizures will alos direct addition of further agents	1
Single isolated seizure may wait, but repetitive treated even if <2/h	1
The treatment depends on the type and length of the seizures and the patient's condition, sometimes we start treatment after the first seizure if it lasts long.	1
usually there is more than one hour with seizures for babies who do not stop seizing spontaneously so i would treat if more than 2 seizures per hour for 2 hours. some babies might have 2 seizures in one hour and then another seizure the next hour and no more after that	1

n=9 respondents wrote in the “other box” even though they ticked one of the options given. What they wrote is described below.

Table 5.3. Other comments, n=9

	n
after the first seizure	1
Again, depends on the clinical scenario; in general treat as soon as we see seizure(s), however, on occasion, the child will have 3-4 brief seizures and by the time they are recognized and/or meds ordered, the seizure have stopped for some time and so we just monitor	1
Answer above depends on clinical scenario	1
I might also treat for one longer seizure in an hour	1
if short	1
more than 2 seizures per 6 hours	1
one long seizure is as important as a few short ones. If short I want to confirm it with another one before initiating therapy	1
Recurrent seizures	1
seizures with by definition > 10 sec duration; sometimes you see more seizures of short duration (eg 5 sec). Then I also start treatment	1

2.4 HOW SEIZURE DURATION IS USED IN TREATMENT DECISIONS

Table 6.1. How seizure duration is used in treatment decisions, n=79

		Primary specialty		
	Overall n (%)	Neonatologist (n=40) n (%)	Other* (n=39) n (%)	p-value**
Individual seizures must be longer than….				0.042
10 seconds before I treat	30 (38.0)	12 (30.0)	18 (46.2)	
30 seconds before I treat	11 (13.9)	5 (12.5)	6 (15.4)	
1 minute before I treat	12 (15.2)	9 (22.5)	3 (7.7)	
2 minutes before I treat	4 (5.1)	3 (7.5)	1 (2.6)	
3 minutes before I treat	1 (1.3)	1 (2.5)	0 (0.0)	
I never consider seizure duration in my treatment decisions	7 (8.9)	6 (15.0)	1 (2.6)	
Other	14 (17.7)	4 (10.0)	10 (25.6)	

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**from Fisher's exact test

Comment on table: Neonatologists were more likely to state that they never consider seizure duration in their treatment decisions than non-neonatologists (15% vs 2.6%). Of those neonatologists who did use seizure duration in their treatment decisions, the seizure burden had to be longer before they treated compared to non-neonatologists.

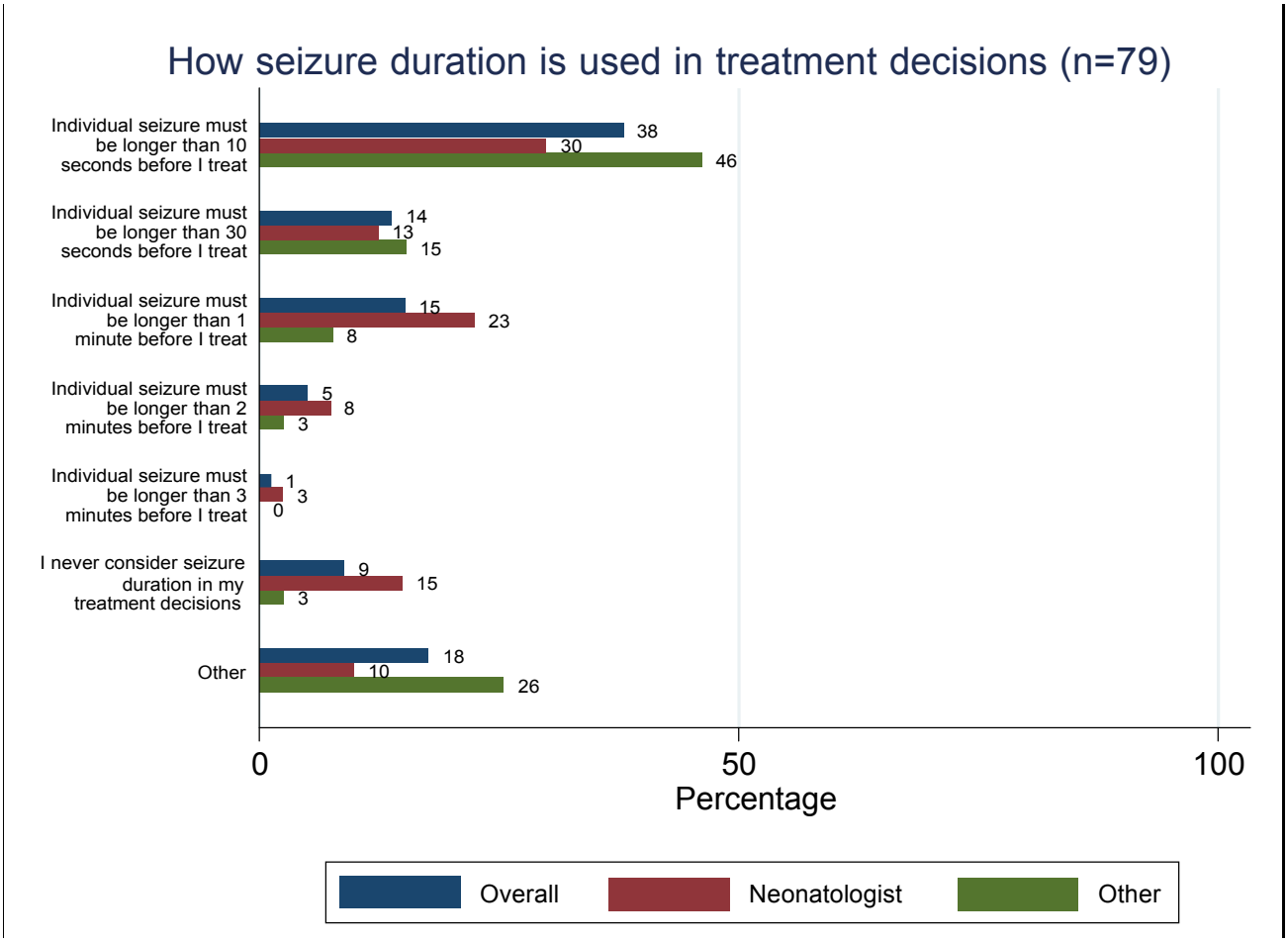

Figure 6. How respondents use seizure duration in treatment decisions overall and by specialty.

Table 6.2. Other responses, n=14

	n
2 seizures in a 24 hour period of > 10 sec duration	1
>5m accumulated time	1
15 seconds	1
Again, cinical scenario, in general treat all seizures; if a child has a single 10 second event I would probably wait to see what's going on before treating.	1
Also considering above - etiology, infant status	1
clinical seizure any duration, electrographic 10 seconds	1
Clinical seizures >2 minutes. EEG seiures >10 seconds consider treatment based on situation and seizure number.	1
could be shorter if frequent; as I mostly used aEEG it is likely that anything shorter than 2min would not be seen	1
i almost never treat after one seizure. but most babies with seizures longer than 2 minutes do not stop seizing spontaneously. so i would answer that i would treat seizures longer than 2 minutes	1
In the ideal condition where there is multichannel EEG, more than 3 seizures longer than 10 seconds I would treat. In the real world, aEEG is mostly used, I would treat if there are clinical seizures if there is or no aEEG seizures.	1
multiple seizure regardless of duration or single prolonged (> 1 minute) seizure	1
Must be long enough to see definitive evolution of stereotyped enough to be definitive ictal events (e.g BiRDs)	1
see also 5	1
they need to be multiple	1

2.5 HOW SEIZURE BURDEN IS USED IN TREATMENT DECISIONS

Table 7.1. How seizure burden is used in treatment decisions, n=76

		Primary specialty		
	Overall n (%)	Neonatologist (n=38) n (%)	Other* (n=38) n (%)	p-value**
Seizure burden must be…….				0.728
≥ 1 minute per hour before I treat	13 (17.1)	7 (18.4)	6 (15.8)	
≥ 2 minutes per hour before I treat	9 (11.8)	4 (10.5)	5 (13.2)	
≥ 3 minutes per hour before I treat	5 (6.6)	4 (10.5)	1 (2.6)	
≥ 5 minutes per hour before I treat	4 (5.3)	1 (2.6)	3 (7.9)	
I never consider the seizure burden in my treatment decisions	23 (30.3)	12 (31.6)	11 (28.9)	
Other	22 (28.9)	10 (26.3)	12 (31.6)	

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**from Fisher's exact test

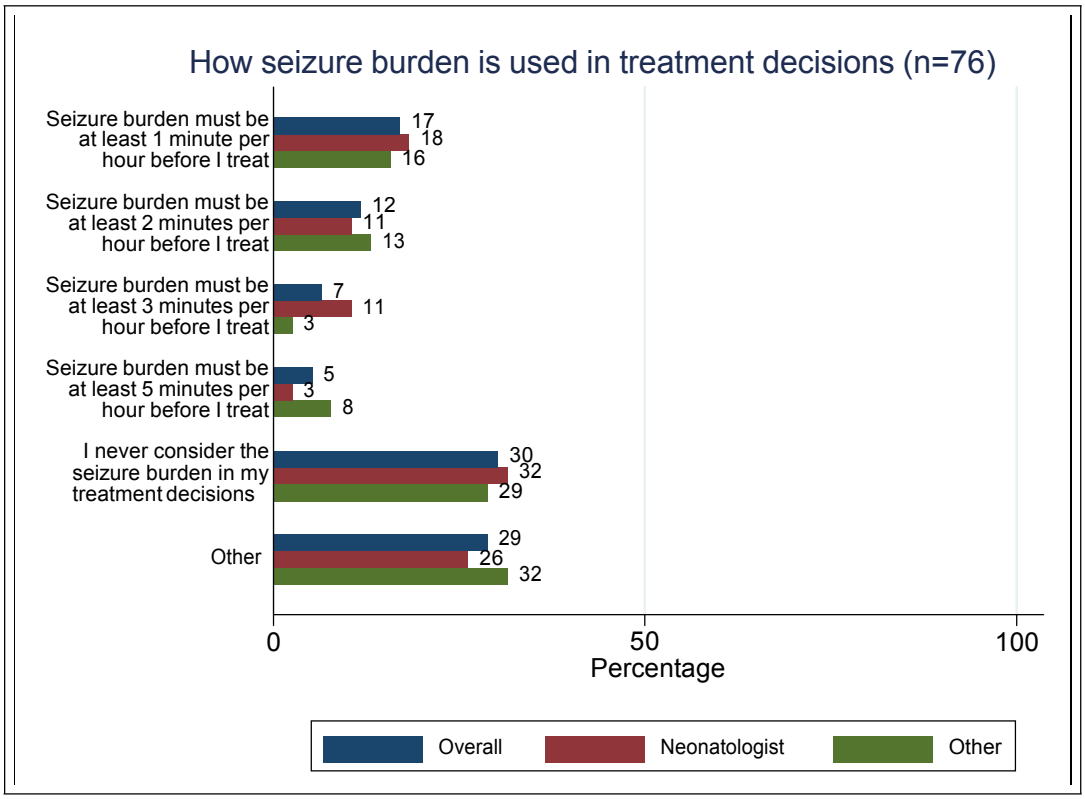

Figure 7. How respondents use seizure burden in treatment decisions overall and by specialty.

Table 7.2. Other responses, n=22

	n
2 seizures in a 24 hour period of > 10 sec duration	1
A combination of duration and frequency as mentioned in previous answers.	1
a few (short) seizures per hours would also be treated	1
Again, it really depends on the scenario.	1
AS per neurologist's rec	1
Burden plus etiology interact.	1
Consideration of seizure burden >= 2 seizures per hour if the patient is on a medication drip	1
I consider overall condition of baby as well, and risk history e.g. HIE	1
i consider the burden of seizures important but I dont have a specific unit measure of time etc to decisde on burden	1
I think this question can only be precise if there is a multichannel EEG facility on site	1
I treat as soon as I see seizures on the EEG or clinically.	1
if acute/provoking event causing seizure or neonatal onset of seizure, then any seizures I would treat	1
it depends on a number of factors	1
More than 2 minutes per 2 hours	1
multiple seizures or status	1
no specific number in mind - take into consideration other factors, discuss with child neurologist	1
only when the sizurs are less then 10 sec I look at the seizure burden	1
Other than status epilepticus (30 minutes or more per hour) I would not use seizure burden in a single hour to decide on treatment. usually the clinical history, exam and first few hours guide treatment. Without evidence- if forced to choose- would treat if 10 minutes or more in one hour	1
response of burden to treatment is more improtant	1
see 5 and 6	1
Single isolated seizure may wait, but repetitive treated even if <2/h	1
very ahrd to have clear cut off as a rule > 1minute	1

2.6 LIKELIHOOD OF TREATING SEIZURES IF THEY ARE ACCOMPANIED BY CLINICAL EVENTS

Table 8. Likelihood of treating seizures if they are accompanied by clinical events, n=87

		Primary specialty		
	Overall n (%)	Neonatologist (n=44) n (%)	Other* (n=43) n (%)	p-value**
Are you more likely to treat seizures if they are accompanied by clinical events?				0.002
Definitely	19 (21.8)	15 (34.1)	4 (9.3)	
More likely	36 (41.4)	20 (45.5)	16 (37.2)	
No, I rely on the EEG only	32 (36.8)	9 (20.5)	23 (53.5)	

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**from chi-squared test

Comment on Table: Neonatologists were more likely to answer "definitely" or "more likely" than non-neonatologists.

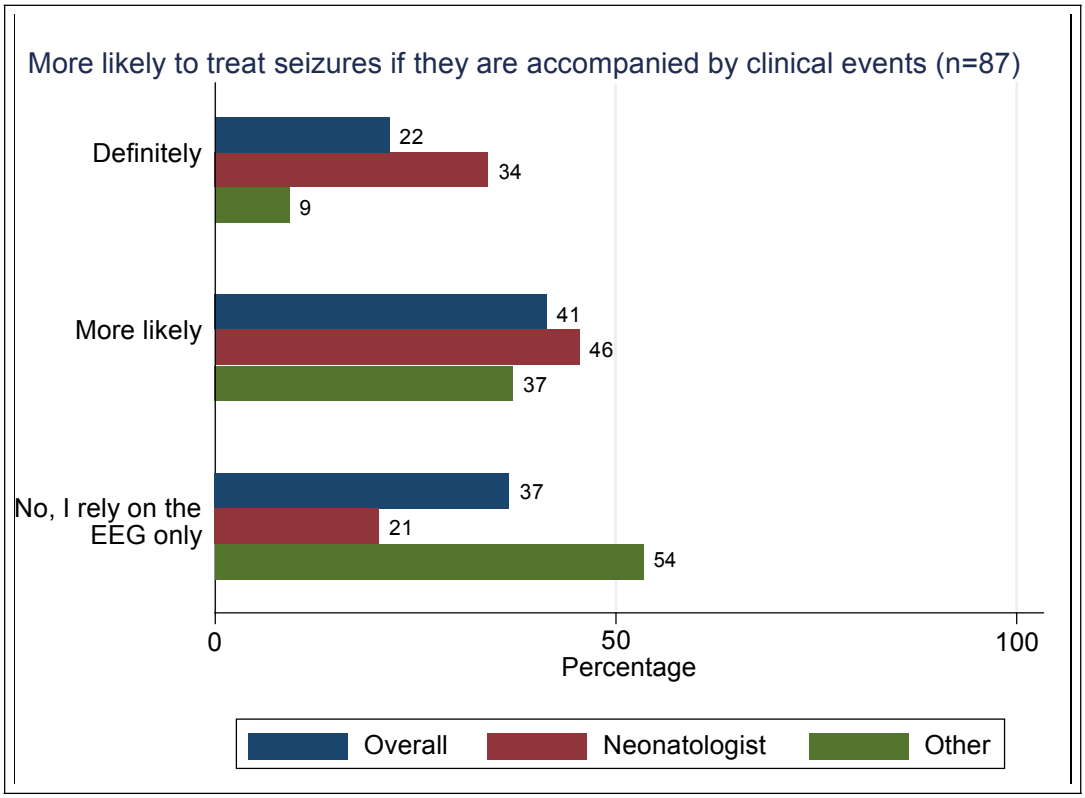

Figure 8. Likelihood of respondents treating seizures if they are accompanied by clinical events overall and by specialty.

2.7 MEASURING TREATMENT SUCCESS

Table 9.1. How treatment success for neonatal seizures is measured, n=87

	Overall n (%)	Primary specialty: Neonatologist (n=44) n (%)	Primary specialty: Other* (n=43) n (%)	p-value**
How do you measure treatment success for neonatal seizures?				0.041
Complete abolition of all seizures for at least 24 hours after treatment	62 (71.3)	25 (56.8)	37 (86.0)	
A reduction in seizure number by 80%	7 (8.0)	6 (13.6)	1 (2.3)	
A reduction in seizure number by 50%	4 (4.6)	3 (6.8)	1 (2.3)	
A reduction in seizure burden by 80%	8 (9.2)	5 (11.4)	3 (7.0)	
A reduction in seizure burden by 50%	3 (3.4)	2 (4.5)	1 (2.3)	
Other	3 (3.4)	3 (6.8)	0 (0.0)	

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**from Fisher's exact test

Comment on Table: Neonatologists were less likely to measure treatment success as complete abolition of all seizures for at least 24 hours after treatment than non-neonatologists (56.8% vs 86%).

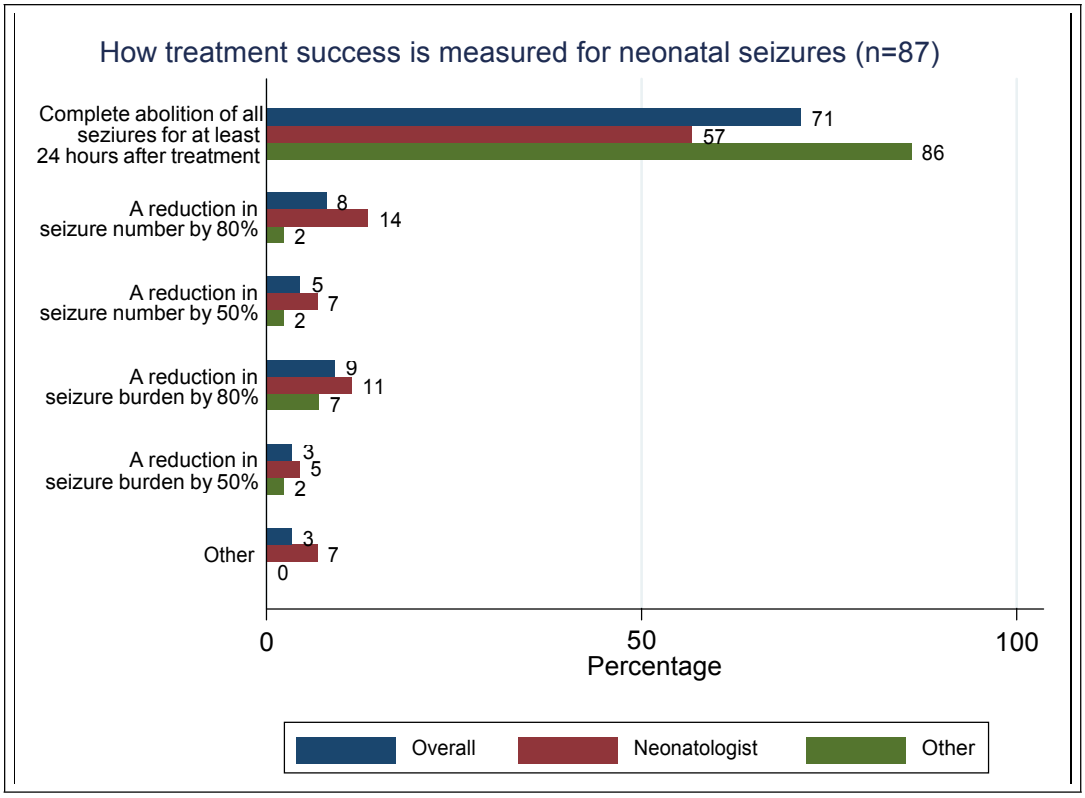

Figure 9. How respondents measure treatment success for neonatal seizures overall and by specialty.

Table 9.2. Other responses, n=3

	n
100%	1
both by 50 %	1
Clinical reduction in number and burden of seizures within 24 hrs after treatment. No set %.	1

n=5 respondents wrote in the "other box" even though they ticked one of the options given. What they wrote is described below.

Table 9.3. Other comments, n=5

	n
Depends on etiology.	1
Depends on etiology. Genetic episodes may be hard to achieve 100% success	1
i dont really try to stopp all seizures i will tolerate some seizures if i am already on third line meds for example	1
obviously abolition is not possible in neonatal onset epilepsies in which case I define treatment success in > 50% reduction or elimination of clinical seizures	1
or if on a drip, we accept less than 2 seizures per hour as appropriate treatment.	1

2.7 LENGTH OF TIME TO RESPONSE TO TREATMENT

Table 10.1. Length of time to response to treatment, n=87

		Primary specialty		
	Overall n (%)	Neonatologist (n=44) n (%)	Other* (n=43) n (%)	p-value**
How do you measure treatment success for neonatal seizures?				0.041
Complete abolition of all seizures for at least 24 hours after treatment	62 (71.3)	25 (56.8)	37 (86.0)	
A reduction in seizure number by 80%	7 (8.0)	6 (13.6)	1 (2.3)	
A reduction in seizure number by 50%	4 (4.6)	3 (6.8)	1 (2.3)	
A reduction in seizure burden by 80%	8 (9.2)	5 (11.4)	3 (7.0)	
A reduction in seizure burden by 50%	3 (3.4)	2 (4.5)	1 (2.3)	
Other	3 (3.4)	3 (6.8)	0 (0.0)	

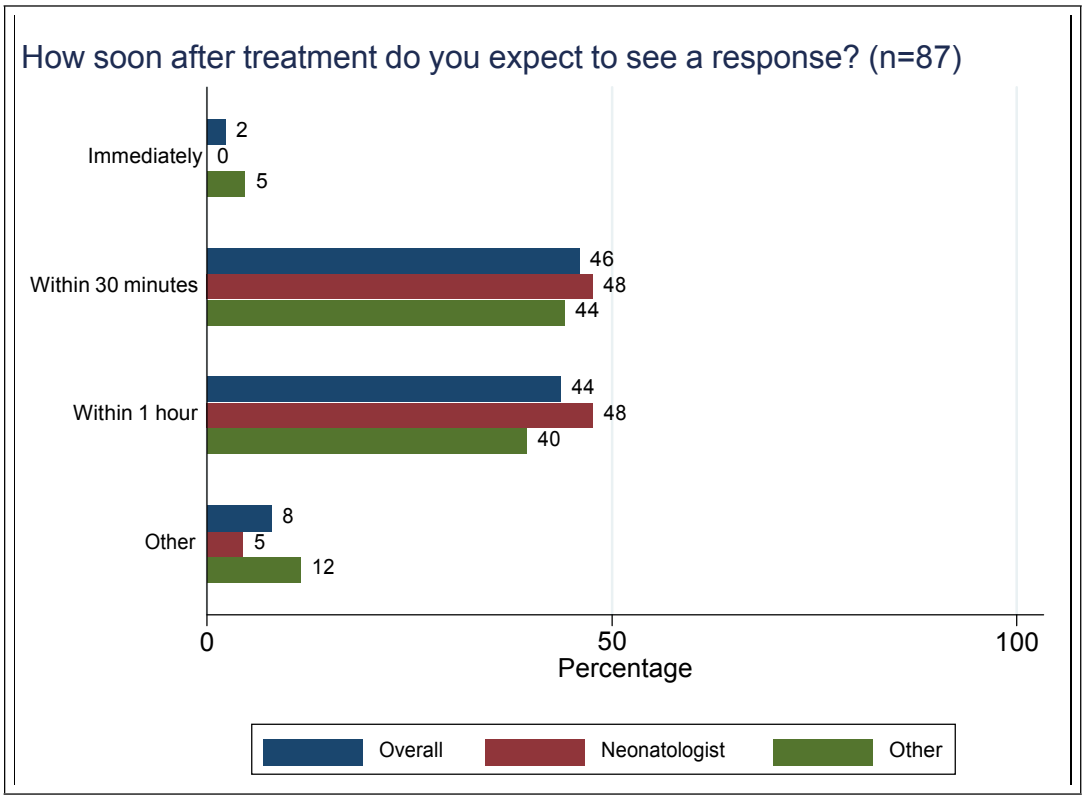

Figure 10. How soon after treatment respondents expect to see a response overall and by specialty.

Table 10.2. Other responses, n=7

	n
it varies and it takes as long as 48 in many cases	1
5 minutes	1
depending on the treatment given (in phenobarbitone and midazolam) I expect an effect within 5 to max 10 minutes, in lidocaine it can take up to 1h	1
it depends on the molecule you use (we use still midazolam for rapid effect)	1
it takes at least an hour until meds are started usually, so 2 h after diagnosis	1
question is too vague; do you refer to abortive or prophylactic treatment?	1
Within 10-30 min of loading dose of a medication.	1

n=6 respondents wrote in the "other box" even though they ticked one of the options given. What they wrote is described below.

Table 10.3. Other comments, n=6

	n
5 mins even if only a definite change rather than cessation	1
Depends if acute treatment for status epilepticus or longer-term treatment for epilepsy.	1
depends on med used	1
Drug infuses over 15 minutes, allow a further 15 minutes until effect assessed. Usually if continue to seize after end of the infusion is going to need further treatment, but have witnessed infrequent case where seizures stopped between 15-30 min	1
for status epilepticus I would like to see at least a 50% decrease in 30 minutes	1
hopeful wishing	1

SECTION 3: RESPONSES TO QUESTIONS BASED ON CASE STUDY

CASE STUDY: In the following case scenario, please let us know how you treat with a second-line anti-seizure drug.

A full-term neonate with HIE undergoing therapeutic hypothermia had EEG documented seizures and received 2 loading doses of phenobarbitone, an initial 20mg/kg plus 10mg/kg 2 hours later when seizures returned. Seizures then disappeared for 4 hours after which an EEG seizure lasting 15 seconds emerges.

3.1 WHAT DO YOU DO NEXT?

Table 11.1. What would you do next?, n=86

		Primary specialty		
	Overall n (%)	Neonatologist (n=44) n (%)	Other* (n=42) n (%)	p-value**
What would you do next?				0.139
Don't treat yet but watch and wait to see if other seizures emerge, then treat	50 (58.1)	29 (67.4)	21 (48.8)	
Treat immediately with a second-line anti-seizure drug	24 (27.9)	8 (18.6)	16 (37.2)	
I have another criteria that I use in this situation (please	12 (14.0)	6 (14.0)	6 (14.0)	

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**from chi-squared test

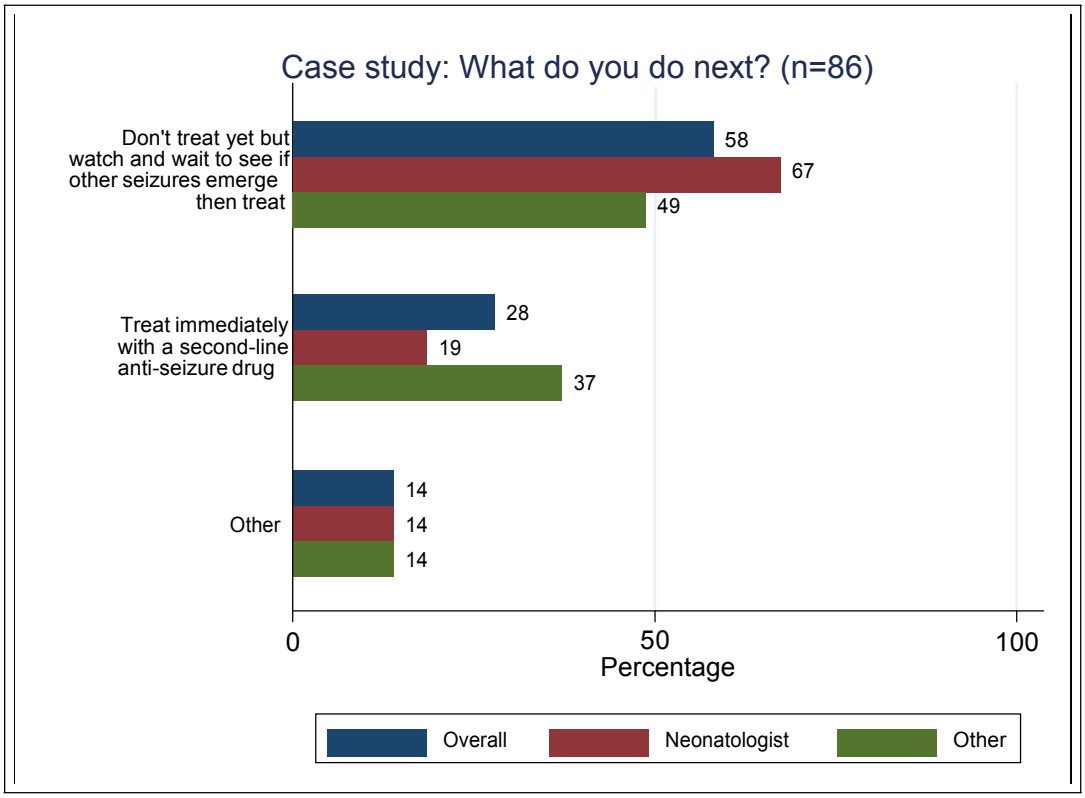

Figure 11. Case study: What respondent would do next overall and by specialty.

Table 11.2. Other responses, n=12

	n
depending on the etiology, I may go to the second drug or wait	1
give another 10 mg/kg PB	1
given more 10 mg/kg pheno	1
I give another 10 mg/kg of Phenobarbitone after 12 hours, if other seizure emerge; then treat with second line anti-seizure drug.	1
I would give an additional dose of 10 mg/kg of phenobarbitone	1
I'd give another 10mg/kg phenobarb	1
Load with 10-20 mg/kg phenobarbital.	1
May treat with another bolus dose of phenobarbital to aim for a serum level above 40, then use a second line agent, either Levetiracetam 50 mg/kg bolus or fosphenytoin 20mg/kg bolus	1
phenobarbital blood levels if >60	1
we will give another 10 mg/kg phenobarbitone	1
would consider higher doses of phenobarbital	1
Would give additional 10mg/kg phenobarbital since there was a response. Uses 40mg/kg PHB total before moving to 2nd line med.	1

3.2 IMPACT OF CLINICAL TRIAL OF A SECOND-LINE ANTI-SEIZURE DRUG ON TREATMENT DECISION

If a clinical trial of a second-line anti-seizure drug was ongoing in your center, would this have an impact on your treatment decision stated above?

Table 12.1. If clinical trial of a second-line anti-seizure drug was ongoing, would this impact treatment decision?, n=86

		Primary specialty		
	Overall n (%)	Neonatologist (n=43) n (%)	Other* (n=43) n (%)	p-value**
				0.363
No, I would still watch and wait as I need to see more than one short seizure before I treat with a second-line drug	31 (36.0)	18 (41.9)	13 (30.2)	
I would be happy to randomize the baby to the trial when this short seizure emerges	48 (55.8)	23 (53.5)	25 (58.1)	
Other	7 (8.1)	2 (4.7)	5 (11.6)	

*this group includes all non-neonatologists (i.e. pediatric neurology/ neurology; neurophysiology or other)

**from Fisher's exact test

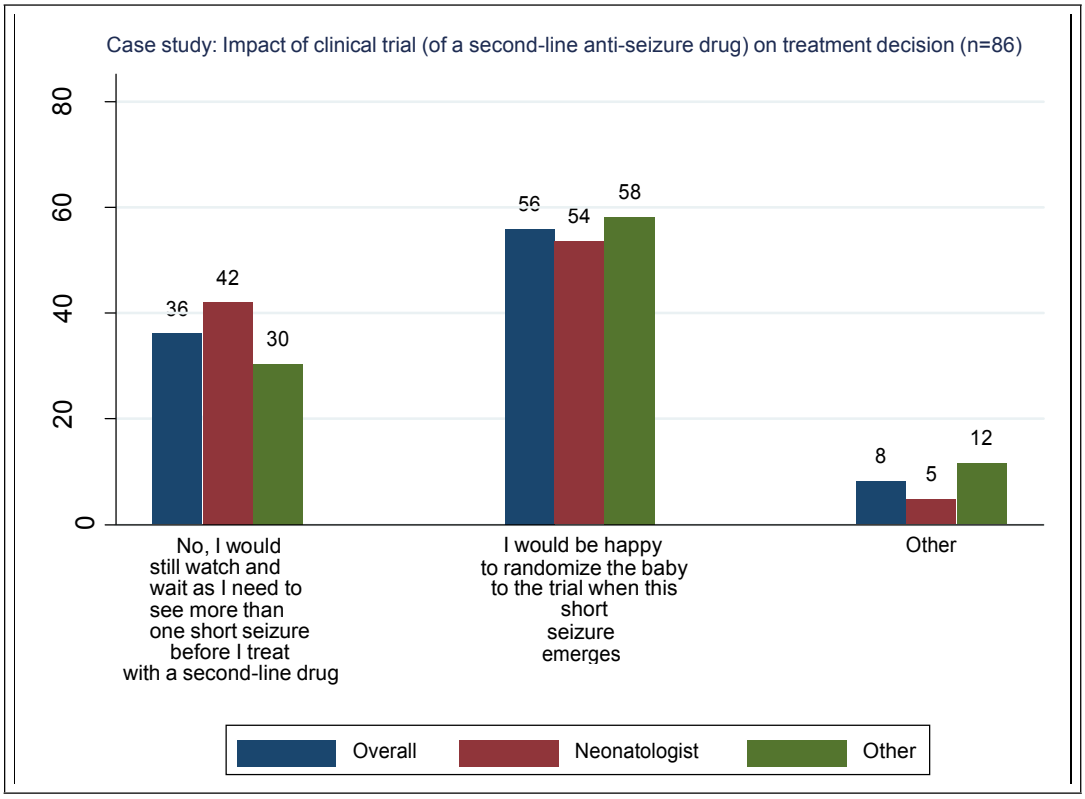

Figure 12. Impact of clinical trial on respondents treatment decision overall and by specialty.

Table 12.2. Other responses, n=7

	n
i would hope that this isn't sufficient evidence in the protocol, probably wouldn't join if it was	1
A randomized trial with 2nd line a/c v. a 3rd dose of phenobarbitral would be more acceptable rather than not treating as the alternate to the 2nd line treatment.	1
If failed the additional 10mg/kg PHB, I would consider randomization (assuming no placebo)	1
not to decide by me	1
see above	1
since seizures stopped initially, would prefer to give extra PB	1
Would load LEV	1

SECTION 4: RESPONSES TO OPEN-ENDED QUESTION: "IS THERE ANYTHING ELSE YOU WOULD LIKE TO TELL US ABOUT HOW YOU TREAT SEIZURES IN NEONATES?"

Table 13. Responses to open-ended question "Is there anything else you would like to tell us about how you treat seizures in neonates?", n=30

Decision about whether to start treatment at all, is as above (seeing seizures>10sec on EEG). However, if deciding to move to a second or third line med or increase a drip rate, especially if level of sedation is a concern, sometimes I will tolerate 1-2 brief (e.g. less than 15-20sec) seizures and observe a few hours longer to see how things evolve. In our current protocol (just a consensus among the neonatal neuro providers at this institution) we use two 20mg/kg PHB boluses, followed by 50mg/kg LEV, then move to Versed gtt. Sometimes with an extra 50mg/kg LEV if there has been a good, but incomplete, response, before having to go to Versed.
During our first line agent, we use frequently serum levels in the 40s-50 range prior to starting a second line AED. Then we choose either Levetiracetam or fosphenytoin depending on the clinical situation, after that we consider midazolam drip our third line. Once a third line agent is chosen our goal is less than 2 seizures (less than 30 second duration) per hour.
For question 1, I might treat clinical seizures if they were focal clonic or repeated stereotyped spells if eeg monitoring was not yet started and the baby was at high risk of seizures (e.g., HIE, stroke or similar)
I agree with the goal to eliminate all electrographic seizures. Usually with max doses of 2 drugs most will come under control especially in HIE babies. I always recommend Fosphenytoin as my second drug of choice and it works very well with phenobarbital in most cases the EG normalizes in 48 hours. Keppra is my next choice.
I found this questionnaire difficult. I could not express myself with answering the questions.
I really would like to test lidocaine as a second line drug compared to levetiracetam
I still feel iv phenytoin works well after phenobarbitone/midazolam has failed to control seizures.
I tend to be more aggressive with initial therapy, attempting to abolish all seizures. When seizure continue despite the use of third-line medications, I may tolerate short (≤30 sec) or infrequent (≤2 per hour) seizures rather than escalate therapy further.
i think that many people are involved in treatment of each patient, and even within one center protocols are difficult to implement
I use the EEG more than clinical events alone which i dont tend to treat if there is no electrical correlate
I work within a team. In the current state of knowledge consistency within the team is more important than my opinion.
I'm assuming this survey refers to acute symptomatic seizures. I find that it is very hard to answer questions without context. It is very rare to just see a single brief seizure. If it's a mild HI or electrolyte/glucose abnormality being corrected and one or two brief seizures, I might watch and wait (or chances are we aren't watching super closely and so we might not catch the first seizure. If the child was in status, sure, I want to catch the next seizure and stay on top of treatment. We ask the ICN to call for 2 or more events (clinical or aEEG) to minimize false alarms.
if a baby has cardiac or respiratory instability and focal or multifocal clonic seizures or focal tonic seizures, I would treat without eeg confirmation of seizures
If I were to randomize i would prefer to not randomize against a placebo rather use another agent which may be standard of care.(non inferiority) as i think placebo controlled trial would be really difficult to enroll patients in.
In general, we follow the national guideline for treatment of neonatal seizures (phenobarb, lidocaine, midazolam)
In my opinion, aggressive treatment of neonatal seizures optimizes long-term neurodevelopmental outcomes.
In practice, a higher threshold for treatment in very preterm infants.
keppra appears to be the drug of choice among neurologists & many neonatologists as 2nd or 3rd line many movng away from lignocaine
Most of these decisions depend on the suspected seizure etiology. Seizures from acute injury like HIE or stroke would be treated differently than other etiologies like hypoglycemia/electrolyte imbalance (correct imbalance) or genetic/metabolic etiologies.
My experience of being responsible for treating seizures on the NICU had been minimal since cooling was introduced. Guidance on the optimal approach in different clinical scenarios to the above issues would be welcome!
My name is Alexa Craig and I practice in Maine. I would love to help recruit patients for clinical trials to develop evidence based approaches to these clinical issues. craiga@mmc.org

Table X cont. Responses to open-ended question "Is there anything else you would like to tell us about how you treat seizures in neonates?", n=30

no
Notreally
Second line drug is affected by the respiratory status of the baby: ventilated babies are more likely t receive midazolam as second line while non ventilated are more likely to receive lidocain
Seizures are not that benign to the neonatal developing brain, hence the urgency to treat seizures as earlier as possible. However, detection of seizures is still a real problem in many tertiary centers. The use of aEEG in ambulance transport should be considered. The other issue is access/route of medication should be considered. PR formulation of anti-seizure medication (such as lorazepam) should be given an emphasis as this can be administered asap.
The above survey indicates a clear prejudice towards treating HIE seizures. There are many other reasons for newborns to have seizures and therefore my answers reflect our general approach to neonatal seizure management rather than something specifically directed at HIE
These are Geraldine's test answers! Thanks Lyn and Laura
we do ask neurology consult and follow rec
We need real data concerning efficacy of levetiracetam
Would consider infant stability (especially if apnea is a seizure manifestation), etiology in how aggressively I would treat seizures.