National Institute for Health and Care Excellence

Final

Epilepsies in children, young people and adults

[B] Computed tomography scan performance in people with epilepsy

NICE guideline NG217

Evidence reviews underpinning recommendations 1.3.1 to 1.3.7 in the NICE guideline.

April 2022

Final

These evidence reviews were developed by the National Guideline Alliance which is a part of the Royal College of Obstetricians and Gynaecologists

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Contents

Evidence review for computed tomography scan performance in people with epilepsy

Review question

What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

Introduction

Computed tomography (CT) is an xray imaging technique that produces cross sectional images of the brain. It does not produce as detailed images as an MRI scan, but CT scanning is more readily available and can give useful information in certain situations. It is important to be aware of when a CT scan should be utilised. The aim of this review is to assess how well CT performs in detecting brain lesions or other relevant abnormalities with epilepsy. Knowing the frequency of these abnormalities helps clinicians to recognise those people who are most at risk of adverse outcomes, and helps optimise therapeutic options.

Summary of the protocol

Please see Table 1 for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	People with 1 or more confirmed epileptic seizures
Intervention	• Computed tomography (CT) scan
Comparison	• Not relevant
Outcomes	Primary outcomes • Proportion identified with a clinically relevant abnormality after: ○ A first seizure ○ Seizure different from the usual seizure in patients with epilepsy

For further details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A and the methods document (supplementary document 1).

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Clinical evidence

Included studies

Forty-nine observational studies (prospective/retrospective single-arm, cohort and cross-sectional studies) were identified for inclusion in this review (Bakhsh 2013,

Bansal 1989, Bogdanoff 1975, Brooks 1990, Chee 1993, Coe 1989, Daras 1987, De la Sayette 1987, Ezeala-Adikaibe 2017, Fei 1992, Fritsch 1988, Garg 1998, Garvey 1998, Holt-Seitz 1999, Hsieh 2010, Hsu 1997, Ismail 2003, Jan 2002, Jha 2004, Kalra 1998, Keranen 1982, Koul 2001, Kumar 1997, Ladurner 1980, Longe 1994, McGahan 1979, Minford 1992, Misra 1994, Nair 1997, Nikodijevic 2016, Obajimi 2004, Ogunniyi 1994, Otsubo 1995, Patel 1986, Patel 2013, Perez Lopez 1985, Phukan 2002, Poudel 2017, Reinikainen 1987, Rodrigues 1996, Samanta 2018, Schoenenberger 1994, Scollo-Lavizzari 1980, Shankar 2013, Sinclair 2003, Singhi 1997, Swaminathan 1998, Thomas 1997, Weishmann 2003).

Clinically relevant abnormalities were categorised into various groups, including congenital/developmental abnormalities, tumours and vascular pathology (please see appendix M for full list).

Analyses were not split by MRI type/technology because no studies were identified reporting data on both MRI and CT, however a separate evidence report was produced assessing the yield of relevant abnormalities detected by MRI scans in people with epilepsy (see evidence report A).

The included studies are summarised in Table 2.

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Excluded studies

Studies not included in this review with reasons for their exclusions are provided in appendix K.Summary of clinical studies included in the evidence review

Summaries of the studies that were included in this review are presented in Table 2. All outcomes reported by the studies were the proportion of patients identified with a clinically relevant abnormality.

Table 2: Summary of included studies

Study	Population	Intervention
Bakhsh 2013 Pakistan Prospective cohort	N=338 children and adults with epilepsy Age, years, range: 1-70	• CT scan
Bansal 1989 India Prospective cohort	N=230 children and adults with focal and generalised epilepsy Age, years, mean (range): 23.58 (5 to 54)	• CT scan
Bogdanoff 1975 US Cross-sectional	N=50 children and adults with focal seizures Age, years, mean (range): 27.2 (5 to 68)	• CT scan
Brooks 1990 US	N=53 children and adults undergoing surgery for complex partial seizures. Results from 38 scans reported (patients with mesial temporal gliosis)	• CT scan

Study	Population	Intervention
Cross-sectional	Age, years, mean (range): 26 (7 to 54)	
Chee 1993 Singapore Retrospective cohort	N=80 patients over the age of 12 admitted for evaluation of recurrent seizures Age, years, mean (range): 33 (13 to 82)	• CT scan
Coe 1989 South Korea Prospective cohort	N=1005 children with a diagnosis of epilepsy Age, years, range: 1 to 15	• CT scan
Daras 1987 US Prospective cohort	N=155 adults with new onset seizures after the age of 20 Age, years, mean: male 42.7; female 51.6	• CT scan
De la Sayette 1987 Canada Retrospective cohort	N=387 older adults with new onset seizures after the age of 50 years Age, years, mean: male 61.8; female 62	• CT scan
Ezeala-Adikaibe 2017 Nigeria Retrospective cohort	N=196 patients with recurrent seizures Age, years, mean (range): 46.8 (20 to 104)	• CT scan
Fei 1992 China Prospective cohort	N=40 children and adults with epilepsy. CT results reported for 27 patients (those with complex partial seizures) Age, years, range: 3 to 61	• CT scan
Fritsch 1988 Austria Prospective cohort	N=156 children with acute partial seizures or chronic partial epilepsies Age, years, mean (range): 6.7 (3 months to 14 years)	• CT scan
Garg 1998 India Prospective cohort	N=77 children and adults with unprovoked recurrent or uncontrolled partial seizures Age, years, mean (range):16.28 (8 to 38)	• CT scan
Garvey 1998 US Retrospective cohort	N=107 children without a history of neurologic illness presenting because of a first seizure/new onset seizures Age, range: 1 month to 13 years	• CT scan
Holt-Seitz 1999	N=84 adults over the age of 60 years with definite or probable seizures	• CT scan

Study	Population	Intervention
Canada Retrospective cohort	No further details on age reported	
Hsieh 2010 US Prospective cohort	N=317 infants over the age of 1 month presenting with new-onset afebrile seizures. CT scans performed for 298 patients Age, months, range: 1 to 24 Included 2 patients with Sturge-Weber syndrome	• CT scan
Hsu 1997 Taiwan Retrospective cohort	N=19 adults with intractable complex partial seizures undergoing surgery Age, years, mean (range): 30.5 (18 to 44)	• CT scan
Ismail 2003 Saudi Arabia Cross-sectional	N=73 adults with newly diagnosed recurrent seizures Age, years, range: 19 to 80	• CT scan
Jan 2002 UK Retrospective cohort	N=18 Children and adolescents with generalised, recurrent convulsive status epilepticus and intractable epilepsy. CT results reported for 11 patients Age, years, mean (range): 15.3 (6 to 22)	• CT scan
Jha 2004 India Prospective cohort	N=150 adult males with solitary seizures. CT results reported for 115 patients Age, years, mean (range): 28.9 (18 to 52)	• CT scan
Kalra 1998 India Retrospective cohort	N=45 paediatric patients with a diagnosed childhood encephalopathy. CT scans available for 26 patients Details on age not reported	• CT scan
Keranen 1982 Finland Prospective cohort	N=83 patients over the age of 16 years with single or more spontaneous cerebral convulsions Age, years, mean (range): 39 (16 to 75)	• CT scan
Koul 2001 Oman Prospective cohort	N=44 children with West syndrome Age at onset of symptoms, months, range: 1 to 9	• CT scan
Kumar 1997 India Prospective cohort	N=178. Children presenting with generalised epilepsy or single unprovoked seizures. CT scans available for 162 patients	• CT scan

Study	Population	Intervention
	Age, range: 1 month to 12 years	
Ladurner 1980 Austria Cross-sectional	N=72 children with generalised and partial seizures. Age, range: 2 months to 14 years.	• CT scan
Longe 1994 Saudi Arabia Cross-sectional	N=142 children and adults with epilepsy (defined as more than 1 seizure) Age, years, range: under 20 to over 48	• CT scan
McGahan 1979 US Retrospective cohort	N=150 children and adults with clinical or EEG patterns satisfying standardised categories of epilepsy Age, range: under 10 years to over 65 years	• CT scan
Minford 1992 UK Retrospective cohort	N=82 children with partial seizures Age at onset of seizures, years, mean (range): 5 (5 months to 14 years)	• CT scan
Misra 1994 India Prospective cohort	N=1023 children and adults with partial seizures Age, range: under 1 year to over 50 years	• CT scan
Nair 1997 India Retrospective cohort	N=198 children over the age of 15 years with simple partial seizures Age at onset of seizures, range: 1 month to 15 years Included 3 patients with Sturge-Weber syndrome	• CT scan
Nikodijevic 2016 Macedonia Cross-sectional	N=37 children and adults with refractory epilepsy. CT results reported for 28 patients. Age, years, range: 2 to 57	• CT scan
Obajimi 2004 Nigeria Retrospective cohort	N=103 children with seizure disorders. Results from 115 scans are reported Age, mean, years (range): 7.4 (1 month to 16 years)	• CT scan
Ogunniyi 1994 Nigeria Prospective cohort	N=75 epileptic patients over the age of 12 years Age, years, mean (SD): 36 (14.8)	• CT scan
Otsubo 1995	N=28 children undergoing temporal lobectomy	• CT scan

Study	Population	Intervention
Canada Cross-sectional	Age, mean (range): 11.8 (7 months to 18 years)	
Patel 1986 Saudi Arabia Cross-sectional	N=115 children with seizures only Age, range: 3 months to 15 years	• CT scan
Patel 2013 India Prospective cohort	N=50 children with partial motor seizures Age, range: 1 month to 12 years	• CT scan
Perez Lopez 1985 Spain Retrospective cohort	N=250 adults with late onset seizures (after the age of 20 years) Age, years, mean (range): 52 (22 to 88)	• CT scan
Phukan 2002 India Cross-sectional	N=60 children with presumed idiopathic generalised seizures Age, years, range: 2 to 12 years	• CT scan
Poudel 2017 Nepal Prospective cohort	N=447 children with afebrile seizures. Results of CT scans reported for 321 patients Age at onset of seizure, months, median: 46 (IQR 12 to 102)	• CT scan
Reinikainen 1987 Finland Retrospective cohort	N=202 adults with newly diagnosed seizures Age, range, years: 16 to over 60	• CT scan
Samanta 2018 India Prospective cohort	N=300 children and adults with newly diagnosed epilepsy Age at onset of seizures, years, mean (range): 25 (5 to 50)	• CT scan
Schoenenberger 1994 US Retrospective cohort	N=119 adults presenting to emergency department within one hour of a generalised seizure Age, years, mean (SD), range: 46 (16), 16 to 87	• CT scan
Scollo-Lavizzari 1980 Switzerland Prospective cohort	N=112 children and adults with partial epilepsy with complex symptomatology Age, years, range: 5 to 73	• CT scan

Study	Population	Intervention
Shankar 2013 Nepal Prospective cohort	N=105 children with seizure disorders. CT results reported for 87 patients Age, range: 3 months to 5 years Included 4 patients with Sturge-Weber syndrome	• CT scan
Sinclair 2003 Canada Retrospective cohort	N=42 children undergoing temporal lobectomy. CT results reported for 39 patients Age at surgery, range: 18 months to 16 years	• CT scan
Singhi 2005 India Prospective cohort	N=124 neurologically 'normal' children presenting with partial seizures. CT results reported for 100 patients Age, years, range: Under 1 to 10 years	• CT scan
Swaminathan 1998 India Prospective cohort	N=40 adults with generalised convulsive status epilepticus admitted to emergency or neurology wards. CT results reported for 26 patients Age, years, mean (range): 36.30 (14 to 71)	• CT scan
Thomas 1997 India Prospective cohort	N=23 'elderly' patients (over the age of 65 years) with new onset seizures. CT results reported for 22 patients Age, years, mean (range): 69.9 (65 to 80)	• CT scan
Weishmann 2003 UK Cross-sectional	N=919 epilepsy patients over the age of 15 years. CT results reported for 163 patients Age, years, mean (range): 39.7 (15 to 87)	• CT scan

IQR: interquartile range; SD: standard deviation

See the full evidence tables in appendix D and the forest plots in appendix E.

Summary of the evidence

Epilepsy related abnormalities (clinically relevant abnormalities) detected by CT

- Very low quality evidence from 37 observational studies assessing N=6028 people with epilepsy showed that the overall proportion of people identified by CT with tumour abnormalities was 5% (95% CI, 3 to 7%). The proportion of tumour abnormalities identified by CT in subgroup analyses were as follows:
  - By age group:
    - Adults (>18 years): n= 1186, 10% (95% CI, 7 to 15%)
    - Children (<18 years): n= 2661, 3% (95% CI, 1 to 7%)

- Very low quality evidence from 38 observational studies assessing N=7035 people with epilepsy showed that the overall proportion of people identified by CT with vascular abnormalities was 7% (95% CI, 5 to 10%). The proportion of vascular abnormalities identified by CT in subgroup analyses were as follows:
    - By age group:
        - Adults (> 18 years): n= 7035, 19% (95% CI, 14 to 25%)
        - Children (< 18 years): n=1186, 6% (95% CI, 4 to 9%)
    - By presence/absence of neurological deficits:
        - Patients with neurological deficits: n=18, 11% (95% CI, 1 to 35%)

- Very low quality evidence from 18 observational studies assessing N=4329 people with epilepsy showed that the overall proportion of people identified by CT with scarring abnormalities was 3% (95% CI, 2 to 6%). The proportion of scarring abnormalities identified in subgroup analyses were as follows:
    - By age group:
        - Adults (> 18 years): n=196, 19% (95% CI, 14 to 25%)
        - Children (< 18 years): n=1803, 3% (95% CI, 2 to 4%)

- Very low quality evidence from 20 observational studies assessing N=3167 people with epilepsy showed that the overall proportion of people identified by CT with congenital/developmental abnormalities was 4% (95% CI, 3 to 7%). The proportion of congenital/developmental abnormalities identified in subgroup analyses were as follows:
    - By age group:
        - Children (< 18 years): n=2746, 5% (95% CI, 3 to 9%)

- Very low quality evidence from 19 observational studies assessing N=4287 people with epilepsy showed that the overall proportion of people identified by CT with inflammatory/infective/immune abnormalities was 14% (95% CI, 8 to 23%). The proportion of inflammatory/infective/immune abnormalities identified in subgroup analyses were as follows:
    - By age group:
        - Adults (> 18 years): n=188, 4% (95% CI, 2 to 7%)
        - Children (< 18 years): n=308, 15% (95% CI, 7 to 28%)

- Very low quality evidence from 6 observational studies assessing N=772 people with epilepsy showed that the overall proportion of people identified by CT with metabolic/genetic abnormalities was 2% (95% CI, 1 to 4%). The proportion of metabolic/genetic abnormalities identified in subgroup analyses were as follows:
    - By age group:
        - Children (< 18 years): n=683, 2% (95% CI, 1 to 4%)

- Very low quality evidence from 47 observational studies assessing N=7595 peopeople with epilepsy showed that the overall proportion of people identified by CT with non-epilepsy related abnormalities was 21% (95% CI, 17 to 27%). The proportion of non-epilepsy related abnormalities identified in subgroup analyses were as follows:
    - By age group:
        - Adults (> 18 years): n=1301, 24% (95% CI, 14 to 36%)

- Children (< 18 years): n=2944, 17% (95% CI, 13 to 24%)

- By presence/absence of neurological deficits:
  - Patients with neurological deficits: n=18, 89% (95% CI, 65 to 99%)

There was no evidence reporting on adverse events (for example, reactions to contrast agent).

Quality assessment of clinical outcomes included in the evidence review

See the clinical evidence profiles in appendix F.

Economic evidence

Included studies

A single economic search was undertaken for all topics included in the scope of this guideline but no economic studies were identified which were applicable to this review question. See the literature search strategy in appendix B and economic study selection flow chart in appendix G.

Excluded studies

A single economic search was undertaken for all topics included in the scope of this guideline. See supplementary material 2 for details.

Summary of studies included in the economic evidence review

No studies were identified which were applicable to this review question.

Economic model

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation.

Summary of the economic evidence

No evidence was identified which was applicable to this review question.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The committee identified two outcomes as relevant for this review question, both of which were agreed to be critical. These were the proportion identified with a clinically relevant abnormality, and adverse events (reactions to contrast agent). Detection of structural brain abnormalities helps clinicians to optimise therapeutic options, and whilst severe adverse reactions to contrast agents are uncommon, it is important that clinicians are mindful of this risk.

The quality of the evidence

The quality of the evidence was assessed with a modified GRADE approach, using the same principles of GRADE for assessing the quality of the evidence, but a different form of presentation as guidance on GRADE for single-arm prevalence studies is not yet available. The quality of the evidence was considered to be very low for most of the outcomes. The domain 'risk of bias' was assessed with the CEBMA checklist, and most studies were considered to be at very high risk of bias, mainly due to the sampling approaches used and concerns regarding how representative the samples were. Many of the outcomes were also downgraded due to high levels of imprecision in the estimated proportions. Other concerns included very high between-study heterogeneity amongst the included studies, for which a random effects model was considered. Possible causes for this substantial heterogeneity are believed to be the variability that was found among the included studies characteristics, such as the variety of designs, point along the pathway when CT was undertaken, or excessive clinical diversity of the individuals included. It was not considered that sensitivity analyses would identify the cause for heterogeneity as excluding a few studies from the analyses on the basis of specific characteristics could add undue emphasis on post-hoc data dependent analysis. Additionally, it was not believed that this will lead to solid results, particularly when it was already established, by committee's informal consensus that the underlying cause of heterogeneity was not due to a single factor.

As a result of the variability between the included studies, some studies appear to be outliers in the meta-analyses conducted; for example, Otsubo 1995, which contributed to the meta-analysis of proportion of tumours abnormalities identified in children. The lower 95% CI for Otsubo 1995 is above the upper 95% CI for the pooled estimate. This study reports on pre-operative abnormalities in children undergoing temporal lobectomy, and it is expected that the sample included in this study was highly selective.

There was no evidence from any of the studies on the frequency of adverse events.

Outcomes were downgraded for inconsistency, as appropriate, and the committee interpreted the evidence taking these limitations into consideration.

Overall, the committee agreed that the evidence was of insufficient quality as the basis to make recommendations alone and supplemented the information provided by the review with their clinical experience and expertise.

Benefits and harms

The evidence identified in this review generally showed that CT scans in children, young people and adults with epilepsy have variable yield in identifying epilepsy-specific and non-specific abnormalities. Yield for tumour, inflammatory and scarring abnormalities tended to be higher in adults than in children, unsurprisingly as these abnormalities are more common with age. CT scans performed in people with neurological deficits appeared to have a far higher yield of non-epilepsy-related abnormalities. However, the committee noted that this was driven by one small, older study which was not necessarily reflective of the UK population. Overall the committee agreed that the evidence was of insufficient quality or distinction in terms of subgroups or specific yield to use as the basis for making separate recommendations focusing on specific clinical contexts.

The evidence report A on the yield of MRI scans includes a discussion of the relative merits of MRI and CT, including the benefits and potential harms of each, so this has not been included in this section.

Although not specifically included in this evidence review, based on clinical experience and expertise, as well as information from the 2012 NICE guideline on diagnosis and management of epilepsies (CG137), MRI remains the neuroimaging modality of choice. As noted in evidence report A relating to the yield of MRI, the committee agreed that when MRI is contraindicated or impracticable, a CT scan may still provide useful diagnostic information and made a recommendation to consider a CT scan in these circumstances.

The committee discussed whether CT scans were required in acute and emergency situations where their use is currently variable. In the committee's experience, there is a tendency in some areas to overuse CT scans in people with established epilepsy presenting at the emergency department with a recurrent seizure. The committee agreed this was not necessary, although emphasised that if there are other concerns, such as a reason to suspect an acute neurological lesion or illness was causing the new seizure, a CT scan may still be indicated.

Cost effectiveness and resource use

The committee noted that no relevant published economic evaluations on the role of CT scans in detecting relevant abnormalities in people with epilepsy and no additional economic analysis had been undertaken in this area.

The tests recommended are already being done as part of current practice so there are unlikely to be any significant resource implications associated with these recommendations. There may be some cost savings when performing a CT scan if MRI is contraindicated.

Recommendations supported by this evidence review

This evidence review supports recommendation section 1.3.1-1.3.7.

References

Bakhsh 2013

Bakhsh, A., Value of neuroimaging in epilepsy: An experience from Pakistan, Journal of Neurosciences in Rural Practice, 4, S35-S39, 2013

Bansal 1989

Bansal, B. C., Dua, A., Gupta, R., Gupta, M. S., Appearing and disappearing CT scan abnormalities in epilepsy in India - an enigma, Journal of Neurology Neurosurgery and Psychiatry, 52, 1185-1187, 1989

Bogdanoff 1975

Bogdanoff, B. M., Stafford, C. R., Green, L., Gonzalez, C. F., Computerized transaxial tomography in the evaluation of patients with focal epilepsy, Neurology, 25, 1013-7, 1975

Brooks 1990

Brooks, B. S., King, D. W., Gammal, T. E., Meador, K., Yaghmai, F., Gay, J. N., Smith, J. R., Flanigin, H. F., MR imaging in patients with intractable complex partial epileptic seizures, American Journal of Neuroradiology, 11, 93-99, 1990

Chee 1993

Chee, M. W., Lim, S. H., Tjia, T. L., Computed tomography in patients with recurrent seizures, Annals of the Academy of Medicine, Singapore, 22, 431-4, 1993

Coe 1989

Coe, C. J., Lee, Y. H., Organic disorders in children with epileptic seizures, Acta Paediatrica Japonica, 31, 267-72, 1989

Daras 1987

Daras, M., Tuchman, A. J., Strobos, R. J., Computed tomography in adult-onset epileptic seizures in a city hospital population, Epilepsia, 28, 519-522, 1987

De la Sayette 1987

De la Sayette, V., Cosgrove, R., Melanson, D., Ethier, R., CT findings in late-onset epilepsy, Canadian Journal of Neurological Sciences, 14, 286-289, 1987

Ezeala-Adikaibe 2017

Ezeala-Adikaibe, A. B., Ohaegbulam, S. C., Ndubuisi, C. A., The Pattern of significant lesions found in computerized tomography scan of recurrent seizure patients at a center in Enugu, Nigeria, Nigerian journal of clinical practice, 20, 1289-1293, 2017

Fei 1992

Fei, Y., Liu, X., Yang, M., Xu, J., Comparative study of 99mTc-HM-PAO SPECT brain imaging, EEG and CT scanning in epileptic patients during the interictal period, Chinese medical sciences journal = Chung-kuo i hsueh k'o hsueh tsa chih / Chinese Academy of Medical Sciences, 7, 5-8, 1992

Fritsch 1988

Fritsch, G., Ebner, F., Schneider, G., Computed tomography in partial epilepsies in childhood, European Neurology, 28, 306-310, 1988

Garg 1998

Garg, R. K., Karak, B., Kar, A. M., Neuroimaging abnormalities in Indian patients with uncontrolled partial seizures, Seizure, 7, 497-500, 1998

Garvey 1998

Garvey M.A., Gaillard, W.D., Rusin, J.A., Ochsenschlager, D., Weinstein, S., Conry J.A., Winkfield D.R., Vezina L.G., Emergency brain computed tomography in children with seizures: who is most likely to benefit?, Journal of Pediatrics, 133, 664-669, 1998

Holt-Seitz 1999

Holt-Seitz, A., Wirrell, E. C., Sundaram, M. B., Seizures in the elderly: Etiology and prognosis, Canadian Journal of Neurological Sciences, 26, 110-114, 1999

Hsieh 2010

Hsieh, D. T., Chang, T., Tsuchida, T. N., Vezina, L. G., Vanderver, A., Siedel, J., Brown, K., Berl, M. M., Stephens, S., Zeitchick, A., Gaillard, W. D., New-onset afebrile seizures in infants: Role of neuroimaging, Neurology, 74, 150-156, 2010

Hsu 1997

Hsu, Y. Y., Chang, C. N., Chu, N. S., Hsu, J. C., Neuroimaging in intractable complex partial seizures, Journal of the Formosan Medical Association, 96, 51-54, 1997

Ismail 2003

Ismail, H. M., Al-Sulaiman, A. A., Abolenin, A. A., Al-Shammary, S., Al-Khamis, F., Al-Qulaiti, K., Abumadini, M. S., Newly diagnosed seizures in adults, Neurosciences, 8, 104-106, 2003

Jan 2002

Jan, M. M. S., Neville, B. G. R., Cox, T. C., Scott, R. C., Convulsive status epilepticus in children with intractable epilepsy is frequently focal in origin, Canadian Journal of Neurological Sciences, 29, 65-67, 2002

Jha 2004

Jha, S. K., Clinical profile of solitary seizures, Medical Journal Armed Forces India, 60, 146-148, 2004

Kalra 1998

Kalra, V., Passi, G. R., Analysis of childhood epileptic encephalopathies with regard to etiological and prognostic factors, Brain & Development, 20, 14-7, 1998

Keranen 1982

Keranen, T., Reinikainen, K., Lehtinen, J., Correlations of computed tomography and electro-encephalographic findings in patients with recently diagnosed epilepsy, Acta Neurologica Scandinavica, 65, 208-209, 1982

Koul 2001

Koul, R., Chacko, A., Cherian, E., West syndrome: a university hospital based study from Oman, Brain & Development, 23, 586-92, 2001

Kumar 1997

Kumar, R., Navjivan, S., Kohli, N., Sharma, B., Clinical correlates of CT abnormality in generalized childhood epilepsy in India, Journal of Tropical Pediatrics, 43, 199-203, 1997

Ladurner 1980

Ladurner, G., Fritsch, G., Sager, W. D., Iliff, L. D., Lechner, H., Computer tomography in children with epilepsy, European Neurology, 19, 180-184, 1980

Longe 1994

Longe, A. C., Omojola, M. F., Computed tomographic brain scan findings in Saudi epileptic patients, East African medical journal, 71, 567-570, 1994

McGahan 1979

McGahan, J. P., Dublin, A. B., Hill, R. P., The evaluation of seizure disorders by computerized tomography, Journal of Neurosurgery, 50, 328-32, 1979

Minford 1992

Minford, A. M. B., Forsythe, W. I., Computed tomography findings in partial seizures, Archives of Disease in Childhood, 67, 693-696, 1992

Misra 1994

Misra, S., Verma, R., Lekhra, O. P., Misra, N. K., CT observations in partial seizures, Neurology India, 42, 24-27, 1994

Nair 1997

Nair, K. P. S., Jayakumar, P. N., Taly, A. B., Arunodya, G. R., Swamy, H. S., Shanmugam, V., CT in simple partial seizures in children: A clinical and computed tomography study, Acta Neurologica Scandinavica, 95, 197-200, 1997

Nikodijevic 2016

Nikodijevic, D., Baneva-Dolnenec, N., Petrovska-Cvetkovska, D., Caparoska, D., Refractory epilepsy-MRI, EEG and CT scan, a correlative clinical study, Open Access Macedonian Journal of Medical Sciences, 4, 98-101, 2016

Obajimi 2004

Obajimi, M. O., Fatunde, O. J., Ogunseyinde, A. O., Omigbodun, O. O., Atalabi, O. M., Joel, R. U., Computed tomography and childhood seizure disorder in Ibadan, West African Journal of Medicine, 23, 167-172, 2004

Ogunniyi 1994

Ogunniyi, A., Adeyinka, A., Fagbemi, S. O., Orere, R., Falope, Z. F., Oyawole, S. O., Computerized tomographic findings in adolescent and adult Nigerian epileptics, West African Journal of Medicine, 13, 128-131, 1994

Otsubo 1995

Otsubo, H., Hwang, P. A., Hoffman, H. J., Becker, L. E., Gilday, D. L., Chuang, S. H., Harwood-Nash, D., Neuroimaging studies in children with temporal lobectomy, Child's Nervous System, 11, 281-287, 1995

Patel 2013

Patel, N. H., Jain, A. R., Iyer, V. K., Shah, A. G., Jain, D. A., Shah, A. A., Clinico - Diagnostic and therapeutic relevance of computed tomography scan of brain in children with partial seizures, Annals of Indian Academy of Neurology, 16, 352-356, 2013

Patel 1986

Patel, P. J., Kolawole, T. M., Mahdi, A. H., Qteishat, W. A., Computed tomography (CT) scan findings in children with seizures only, Acta Neurologica Scandinavica, 74, 165-166, 1986

Perez Lopez 1985

Perez Lopez, J. L., Longo, J., Quintana, F., Late onset epileptic seizures. A retrospective study of 250 patients, Acta Neurologica Scandinavica, 72, 380-384, 1985

Phukan 2002

Phukan, S., Bhargava, S. K., Balarangaiah, G., Murthy, M. G. K., Pushkarna, R., Cranial computed tomography in childhood seizures, Journal International Medical Sciences Academy, 15, 79-81, 2002

Poudel 2017

Poudel, P., Gupta, M. K., Kafle, S. P., Computerized Axial Tomography Findings in Children with Afebrile Seizures: A Hospital Based Study at Eastern Nepal, Journal of Nepal Health Research Council, 15, 61-66, 2017

Reinikainen 1987

Reinikainen K. J., Keranen, t, Lehtinen, J. M., Kalviainen, R., Saari, T., Riekkinen, P. J., CT brain scan and EEG in the diagnosis of adult onset seizures, Epilepsy Research, 1, 178-184, 1987

Rodrigues 1996

Rodrigues, M., Botelho, M. M., Fonseca, A. T., Peter, J. P., Pimentel, T., Vieira, M. R., Combined study of ^{99m}Tc-HMPAO SPECT and computerized electroencephalographic topography (CET) in patients with medically refractory complex partial epilepsy, Annals of Nuclear Medicine, 10, 113-118, 1996

Samanta 2018

Samanta, M., Mallick, A. K., Mohanty, G., Swain, K. P., Clinicoradiological evaluation of newly diagnosed epilepsy: A monocentric prospective study from a tertiary care hospital of eastern india, Journal of Clinical and Diagnostic Research, 12, OC05-OC09, 2018

Schoenenberger 1994

Schoenenberger, R. A., Heim, S. M., Indication for computed tomography of the brain in patients with first uncomplicated generalised seizure, British Medical Journal, 309, 986-989, 1994

Scollo-Lavizzari 1980

Scollo-Lavizzari, G., Balmer, C., Electroencephalography and computerized transaxial tomography in patients with temporal lobe epilepsy, European Neurology, 19, 33-38, 1980

Shankar 2013

Shankar, S. G., Prakash, M. O., Pattern of seizure disorders in children in Eastern Nepal, Journal of Pediatric Neurology, 11, 103-106, 2013

Sinclair 2003

Sinclair, D. B., Aronyk, K., Snyder, T., McKean, J., Wheatley, M., Bhargava, R., Hoskinson, M., Hao, C., Colmers, W., Pediatric temporal lobectomy for epilepsy, Pediatric Neurosurgery, 38, 195-205, 2003

Singhi 1997

Singhi, S., Singhi, P., Clinical profile and etiology of partial seizures in north Indian infants and children, Journal of Epilepsy, 10, 32-36, 1997

Swaminathan 1998

Swaminathan, S., Sawhney, I. M. S., Jain, S., Garg, S. K., Profile of status epilepticus - A prospective study, Neurology India, 46, 279-283, 1998

Thomas 1997

Thomas, S. V., Pradeep, K. S., Rajmohan, S. J., First ever seizures in the elderly: a seven-year follow-up study, Seizure, 6, 107-10, 1997

Weishmann 2003

Wieshmann, U. C., Clinical application of neuroimaging in epilepsy, Journal of Neurology Neurosurgery and Psychiatry, 74, 466-470, 2003

Appendices

Appendix A – Review protocols

Review protocol for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

Table 3: Review protocol for yield of relevant abnormalities detected by CT in people with epilepsy

Field	Content
PROSPERO registration number	CRD42019159416
Review title	Computed tomography (CT) scan performance in people with epilepsy
Review question	What is the yield of relevant abnormalities detected by CT in people with epilepsy? *Note: The question has changed from that in the scope, as the committee agreed the accuracy of CT is known; however determining when CT should be used is not clear.*
Objective	The objective of this review is to assess how well computed tomography (CT) performs in detecting brain lesions or other relevant abnormalities with epilepsy. Knowing the frequency of these abnormalities helps clinicians to recognise those people who are most at risk of adverse outcomes, and helps to optimise therapeutic options.
Searches	The following databases will be searched: • CDSR • CENTRAL • DARE • HTA

Field	Content
	• MEDLINE & MEDLINE In-Process and Other Non-Indexed Citations • Embase • EMCare Searches will be restricted by: • Date: No date limit • English language studies • Human studies
Condition or domain being studied	• Epilepsy
Population	Inclusion: • People with 1 or more confirmed epileptic seizures Exclusion: • Newborn babies (under 28 days) with acute symptomatic seizures
Interventions	• Computed tomography
Comparator	• Not relevant
Types of study to be included	• Systematic reviews of observational studies • Prospective/retrospective cohort studies • Cross-sectional studies Note: For further details, see the algorithm in appendix H, Developing NICE guidelines: the manual.
Other exclusion criteria	• Studies with a mixed population (this is, including children, young people and adults with epilepsy and others with a condition different to epilepsy) will be excluded, unless subgroup analysis for epilepsy has been reported. • Conference abstracts will be excluded because these do not typically provide sufficient information to fully assess risk of bias.
Context	Recommendations will apply to those receiving care in any healthcare setting (for example, community, primary, secondary care).

Field	Content
	Priority in decision making will be given to identified studies which report data on both MRI and CT as determining who should be tested for MRI and/or CT is required when determining the aetiology of epilepsy.

Primary outcomes (critical outcomes)	• Proportion identified with a clinically relevant abnormality after:
	  ○ A first seizure
	  ○ Seizure different from the usual seizure in patients with epilepsy
	
	Clinically relevant abnormalities such as:
	• Encephalomalacia/scarring
	• Haemorrhage
	• Infarctions
	• Calcification
	• AVM (arterio venuous malformation)
	• Hydrocephalus
	• Oedema/edema
	• Tumour
	• Adverse events: reaction to contrast agent.

Secondary outcomes (important outcomes)	None
Data extraction (selection and coding)	All references identified by the searches and from other sources will be uploaded into STAR and de-duplicated. Titles and abstracts of the retrieved citations will be screened. The full text of potentially eligible studies will be retrieved and will be assessed in line with the inclusion criteria outlined in the review protocol. Studies that fail to meet the inclusion criteria once the full version has been checked will be excluded at this stage. Each study excluded after checking the full version will be listed, along with the reason for its exclusion. A standardised form will be used to extract data from studies (see Developing NICE guideline: the manual section 6.4) and will include: study setting; study design; study aim; study dates; funding; sample size; participant demographics and baseline characteristics; inclusion and exclusion criteria; details of intervention and control groups; study methodology; recruitment and study completion rates; outcomes and times of measurement; and information for assessment of risk of bias.

Field	Content
	All data extraction will be quality assured by a senior reviewer. Draft included and excluded studies tables will be circulated to the Topic Group for their comments. Resolution of disputes will be by discussion between the senior reviewer, Topic advisor and Chair. Duplicate screening will not be undertaken for this question.
Risk of bias (quality) assessment	Quality assessment of individual studies will be performed using the following checklists: • ROBIS tool for systematic reviews • The CEBMA checklist for prevalence data The quality assessment will be performed by one reviewer and this will be quality assessed by a senior reviewer
Strategy for data synthesis	Depending on the availability of the evidence, the findings will be summarised narratively or quantitatively. Data synthesis Yield data will be extracted from the studies, and where possible, meta-analyses will be conducted using R, version 3.1.2. A fixed effect meta-analysis will be conducted and data will be presented as absolute rates of yield. Heterogeneity Heterogeneity in the effect estimates of the individual studies will be assessed using the I^2 statistic. I^2 values of greater than 50% and 75% will be considered as significant and very significant heterogeneity, respectively. In the presence of heterogeneity, sub-group analysis will be conducted: • according to the risk of bias of individual studies • study location Exact sub-group analysis may vary depending on differences identified within included studies. If heterogeneity cannot be explained using these methods, random effects model will be used. If heterogeneity remains above 75% and cannot be explained by sub-group analysis; reviewers will consider if meta-analysis is appropriate given characteristics of included studies. Validity

Field	Content			
	The confidence in the findings across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group: http://www.gradeworkinggroup.org/			

Analysis of sub-groups	Stratification
	If data is available, separate analysis will be conducted on:
	• Age group:
	  ○ Children (≤18 years)
	  ○ Adults
	• Seizure only versus seizure with encephalopathy +/- other neurological deficit/history
	• According to those who have or have not had a previous MRI scan			

Type and method of review	☐	Intervention		
	☐	Diagnostic		
	☐	Prognostic		
	☐	Qualitative		
	☒	Epidemiologic		
	☐	Service Delivery		
	☐	Other (please specify)		
Language	English			
Country	England			
Anticipated or actual start date	16 January 2020			
Anticipated completion date	21 April 2021			
Stage of review at time of this submission	Review stage		Started	Completed
	Preliminary searches		x	x

Field	Content		
	Piloting of the study selection process	x	x
	Formal screening of search results against eligibility criteria	x	x
	Data extraction	x	x
	Risk of bias (quality) assessment	x	x
	Data analysis	x	x
Named contact	5a. Named contact National Guideline Alliance 5b. Named contact e-mail epilepsies@nice.org.uk 5c. Organisational affiliation of the review National Institute for Health and Care Excellence (NICE) and National Guideline Alliance		
Review team members	NGA technical team		
Funding sources/sponsor	This systematic review is being completed by the National Guideline Alliance, which is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists. NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England.		
Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.		
Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: https://www.nice.org.uk/guidance/indevelopment/gid-ng10112		

Field	Content
Other registration details	Not applicable
URL for published protocol	https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42019159416
Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: notifying registered stakeholders of publication publicising the guideline through NICE's newsletter and alerts issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.
Keywords	abnormalities, children, CT, epilepsy, management, adults, patient outcomes, young people, seizures
Details of existing review of same topic by same authors	Not applicable
Additional information	Not applicable
Details of final publication	www.nice.org.uk

CDSR: Cochrane Database of Systematic Reviews; CEBMA; center for evidence-based management; CENTRAL: Cochrane Central Register of Controlled Trials; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HTA: Health Technology Assessment; MID: minimal important difference; NICE: National Institute for Health and Care Excellence; RCT: Randomised Controlled Trial; RoB: Risk of Bias; ROBIS: risk of bias in systematic reviews; SD: Standard Deviation

Appendix B – Literature search strategies

Literature search strategies for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

Clinical

Database(s): EMCare, MEDLINE and Embase (Multifile) – OVID

EMCare 1995 to November 25, 2019; Embase Classic+Embase 1947 to 2019 November 25; Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily 2019 November 25, 2019
Date of last search: 25 November 2019

Multifile database codes: emcr=EMCare; emczd=Embase Classic+Embase; ppez= MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily

#	searches
1	exp epilepsy/ use ppez, emczd, emcr or epilep*.ti,ab.
2	(((absence or astatic or atonic or tonic or tonic clonic) adj2 (seizure* or spasm*)) or (benign adj2 (childhood or neonatal or pediatric or paediatric) adj2 (convulsion* or seizure* or spasm*)) or (benign adj3 convulsion* adj2 centrotemporal adj2 spike*) or ((centralopathic or centrotemporal or temporal-central focal) adj (convulsion* or seizure*)) or continous spike wave of slow sleep or doose* or dravet or ((early or infantile) adj2 myoclonic adj2 encephalopath*) or ((flexor or infantile or neonatal) adj2 (seizure* or spasm*)) or hypsarrhythmia* or infant* spasm* or ((jacknife or jack nife or lightening or nodding or salaam) adj (attack* or convulsion* or seizure* or spasm*)) or (landau adj2 kleffner) or lennox gastaut or massive myoclonia or (myoclonic adj2 (astatic or atonic)) or (myoclonic adj3 (seizure* or spasm*)) or ((osylvian or postrolandic or roland*) adj2 (convulsion* or seizure* or spasm*)) or propulsive petit mal or spasm in*1 flexion or spasmus nutans or west syndrome*).ti,ab.
3	(bcects or bects or brec or cects or lgs or mae or smei).ti,ab.
4	or/1-3
5	seizure*.ti,ab,hw. or (convulsion* or fits or jerk* or spasm*).ti,ab.
6	4 and 5
7	exp tomography, emission-computed/ use ppez or tomography, x-ray computed/ ppez or computer assisted tomography/ use emczd, emcr
8	((comput* or ct* or cat* or emission or radionuclide) adj2 (angiogra* or imag* or scan* or tomogra* or tomoangiogra*)).ti,ab.
9	or/7-8
10	brain injuries/ use ppez or exp brain injury/ use emczd, emcr or ((brain* or cerebral) adj2 (abnormal* or damage or lesion* or malformation*)).ti,ab.
11	exp encephalomalacia/ use ppez, emczd, emcr or ((brain adj (malacia or softening)) or cerebromalacia* or encephalomalacia* or scarring).ti,ab.
12	exp hemorrhage/ or (bleeding or (blood adj (effusion or loss)) or ha?morrhag* or he?morrhag*).ti,ab.
13	infarction/ use ppez, emczd, emcr or (infarct* or ((thrombo embolic or thromboembolic) adj accident*)).ti,ab.
14	calcification*.hw. or calcification.ti,ab.
15	exp vascular malformations/ use ppez or exp congenital blood vessel malformation/ use emczd, emcr or ((vascular adj (abnormal* or malformation*)) or ((arteriovenous or arterio venous) adj malformation*) or avm).ti,ab.
16	exp hydrocephalus/ use ppez, emczd, emcr or (aqueductal stenos?s or cerebral ventriculomegal* or hydrocephal*).ti,ab.
17	exp edema/ use ppez, emczd, emcr or (anasarca or dropsy or hydrops or oedema* or edema* or tissue swelling).ti,ab.
18	exp brain neoplasms/ use ppez or meningioma/ use ppez, emczd, emcr or exp brain tumor/ use emczd, emcr
19	(((brain or cerebral or intracranial or meninges or midline) adj2 (cancer* or metastases or neoplasm* or tumor* or tumour*)) or cerebroma* or mening?oma*).ti,ab.
20	(or/10-19) or (abnormal* or lesion* or malformation*).ti,ab. or malformation*.hw.
21	exp epilepsy/di or diagnos*.sh. or (diagnos* or detect* or identif* or indicat* or reveal* or ((epilepsy or seizure) adj protocol*) or yield*).ti,ab.
22	6 and 9 and 20 and 21

#	searches
23	6 and 9 and ((angiogra* or tomoangiogra* or imag* or scan* or tomogra*) adj3 (abnormal* or lesion* or malformation*)).ti,ab.
24	(6 and 9 and (exp case control studies/ or exp cohort studies/ or cross-sectional studies/ or epidemiologic studies/ or observational study/ or (case control or (cohort adj (analy* or study or studies)) or cross sectional or (follow up adj (study or studies)) or longitudinal or (observational adj (study or studies)) or retrospective).ti,ab.) and ((abnormal* or lesion* or malformation*).ti,ab. or malformation*.hw.)) use ppez or (6 and 9 and (exp case control study/ or cohort analysis/ or cross-sectional study/ or follow up/ or longitudinal study/ or observational study/ or prospective study/ or retrospective study/ or (case control or (cohort adj (analy* or study or studies)) or cross sectional or (follow up adj (study or studies)) or longitudinal or (observational adj (study or studies)) or retrospective).ti,ab.) and ((abnormal* or lesion* or malformation*).ti,ab. or malformation*.hw.)) use emczd, emcr
25	or/22-24
26	limit 25 to english language
27	((letter.pt. or letter/ or note.pt. or editorial.pt. or case report/ or case study/ or (letter or comment*).ti.) not (randomized controlled trial/ or random*.ti,ab.)) or ((animal/ not human/) or nonhuman/ or exp animal experiment/ or exp experimental animal/ or animal model/ or exp rodent/ or (rat or rats or mouse or mice).ti.)
28	27 use emez
29	((letter/ or editorial/ or news/ or exp historical article/ or anecdotes as topic/ or comment/ or case report/ or (letter or comment*).ti.) not (randomized controlled trial/ or random*.ti,ab.)) or ((animals not humans).sh. or exp animals, laboratory/ or exp animal experimentation/ or exp models, animal/ or exp rodentia/ or (rat or rats or mouse or mice).ti.)
30	29 use mesz
31	28 or 30
32	26 not 31

Database(s): Cochrane Library

Cochrane Database of Systematic Reviews, Issue 11 of 12, November 2019; Cochrane Central Register of Controlled Trials, Issue 11 of 12, November 2019
Date of last search: 25 November 2019

#	searches
1	mesh descriptor: [epilepsy] explode all trees
2	epilep*:ti,ab
3	(((absence or astatic or atonic or tonic or “tonic clonic”) near/2 (seizure* or spasm*)) or (benign near/2 (childhood or neonatal or pediatric or paediatric) near/2 (convulsion* or seizure* or spasm*)) or (benign near/3 convulsion* near/2 centrotemporal near/2 spike*) or ((centralopathic or centrotemporal or “temporal-central” focal) next (convulsion* or seizure*)) or “continous spike wave of slow sleep” or doose* or dravet or ((early or infantile) near/2 myoclonic near/2 encephalopath*) or ((flexor or infantile or neonatal) near/2 (seizure* or spasm*)) or hypsarrhythmia* or “infant* spasm*” or ((jacknife or “jack nife” or lightening or nodding or salaam) next (attack* or convulsion* or seizure* or spasm*)) or (landau near/2 kleffner) or “lennox gastaut” or “massive myoclonia” or (myoclonic near/2 (astatic or atonic)) or (myoclonic near/3 (seizure* or spasm*)) or ((osylvian or postrolandic or roland*) near/2 (convulsion* or seizure* or spasm*)) or “propulsive petit mal” or “spasm in* flexion” or “spasmus nutans” or “west syndrome*”):ti,ab
4	(bcects or bects or brec or cects or lgs or mae or smei)
5	{ or #1-#4}
6	(convulsion* or fits or jerk* or seizure* or spasm*):ti,ab,kw
7	#5 and #6
8	mesh descriptor: [tomography, emission-computed] explode all trees
9	mesh descriptor: [tomography, x-ray computed] this term only
10	((comput* or ct* or cat* or emission or radionuclide) near/2 (angiogra* or imag* or scan* or tomogra* or tomoangiogra*)):ti,ab
11	{or #8-#10}

#	searches
12	mesh descriptor: [brain injuries] this term only
13	mesh descriptor: [encephalomalacia] explode all trees
14	mesh descriptor: [hemorrhage] explode all trees
15	mesh descriptor: [infarction] this term only
16	calcification*:kw
17	mesh descriptor: [vascular malformations] explode all trees
18	mesh descriptor: [hydrocephalus] explode all trees
19	mesh descriptor: [edema] explode all trees
20	mesh descriptor: [brain neoplasms] explode all trees
21	mesh descriptor: [meningioma] this term only
22	((brain* or cerebral) near/2 (abnormal* or damage or lesion* or malformation*)):ti,ab
23	((brain next (malacia or softening)) or cerebromalacia* or encephalomalacia* or scarring) :ti,ab
24	(bleeding or (blood next (effusion or loss)) or ha?morrhag* or he?morrhag*):ti,ab
25	(infarct* or ((“thrombo embolic” or thromboembolic) next accident*)):ti,ab
26	calcification:ti,ab
27	((vascular next (abnormal* or malformation*)) or ((arteriovenous or “arterio venous”) next malformation*) or avm) :ti,ab
28	(“aqueductal stenos?s” or “cerebral ventriculomegal*” or hydrocephal*):ti,ab
29	(anasarca or dropsy or hydrops or oedema* or edema* or “tissue swelling”) :ti,ab
30	(((brain or cerebral or intracranial or meninges or midline) near/2 (cancer* or metastases or neoplasm* or tumor* or tumour*)) or cerebroma* or mening?oma*):ti,ab
31	(abnormal* or lesion* or malformation*) :ti,ab
32	malformation*:kw.
33	{or #12-#32}
34	MeSH descriptor: [epilepsy] explode all trees and with qualifier(s): [diagnosis - DI]
35	diagnos*:kw
36	(diagnos* or detect* or identif* or indicat* or reveal* or ((epilepsy or seizure) next protocol*) or yield*):ti,ab
37	{or #34-#36}
38	#7 and #11 and #33 and #37
39	((angiogra* or tomoangiogra* or imag* or scan* or tomogra*) near/3 (abnormal* or lesion* or malformation*)):ti,ab
40	#7 and #11 and #39
41	mesh descriptor: [case control studies] explode all trees
42	mesh descriptor: [cohort studies] explode all trees
43	mesh descriptor: [cross-sectional studies] this term only

#	searches
44	mesh descriptor: [epidemiologic studies] this term only
45	mesh descriptor: [observational study] this term only
46	(“case control” or (cohort next (analy* or study or studies)) or “cross sectional” or (“follow up” next (study or studies)) or longitudinal or (observational next (study or studies)) or retrospective)):ti,ab
47	((abnormal* or lesion* or malformation* or malformation*):ti,ab,kw
48	{or #41-#46}
49	#47 and #48
50	#7 and #11 and #49
51	#38 or #40 or #50

Database(s): DARE; HTA database - CRD
Date of last search: 25 November 2019

#	searches
1	mesh descriptor epilepsy explode all trees
2	epilep*
3	(((absence or astatic or atonic or tonic or “tonic clonic”) near2 (seizure* or spasm*)) or (benign near2 (childhood or neonatal or pediatric or paediatric) near2 (convulsion* or seizure* or spasm*)) or (benign near3 convulsion* near2 centrotemporal near2 spike*) or ((centralopathic or centrotemporal or “temporal-central” focal) next (convulsion* or seizure*)) or “continous spike wave of slow sleep” or doose* or dravet or ((early or infantile) near2 myoclonic near2 encephalopath*) or ((flexor or infantile or neonatal) near2 (seizure* or spasm*)) or hypsarrhythmia* or “infant* spasm*” or ((jacknife or “jack nife” or lightening or nodding or salaam) next (attack* or convulsion* or seizure* or spasm*)) or (landau near2 kleffner) or “lennox gastaut” or “massive myoclonia” or (myoclonic near2 (astatic or atonic)) or (myoclonic near3 (seizure* or spasm*)) or ((osylvian or postrolandic or roland*) near2 (convulsion* or seizure* or spasm*)) or “propulsive petit mal” or “spasm in* flexion” or “spasmus nutans” or “west syndrome*”)
4	(bcects or bects or brec or cects or lgs or mae or smei)
5	#1 or #2 or #3 or #4

Economic

Database(s): MEDLINE & Embase (Multifile) - OVID
Embase Classic+Embase 1947 to 2021 March 31; Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily 1946 to March 31, 2021
Date of last search: 31 March 2021

Multifile database codes: emczd=Embase Classic+Embase; ppez= MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily

#	searches
1	exp epilepsy/ or exp seizure/ or "seizure, epilepsy and convulsion"/
2	1 use emczd
3	exp epilepsy/ or seizures/ or seizures, febrile/ or exp status epilepticus/
4	3 use ppez
5	(epilep* or seizure* or convuls*).ti,ab. or (continous spike wave of slow sleep or infant* spasm*).ti,ab.
6	(seizure and absence).sh. use emczd, emcr or seizures/ use ppez or ((absence adj2 (convulsion* or seizure*)) or ((typical or atypical) adj absenc*) or petit mal* or pyknolepsy or typical absence*).ti,ab.

#	searches
7	(atonic seizure or tonic seizure).sh. use emczd, emcr or exp seizures/ use ppez or ((drop or akinetic or atonic or tonic) adj2 (attack* or epileps* or seizure* or convulsion*)).ti,ab. or brief seizure.ti,ab. or (tonic adj3 atonic adj3 (attack* or epileps* or seizure* or convulsion*)).ti,ab.
8	exp benign childhood epilepsy/ use emczd, emcr or epilepsy, rolandic/ use ppez or (bcects or bects or brec or benign epilepsy or (benign adj2 (childhood or neonatal or pediatric or paediatric) adj2 epileps*) or (benign adj2 (childhood or neonatal or pediatric or paediatric) adj2 (convulsion* or epileps* or seizure* or spasm*)) or (benign adj3 (convulsion* or epileps*) adj2 centrotemporal adj2 spike*) or cects or ((centralopathic or centrotemporal or temporal-central focal) adj (convulsion* or epileps* or seizure*)) or ((osylvian or postrolandic or roland*) adj2 (convulsion* or epileps* or seizure* or spasm*))).ti,ab.
9	exp generalized epilepsy/ use emczd, emcr or exp epilepsy, generalized/ use ppez
10	(((akinetic or atonic or central or diffuse or general or generali?ed or idiopathic or tonic) adj3 (epilep* or seizure*)) or ((childhood absence or juvenile absence or myoclonic or myoclonia or myoclonic astatic or myoclonus or gtcs) adj2 epilep*) or (epilepsy adj2 eyelid myoclonia) or (ige adj2 phantom absenc*) or impulsive petit mal or (janz adj3 (epilep* or petit mal)) or jeavons syndrome* or ((janz or lafora or lafora body or lundborg or unverricht) adj2 (disease or syndrome)) or ((jme or jmes) and epilep*) or perioral myoclon*).ti,ab.
11	infantile spasm/ use emczd, emcr or spasms, infantile/ use ppez or (((early or infantile) adj2 myoclonic adj2 encephalopath*) or ((early or infantile) adj2 epileptic adj2 encephalopath*) or epileptic spasm* or ((flexor or infantile or neonatal) adj2 (seizure* or spasm*)) or generali?ed flexion epileps* or hypsarrhythmia* or ((jacknife or jack nife or lightening or nodding or salaam) adj (attack* or convulsion* or seizure* or spasm*)) or massive myoclonia or minor motor epilepsy or propulsive petit mal or spasm in*1 flexion or spasmus nutans or west syndrome*).ti,ab.
12	landau kleffner syndrome/ use emczd, emcr, ppez or (dravet or lennox gastaut or lgs or (landau adj2 kleffner) or smei).ti,ab.
13	lennox gastaut syndrome/ use emczd, emcr or lennox gastaut syndrome/ use ppez or generalized epilepsy/ use emczd, emcr or epileptic syndromes/ use ppez
14	(child* epileptic encephalopath* or gastaut or lennox or lgs).ti,ab.
15	myoclonus seizure/ use emczd, emcr or seizures/ use ppez or ((myoclon* adj2 (absence* or epileps* or seizure* or jerk* or progressive familial epilep* or spasm* or convulsion*)) or ((lafora or unverricht) adj2 disease) or muscle jerk).ti,ab.
16	myoclonic astatic epilepsy/ use emczd, emcr or exp epilepsies, myoclonic/ use ppez or ((myoclonic adj2 (astatic or atonic)) or (myoclonic adj3 (seizure* or spasm*)) or doose* syndrome or mae or generali?ed idiopathic epilepsy).ti,ab. or ((absence or astatic or atonic or tonic or tonic clonic) adj2 (seizure* or spasm*)).ti,ab.
17	exp epilepsies, partial/ use ppez or exp focal epilepsy/ use emczd, emcr or ((focal or focal onset or local or partial or simple partial) adj3 (epileps* or seizure*)).ti,ab.
18	severe myoclonic epilepsy in infancy/ use emczd, emcr or exp epilepsies, myoclonic/ use ppez
19	(dravet*1 or (intractable childhood epilepsy adj2 (generalised tonic clonic or gtc)) or icegtc* or (severe adj2 (myoclonic or polymorphic) adj2 epilepsy adj2 infancy) or smeb or smei).ti,ab.
20	epilepsy, tonic-clonic/ use ppez or epilepsy, generalized/ use ppez or generalized epilepsy/ use emczd, emcr or grand mal epilepsy/ use emczd, emcr or (((clonic or grand mal or tonic or (tonic adj3 clonic)) adj2 (attack* or contraction* or convuls* or seizure*)) or gtcs or (generali* adj (contraction* or convuls* or insult or seizure*))).ti,ab.
21	or/2,4-20
22	exp budgets/ or exp "costs and cost analysis"/ or exp economics, hospital/ or exp economics, medical/ or economics, nursing/ or economics, pharmaceutical/ or economics/ or exp "fees and charges"/ or value of life/
23	22 use ppez
24	budget/ or exp economic evaluation/ or exp fee/ or funding/ or health economics/ or exp health care cost/
25	24 use emczd
26	budget*.ti,ab.
27	cost*.ti.
28	(economic* or pharmaco economic* or pharmacoeconomic*).ti.
29	(price* or pricing*).ti,ab.
30	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
31	(financ* or fee or fees).ti,ab.
32	(value adj2 (money or monetary)).ti,ab.
33	or/23,25-32
34	21 and 33
25	limit 34 to engish language

Database(s): NHS Economic Evaluation Database (NHS EED), HTA database – CRD

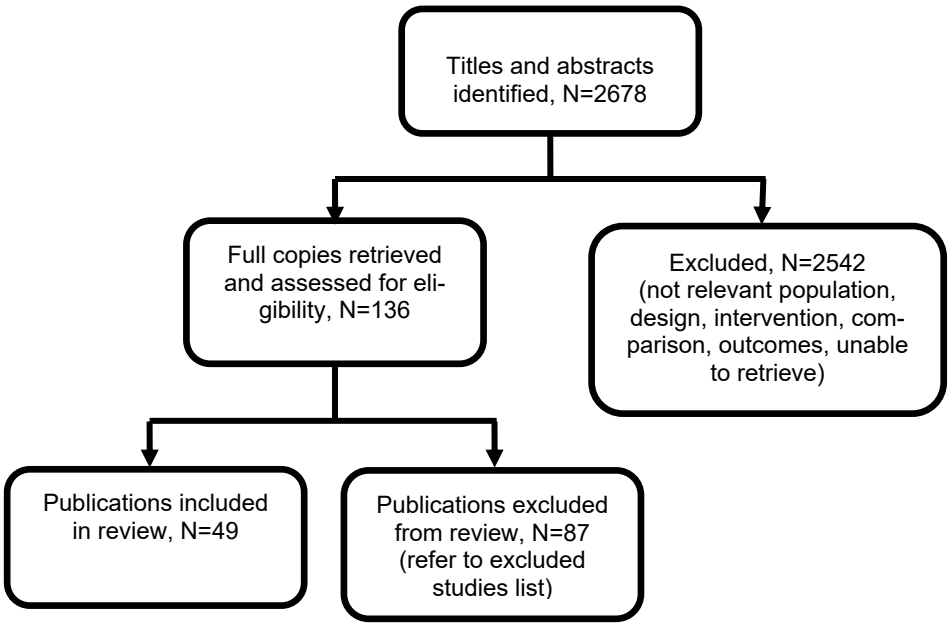
Date of last search: 31 March 2021

#	searches
1	mesh descriptor epilepsy explode all trees
2	mesh descriptor seizures this term only
3	mesh descriptor seizures, febrile this term only
4	mesh descriptor status epilepticus explode all trees
5	(epilep* or seizure* or convuls*) or ("continous spike wave of slow sleep" or "infant* spasm*")
6	((absence near2 (convulsion* or seizure*)) or ((typical or atypical) next absenc*) or "petit mal*" or pyknolepsy or "typical absence*")
7	mesh descriptor seizures explode all trees
8	((drop or akinetic or atonic or tonic) near2 (attack* or epileps* or seizure* or convulsion*)) or "brief seizure" or (tonic near3 atonic near3 (attack* or epileps* or seizure* or convulsion*))
9	mesh descriptor epilepsy, rolandic this term only
10	(bcects or bects or brec or "benign epilepsy" or (benign near2 (childhood or neonatal or pediatric or paediatric) near2 epileps*) or (benign near2 (childhood or neonatal or pediatric or paediatric) near2 (convulsion* or epileps* or seizure* or spasm*)) or (benign near3 (convulsion* or epileps*) near2 centrotemporal near2 spike*) or cects or ((centralopathic or centrotemporal or "temporal-central focal") near (convulsion* or epileps* or seizure*)) or ((osylvian or postrolandic or roland*) near2 (convulsion* or epileps* or seizure* or spasm*)))
11	mesh descriptor epilepsy, generalized this term only
12	(((akinetic or atonic or central or diffuse or general or generali?ed or idiopathic or tonic) near3 (epilep* or seizure*)) or (("childhood absence" or "juvenile absence" or myoclonic or myoclonia or "myoclonic astatic" or myoclonus or gtcs) near2 epilep*) or (epilepsy near2 "eyelid myoclonia") or (ige near2 phantom absenc*) or "impulsive petit mal" or (janz near3 (epilep* or "petit mal")) or "jeavons syndrome*" or ((janz or lafora or "lafora body" or lundborg or unverricht) near2 (disease or syndrome)) or ((jme or jmes) and epilep*) or "perioral myoclon*")
13	mesh descriptor spasms, infantile this term only
14	(((early or infantile) near2 myoclonic near2 encephalopath*) or ((early or infantile) near2 epileptic near2 encephalopath*) or "epileptic spasm*" or ((flexor or infantile or neonatal) near2 (seizure* or spasm*)) or "generali?ed flexion epileps*" or hypsarrhythmia* or ((jacknife or "jack nife" or lightening or nodding or salaam) next (attack* or convulsion* or seizure* or spasm*)) or "massive myoclonia" or "minor motor epilepsy" or "propulsive petit mal"or "spasm in* flexion" or "spasmus nutans" or "west syndrome*")
15	mesh descriptor landau kleffner syndrome this term only
16	(dravet or "lennox gastaut" or lgs or (landau near2 kleffner) or smei)
17	mesh descriptor lennox gastaut syndrome this term only
18	mesh descriptor epileptic syndromes this term only
19	("child* epileptic encephalopath*" or gastaut or lennox or lgs)
20	((myoclon* near2 (absence* or epileps* or seizure* or jerk* or "progressive familial epilep*" or spasm* or convulsion*)) or ((lafora or unverricht) near2 disease) or "muscle jerk")
21	mesh descriptor epilepsies, myoclonic explode all trees
22	((myoclonic near2 (astatic or atonic)) or (myoclonic near3 (seizure* or spasm*)) or "doose* syndrome" or mae or "generali?ed idiopathic epilepsy") or ((absence or astatic or atonic or tonic or "tonic clonic") near2 (seizure* or spasm*))
23	mesh descriptor epilepsies, partial explode all trees
24	((focal or "focal onset" or local or partial or "simple partial") near3 (epileps* or seizure*))
25	mesh descriptor epilepsies, myoclonic this term only
26	(dravet*1 or ("intractable childhood epilepsy" near2 ("generalised tonic clonic" or gtc)) or icegtc* or (severe near2 (myoclonic or polymorphic) near2 epilepsy near2 infancy) or smeb or smei)
27	mesh descriptor epilepsy, tonic-clonic this term only
28	mesh descriptor epilepsy, generalized this term only
29	(((clonic or "grand mal" or tonic or (tonic near3 clonic)) near2 (attack* or contraction* or convuls* or seizure*)) or gtcs or (generali* next (contraction* or convuls* or insult or seizure*)))
30	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29

Appendix C – Clinical evidence study selection

Clinical study selection for: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

Figure 1: Study selection flow chart



Appendix D – Clinical evidence tables

Clinical evidence tables for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

Table 4: Clinical evidence tables

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Bakhsh, A., Value of neuroimaging in epilepsy: An experience from Pakistan, Journal of Neurosciences in Rural Practice, 4, S35-S39, 2013 **Ref Id** 1153420 **Country/ies where the study was carried out** Pakistan **Study type** Prospective cohort **Aim of the study** To "… detect the possible structural brain lesions in the patients suffering from various kinds of epilepsy during the routine neuroimaging." p S35	**Sample size** N=366. CT scans performed in 338 patients **Characteristics** Patients with epilepsy (regardless of cause, type, or neurological status) Age, years, range 1-70 (1 -10 years n=53; 11-20 years n=140 years; 21-30 years n=100; 31-40 years n=40; 41-50 years n=18; 51-60 years n=8; 61-70 years n=7) Sex – male n=240; female n=126 Seizure type – generalised tonic clonic n=282 (77.04%); complex partial leading to generalised tonic clonic n=70 (19.12%); partial motor leading to generalised tonic clonic n=10 (2.73%); juvenile myoclonic epilepsy n=2 (0.54%); complex partial n=2 (0.54%) Seizure cause – idiopathic n=196 (53.55%); familial n=120 (32.43%); post traumatic n=26 (7.02%); post	**Interventions** • CT scanner - Toshiba • 10 mm thickness axial cuts • Plain or contrast – not reported • Patients required to pay for procedure – yes	**Details** Not reported Outpatient setting. Diagnosis of epilepsy made on basis of clinical history only	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 2/339 Vascular: 18/339 Scarring: 1/339 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 20/339	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Not reported	meningitic n=20 (5.40%); post stroke n=4 (1.08%) Neurological deficit – present 2%; absent 98% **Inclusion criteria** Not reported **Exclusion criteria** • Patients under age of 1 • Patients who had only experienced 1 seizure • Patients experiencing pseudoseizures • Patients experiencing atypical seizures • Female patients who were pregnant • Patients with seizures secondary to any metabolic disorders • Patients with a seizure frequency of 1 per year				Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Yes Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? Yes Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Bansal, B. C., Dua, A., Gupta, R., Gupta, M. S., Appearing and disappearing CT scan abnormalities in epilepsy in India - an enigma, Journal of	**Sample size** N=230 **Characteristics** Consecutive patients with focal and generalised epilepsy, who were willing to have a CT scan	**Interventions** Majority of CT scans were enhanced and carried out within six weeks of an ictus. No further details reported.	**Details** Consecutive patients attending 1 neurology clinic	**Results** <u>Proportion identified with a clinically relevant abnormality</u>: Tumour: 4/230 Vascular: 1/230 Scarring: 5/230 Congenital/ developmental: NA	**Limitations** <u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Neurology Neurosurgery and Psychiatry, 52, 1185-1187, 1989 **Ref Id** 1153430 **Country/ies where the study was carried out** India **Study type** Prospective cohort **Aim of the study** Not reported **Study dates** Not reported **Source of funding** Not reported	Age, years, mean (range): 23.58 (5 – 54) Sex – male: female ratio = 2:1 **Inclusion criteria** Not reported **Exclusion criteria** • Patients with syncope, hysterical seizures, blackouts of indeterminate nature, brain tumours, and exposure to intoxicants were excluded			Inflammatory/infective/ immune: 8/230 Metabolic/genetic: NA. Other: 128/230	Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Ye Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Bogdanoff, B. M., Stafford, C. R., Green, L., Gonzalez, C. F., Computerized transaxial tomography in the evaluation of patients with focal epilepsy, Neurology, 25, 1013-7, 1975 **Ref Id** 1153508 **Country/ies where the study was carried out** US **Study type** Cross-sectional **Aim of the study** To determine the applicability of computerized transaxial tomography to the evaluation of ambulatory patients with focal epileptic disorders **Study dates** Not reported **Source of funding** Not reported	**Sample size** N=50. 51 scans reported as 1 patient had 2 scans **Characteristics** Patients with focal seizures Age - range 5-68 years (mean age 27.2 years) Sex – male n=24; female n=26 Age at onset – infancy n=5; childhood n=8; adolescence/young adulthood n=30; late onset n=7 Seizure type – generalised n=19; temporal lobe n=18; focal n=13 Antecedent history - significant n=16 (head injury n=8; known perinatal injury or anoxia n=2; congenital malformations n=2; previous central nervous system infections n=2; onset during pregnancy n=2); no suggestive prior history n=34 Physical and neurologic examination - normal n=37; abnormal n=13 (significant 'intellectual impairment' n=9; focal abnormalities n=8; combined focal and intellectual abnormalities n=4) EEG findings - At least 1 abnormal EEG n=50 **Inclusion criteria**	**Interventions** CT scans. No further details reported	**Details** Consecutive non-hospitalised patients referred to 1 neurology service	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 2/51 Vascular: NA Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: 1/51 Other: 17/51	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	• Patients with seizures with focal characteristics or if an EEG showed a focal abnormality. **Exclusion criteria** Not reported				Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation	**Sample size**	**Interventions**	**Details**	**Results**	**Limitations**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Brooks, B. S., King, D. W., Gammal, T. E., Meador, K., Yaghmai, F., Gay, J. N., Smith, J. R., Flanigin, H. F., MR imaging in patients with intractable complex partial epileptic seizures, American Journal of Neuroradiology, 11, 93-99, 1990 **Ref Id** 1153536 **Country/ies where the study was carried out** USA **Study type** Cross-sectional **Aim of the study** Not reported **Study dates** October 1985 - October 1988 **Source of funding** Not reported	N=53. Results from 38 scans reported (patients with mesial temporal gliosis) **Characteristics** Patients with complex partial seizures refractory to medical management who underwent surgery Age – range 7-54 years (average 26 ± 12) Sex – Male n=23; female n=30 Duration of seizure disorder - average 18 years (range 1-52 years) **Inclusion criteria** Not reported **Exclusion criteria** Not reported	CT scans performed both with and without IV contrast enhancement using a General Electric 9800 scanner. Standard transaxial non-enhanced scans were obtained with contiguous 10 mm sections. Contrast-enhanced CT was performed by using a modified technique with gantry angulation to obtain optimal temporallobe views. Section planes parallel to the long axis of the temporal lobe were obtained with 10 contiguous 3 mm slices; the remainder of the brain was scanned with 10 mm thick sections at 10 mm intervals.	Not reported	<u>Proportion identified with a clinically relevant abnormality:</u> Tumour: NA Vascular: NA Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: 1/38. Other: 7/38	<u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Chee, M. W., Lim, S. H., Tjia, T. L., Computed tomography in patients with recurrent seizures, Annals of the Academy of Medicine, Singapore, 22, 431-4, 1993 **Ref Id** 1153606 **Country/ies where the study was carried out** Singapore	**Sample size** N=80 **Characteristics** Patients over the age of 12 admitted for evaluation of recurrent seizures Age, years, mean (range): 33 (13 to 82) Possible aetiological factors – unknown n=50; previous central nervous system infection n=6; trauma n=5; vascular malformations n=5; cerebral infarction n=4; tumours	**Interventions** CT scans performed using 4th gen. Picker 1200 SX scanner. Contiguous 8 mm thick slices obtained from base of skull to cranial vault. Contrast given as required	**Details** CT scans read by radiologists blinded to EEG findings Seizures classified from clinical history using ILAE system	**Results** Total sample - proportion identified with a clinically relevant abnormality: Tumour: 5/80 Vascular: 11/80 Scarring: 5/80 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 22/80 Focal CT abnormalities by seizure type: Complex partial 9/27; simple partial 5/11; myoclonic	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (em-

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Retrospective cohort **Aim of the study** Not reported **Study dates** March 1989 and March 1990 **Source of funding** Not reported	n=4; Lupus Erythematosus n=2; congenital lesions n=4 Seizure type – complex partial n=27; simple partial n=11; myoclonic n=2 (both patients had juvenile myoclonic epilepsy); generalised tonic clonic n=40 **Inclusion criteria** Not reported **Exclusion criteria** Patients experiencing seizures associated with an acute brain or metabolic insult			0/2; generalised tonic-clonic 12/40. NB. Abnormalities not reported in detail <u>Focal CT abnormalities by EEG findings:</u> Focal EEG abnormality 21/40; generalised EEG abnormality 14/15; normal EEG 6/21 NB. Abnormalities not reported in detail	ployees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Coe, C. J., Lee, Y. H., Organic disorders in children with epileptic seizures, Acta Paediatrica Japonica, 31, 267-72, 1989 **Ref Id** 1153659 **Country/ies where the study was carried out** South Korea **Study type** Prospective cohort **Aim of the study** To "…evaluate the usefulness of brain C-T scan as a diagnostic tool for various types of epilepsy in children." p 285 **Study dates** January 1981 - Dec 1987	**Sample size** N=1005 **Characteristics** Children with a diagnosis of epilepsy seen at 1 paediatric neurology clinic Male n=600; female n=405 Age 1-3 years 25.8%; 4-6 years 18.9%; 7-9 years 18.1%; 10-12 years 14.1%; 13-15 years 5.9%. 'Mental retardation' n=170 Cerebral palsy n=86 Hyperactivity and developmental disorder n=82 Sturge-Weber syndrome n=1 **Inclusion criteria** • Patients with more than 2 episodes of the same seizure type **Exclusion criteria** • Newborns • Patients with febrile seizures	**Interventions** CT scan. No details reported	**Details** Not reported	**Results** Total sample - proportion identified with a clinically relevant abnormality: Tumours: 22/1005 Vascular: 46/1005 Scarring: 24/1005 Congenital/ developmental: 7/1005 Inflammatory/infective/ immune: 54/1005 Metabolic/genetic: NA. Other: 169/1005 Proportion identified with a clinically relevant abnormality: Abnormalities by age: < 1 year (n=178) - abnormal n=88 (49.4%) 1 - 3 years (n=254) abnormal n=71 (28.0%) 4 - 6 years (n=190) abnormal n=45 (23.7%) 7 - 9 years (n=182) abnormal n=54 (29.7%) 10- 12 years (n=142) abnormal n=45 (31.7%) 13 - 15 years (n=59) abnormal n=19 (32.2%).	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding Not reported				Abnormalities by seizure type: Partial simple (n=122) abnormal n=46 (37.7%) Partial complex (n=83) abnormal n=30 (36.1%) Secondarily generalized (n=215) abnormal n=72 (33.5%) Generalized (n=439) abnormal n=119 (27.1%) Tonic Clonic (n=207) abnormal n=54 (26.1%) Tonic (n=55) abnormal n=13 (23.6%) Clonic (n=8) abnormal n=3 (37.5%) Myoclonic (n=103) abnormal n=38 (36.9%) Atonic-Akinetic (n=39) abnormal n=8 (20.5%) Atypical absence (n=20) abnormal n=3 (15%) Typical absence (n=7) abnormal n=0 (0%) Unclassified (n=80) abnormal n=21 (26.3%) Infantile spasm (n=51) abnormal n=27 (26.3%).	Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Daras, M., Tuchman, A. J., Strobos, R. J., Computed tomography in adult-onset epileptic seizures in a	**Sample size** N=155 **Characteristics** Patients with new onset seizures after the age 20	**Interventions** CTs performed with and without contrast. These were interpreted by a neuroradiologist, and in	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumours: 16/155 Vascular: 44/155 Scarring: NA	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
city hospital population, Epilepsia, 28, 519-522, 1987 **Ref Id** 1153709 **Country/ies where the study was carried out** US **Study type** Prospective cohort **Aim of the study** Not reported **Study dates** Not reported **Source of funding** Not reported	Sex – male n=96; female n=59 Age, years, mean: male 42.7; female 51.6 Medical problems - history of alcoholism n=61; diabetes mellitus n=25; hypertension n=40; previous head injury n=22; stroke n=15 EEG finding – diffuse abnormality n=36; focal abnormality n=51; normal n=68 **Inclusion criteria** • Patients with ≤ 1 year between seizure onset and neurological and CT evaluation **Exclusion criteria** Patients with ≥ 1 year between onset of seizures and neurological and CT evaluation	tumours, abscesses and arteriovenous malformation were confirmed by angiography or surgery		Congenital/ developmental: NA Inflammatory/ infective/ immune: NA Metabolic/genetic: Other: 106/155	Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Was the statistical significance assessed? Not applicable. Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation De la Sayette, V., Cosgrove, R., Melanson, D., Ethier, R., CT findings in late-onset epilepsy, Canadian Journal of Neurological Sciences, 14, 286-289, 1987 **Ref Id** 1153727 **Country/ies where the study was carried out** Canada **Study type** Retrospective cohort **Aim of the study**	**Sample size** N=387 **Characteristics** Older adult patients with new onset seizures after 50 years of age Sex – Male n=19 men (mean age, 61.8 years); female n= 168 (mean age, 62 years) Age at first seizure – 50-59 years n=182; > 60 years n=205 Seizure type – generalised n=212 (54.6%, of which n=35 [9%] were nocturnal) Focal seizures n=160 (41.2%; - partial simple seizures n=82 [21.4%]; partial complex 56 [14.1%] partial-complex; partial seizures with secondary generalization n=22 [5.7%])	**Interventions** All scans performed using EMI 1010 Head Scanner (160 x 160 matrix) with systematic study from vertex to foramen magnum at 10 mm intervals. Contrast enhancement not used routinely, except in patients presenting with partial epilepsy and in patients whose initial plain CT	**Details** Clinical and electrophysiological information was obtained from chart review and by direct communication with the referring physician	**Results** Proportion identified with a clinically relevant abnormality: Tumours: 20/387 Vascular: 47/387 Scarring: NA Congenital/ developmental: NA Inflammatory/ infective/ immune: NA Metabolic/genetic: Other: 133/387	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
To review the "…the clinical and CT findings of 387 elderly patients (older than 50) with new-onset seizures in an attempt to establish clinical and radiological correlations in late-onset epilepsy and to examine the role of CT scanning in this condition." p 286 **Study dates** 1978 - 1984 **Source of funding** Not reporte	Unclassified n=15 (4.2%) **Inclusion criteria** Not reported. **Exclusion criteria** • Patients with known antecedent neurological disease • Patients with previous seizures (including childhood) • Patients with a history of remote cranial trauma or neurosurgical intervention • Patients with unclear diagnoses (clinical or EEG) of epilepsy.	showed ventricular asymmetry			Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Ezeala-Adikaibe, A. B., Ohaegbulam, S.	**Sample size** N=196	**Interventions** CT scans. No details reported	**Details** Not reported	**Results**	**Limitations**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
C., Ndubuisi, C. A., The Pattern of significant lesions found in computerized tomography scan of recurrent seizure patients at a center in Enugu, Nigeria, Nigerian journal of clinical practice, 20, 1289-1293, 2017 **Ref Id** 1153868 **Country/ies where the study was carried out** Nigeria **Study type** Retrospective cohort **Aim of the study** To "… determine the pattern of significant intracerebral lesions in patients presenting with recurrent seizures in a tertiary hospital in Enugu." p 1289 **Study dates** January 2003 - December 2013 **Source of funding** Not reported	**Characteristics** Patients with recurrent seizures (mostly evaluated as outpatients) Age – mean 46.8 ± 18.6 years (20–104 years). < 40 years n= 83 (42.3%); 40-59 years n=63 (32.1%); ≥ 60 years n=50 (25.5%) Sex - males n=135 (68.9%); female n=129 (31.1%) **Inclusion criteria** Not reported **Exclusion criteria** • Patients with possible secondary seizure disorders. • Patients with a medical history suggesting possible causes. • Patients > 20 years			<u>Total sample (N=196) - proportion identified with a clinically relevant abnormality</u>: Tumour: 40/196 Vascular: 32/196 Scarring: 37/196 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 18/196 <u>< 40 years (n=90) - proportion identified with a clinically relevant abnormality</u>: Tumour: 16/90 Vascular: 13/90 Scarring: 9/90 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 5/90 <u>40-59 years (n=66) - proportion identified with a clinically relevant abnormality</u>: CT findings – normal n=30; abnormal n=33 Tumour: 19/66 Vascular: 6/66 Scarring: 5/66 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA	<u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Other: 6/66 ≥ 60 years (n=59) - proportion identified with a clinically relevant abnormality: Tumour: 5 Vascular: 13/59 Scarring: 23/59 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 7/59	Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable. Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Fei, Y., Liu, X., Yang, M., Xu, J., Comparative study of 99mTc-HM-PAO SPECT brain imaging, EEG and CT scanning in epileptic patients during the interictal period, Chinese medical sciences journal = Chung-kuo i hsueh k'o hsueh tsa chih / Chinese Academy of Medical Sciences, 7, 5-8, 1992 **Ref Id**	**Sample size** N=40. Results of CT scans are only reported for 27 patients with complex partial seizures **Characteristics** Epileptic patients during interictal period Age – range - 3-61 years Sex – male n=26; female n=14 Seizure type – generalised (tonic) n=4; childhood benign partial seizures n=2; complex partial seizures n=34 **Inclusion criteria** Not reported	**Interventions** CT scans. No details reported	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: NA Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: 8/27 Metabolic/genetic: NA. Other: NA	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1153881 **Country/ies where the study was carried out** China **Study type** Prospective cohort **Aim of the study** Not reported **Study dates** Not reported **Source of funding** Not reported	**Exclusion criteria** Not reported				Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Can the results be applied to your organization? Yes
Full citation Fritsch, G., Ebner, F., Schneider, G., Computed tomography in partial epilepsies in childhood, European Neurology, 28, 306-310, 1988 **Ref Id** 1153933 **Country/ies where the study was carried out** Austria **Study type** Prospective cohort **Aim of the study** To determine if a sufficient etiological classification can be made using clinical and anamnestic data only; or if this has to be calculated using 'unexpected' CT findings; and to show the frequency of symptomatic epilepsies in patients **Study dates**	**Sample size** N=156 **Characteristics** Children with acute partial seizures or chronic partial epilepsies Age - range 3 months-14 years (mean 6.7 years) Mental 'retardation' – present n=24 Neurological abnormalities – present n=30 children Neonatal seizures – present n=4 **Inclusion criteria** Not reported **Exclusion criteria** Not reported	**Interventions** EMI 1010 scanner (120 kV and 33 mA, matrix 160 X 160) and Siemens Somatom DR2 (125 kV, 520 mA, matrix 256 X 256) scanners used. Contrast enhancement carried out in 30% of cases using meglumine amidotrizoate or meglumine iodoglycinate (300 mg 1/ml) corresponding to 1 ml/kg body weight. CT scans were performed parallel with the orbitomeatal plane	**Details** Consecutive investigation of children over a period of 8 years. No further details reported Seizure classification was made according to ILAE criteria	**Results** <u>Total sample - proportion identified with a clinically relevant abnormality</u>: Tumour: 7/156 Vascular: 7/156 Scarring: NA Congenital/ developmental: 18/156 Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 40/156 <u>Results by seizure type - proportion identified with a clinically relevant abnormality</u>: Partial elementary + secondary generalization (n=96) - normal n=51; pathological n=45 (46%). Partial complex ± secondary generalization (n=18) - normal n=15, pathological n=3(16%) <u>Results by neurodevelopmental status - proportion identified with a clinically relevant abnormality</u>: CT findings - 'Normal' neurodevelopmental status - normal n=85; pathological n=17 (tumour n=1; vascular	**Limitations** <u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Not reported **Source of funding** Not reported				n=1; scarring – NA; congenital/ developmental – NA; inflammatory/ infective – NA; metabolic/ genetic – NA; other n=3). 'Pathological' neurodevelopmental status - normal n=10; pathological n=44	Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable. Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Garg, R. K., Karak, B., Kar, A. M., Neuroimaging abnormalities in Indian patients with uncontrolled partial seizures, Seizure, 7, 497-500, 1998 **Ref Id** 1153968	**Sample size** N=77 **Characteristics** Patients with unprovoked recurrent/uncontrolled partial seizures Age – range 8-38 years, mean 16.28 ± 4.31. Sex – male n=41 (53.2%); female n=36 (46.8%). Duration of seizures (months) – mean 26.38 ± 10.29, range 18-37.	**Interventions** CT scans. No details reported	**Details** Consecutive patients attending 1 clinic Seizures classified on basis of clinical and/or electroencephalographic evidence	**Results** Proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: NA Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: 24/77 Metabolic/genetic: NA. Other: 31/77	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out India **Study type** Prospective cohort **Aim of the study** To "…evaluate imaging abnormalities in patients with uncontrolled partial seizures." p 497 **Study dates** Not reported **Source of funding** Not reported	Type of seizure – simple partial n=59 (76.6%); complex partial n=28 (23.4%) Drug treatment at inclusion – monotherapy n=51 (66.2%); polytherapy n=26 (33.8%) No patients had history of febrile seizures or head injury **Inclusion criteria** Not reported **Exclusion criteria** Not reported				Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable. Are confidence intervals given for the main results? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Garvey, M.A., Gaillard, W.D., Rusin, J.A., Ochsenschlager, D., Weinstein, S., Conry, J.A., Winkfield, D.R., Vezina L.G, Emergency brain computed tomography in children with seizures: who is most likely to benefit?, Journal of Pediatrics, 133, 664-669, 1998 **Ref Id** 140927 **Country/ies where the study was carried out** US **Study type** Retrospective cohort **Aim of the study** To "…investigate whether CT imaging had contributed to the	**Sample size** N=107 **Characteristics** Children without a history of neurologic illness presenting because of a first seizure/new onset seizures Age, range – 1 month – 13 years. Seizure type - generalized convulsions n=62; focal onset n=37 (complex partial n=8) Abnormalities identified in postictal neurologic examination n=20 **Inclusion criteria** Not reported **Exclusion criteria** Not reported • Children with a previously identified underlying neurologic disorder (for example, cerebral palsy, ventriculoperitoneal shunt) or systemic disorder such as hepatic or renal failure or systemic lupus erythematosus	**Interventions** Every scan was performed on a GE9800 scanner with axial 5-mm images through the posterior fossa and 10 mm images above this. Contrast was administered only for better definition of an abnormal noncontrast CT scan or when a diagnosis of encephalitis was suspected. All CT scans were read by 1 of 2 pediatric neuroradiologists.	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 2/107 Vascular: 3/107 Scarring: NA Congenital/ developmental: 3/107 Inflammatory/infective/ immune: 2/107 Metabolic/genetic: NA. Other: 10/107	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
management of new-onset seizures and to identify risk factors associated with CT scan abnormalities that required intervention." p 665 **Study dates** July 1993 - June 1994 **Source of funding** Not reported	• Children with a previously diagnosed neurocutaneous syndrome, brain tumor, or other underlying malignancy • Children between ages of 6 months and 5 years presenting with brief generalised seizures (< 20 minutes) associated with febrile illness and normal findings on postictal neurologic examination				Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Holt-Seitz, A., Wirrell, E. C., Sundaram, M. B., Seizures in the elderly: Etiology and prognosis, Canadian Journal of Neurological Sciences, 26, 110-114, 1999	**Sample size** N=84 **Characteristics** Patients over the age of 60 years with definite or probable seizures Sex – male n=54; female n=7	**Interventions** CT scans. No details reported	**Details** Not reported Consecutive patients with newly diagnosed recurrent seizures were seen in 1	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 7/84 Vascular: 22/84 Scarring: NA Congenital/ developmental: NA	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 1154155 **Country/ies where the study was carried out** Canada **Study type** Retrospective cohort **Aim of the study** To "… define the diagnostic yields of electroencephalogram (EEG) and computerized tomography scanning of the head (CT), etiology, early mortality and prognosis in new-onset seizures in the elderly population." p 110 **Study dates** January 1994 – July 1997 **Source of funding** Not reported	Seizure aetiology – cryptogenic n=38; acute symptomatic n=41 (acute ischemic stroke n=19; metabolic n=8; intracranial tumor n= 7; head injury or subdural hematoma n=4; alcohol withdrawal n=2; brain abscess n=1); remote symptomatic n=5 (prior brain infarction n=3; previous encephalitis n=1; prior head injury n=1). Seizure type – primarily generalised n=10; partial simple n=3; partial complex with or without partial simple n=36; secondarily generalised seizures with or without partial seizures n=35. EEG findings – normal n=23; abnormal n=61 (focal slowing n=54; focal epileptiform discharge n=33) NB No further details on age reported **Inclusion criteria** Not reported **Exclusion criteria** Not reported		Neurology Department between January 1996 and December 1997	Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 17/84	Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Hsieh, D. T., Chang, T., Tsuchida, T. N., Vezina, L. G., Vanderver, A., Siedel, J., Brown, K., Berl, M. M., Stephens, S., Zeitchick, A., Gaillard, W. D., New-onset afebrile seizures in infants: Role of neuroimaging, Neurology, 74, 150-156, 2010 **Ref Id** 1154172 **Country/ies where the study was carried out** USA **Study type** Prospective cohort	**Sample size** N=317. CT scans performed for 298 patients **Characteristics** Infants over the age of 1 month presenting with new-onset afebrile seizures Age 1 – 6 months n=122 (38.5%); 6 – 12 months n=87 (27.5%); 12 – 24 months n=108 (34%). Sex – male n=165; female n=152. Ethnicity – African American 61%; Hispanic 14%; Caucasian 20; Asian 5%. Family history of seizures 26%. Developmental delays n=15; cerebral palsy n=5. Seizure type – partial n=154 (partial only n=122; secondarily generalised n=32); tonic n=24; clonic n=2; tonic-clonic n=91; myoclonic n=11; atonic n=3; spasms n=32	**Interventions** CT scans. No details reported	**Details** Seizures classified according to ILAE definitions CT findings interpreted by certified paediatric neurologists	**Results** <u>Total sample - proportion identified with a clinically relevant abnormality</u>: Tumour: 1/298 Vascular: 15/298 Scarring: 9/298 Congenital/ developmental: 35/298 Inflammatory/infective/ immune: 4/298 Metabolic/genetic: 1/298. Other: 50/298 <u>1 – 6 months - proportion identified with a clinically relevant abnormality</u>: Tumour: NA Vascular: 11/114 Scarring: 6/114 Congenital/ developmental: 18/114 Inflammatory/infective/ immune: 3/114 Metabolic/genetic: 1/114. Other: 24/114	**Limitations** <u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To "…investigate the presenting characteristics of new-onset afebrile seizures in infants (age 1–24 months) and the yield of neuroimaging." p 150 **Study dates** January 2001 - February 2007 **Source of funding** Not reported	NB. 2 patients were identified with Sturge-Weber syndrome **Inclusion criteria** • Infants between the ages of 1 and 24 months **Exclusion criteria** • Patients presenting with febrile seizures • Patients presenting with an infection of the central nervous system			6 – 12 months - proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: 3/80 Scarring: 1/80 Congenital/ developmental: 9/80 Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 12/80 12 – 24 months - proportion identified with a clinically relevant abnormality: Tumour: 1/104 Vascular: 1/104 Scarring: 2/104 Congenital/ developmental: 8/104 Inflammatory/infective/ immune: 1/104 Metabolic/genetic: NA. Other: 15/104	regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Yes Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Hsu, Y. Y., Chang, C. N., Chu, N. S., Hsu, J. C,	**Sample size** N=19 **Characteristics**	**Interventions** CT scans performed using 9800 Quick and	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 4/19	**Limitations** The quality of this study was assessed using the CEBMA checklist

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Neuroimaging in intractable complex partial seizures, Journal of the Formosan Medical Association, 51-54, 1997 **Ref Id** 1154174 **Country/ies where the study was carried out** Taiwan **Study type** Retrospective cohort **Aim of the study** Not reported **Study dates** August 1990 - December 1994 **Source of funding** Not reported	Patients with intractable complex partial seizures who underwent surgery Age – range 18 – 44 years (mean 30.5 years). Sex – male n=10; female n=19. Seizure frequency – range 1 or 2 per day – 1 or 2 per month **Inclusion criteria** Not reported **Exclusion criteria** Not reported	Pro-Speed GE scanners. non-contrast axial scans of 10 mm slice thickness were obtained. Postcontrast axial CT scans performed in 7 patients and 1 additional coronal scan was performed in 3 patients.		Vascular: 4/19 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 4/19	Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Ismail, H. M., Al-Sulaiman, A. A., Abolenin, A. A., Al-Shammary, S., Al-Khamis, F., Al-Qulaiti, K., Abumadini, M. S., Newly diagnosed seizures in adults, Neurosciences, 8, 104-106, 2003 **Ref Id** 1154209 **Country/ies where the study was carried out** Saudi Arabia	**Sample size** N=73 **Characteristics** Patients over the age of 18 years with newly diagnosed recurrent seizures Age – range 19-80 years. Sex – male n=43; female n=30. Seizure type - simple partial and complex partial n=27 (37%); partial with secondary generalization n=22 (30.1%); generalized n=24 (32.9%). Syndrome types – localization related n=34 (46.6%); generalized n=24 (32.9%); undetermined n=15 (20.5%)	**Interventions** CT scans. No details reported	**Details** Not reported Consecutive patients with newly diagnosed recurrent seizures were seen in 1 Neurology Department between January 1996 and December 1997	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 4/73 Vascular: 12/73 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: 1/73 Metabolic/genetic: NA. Other: 12/73	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Cross-sectional **Aim of the study** To "… study the clinical, electroencephalographic (EEG) and computed tomography (CT) profile in a hospital population of over 18-years adult patients with newly diagnosed recurrent seizures." p 104 **Study dates** January 1996 - December 1997 **Source of funding** Not reported	Presentation within 1 year of onset – positive n=60 (82.2%). Family history of seizures – positive n=9 (12.3%). EEG findings – abnormal n=45 (61.6%) - partial epileptiform activity n=22 (48.9%); generalized epileptiform activity n=11 (24.4%); non-epileptiform n=12 (26.7%) **Inclusion criteria** Not reported **Exclusion criteria** Not reported				Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Can the results be applied to your organization? Yes
Full citation Jan, M. M. S., Neville, B. G. R., Cox, T. C., Scott, R. C., Convulsive status epilepticus in children with intractable epilepsy is frequently focal in origin, Canadian Journal of Neurological Sciences, 29, 65-67, 2002 **Ref Id** 1154234 **Country/ies where the study was carried out** United Kingdom **Study type** Retrospective cohort **Aim of the study** To "… examine the clinical, radiological, and EEG data from children with generalized CSE in the context of severe epilepsy, to seek clinical, structural and functional evidence supporting a focal onset." p 66	**Sample size** N=18. 11 patients underwent CT scans **Characteristics** Children and adolescents with generalised, recurrent convulsive status epilepticus and intractable epilepsy Age – mean 15.3 years (range 6-22 years, SD±4). Age at onset – mean 16 months (range 6 weeks – 6 years, SD 19 months). Sex - male n=12 (67%); females n=6 (33%). Severe learning disability 79%; behavioural disorders 89%. Seizure type – recurrent convulsive status epilepticus 100%. 89% also experienced other seizure types (95% of these were simple or complex partial seizures). Lennox-Gastaut n=12 (67%) History of infantile spasms - 28%. History of ASM use (multiple) 100% Current treatment status - 3 or more ASM n=10 (55%); 2 AEDs n=8; 1 ASM n=1; Ketogenic diet 33% Aetiology - unknown n=9 (50%); post-encephalitis/meningitis n=3; chromosomal abnormalities n=2;	**Interventions** CT scans. No further details reported	**Details** CT scans were categorised by a neuroradiologist blinded to clinical details	**Results** Proportion identified with a clinically relevant abnormality: Tumours: NA Vascular: 1/11 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 3/11	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Not reported **Source of funding** Post-doctoral research award sponsored by British Council and British Aerospace	cerebral palsy n=1; history of internal carotid injury n=1; history of head injury n=1; and tuberous sclerosis n=1 **Inclusion criteria** Not reported **Exclusion criteria** Not reported				Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Jha, S. K., Clinical profile of solitary seizures, Medical Journal Armed Forces India, 60, 146-148, 2004 **Ref Id** 1154246	**Sample size** N=150. CT results reported for 115 patients **Characteristics** Patients with solitary seizures Sex – Male n=150 (100%) Age – range 18-52 years (mean 28.9 years) Duration of observation – range - 1 month-12 years (median 1.2 years)	**Interventions** CT scans. No details reported	**Details** Consecutive cases of solitary seizures presenting at 1 neurology service between July 1995 and August 1997	**Results** Proportion identified with a clinically relevant abnormality: Tumours: NA Vascular: NA Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: 8/115 Metabolic/genetic: NA Other: 11/115	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out India **Study type** Prospective cohort **Aim of the study** To "…evolve a standard line of management for cases of solitary seizures." p 146 **Study dates** July 1995 - August 1997 **Source of funding** Not reported	Seizure type - Generalised tonic clonic seizure n=128 (85.34%); partial seizures n=22 (14.66% [including n=13 with secondary generalisation]) EEG findings - Normal n=127 (78.0%); abnormal n=33 (22.0%). Treatment provided – received ASM n=102; did not receive ASM n=48 NB All patients were male as the hospital primarily treats serving members of the armed forces **Inclusion criteria** • Patients who had experienced only 1 seizure at the time of examination (at least 6 weeks after first seizure) • Patients who only experienced 1 seizure during the first year of follow-up but subsequently experienced further seizures were also included **Exclusion criteria** • Patients where diagnosis of seizure is not clear • Patients experiencing seizures following trauma to central nervous system • Patients experiencing seizures related to infections • Patients experiencing seizures associated with metabolic disorders such as hypoglycaemia				Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	• Patients experiencing alcohol related seizures				Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Kalra, V., Passi, G. R., Analysis of childhood epileptic encephalopathies with regard to etiological and prognostic factors, Brain & Development, 20, 14-7, 1998 **Ref Id** 1079134 **Country/ies where the study was carried out** India **Study type** Retrospective cohort **Aim of the study** To "…analyse the clinical characteristics of patients with childhood epileptic encephalopathies." **Study dates** January 1988 - December 1990	**Sample size** N=45. CT scans available for 26 patients **Characteristics** Paediatric patients with a diagnosed childhood encephalopathy (a West syndrome, Lennox Gastaut syndrome, or epilepsy with myoclonic-astatic seizures). Sex - Male n=30; female n=15. Epileptic encephalopathy - West syndrome n=29 (64.4%); Lennox-Gastaut syndrome n=5; unclassified n=6; tuberous sclerosis n=1; Aicardi's syndrome n=1. Seizure onset - before 1 year of age n=28 (62.2%). Onset of myoclonus - below 3 months of age n=13 NB Details on age not reported **Inclusion criteria** Not reported **Exclusion criteria** • Patients with sub-acute sclerosing panencephalitis	**Interventions** CT scan. No details reported	**Details** Epileptic encephalopathies classified using ILAE system	**Results** Proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: 4/26 Scarring: 1/26 Congenital/ developmental: 2/26 Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 9/26	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding Not reported					Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? No Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Keranen, T., Reinikainen, K., Lehtinen, J., Correlations of computed tomography and electro-encephalographic findings in patients with recently diagnosed	**Sample size** N=83 **Characteristics** Patients with single or more spontaneous cerebral convulsions Sex – Male n=51; female n=32	**Interventions** All CT scans made using third generation rotatefan beam scanner (Somatom 2, Siemens). Image	**Details** Consecutive patients	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 15/83 Vascular: 1/83 Scarring: NA Congenital/ developmental: NA	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
epilepsy, Acta Neurologica Scandinavica, 65, 208-209, 1982 **Ref Id** 1154325 **Country/ies where the study was carried out** Finland **Study type** Prospective cohort **Aim of the study** To "… to evaluate CT findings in patients with single or more spontaneous cerebral convulsions and correlate CT findings with waking EEG." p 208 **Study dates** Not reported **Source of funding** Not reported	Age - 16-75 years (mean 39 years). Probable significant antecedent neurological history n=11 Seizure type - generalized tonic-clonic seizures without focal signs n=40 (48%); partial secondary generalised n=25 (30%); simple partial n=2 (2%); complex partial n=9 (10%); unclassified n=7 (8%) **Inclusion criteria** Not reported **Exclusion criteria** • Patients with chronic epilepsy or those with an obvious aetiology (for example, proven recent cerebral contusion or thrombosis	matrix 256 x 256		Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 10/83	Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Yes Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Koul, R., Chacko, A., Cherian, E., West syndrome: a university hospital based study from Oman, Brain & Development, 23, 586-92, 2001 **Ref Id** 1079195 **Country/ies where the study was carried out** Oman **Study type** Prospective cohort **Aim of the study** Not reported **Study dates** January 1993 - June 2000	**Sample size** N=44 **Characteristics** Children with West syndrome Sex - Male n=20 male; female n=24. Symptomatic n=34 (77.3%); cryptogenic n=10. Age at presentation of West syndrome (months) - 1–3 n=11 (25%); 3–6 n=16 (36.4%); 6–9 n=10 (22.7%); 9–12 n=6 (13.6%); >12 n=1 (2.3%). Age at onset of symptoms 1 – 9 months n=37 (84%). Developmental delay before onset of infantile spasms n=29 (65.9%); developmental delay after onset of infantile spasms n=9 (20.5%) Microcephaly – present n=21 (47.7%) **Inclusion criteria**	**Interventions** CT scans. No details reported	**Details** Not reported Microcephaly defined according to Ministry of Health protocols for measurement of growth and development of children	**Results** Proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: NA Scarring: NA Congenital/ developmental: 11/44 Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 18/44	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding Not reported	• Infants with a history of infantile spasms **Exclusion criteria** None reported				regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Kumar, R., Navjivan, S., Kohli, N., Sharma, B., Clinical correlates of CT abnormality in	**Sample size** N=178. n=162 patients received CT scans **Characteristics**	**Interventions** CT scans	**Details** Consecutive children between 1 month and 12	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 1/162	**Limitations** The quality of this study was assessed using the CEBMA checklist

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
generalized childhood epilepsy in India, Journal of Tropical Pediatrics, 43, 199-203, 1997 **Ref Id** 1154418 **Country/ies where the study was carried out** India **Study type** Prospective cohort **Aim of the study** To "… study the rate and type of CT scan findings seen in generalized epilepsy in children and to determine which, if any, clinical features 'predict' a CT abnormality." p199 **Study dates** Not reported **Source of funding** Not reported	Children between 1 month and 12 years of age presenting with clinical generalized epilepsy or single unprovoked seizures as the main symptom irrespective of duration of seizures, neurological findings, or past medical history Generalised tonic-clonic n=138 (85%); myoclonic n=18; atonic n=6. Age at onset of seizures 0-6 months n=35; 6-24 months n=26; 24-60 months n=21; > 60 months n=80. Duration of epilepsy 1 month or less n=43; 1-6 months n=46; 6-24 months n=43; > 2 years n=30. 'Significant' antecedent history n=32 (20%) - birth asphyxia n=12; fall from a height with head injury n=7; past meningitis or encephalitis n=10; neonatal septicaemia n=3. Family history of epilepsy n=16 (10%) Mental 'retardation' with delayed milestones n=37 (23%) Indicators of tuberculosis n=21/52 investigated (40%) EEG findings – abnormal n=52/93 (56%) **Inclusion criteria** Not reported **Exclusion criteria** • Patients with seizures provoked by intercurrent illness, encephalitis, or febrile seizures	Patients were required to pay for procedure	years of age presenting at 1 paediatric department over an 18-month period	Vascular: 1/162 Scarring: 3/162 Congenital/ developmental: 3/162 Inflammatory/infective/ immune: 32/162 Metabolic/genetic: NA. Other: 16/162	Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes. Patients and their families were required to pay for CT scans Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Ladurner, G., Fritsch, G., Sager, W. D., Iliff, L. D., Lechner, H., Computer tomography in children with epilepsy, European Neurology, 19, 180-184, 1980 **Ref Id** 1154440 **Country/ies where the study was carried out** Austria	**Sample size** N=72 **Characteristics** Children with generalised and partial seizures Age – range 2 months – 14 years. Seizure type – generalised n=55; partial/partial with secondary generalisation n=17 Neurological findings – normal n=59; abnormal n=13 'Mental retardation' – present n=22 EEG findings (n=68) – normal n=7; generalised or diffuse abnormalities n=11; focal abnormalities with	**Interventions** CT scans performed using EMI 1010 and 5005 scanners	**Details** Not reported	**Results** <u>Total sample - proportion identified with a clinically relevant abnormality</u>: Tumour: 8/72 Vascular: 5/72 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: Other: 22/72 <u>Generalised seizures (n=55) - proportion identified with a clinically relevant abnormality</u>:	**Limitations** <u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (em-

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Cross-sectional **Aim of the study** Not reported **Study dates** Not reported **Source of funding** Not reported	or without epileptic foci n=30; generalised epileptic potentials n=20 **Inclusion criteria** Not reported **Exclusion criteria** Not reported			Tumour: 3/55 Vascular: 4/55 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 14/55 <u>Partial/partial with secondary generalisation (n=17) - proportion identified with a clinically relevant abnormality</u>: Tumour: 5/17 Vascular: 1/17 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 9/17 <u>Neurological findings - proportion identified with a clinically relevant abnormality</u>: Neurologically normal (n=59) - normal n=40; abnormal n=19; neurologically abnormal (n=13) - normal n=2; abnormal n=11 <u>Mental 'retardation' - proportion identified with a clinically relevant abnormality</u>: CT findings - Mental retardation – present (n=22) –	ployees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				normal n=6; abnormal n=16; Mental retardation – absent (n=50) – normal n=36; abnormal n=14	Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Longe, A. C., Omojola, M. F., Computed tomographic brain scan findings in Saudi epileptic patients, East African medical journal, 71, 567-570, 1994 **Ref Id** 1154521 **Country/ies where the study was carried out** Saudi Arabia **Study type** Cross-sectional **Aim of the study** Not reported **Study dates** Not reported **Source of funding** Not reported	**Sample size** N=142 **Characteristics** Patients with epilepsy (defined as more than 1 seizure) Sex – Male n=81 (57%); female n=61 (43%) Age < 20 years n=64 (45%); ≥ 20 years n=78 (55%) Age at onset of seizures < 20 years n=94 (66%); ≥ years n=48 (34%) Duration of epilepsy < 5 years n=78 (56%); ≥ 5 years n=62 (44%) Seizure type – Partial (focal) n=55 (39%); generalised n=77 (54%); unclassifiable n=10 (7%) Aetiology – Idiopathic n=76 (54%); symptomatic n=36 (25%); unclassifiable n=30 (21%) **Inclusion criteria** • Patients who had experienced more than 1 seizure	**Interventions** GE9800 scanner. Adults – 10 mm contiguous axial scans. Children 5 mm contiguous axial scans through posterior fossa and 10 mm scans through rest of brain. Contrast enhanced scans carried out where necessary (n=107, 75%)	**Details** Consecutive patients Seizures classified according to ILAE system	**Results** Total sample (N=142) - proportion identified with a clinically relevant abnormality: Tumour: 3/142 Vascular: 19/142 Scarring: 4/142 Congenital/ developmental: 6/142 Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 77/142	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Exclusion criteria • Patients with clinical features at the time of examination which suggested that seizures were symptomatic of a progressive condition; acute illness; or metabolic disorder				Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation McGahan, J. P., Dublin, A. B., Hill, R. P., The evaluation of seizure disorders by computerized tomography, Journal of Neurosurgery, 50, 328-32, 1979	**Sample size** N=150. **Characteristics** Patients with clinical or EEG patterns satisfying standardised categories of epilepsy Sex – not reported.	**Interventions** Non-contrast enhanced and contrast enhanced scans performed for n=92/150 patients.	**Details** Not reported	**Results** Total sample (N=142) - proportion identified with a clinically relevant abnormality: Tumour: 6/150 Vascular: 6/150 Scarring: NA Congenital/ developmental: 4/150	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 1154617 **Country/ies where the study was carried out** USA **Study type** Retrospective cohort **Aim of the study** To evaluate the use of CT in seizure disorders through comparison of results with neurological findings **Study dates** Not reported **Source of funding** Not reported	Age < 10 years n=17; 10-45 years n=88; 45-65 years n=30; > 65 years n=15 Duration of seizures < 6 months n=45; 6 months - 1 year n=5; 1-5 years n=31; > 5 years n=69 Seizure type – partial elementary n=12; partial complex n=28; partial secondarily generalised n=17; generalised non-convulsive n=16; generalised convulsive n=77 **Inclusion criteria** Not reported **Exclusion criteria** Not reported	All patients with a history of seizure also received a scan parallel to Reed's baseline		Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 42/150	Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Minford, A. M. B., Forsythe, W. I., Computed tomography findings in partial seizures, Archives of Disease in Childhood, 67, 693-696, 1992 **Ref Id** 1154651 **Country/ies where the study was carried out** UK **Study type** Retrospective cohort **Aim of the study** To "… investigate the incidence of abnormal computed tomograms …" p 693	**Sample size** N=82 **Characteristics** Children with partial seizures Age at onset of seizures range 5 months - 14 years (mean 5 years) Seizure type – partial seizures n=82; partial seizures only n=51; presentation with partial seizures only but later experience of generalised seizures n=21; presentation with generalised seizures but later predominance of partial seizures n=10 History of febrile seizures n=6 Neurological abnormalities n=0 **Inclusion criteria** • Patients with seizures which had predominantly focal motor phenomena	**Interventions** EMI 1010 scanner IGE 9800 scanner; Siemens Sonaton DR third generation scanner	**Details** Not reported	**Results** Total sample - proportion identified with a clinically relevant abnormality: Tumour: 2/82 Vascular: 3/82 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 5/82	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates June 1978 - November 1988 **Source of funding** Not reported	**Exclusion criteria** • Children with a known or suspected aetiology • Children with severe mental 'retardation' (children with specific learning difficulties, mild or moderate mental retardation, or behaviour problems were *not* excluded) • Children with benign rolandic epilepsy				regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Misra, S., Verma, R., Lekhra, O. P., Misra, N. K., CT observa-	**Sample size** N=1023 **Characteristics** Patients with partial seizures	**Interventions** Plain and enhanced CT scans performed using	**Details** Seizures classified according to ILAE system	**Results** Proportion identified with a clinically relevant abnormality: Tumour: NA	**Limitations** The quality of this study was assessed using the CEBMA checklist

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
tions in partial seizures, Neurology India, 42, 24-27, 1994 **Ref Id** 1154655 **Country/ies where the study was carried out** India **Study type** Prospective cohort **Aim of the study** To detect "… all possible lesions in partial epileptics, to establish pattern of seizure abnormalities in epileptic patients in and around Varanasi and to compare abnormalities with reports from other parts of India and other countries." p 24 **Study dates** Not reported **Source of funding** Not reported	Seizure type – simple partial n=158 (15.5%); complex partial n=62 (6%); secondary generalised n=803 (78.5%) Age 0-10 years n=229 (22.4%); 11-20 years n=404 (39.5%); 21-30 years n=177 (17.3%); 31-40 years n=113 (11.0%); 41-50 years n=55 (5.4%); > 50 years n=45 (4.4%). Duration of seizures 0 - 6 months n=443 (43.4%); 6 months - 1 year years n=266 (26.0%); 1 year – 5 years n=240 (23.7%); > 5 years n=71 (6.9%) Currently prescribed/placed on anti-tubercular treatment n=44 **Inclusion criteria** Not reported **Exclusion criteria** • Patients experiencing seizures post-trauma	Hitachi 1000 scanner		Vascular: 48/1023 Scarring: 4/1023 Congenital/developmental: NA Inflammatory/ infective/ immune: 534/1023 Metabolic/genetic: NA Other: 221/1023	Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Nair, K. P. S., Jayakumar, P. N., Taly, A. B., Arunodya, G. R., Swamy, H. S., Shanmugam, V., CT in simple partial seizures in children: A clinical and computed tomography study, Acta Neurologica Scandinavica, 95, 197-200, 1997 **Ref Id** 1154725 **Country/ies where the study was carried out** India	**Sample size** N=198 **Characteristics** Children over the age of 15 years with simple partial seizures Age at onset of seizures – under 1 year n=12 (6.06%); 1 – 5 years n=56 (28.28%); 6 – 15 years n=130 (65.65%) Duration of seizures (at time of presentation) – range 1 month – 10 years Seizure type - motor n=65 (83.33%); sensory n=31 (15.66%); autonomic n=2 (1.02%)	**Interventions** GE 9000/9800 scanners used. Sections of 5-10 mm thickness were obtained with orbitomeatal line as reference Plain and contrast scans used	**Details** ILAE classification/definitions used to identify patients with simple partial seizures	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 4/198 Vascular: 15/198 Scarring: NA Congenital/ developmental: 1/198 Inflammatory/infective/ immune: 65/198 Metabolic/genetic: 5/198. Other: 48/198	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Ye Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? N

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Retrospective cohort **Aim of the study** To evaluate the significance of CT scans in the management of simple partial seizures in children **Study dates** March 1992 - May 1993 **Source of funding** Not reported	Simple partial seizures which evolved to become generalized seizures – yes n=153 (77.27%); no n=45 (22.73%) patients Developmental delay - present n=15 (7.57%) History suggestive of neuroinfection – present n=10 (5.05%). Family history of seizure disorders – present n=18 (9.09%). History of febrile convulsions prior to development of simple partial seizures – present n=10 (5.05%) NB 3 patients had Sturge -Webber syndrome **Inclusion criteria** Not reported **Exclusion criteria** Not reported				Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Can the results be applied to your organization? Yes
Full citation Nikodijevic, D., Baneva-Dolnenec, N., Petrovska-Cvetkovska, D., Caparoska, D., Refractory epilepsy-MRI, EEG and CT scan, a correlative clinical study, Open Access Macedonian Journal of Medical Sciences, 4, 98-101, 2016 **Ref Id** 1154759 **Country/ies where the study was carried out** Macedonia **Study type** Cross-sectional **Aim of the study** To ".. determine the specificity and sensitivity of neurophysiologic and neuroimaging methods, in detecting the epileptogenic focus of patients with refractory epilepsy, as well as to	**Sample size** N=37. CT results reported for 28 patients only **Characteristics** Patients diagnosed with refractory epilepsy Age 2 years - 57 years Sex – Male n=14; female n=23 female Seizure type – Partial simple n=5 (13.5%); partial complex n=23 (62.1%); generalised n=9 924.3%). Seizure frequency – weekly n=24; daily n=13 EEG findings – positive 70.2%. Aetiology – Trauma n=2 (7.14%); cerebral malformation n=5 (17.8%); post-cerebrovascular accident n=3 (10.7%); vascular malformation n=2 (7.14%); perinatal trauma n=1 (3.5%); tumours n=2 (7.14%); hippocampal sclerosis n=12 (42.8%); toxical post infection n=1 (3.5%0 **Inclusion criteria** Not reported **Exclusion criteria** Not reported	**Interventions** 16-18 transaxial sequences used, and contrast used where required	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 1/28 Vascular: NA Scarring: 6/28 Congenital/ developmental: 1/28 Inflammatory/infective/ immune: 1/ NA Metabolic/genetic: NA. Other: 30/28 NB. Detailed results from CT scans are only reported for 28 patients (those with a positive aetiology)	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
analyze the correlation between them." p 99 **Study dates** Not reported **Source of funding** Not reported					Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Obajimi, M. O., Fatunde, O. J., Ogunseyinde, A. O., Omigbodun, O. O., Atalabi, O. M., Joel, R. U., Computed tomography and childhood seizure disorder in Ibadan, West African Journal of Medicine, 23, 167-172, 2004	**Sample size** N=103. Results from 115 scans are reported **Characteristics** Children with seizure disorders Age mean 7.4 years (SD ± 4.6), range 1 month – 16 years Male n=71; female n=32 Neurologic deficit – present n=32; absent n=81	**Interventions** GEC 9000. Axial slices of brain obtained at 4mm cuts from base of skull to posterior fossa and 10mm cuts to skull vertex. Pre and post contrast slices obtained	**Details** Not reported	**Results** Total sample (N=115) - proportion identified with a clinically relevant abnormality: Tumour: 9/115 Vascular: 19/115 Scarring: 7/115 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 30/115	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 1154773 **Country/ies where the study was carried out** Nigeria **Study type**. Retrospective cohort **Aim of the study** To "… evaluate the usefulness of CT in defining the aetiology of seizures in children by documenting their diverse CT findings." p 168 **Study dates** January 1997 - December 2001 **Source of funding** Not reported	**Inclusion criteria** Not reported **Exclusion criteria** Not reported			1 month - 12 months (n=11) - proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: 2/11 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 4/11 13 months - 4 years (n=27) - proportion identified with a clinically relevant abnormality: Tumour: 1/27 Vascular: 2/27 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 7/27 5 years - 10 years (n=46) - proportion identified with a clinically relevant abnormality: Tumour: 6/46 Vascular: 9/46 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA	Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Metabolic/genetic: NA. Other: 9/46 <u>11 years - 15 years (n=29) - proportion identified with a clinically relevant abnormality</u>: Tumour: 1/29 Vascular: 6/29 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 5/29 <u>> 15 years (n=2) - proportion identified with a clinically relevant abnormality</u>: Tumour: 1/2 Vascular: NA Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: NA <u>Simple partial (n=15) - proportion identified with a clinically relevant abnormality</u>: Tumour: 1/15 Vascular: 4/15 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/	Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				immune: NA Metabolic/genetic: NA. Other: 5/15 <u>Complex partial (n=12) - proportion identified with a clinically relevant abnormality</u>: Tumour: NA Vascular: 1/12 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 4/12 <u>Partial secondarily generalised (n=4) - proportion identified with a clinically relevant abnormality</u>: Tumour: 1/4 Vascular: 1/4 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 1/4 <u>GTC (n=84) proportion identified with a clinically relevant abnormality:</u> Tumour: 7/84 Vascular: 11/84 Scarring: NA Congenital/	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 15/84	
Full citation Ogunniyi, A., Adeyinka, A., Fagbemi, S. O., Orere, R., Falope, Z. F., Oyawole, S. O., Computerized tomographic findings in adolescent and adult Nigerian epileptics, West African Journal of Medicine, 13, 128-131, 1994 **Ref Id** 1154783 **Country/ies where the study was carried out** Nigeria **Study type** Prospective cohort **Aim of the study** To "… determine factors associated with positive yield for judicious utilisation of CT." p 128 **Study dates**	**Sample size** N=75 **Characteristics** Epilepsy patients over the age of 12 years Sex – Male n=48; female n=27 Age (mean) 36 (SD 14.8 years) Neurologic deficit – Present n=18; absent n=57 Seizure type – Partial n=27 (simple n=4; complex n=8; secondarily generalised n=15); Generalised n=17 (tonic-clonic n=15; absence n=1; myoclonic n=1; unclassified n=2 EEG findings – normal n=12; epileptiform n=20; slowing n=14 **Inclusion criteria** • At least 2 stereotyped episodes of unprovoked seizures characterised by focal or generalised convulsions, loss of consciousness or periods of altered awareness associated with special sensory, somatosensory, psychic, autonomic symptoms and/or automatism. Episodes must have	**Interventions** Plain and contrast CT scans performed using a GEC9000 scanner Patients required to pay for procedure	**Details** Consecutive epileptic patients seen at 1 adult neurology clinic between Jan 1990 and March 1992	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 11/75 Vascular: 6/75 Scarring: NA Congenital/ developmental: 1/75 Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 16/75	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
January 1990 - March 1992 **Source of funding** Not reported	been witnessed by another individual **Exclusion criteria** • Non Nigerians • Non epileptics • Patients with acute symptomatic seizures • Patients with single seizures				Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Otsubo, H., Hwang, P. A., Hoffman, H. J., Becker, L. E., Gilday, D. L., Chuang, S. H., Harwood-Nash, D, Neuroimaging studies in children with temporal lobectomy, Child's Nervous System, 281-287, 1995 **Ref Id**	**Sample size** N=28 **Characteristics** Age – range 7 months – 18 years (mean 11.8 years) Sex – male n=12; female n=16	**Interventions** CT with and without intravenous enhancement was performed on GE9800 scanner. Standard transaxial non-enhanced scans were obtained with contiguous 10-mm	**Details** Not reported	**Results** <u>Proportion identified with a clinically relevant abnormality</u>: Tumour: 12/28 Vascular: 2/28 Scarring: NA Congenital/ developmental: 1/28 Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 14/28	**Limitations** <u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
1154808 **Country/ies where the study was carried out** Canada **Study type** Cross-sectional **Aim of the study** To "…determine the most precise method of detecting the presence of lesions and the epileptogenic zone in children fo whom a temporal lobectomy was planned." **Study dates** Not reported **Source of funding** Not reported	Seizure type – complex partial only n=15; complex partial with secondary generalisation n=13 Seizure onset – range 3 months – 17 years (mean 4.9 years) **Inclusion criteria** Not reported **Exclusion criteria** Not reported	sections. Additional 5-mm-thick coronal views were obtained during contrast-enhanced CT			Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Patel, N. H., Jain, A. R., Iyer, V. K., Shah, A. G., Jain, D. A., Shah, A. A., Clinico - Diagnostic and therapeutic relevance of computed tomography scan of brain in children with partial seizures, Annals of Indian Academy of Neurology, 352-356, 2013 **Ref Id** 1154841 **Country/ies where the study was carried out** India **Study type** Prospective cohort **Aim of the study** To "…evaluate the significance of CT scan of brain in the	**Sample size** N=50 **Characteristics** Children with partial motor seizures. Nine children were excluded from analysis as 4 children expired after admission before investigations, 3 children were not ready for admission and investigations. CT scan could not be carried out in two patients because of financial constraints. Seizure type – simple partial n=25; complex partial n=18; partial seizures later developing into generalised seizures n=7. Age, range - 1 month to 12 years Sex – Male n=31; female n=19 History of contact with a person with tuberculosis; history of gastro intestinal worm infestation n=2; congenital heart disease n=4 History of febrile convulsions n=4	**Interventions** Scans carried out using Siemens SOMATOM Definition AS + model scanner. Sections of 5-10 mm thickness were obtained with orbitomeatal line as reference Patients required to pay for scans	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: 13/50 Scarring: 2/50 Congenital/ developmental: NA Inflammatory/infective/ immune: 16/50 Metabolic/genetic: NA. Other: 3/50	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
management of children with partial seizures." p 352 **Study dates** August 2001 - July 2002 **Source of funding** Not reported	Family history of epilepsy n=2; family history of febrile convulsions n=1 **Inclusion criteria** • Children between ages 1 month and 12 years experiencing partial seizures with predominantly focal motor phenomena **Exclusion criteria** • Neonates				Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Ye Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Patel, P. J., Kolawole, T. M., Mahdi, A. H., Qteishat, W. A., Computed tomography (CT) scan findings in children with seizures only, Acta Neurologica Scandinavica, 74, 165-166, 1986	**Sample size** N=115. **Characteristics** Children with seizures only. Male n=80; female n=35 Age range 3 months-15 years	**Interventions** CT scans. No details reported	**Details** Not reported	**Results** Total sample (N=115) - proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: 7/115 Scarring: NA Congenital/ developmental: 3/115 Inflammatory/infective/	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 1154842 **Country/ies where the study was carried out** Saudi Arabia **Study type** Cross-sectional **Aim of the study** To "… detect any treatable abnormalities on CT scan with children presenting with seizures only and also to, evaluate the efficacy of CT scan in the management of such children." p 165 **Study dates** Not reported **Source of funding** Not reported	EEG status (n=90) – normal n=11 (12.2%); abnormal n=79 (87.8%) **Inclusion criteria** Not reported **Exclusion criteria** • Children with significant neurological signs and symptoms			immune: NA Metabolic/genetic: NA Other: 13/115 <u>Generalised (n=57) - proportion identified with a clinically relevant abnormality</u>: Tumour: NA Vascular: NA Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 6/57 <u>Partial (n=37) - proportion identified with a clinically relevant abnormality</u>: Tumour: NA Vascular: 4/37 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 3/37 <u>Partial + generalised seizures (n=21) - proportion identified with a clinically relevant abnormality</u>: Tumour: NA Vascular: 3/21 Scarring: NA Congenital/ developmental: NA	Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 4/21	Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Perez Lopez, J. L., Longo, J., Quintana, F., Late onset epileptic seizures. A retrospective study of 250 patients, Acta Neurologica Scandinavica, 72, 380-384, 1985 **Ref Id** 1154855 **Country/ies where the study was carried out** Spain **Study type** Retrospective cohort **Aim of the study** To "… ascertain the relative frequency of the different etiologi-	**Sample size** N=250 **Characteristics** Patients with late-onset seizures (beginning after the age of 20) Age, range 22 – 88 years (mean 52 years) Duration of seizures < 1 year n=124; 1-5 years n=68; > 5 years n=58 Seizure type – Partial elementary n=47; partial complex n=57; generalised n=146 EEG findings – Normal n=58; diffuse slowing n=14; focal slowing n=109; focal spikes n=55; bilateral spikes n=10 **Inclusion criteria** Not reported	**Interventions** Base and contrast enhanced CT scan performed in all patients using a 8.800 GE body scanner	**Details** Not reported	**Results** <u>Total sample -proportion identified with a clinically relevant abnormality</u>: Tumour: 42/250 Vascular: 26/250 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 59/250 <u>Partial elementary (n=47) - proportion identified with a clinically relevant abnormality</u>: Tumour: 18/47 Vascular: 11/47 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA	**Limitations** <u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
cal factors and to determine the efficacy and usefulness of a cranial CT scan in these cases." p 380 **Study dates** July 1981 - December 1983 **Source of funding** Not reported	**Exclusion criteria** • Patients with syncope, hysterical fits, faints with indeterminate causes			Other: 5/47 Partial complex (n= 57) - proportion identified with a clinically relevant abnormality: Tumour: 5/39 Vascular: 1/39 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 8/39 Generalised (n= 146) proportion identified with a clinically relevant abnormality: Tumour: 18/47 Vascular: 40/47 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 40/47	regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Phukan, S., Bhargava, S. K., Balarangaiah, G., Murthy, M. G. K.,	**Sample size** N=60 **Characteristics**	**Interventions** Plain and contrast scans used "… as and	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 4/60	**Limitations** The quality of this study was assessed using the CEBMA checklist

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Pushkarna, R., Cranial computed tomography in childhood seizures, Journal International Medical Sciences Academy, 15, 79-81, 2002 **Ref Id** 1154870 **Country/ies where the study was carried out** India **Study type** Cross-sectional **Aim of the study** Not reported **Study dates** Not reported **Source of funding** Not reported	Patients with presumed idiopathic generalised seizures between ages of 2 and 12 years **Inclusion criteria** • All patients presenting with generalised seizures; partial seizures; abnormal neurological seizures; focal paroxysmal discharge and showing electroencephalographic changes were included initially **Exclusion criteria** • Patients presenting with absence seizures • Patients presenting with benign rolandic epilepsy • Patients presenting with febrile seizures	when required." p 79		Vascular: 4/60 Scarring: 2/60 Congenital/ developmental: 10/60 Inflammatory/infective/ immune: 18/60 Metabolic/genetic: NA. Other: 2/60	Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear. Are the measurements (questionnaires) likely to

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Poudel, P., Gupta, M. K., Kafle, S. P., Computerized Axial Tomography Findings in Children with Afebrile Seizures: A Hospital Based Study at Eastern Nepal, Journal of Nepal Health Research Council, 15, 61-66, 2017 **Ref Id** 1154887 **Country/ies where the study was carried out** Nepal	**Sample size** N=447. 321 patients underwent CT scans (71.8%) **Characteristics** Children with afebrile seizures Male n=276; female n=171 Age at onset of seizure (median) 46 months (IQR 12-102) months Presence of developmental delay n=137 (30.6%) History of birth asphyxia n=71 (15.9%)	**Interventions** CT scans. No details reported. Patients required to pay for procedure.	**Details** Consecutive sampling of children with afebrile seizures (generalised and focal) presenting to 1 paediatric and adolescent neurology clinic. Seizures classified according to ILAE system. Diagnosis: Epileptic encephalopathies such as West Syndrome	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 3/321 Vascular: 12/321 Scarring: NA Congenital/developmental: 17/321 Inflammatory/infective/ immune: 53/321 Metabolic/genetic: NA. Other: 68/321	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Prospective cohort **Aim of the study** To "…to explore CT scan findings in children suffering from afebrile seizures, to find out the proportion of cases with abnormal CT scan and to find out the positivity rate of CT scan in children with afebrile seizures who were subjected to CT scan in a resource limited area." p 61 **Study dates** July 2009 - March 2014 **Source of funding** Not reported	Family history of seizure n=51 (11.4%) Abnormal neurological examination n=152 (34.0%) Presence of motor deficit n=105 (23.5%) EEG findings - normal n=108 (24.2%); abnormal n=277 (62.0%); not done n=62 (13.9%). Cerebral palsy n=86 (19.2%) Type of seizure – Generalised n=217 (48.5%); focal n=230 (51.5%) **Inclusion criteria** • Age 1 month-20 years • Presence of at least one afebrile unprovoked seizure **Exclusion criteria** • Neonates • Children with febrile convulsions • Acute symptomatic seizures; for example, seizures due to acute febrile encephalopathy, acute metabolic disturbance, electrolyte disturbance, drug overdose and poisoning, etcetera. Children with psychogenic non epileptic seizures • Patients with a single episode of brief generalized seizure; primary		and Lennox Gastaut Syndrome were defined as generalised seizures.		Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? No Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	generalized epilepsies; or benign rolandic epilepsy				Can the results be applied to your organization? Yes
Full citation Reinkikainen, K. J., Keranen, t, Lehtinen, J. M., Kalviainen, R., Saari, T., Riekkinen, P. J., CT brain scan and EEG in the diagnosis of adult onset seizures, Epilepsy Research, 1, 178-184, 1987 **Ref Id** 1154946 **Country/ies where the study was carried out** Finland **Study type** Retrospective cohort **Aim of the study** To "… present the incidence of CT abnormalities and the correlation of CT findings with the clinical features and EEG changes in patients who had their first epileptic seizures after the age of 15 years and who had no	**Sample size** N=202 **Characteristics** Adult patients with newly diagnosed seizures. Sex – male n=120; females n=120 Duration of seizures < 1 year n=172; ≥ 1 year n=30 Age – 16-20 years n=31; 21-30 years n=52; 31-40 years n=31; 41-50 years n=33; 51-60 years n=26; > 60 years n=39 Seizure type – Generalised, tonic clonic n=99; Partial secondary generalised n=53; Simple partial n=6; Complex partial n=22; unclassified n=22 EEG findings – normal n=43; borderline n=9; slow background activity n=14; slow wave n=55; irritative n=35; slow-wave discharges n=17; spike and wave n=19 **Inclusion criteria** • > 15 years of age • One or more spontaneous epileptic seizures for the first time within 1 year before the examinations were included in this study.	**Interventions** CT scans performed using 3rd generation Siemens Somatom 2 CT equipment. Abnormal findings were re-evaluated by a neuroradiologist, without access to clinical data	**Details** Not reported.	**Results** <u>Total sample - proportion identified with a clinically relevant abnormality:</u> Tumour: 34/202 Vascular: 11/202 Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 24/202 <u>16-20 years (n=31) - proportion identified with a clinically relevant abnormality:</u> Tumour: 1/31 Vascular: NA Scarring: NA Congenital/developmental: Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 2/31 <u>21-30 years (n=52) - proportion identified with a clinically relevant abnormality:</u> Tumour: 5/52 Vascular: NA Scarring: NA Congenital/developmental: NA	<u>The quality of this study was assessed using the CEBMA checklist</u> Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
previous history of a known cause of seizures." p 179 **Study dates** February 1980 – July 1984 **Source of funding** Not reported	• Patients with a seizure history longer than 1 year were included only if no etiological examinations had been carried out previously **Exclusion criteria** • Patients with seizures due to exogenous causes or acute illnesses (for example, alcohol withdrawal, acute brain injury, central nervous system infection or cerebrovascular accident) • Patients with significant or suggestive antecedent history for seizures (for example, cerebrovascular disease, cerebral contusion, encephalitis, meningitis or carcinoma showing metastases to other organs and likely to metastase to the brain)			Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 5/52 <u>31-40 years (n=31) - proportion identified with a clinically relevant abnormality:</u> Tumour: 5/31 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 7/31 <u>41-50 years (n=33) - proportion identified with a clinically relevant abnormality:</u> Tumour: 8/33 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 7/33 <u>51-60 years (n=26) - proportion identified with a clinically relevant abnormality:</u> Tumour: 10/26 Vascular: NA Scarring: NA	Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 7/26 <u>>60 years (n=39) - proportion identified with a clinically relevant abnormality:</u> Tumour: 5/39 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 10/39 <u>GTC (n=99) - proportion identified with a clinically relevant abnormality:</u> Tumour: 9/99 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 18/99 <u>Partial, secondary generalised (n=53) - proportion identified with a clinically relevant abnormality:</u> Tumour: 13/53	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 10/53 <u>Simple partial (n=6) - proportion identified with a clinically relevant abnormality:</u> Tumour: 1/6 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 2/6 <u>Complex partial (n=22) - proportion identified with a clinically relevant abnormality:</u> Tumour: 3/22 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 5/22	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Unclassified (n=22) - proportion identified with a clinically relevant abnormality: Tumour: 8/22 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 2/22	
Full citation Samanta, M., Mallick, A. K., Mohanty, G., Swain, K. P., Clinico-radiological evaluation of newly diagnosed epilepsy: A monocentric prospective study from a tertiary care hospital of eastern india, Journal of Clinical and Diagnostic Research, 12, OC05-OC09, 2018 **Ref Id** 1155044 **Country/ies where the study was carried out** India **Study type** Prospective cohort **Aim of the study**	**Sample size** N=300. **Characteristics** Sex – male n=222 (74%); female n=78 (26%) Geographic background - rural n=186 (62%); urban n=114 (38%) Age at onset of seizures – range 5 - 50 years; mean 25 years (SD 11.07) Seizure pattern – Awake state n=180 (60%); during sleep n=48 (16%); both n=72 (24%) Family history of seizure – present n=18 (6%) Precipitating factors – not present n=174 (58%); sleep deprivation n=66 (22%); emotional strain n=18 (6%); missed medication n=18 (6%); fatigue n=12 (4%); missed	**Interventions** CT scans. No details reported	**Details** Seizures classified using ILAE system	**Results** Total sample - proportion identified with a clinically relevant abnormality: Tumour: 12/300 Vascular: 6/300 Scarring: 6/300 Congenital/ developmental: NA Inflammatory/infective/ immune: 42/300 Metabolic/genetic: NA. Other: 48/300 Patients with generalised seizures - proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: 6/198 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: 12/198 Metabolic/genetic: NA. Other: 12/198	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with regard to the population

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
To analyse the clinical profile and neuroimaging characteristics in cases of newly diagnosed epilepsies and to determine the correlation between clinical features and neuroimaging characteristics **Study dates** August 2013 - August 2016 **Source of funding** Not reported	meal n=6 (2%); flicker flash n=6 (2%) Seizure type - Generalised n=198 (66%) – tonic–clonic n=132 (66.67%); tonic n=12 (6.06%); clonic n=6 (3.03%); atonic n=12 (6.06%); myoclonic n=6 (3.03%); absence n=12 (6.06%); atypical absence n=6 (3.03%); myoclonic + generalised tonic-clonic n=12 (6.06%) Focal n=102 (34%) – simple partial n=12 (11.8%); complex partial n=18 (17.7%); focal with secondary generalisation n=72 (70.5%) **Inclusion criteria** • Patients with newly diagnosed epilepsy over 5 years of age who meet clinical criteria for an epileptic seizure (ILAE-2014) **Exclusion criteria** • Patients experiencing seizures after a head injury • Patients with systemic illness, metabolic abnormalities or seizures provoked by external factors such as alcohol withdrawal • Eclampsia with seizure			Patients with focal seizures - proportion identified with a clinically relevant abnormality: Tumour: 12/102 Vascular: NA Scarring: 6/102 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: NA	to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Schoenenberger, R. A., Heim, S. M., Indication for computed tomography of the brain in patients with	**Sample size** N=119. **Characteristics**	**Interventions** Computed tomography of the brain was performed usually within six hours	**Details** Not reported.	**Results** Total sample - proportion identified with a clinically relevant abnormality: Tumour: 34/119 Vascular: 11/119	**Limitations** The quality of this study was assessed using the CEBMA checklist

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
first uncomplicated generalised seizure, British Medical Journal, 986-989, 1994 **Ref Id** 1160353 **Country/ies where the study was carried out** USA **Study type** Retrospective cohort **Aim of the study** To "… assess the yield of emergency computed tomography of the brain in patients with a first generalised epileptic seizure and to evaluate a four item screening questionnaire on alcohol misuse (CAGE questionnaire) as a triage tool to avoid unnecessary scans in cases of seizures related to withdrawal from alcohol." p 986 **Study dates** May 1992 - April 1993 **Source of funding** Scientific Foundation	Adult patients presenting to casualty within one hour of a generalised seizure Age - mean 46 years (SD 16), range 16-87 Sex – male n=81; female n=38. Focal neurological signs – present n=29; absent n=90 Dependence on alcohol (answering yes to ≥ 2 questions on CAGE questionnaire [Ewing JA. Detecting alcoholism, the CAGE questionnaire. JAMA 1984;252: 1905-7]) n=39 **Inclusion criteria** • Patients with a first seizure (determined through clinical history) • Complete, transient loss of consciousness, witnessed tonic-clonic jerks oral laceration, urinary loss, or postictal amnesia **Exclusion criteria** • Patients in status epilepticus and patients with an impairment of consciousness of < 14 on the Glasgow coma scale that lasted for more than one hour after they entered the casualty unit	and always within 24 hours of the seizure. Except for patients whose unenhanced scans showed an intracranial haemorrhage, all patients were also examined with enhancement with bolus injection of intravenous contrast medium. The scans were reported jointly by a junior radiologist and a senior neuroradiologist. CT scans were performed using a third-generation beam scanner, Siemens Somatom 2 CT equipment. Abnormal findings were re-evaluated by a neuroradiologist, without access to clinical data.		Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 24/119 <u>16-20 years (n=31) - proportion identified with a clinically relevant abnormality</u>: Tumour: 1/31 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 2/31 <u>21-30 years (n=52) proportion identified with a clinically relevant abnormality</u>: Tumour: 5/52 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 5/52 <u>31-40 years (n=31) - proportion identified with a clinically relevant abnormality</u>: Tumour: 5/31 Vascular: NA	Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
of the Department of Medicine, University Hospital, Basle				Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 7/31 41-50 years (n=33) - proportion identified with a clinically relevant abnormality: Tumour: 8/33 Vascular: NA Scarring: NA Congenital/developmental: Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 7/33 51-60 years (n=26) - proportion identified with a clinically relevant abnormality: Tumour: 10/26 Vascular: NA Scarring: NA Congenital/developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 7/26 >60 (n=39) - proportion identified with a clinically relevant abnormality: Tumour: 5/39 Vascular: NA Scarring: NA	Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Congenital/developmental: Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 10/39 <u>Generalised tonic clonic (n=99) proportion - identified with a clinically relevant abnormality</u>: Tumour: 9/99 Vascular: NA Scarring: NA Congenital/developmental: Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 18/99 <u>Partial, secondary generalised (n=53) - proportion identified with a clinically relevant abnormality</u>: Tumour: 13/53 Vascular: NA Scarring: NA Congenital/developmental: Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 10/53 <u>Simple partial (n=6) - proportion identified with a clinically relevant abnormality</u>: Tumour: 1/6 Vascular: NA Scarring: NA Congenital/developmental:	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
				Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 2/6 Complex partial (n=22)- proportion identified with a clinically relevant abnormality: Tumour: 3/22 Vascular: NA Scarring: NA Congenital/developmental: Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 5/22 Unclassified (n=22) - proportion identified with a clinically relevant abnormality: Tumour: 8/22 Vascular: NA Scarring: NA Congenital/developmental: Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 2/22	
Full citation Scollo-Lavizzari, G., Balmer, C., Electroencephalography and computerized transaxial tomography in patients with temporal lobe epilepsy, European Neurology, 19, 33-38, 1980	**Sample size** N=112 **Characteristics** Patients with partial epilepsy with complex symptomatology Age (range) 5 – 73 years.	**Interventions** CT scans. No details reported	**Details** Epilepsies classified according to ILAE system	**Results** Total sample - proportion identified with a clinically relevant abnormality: Tumour: 8/112 Vascular: 1/112 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 1155086 **Country/ies where the study was carried out** Switzerland **Study type** Prospective cohort **Aim of the study** Not reported **Study dates** January 1979 - June 1979 **Source of funding** Not reported	5-19 years n=30; 20-39 years n=44; 40-59 years n=33; 60-80 years n=5 Sex – male n=49; female n=63. Duration of seizures < 6 months n=20; 6 months – 1 year n=21; 2-5 years n=26; > 5 years n=33 Seizure type – Partial complex n=54; partial complex with secondarily generalised n=58 EEG findings – Delta f. n=13; focal spike n=35; bilateral spike n=64. **Inclusion criteria** Not reporte **Exclusion criteria** Not reported			immune: NA Metabolic/genetic: NA Other: 29/112 <u>Partial complex - proportion identified with a clinically relevant abnormality</u>: Tumour: 5/54 Vascular: 1/54 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: 12/54 <u>Partial complex secondarily generalised - proportion identified with a clinically relevant abnormality</u>: Tumour: 3/58 Vascular: NA Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 17/58	Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Shankar, S. G., Prakash, M. O., Pattern of seizure disorders in children in Eastern Nepal, Journal of Pediatric Neurology, 11, 103-106, 2013 **Ref Id** 1155111 **Country/ies where the study was carried out** Nepal **Study type** Prospective cohort **Aim of the study** To "… find out the prevalence, pattern	**Sample size** N=105. 87 patients underwent CT scans **Characteristics** Children presenting with seizure disorders Age 3 months-5 years n=30 (28.5%); 6-10 years n=45 (42.9%); 11-15 years n=30 (28.5%) Male n=65 (61.9%); female n=40 (38.1%) Ethnicity - Mongolian n=70 (66.7%); non Mongolian n=35 (33.3%)	**Interventions** CT scans. No details reported	**Details** Seizures were classified according to ILAE system	**Results** Proportion identified with a clinically relevant abnormality: Tumour: NA Vascular: NA Scarring: 2/87 Congenital/developmental: 7/87 Inflammatory/infective/ immune: 36/87 Metabolic/genetic: 4/87. Other: 10/87	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
and etiology of seizure disorders in children attending at a tertiary care center of a teaching hospital." p 103 **Study dates** June 2005 - May 2006 **Source of funding** Not reported	Predisposing factors - Birth asphyxia n=16 (15.2%); Meningitis/encephalitis n=5 (4.7%); Developmental delay n=14 (13.3%); Family history of epilepsy n=5 (4.7%) Currently prescribed ASMs n=80 (76.1%); not currently prescribed ASMs 25 (23.8%) Number of prescribed ASMs 1 ASM n=50 (62.5%); 2 ASM n=13 (16.2%); 3 ASMs n=17 (21.3%). ASMs included phenytoin sodium, sodium valproate, carbamazepine, phenobarbitone, and clobazam Seizure type – Generalised seizures n=73 (69.5 %); partial seizures 20 (19%); unclassified n=12 (11.4%). Generalised seizure and experience of other seizure types - tonic clonic in n=50 (68.4%); absence n=10 (9.5%); myoclonic n=8 (7.6%) tonic n=2 (1.9%); clonic and atonic types n=1 (0.95%). Partial seizures and experience of other seizure types - with secondary generalization n=9 (8.5%); complex partial n=6 (5.7%); simple partial n=5 (4.7%) EEG findings Abnormal n=48/87 (55.1%)				Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? No Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	NB Included 4 patients with Sturge-Weber syndrome **Inclusion criteria** • Age 3 months-15 years • 2 or more unprovoked epileptic events occurring at least 24 hours apart **Exclusion criteria** • Age < 3 months • Single or isolated seizures • Febrile seizures • Provoked seizures; this is those due to systemic, toxic, metabolic and acute insults to central nervous system such as infections, history of head trauma or intracranial haemorrhage				
Full citation Sinclair, D. B., Aronyk, K., Snyder, T., McKean, J., Wheatley, M., Bhargava, R., Hoskinson, M., Hao, C., Colmers, W., Pediatric temporal lobectomy for epilepsy, Pediatric Neurosurgery, 38, 195-205, 2003 **Ref Id** 1155154	**Sample size** N=42. CT scans available for 39 patients **Characteristics** Paediatric patients under the age of 17 years undergoing temporal lobectomy for intractable epilepsy Sex – male n=25; female n=17. Age at surgery - range 18 months – 16 years Duration of epilepsy – range 6 months – 15 years Seizure type - partial complex n=29; complex partial seizures with	**Interventions** CT scans. No details reported	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 4/39 Vascular: NA Scarring: NA Congenital/ developmental: 4/39 Inflammatory/infective/ immune: NA Metabolic/genetic: NA. Other: NA	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? No Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (em-

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out Canada **Study type** Retrospective cohort **Aim of the study** Not reported **Study dates** 1988 – 2000 **Source of funding** Not reported	secondary generalization n=11; simple partial and complex partial n=1; infantile spasms n=1 EEG findings – normal n=4; focal epileptic abnormality n=22; generalized epileptic abnormality n=1; focal slowing n=9; generalized slowing n=5; hypsarrhythmia n=1. NB included 1 patient with West syndrome **Inclusion criteria** Not reported **Exclusion criteria** Not reported				ployees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Yes Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Singhi, P., Ray, M., Profile of West syndrome in North Indian children, Brain & Development, 27, 135-40, 2005 **Ref Id** 1079620 **Country/ies where the study was carried out** India. **Study type** Prospective cohort. **Aim of the study** To "… examine the clinical profile of children with partial seizures … to determine the value of neurological examination, interictal EEG, and CT scans in identifying the region of cerebral origin; and (c) to determine the	**Sample size** N=124. 100 patients underwent CT scans **Characteristics** Neurologically 'normal' children between 3 months and 12 years of age, presenting with partial seizures Sex - Male n=60 boys; female n=40 girls Age - < 1 year n=8; 1-2 years n=8; 3-4 years n=10; 5-6 years n=28; 7-8 years n=13; 9-10 n=23; 11-12 n=10. Seizure type – Complex partial seizures 65%; simple partial seizures 35%; secondarily generalized 21%. EEG findings – focal spikes n=52; multiple spikes-waves n=24; generalized spike-wave n=22; normal/nonspecific n=2; slowing/delta activity (with or without other findings) n=27	**Interventions** CT scans. No details reported	**Details** Consecutive children presenting to 1 paediatric emergency department over a 2 year period Seizure type categorised using ILAE classification Plain and contrast scans used. No further details reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 1/100 Vascular: NA Scarring: NA Congenital/ developmental: 2/100 Inflammatory/infective/ immune: 28/100 Metabolic/genetic: 2/100. Other: 7/100	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
underlying cause of seizures in our population." p 32 **Study dates** Not reported **Source of funding** Not reported	**Inclusion criteria** • Patients with onset of seizures in the past month **Exclusion criteria** • Patients referred for poorly controlled seizures of longer duration • Children with fever, previous febrile seizures • Children with a history of neurological insult • Children with gross developmental delay, or severe mental 'retardation' • Children with persistent neurological signs				Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Swaminathan, S., Sawhney, I. M. S., Jain, S., Garg, S. K., Profile of status epilepticus - A prospective study, Neurology India, 46, 279-283, 1998	**Sample size** N=40. CT scans performed in 26 patients **Characteristics** Adults with generalised convulsive status epilepticus admitted to emergency or neurology wards.	**Interventions** All patients initially treated with intravenous diazepam, followed by a loading dose of phenytoin.	**Details** Not reported	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 1/26 Vascular: 5/26 Scarring: 2/26 Congenital/ developmental: 1/26	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 1155266 **Country/ies where the study was carried out** India **Study type** Prospective cohort **Aim of the study** Not reported **Study dates** January 1995 - June 1996 **Source of funding** Not reported	Convulsive status epilepticus defined as "… generalised tonic-clonic or tonic seizures with more than 30 minutes of continuous seizure activity or two or more sequential seizures without recovery of consciousness between them." p 279 Age – range 14-71 (mean 36.30 ± 15.78) years Sex – male n=24; female n=16 Seizure type – Generalised tonic-clonic n=26; partial with secondary generalisation n=14 Frequency of seizures per hour (mean) 4.70 ± 1.83 Duration of seizures (minutes) 1.78 ± 1.01 Cumulative convulsive time (minutes) 25.27 ± 21.50 Seizure classification – symptomatic n=25, idiopathic n=4, cryptogenic n=11 History of epilepsy – present n=13 **Inclusion criteria** Not reported **Exclusion criteria** Not reported	CT scans – no details reported		Inflammatory/infective/ immune: 6/26 Metabolic/genetic: NA. Other: 3/26	Is the research method (study design) appropriate for answering the research question? Unclear Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection)bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation Thomas, S. V., Pradeep, K. S., Rajmohan, S. J., First ever seizures in the elderly: a seven-year follow-up study, Seizure, 6, 107-10, 1997 **Ref Id** 1155340 **Country/ies where the study was carried out** India **Study type** Prospective cohort **Aim of the study** To "… ascertain the clinical characteristics	**Sample size** N=23. 22 patients underwent CT scans. **Characteristics** Elderly patients (over the age of 65 years) with first ever seizures seen at 1 clinic between January 1988 and March 1989. Sex - Male n=14 (60.9%); female n=9 (39.1%) Age – Mean 69.9 ± 4.9 (range 65-80) years Seizure type – partial with secondary generalised n=12; generalised n=11 Seizure frequency – convulsive status epilepticus n=3 (13.0%); ≥ 1 per day n=2 (8.7%); 1-6 per week	**Interventions** CT scans. No details reported	**Details** Both inpatients and outpatients were included. Patients who had not visited the hospital in the last 6 months were contacted through letters and a review in the hospital was arranged to update the data. Data on those who failed to make this visit was updated through a subsequent postal questionnaire	**Results** Proportion identified with a clinically relevant abnormality: Tumour: 1/22 Vascular: 9/22 Scarring: NA Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 8/22	**Limitations** The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? No Could the way the sample was obtained introduce (selection) bias? Yes

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
and outcome of first ever seizures in the elderly in a hospital setting." p 107 **Study dates** January 1988 – December 1995 **Source of funding** Not reported	n=3 (13%); 1 per month n=3(13.0%); 2 per year n=1 (4.3%); single seizure n=10 (43%) Neurological deficit at time of initial evaluation – present n=14; not present n=9 (39.1%) EEG findings (n=3) – normal n=2; focal n=1 Systemic disorders – present n=17 (73.9%) - diabetes n=6); high blood pressure n=4; pulmonary tuberculosis n=3; chronic obstructive pulmonary disease n=1; rheumatic heart disease n=1; myocardial infarction n=1 Aetiology – unknown 43.5%; stroke 26.1%; tumours 4.3%; central nervous system infections 4.3%; post traumatic 8.6%; others 8.6% **Inclusion criteria** • Patients over the age of 65 years **Exclusion criteria** Not reported				Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? Unclear Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? Yes Can the results be applied to your organization? Yes
Full citation	**Sample size**	**Interventions** CT imaging was	**Details** Not reported	**Results**	**Limitations**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Wieshmann, U. C., Clinical application of neuroimaging in epilepsy, Journal of Neurology Neurosurgery and Psychiatry, 74, 466-470, 2003 **Ref Id** 1155495 **Country/ies where the study was carried out** UK. **Study type** Cross-sectional. **Aim of the study** To "… evaluate the use of neuroimaging in clinical practice and to assess the prevalence of detected structural abnormalities in epilepsy patients in a clinical set up." p 466 **Study dates** Not reported **Source of funding** Not reported	N=919. CT scans were performed in 163 patients **Characteristics** Age (total, N=919) – mean 39.7 years (median 39, range 15-87 years, standard deviation 14.2 years) Epilepsy type (patients who received CT scan n=163) – localisation related epilepsy n=93; idiopathic generalised epilepsy n=17; single epileptic attack n=31; remission n=25; non-epileptic attack n=14 **Inclusion criteria** • Patients with chronic active epilepsy, a single epileptic seizure, epilepsy in remission (no seizures for two years or longer) or non-epileptic seizures **Exclusion criteria** • Patients suffering from non-epileptic attack disorder • Patients with faints or other transient non-epileptic episodes	performed on a Philips CT scanner. Intravenous contrast was given if a focal onset was indicated on the request form. Axial images were obtained		Proportion identified with a clinically relevant abnormality: Tumour: 4/163 Vascular: 13/163 Scarring: 18/163 Congenital/ developmental: NA Inflammatory/infective/ immune: NA Metabolic/genetic: NA Other: 17/163	The quality of this study was assessed using the CEBMA checklist Did the study address a clearly focused question / issue? Yes Is the research method (study design) appropriate for answering the research question? Yes Is the method of selection of the subjects (employees, teams, divisions, organizations) clearly described? Yes Could the way the sample was obtained introduce (selection) bias? Yes Was the sample of subjects representative with regard to the population to which the findings will be referred? Unclear Was the sample size based on pre-study considerations of statistical power? No Was a satisfactory response rate achieved? No

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Are the measurements (questionnaires) likely to be valid and reliable? Yes Was the statistical significance assessed? Not applicable Are confidence intervals given for the main results? No Could there be confounding factors that haven't been accounted for? No Can the results be applied to your organization? Yes

ASMs:: antiseizure medications; CEBMA: Center for Evidence-Based Management; EEG: electroencephalogram; ILAE: International League Against Epilepsy; IQR: interquartile range; IV: intravenous; kV: kilovolt; mA: milliamperes; mg: milligram; ml: millilitre; mm: millimetre; SD: standard deviation.

Appendix E – Forest plots

Forest plots for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

This section includes forest plots only for outcomes that are meta-analysed. Outcomes from single studies are not presented here, but the quality assessment for these outcomes is provided in the GRADE profiles in appendix F.

Critical outcomes: proportion identified with tumour abnormalities

Figure 2: Proportion identified with tumour abnormalities: overall estimate

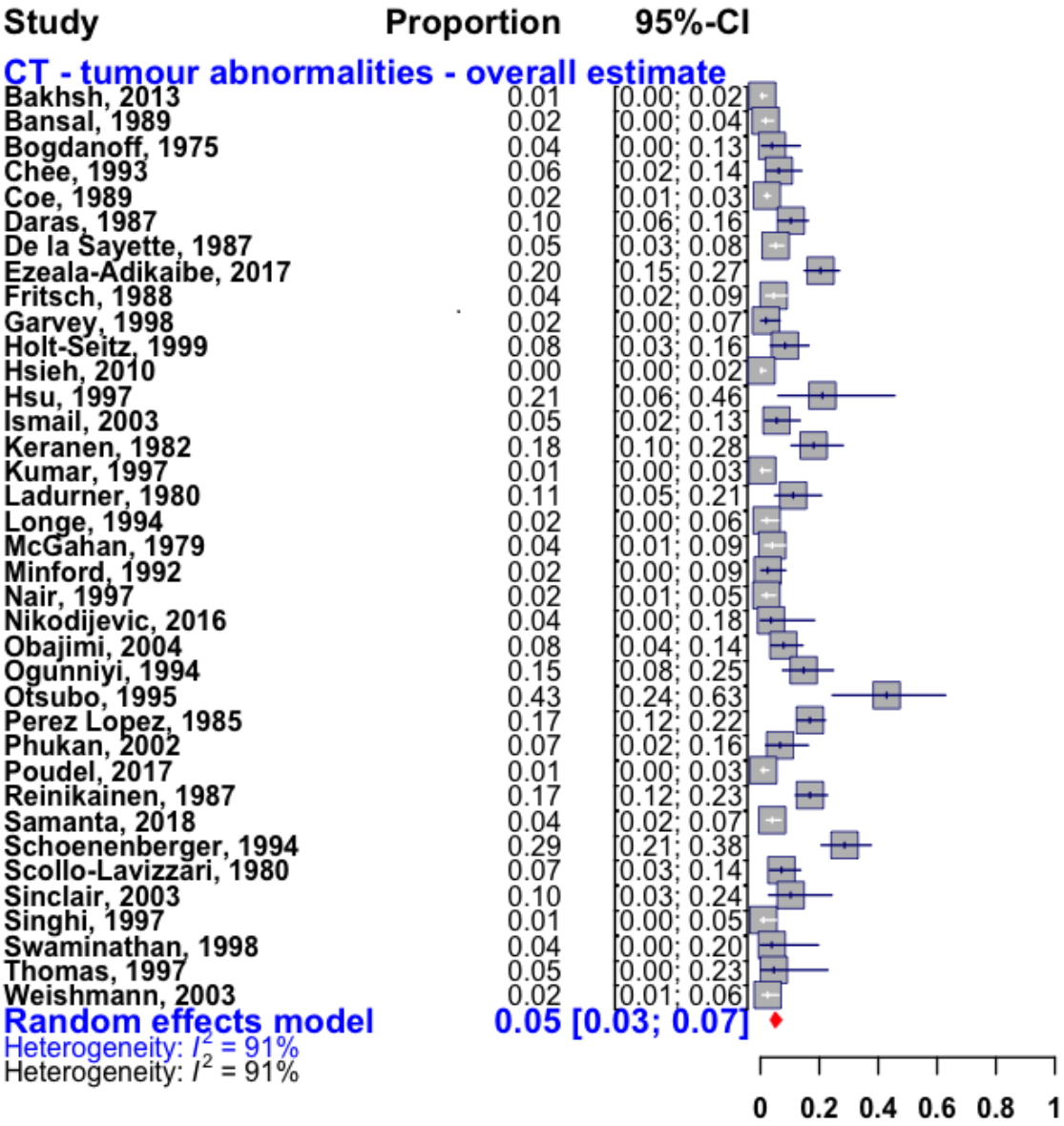


Figure 3: Proportion of tumour abnormalities identified in adults (>18 years)

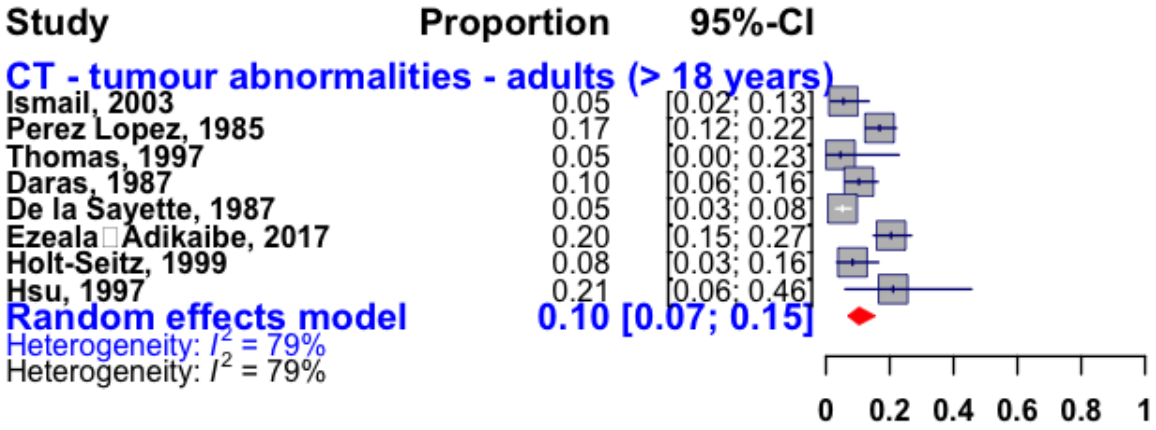
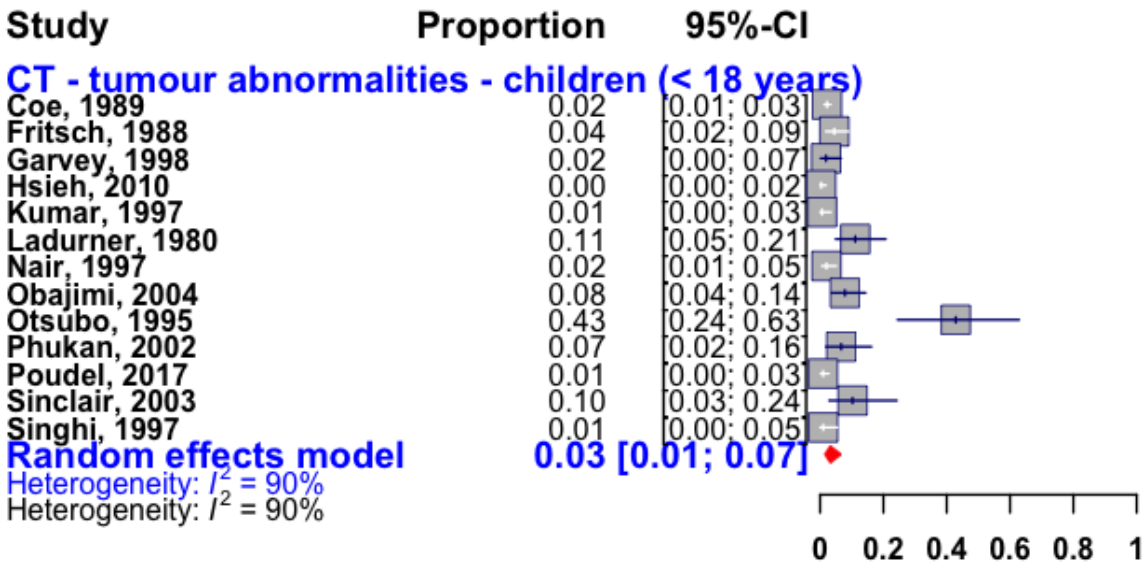


Figure 4: Proportion of tumour abnormalities identified in children (<18 years)



Critical outcomes: proportion identified with vascular abnormalities

Figure 5: Proportion identified with vascular abnormalities: overall estimate

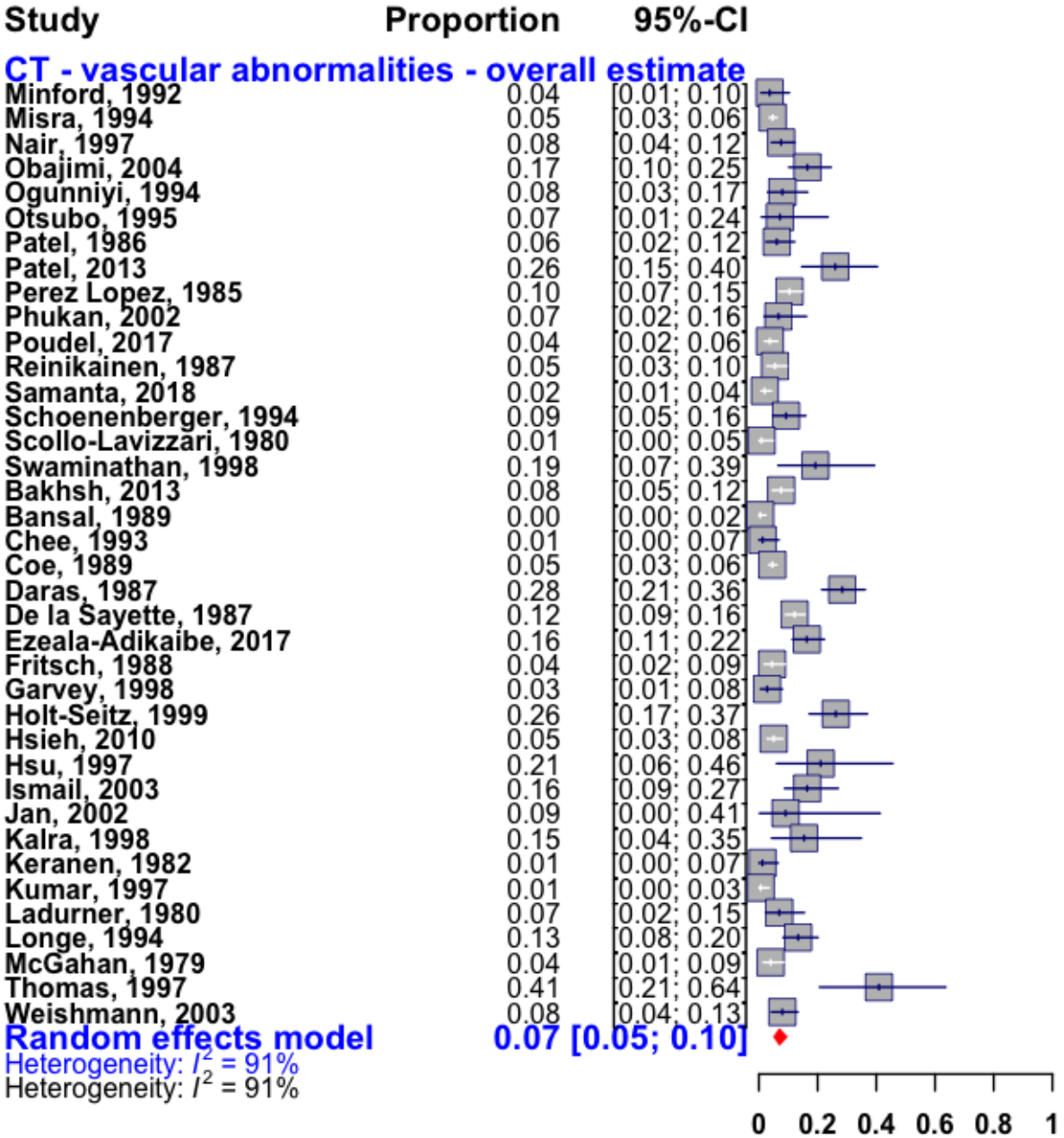


Figure 6: Proportion of vascular abnormalities identified in adults (> 18 years)

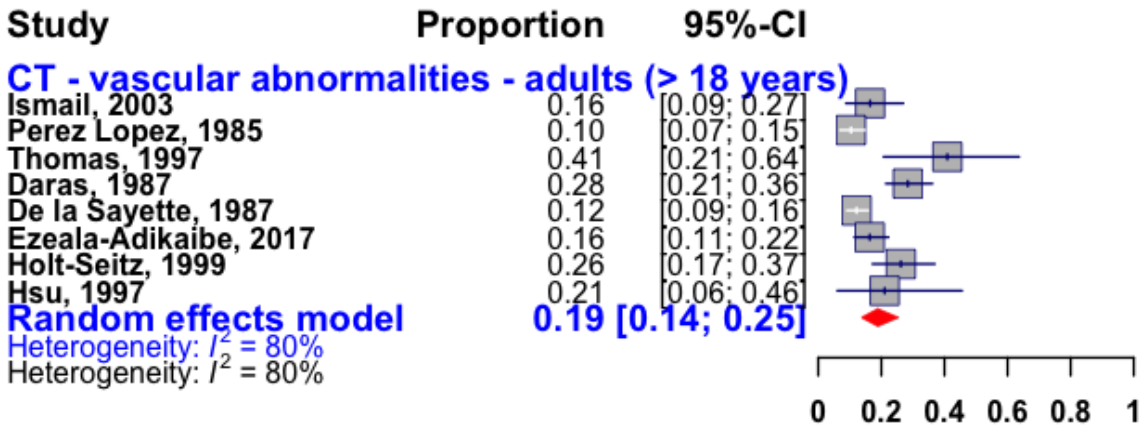
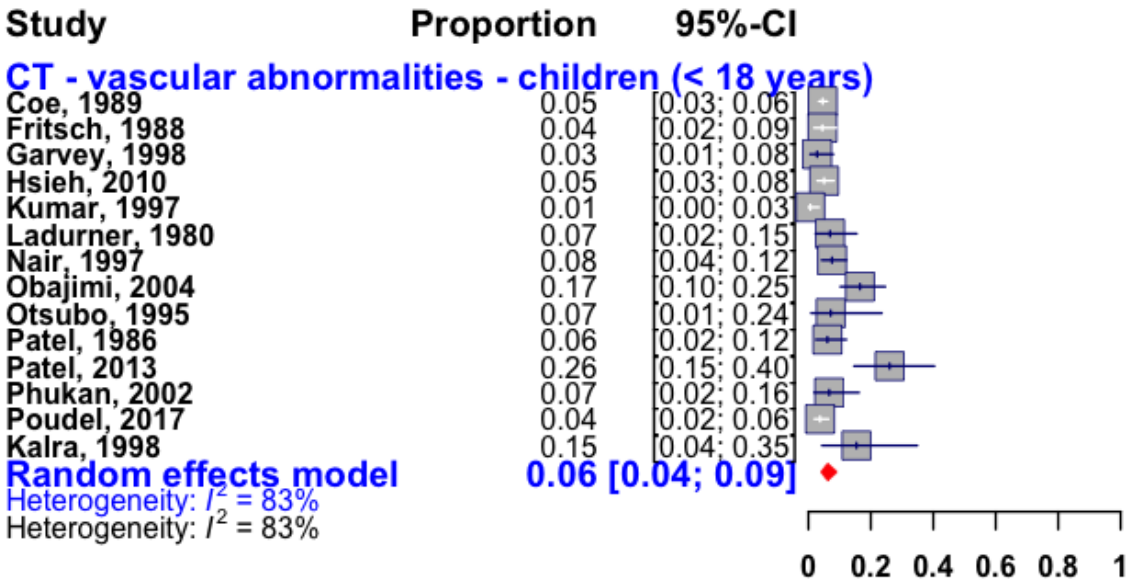


Figure 7: Proportion of vascular abnormalities identified in children (< 18 years)



Critical outcomes: proportion identified with scarring abnormalities

Figure 8: Proportion identified with scarring abnormalities: overall estimate

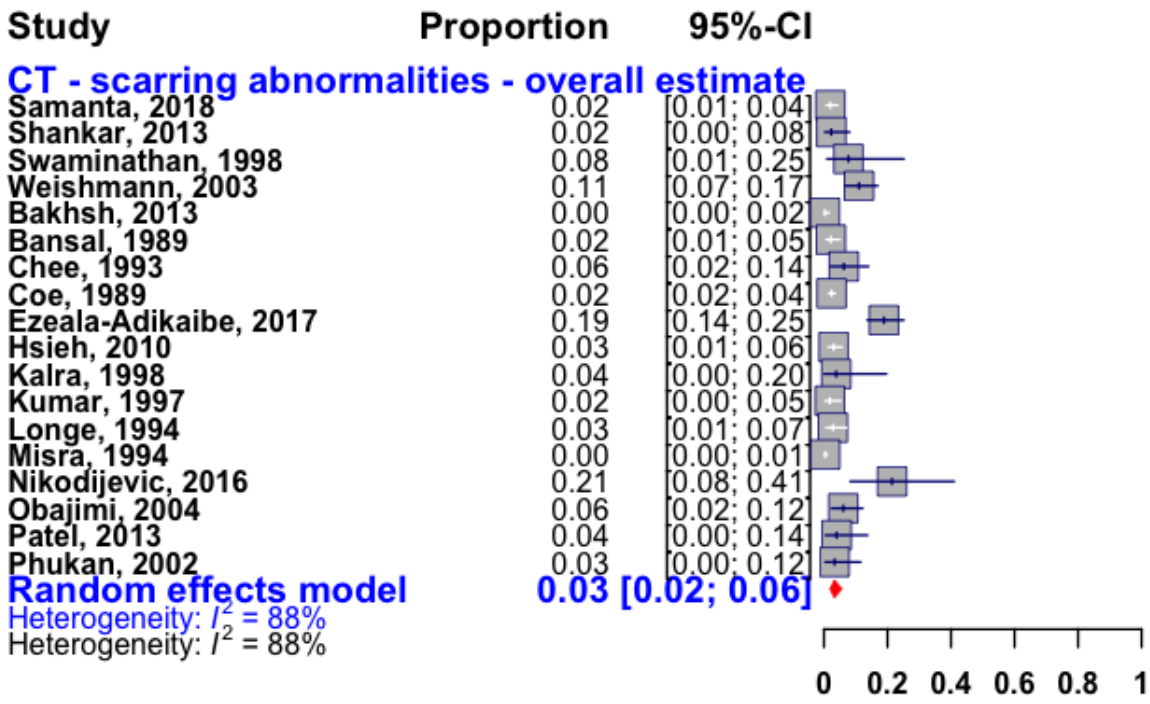
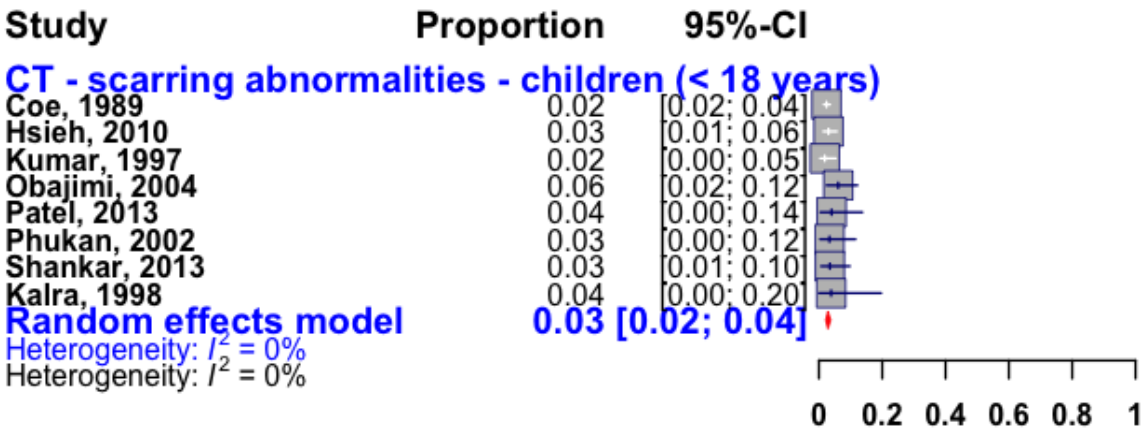


Figure 9: Proportion of scarring abnormalities in children (<18 years)



Critical outcomes: proportion identified with congenital/developmental abnormalities

Figure 10: Proportion identified with congenital/developmental abnormalities: overall estimate

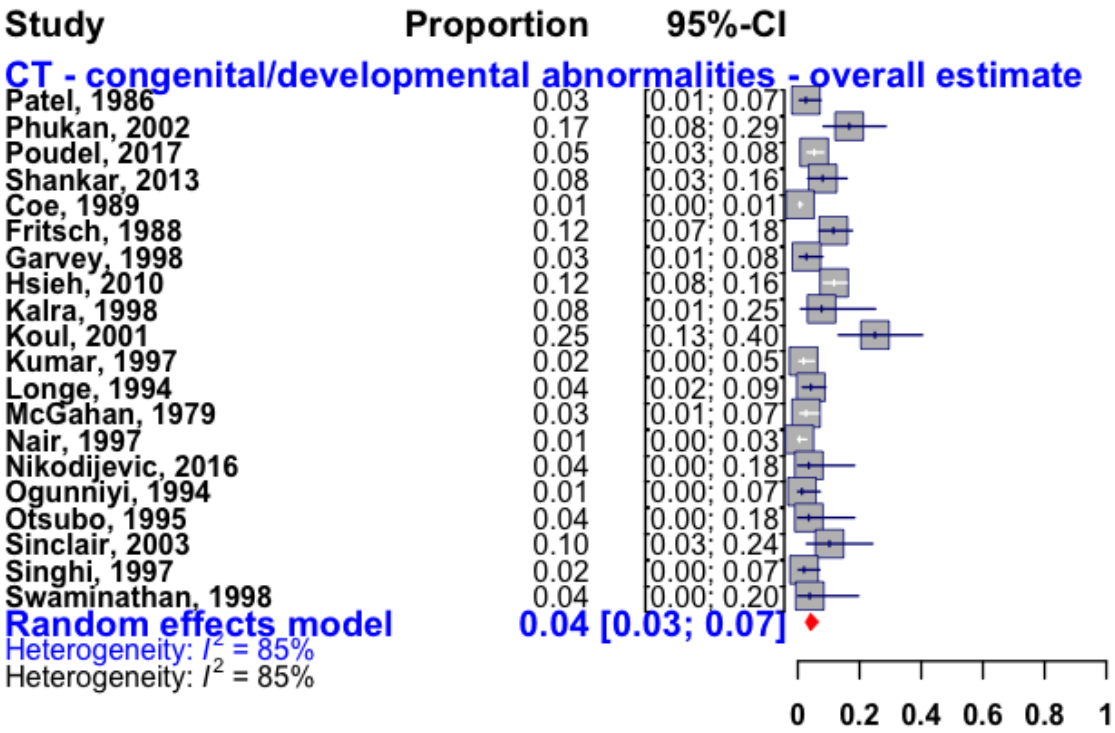
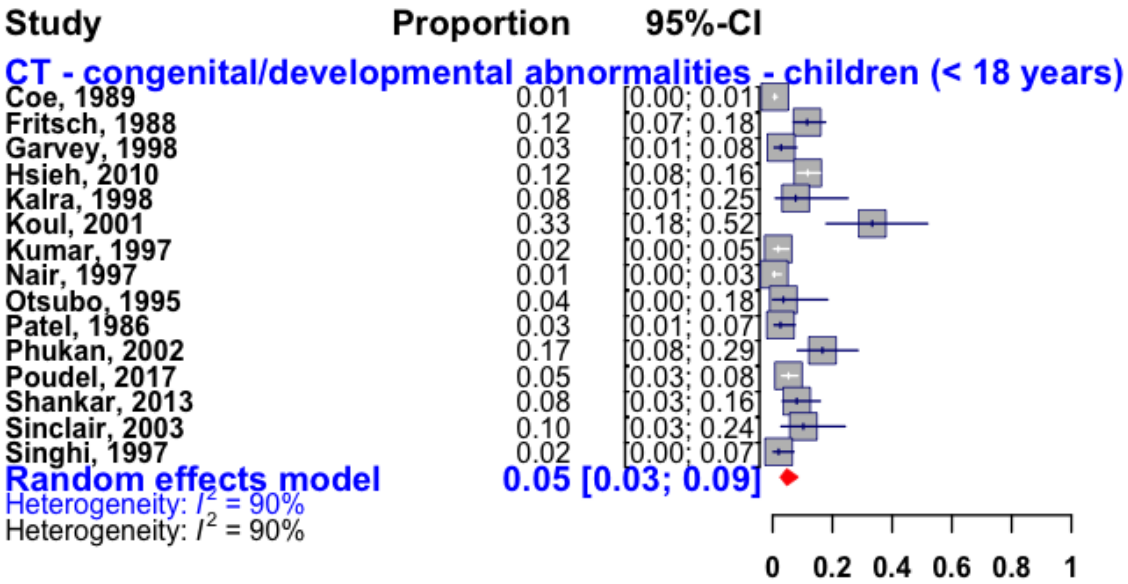


Figure 11: Proportion of congenital/developmental abnormalities identified in children (< 18 years)



Critical outcomes: proportion identified with inflammatory/infective/immune abnormalities

Figure 12: Proportion identified with inflammatory/infective/immune abnormalities: overall estimate

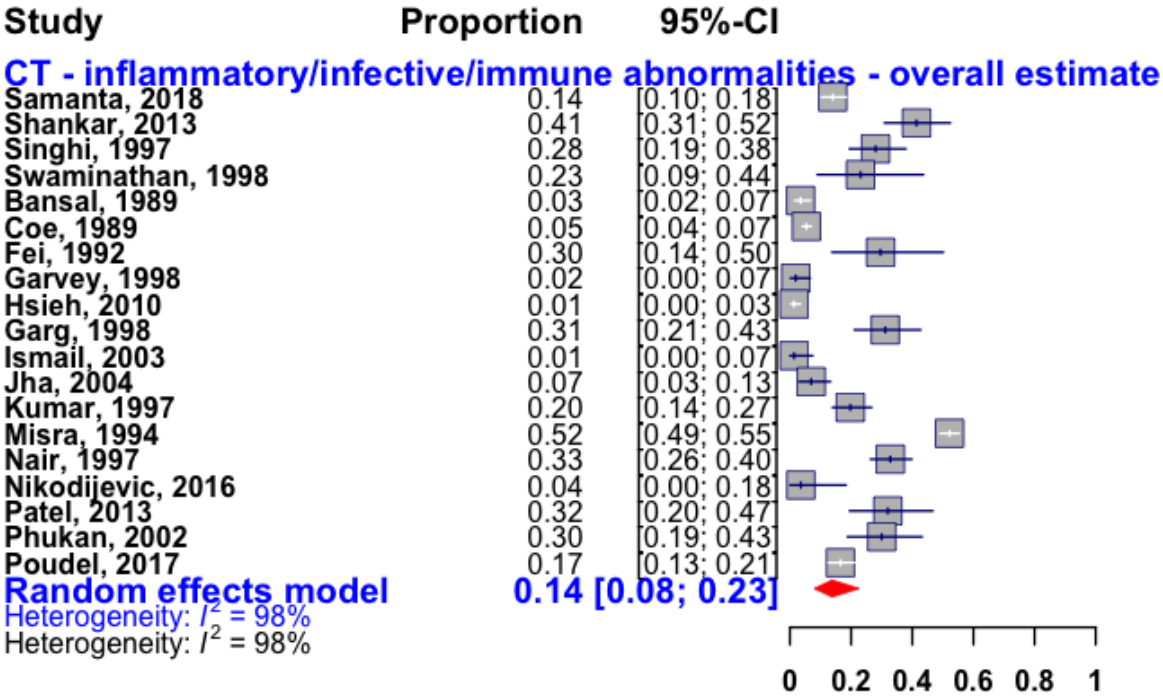


Figure 13: Proportion of inflammatory/infective/immune abnormalities identified in adults (> 18 years)

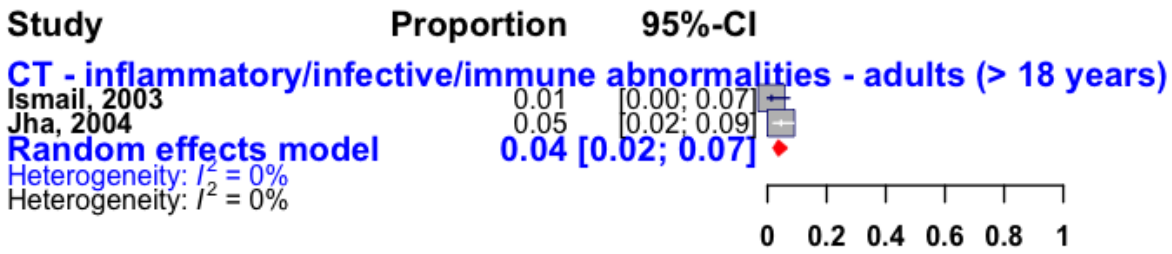
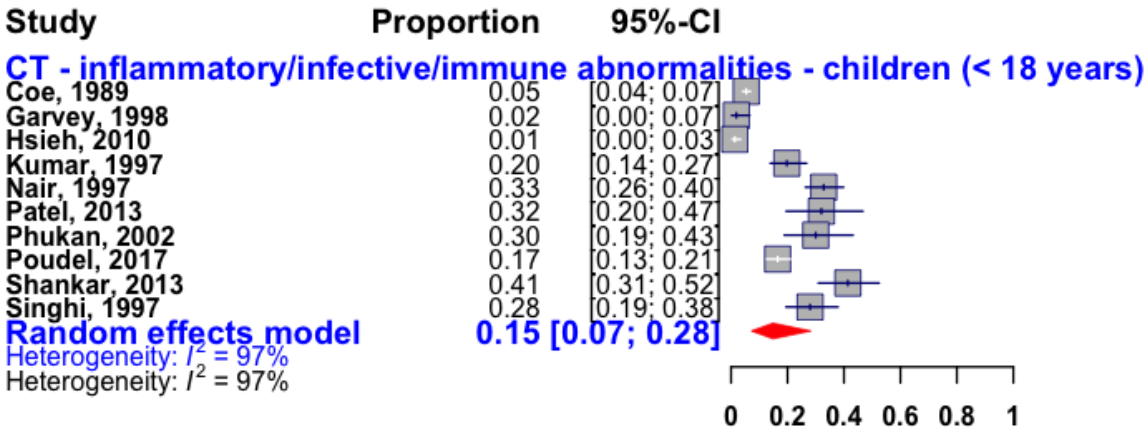


Figure 14: Proportion of inflammatory/infective/immune abnormalities identified in children (< 18 years)



Critical outcomes: proportion identified with metabolic/genetic abnormalities

Figure 15: Proportion identified with metabolic/genetic abnormalities: overall estimate

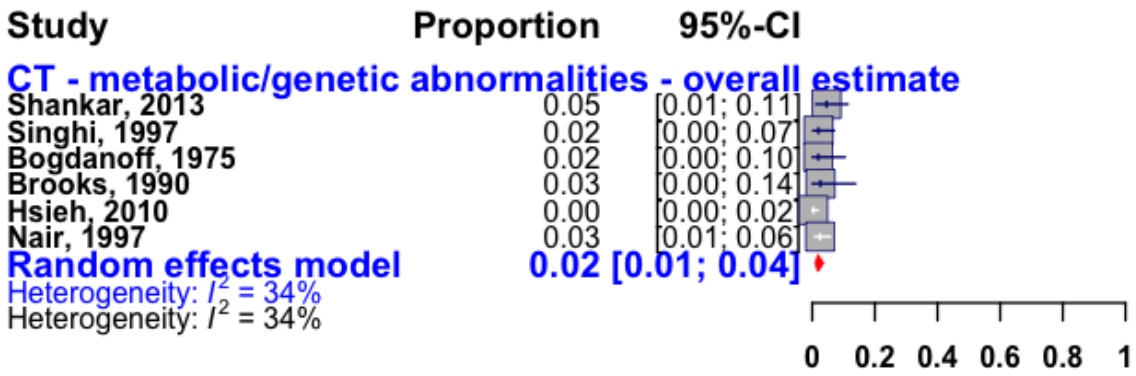
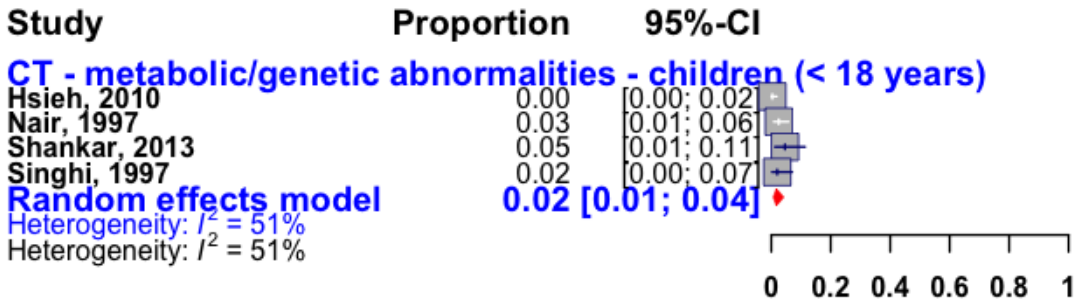


Figure 16: Proportion of metabolic/genetic abnormalities identified in children (< 18 years)



Important outcomes: proportion identified with a non-epilepsy related abnormality

Figure 17: Proportion identified with non-epilepsy abnormalities: overall estimate

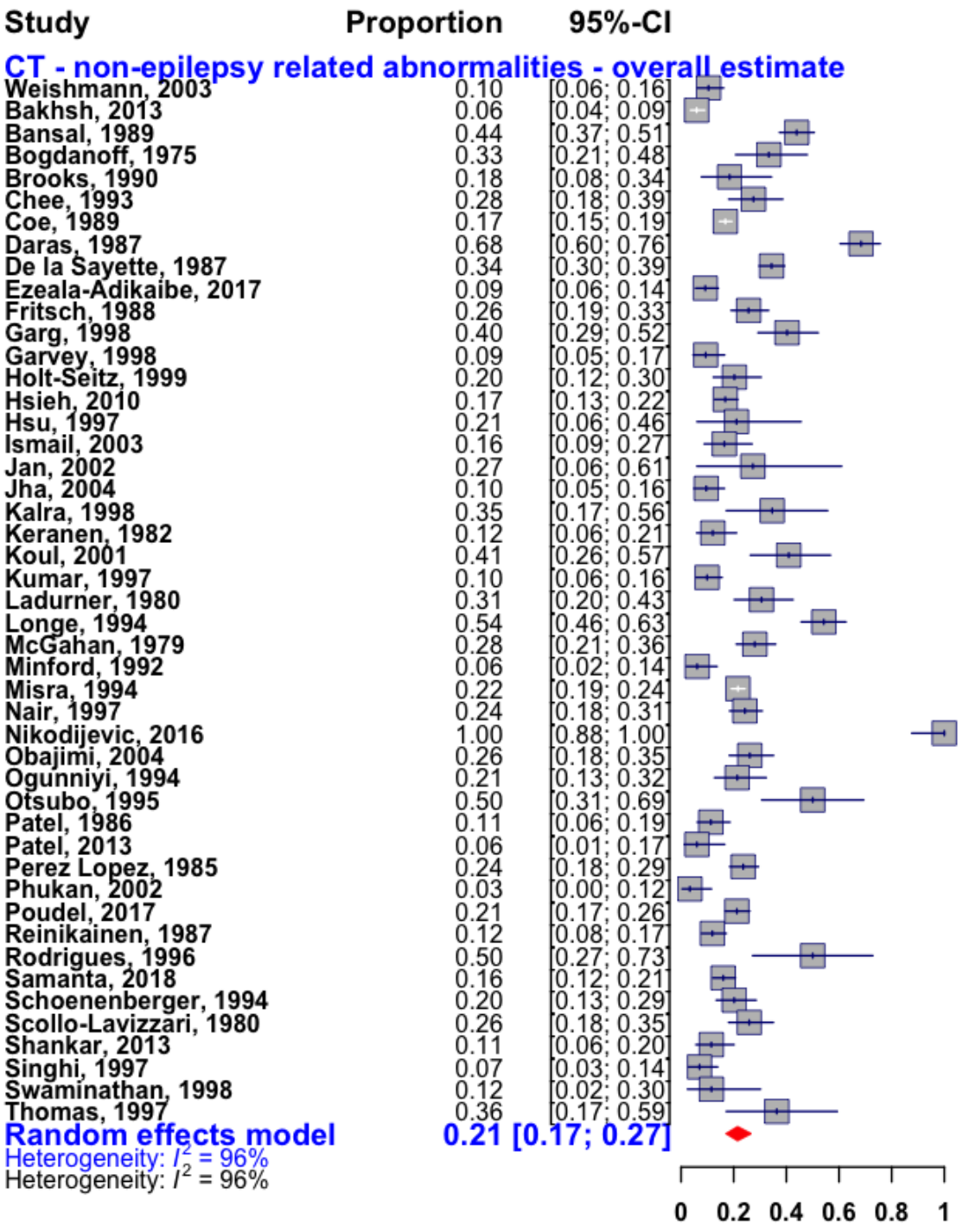


Figure 18: Proportion of non-epilepsy related abnormalities identified in adults (> 18 years)

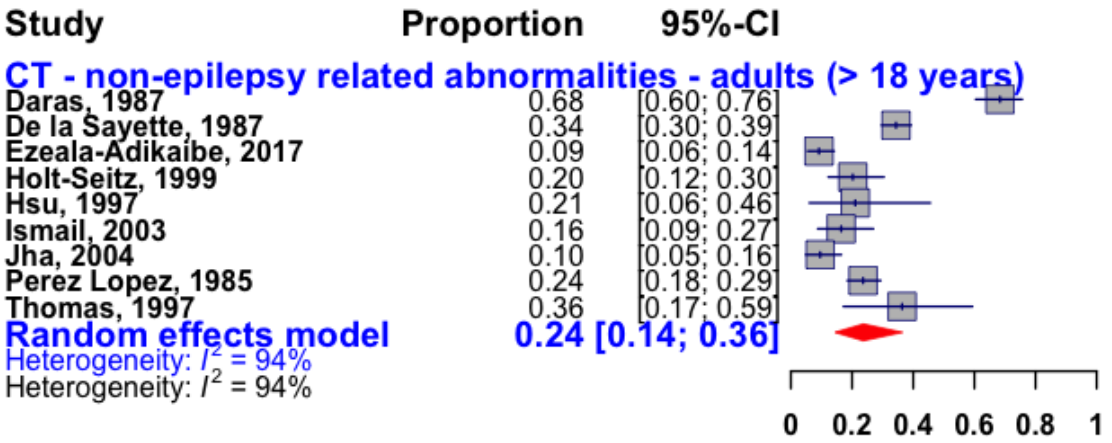
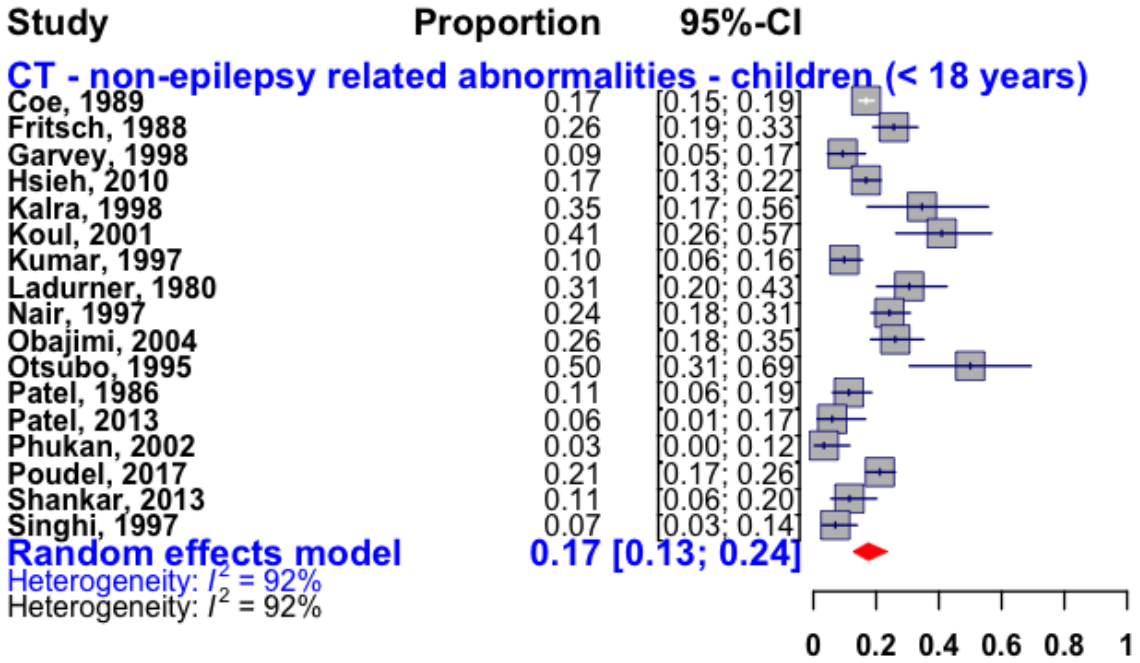


Figure 19: Proportion of non-epilepsy related abnormalities identified in children (< 18 years)



Appendix F – Adapted GRADE tables

Clinical evidence profile tables for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

Table 5: Clinical evidence profile for proportion identified with tumour abnormalities

Quality assessment						Number of patients		Effect		
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Number with a clinically relevant abnormality	Number assessed	Proportion (95% CI)	Quality	Importance
Proportion identified with tumour abnormalities: overall estimate										
37[1]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	No serious imprecision	356	6028	0.05 (0.03 to 0.07)	⊕OOO VERY LOW	CRITICAL
Proportion of tumour abnormalities identified in adults (>18 years)										
8[4]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Very serious[5]	134	1186	0.10 (0.07 to 0.15)	⊕OOO VERY LOW	CRITICAL
Proportion of tumour abnormalities identified in children (<18 years)										
13[6]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Very serious[5]	78	2661	0.03 (0.01 to 0.07)	⊕OOO VERY LOW	CRITICAL

1 Bakhsh 2013, Bansal 1989, Bogdanoff 1975, Chee 1993, Coe 1989, Daras 1987, De la Sayette 1987, Ezeala-Adikaibe 2017, Fritsch 1988, Garvey 1998, Holt-Seitz 1999, Hsieh 2010, Hsu 1997, Ismail 2003, Keranen 1982, Kumar 1997, Ladurner 1980, Longe 1994, McGahan 1979, Minford 1992, Nair 1997, Nikodijevic 2016, Obajimi 2004, Ogunniyi 1994, Otsubo 1995, Perez Lopez 1985, Phukan 2002, Poudel 2017, Reinikainen 1987, Samanta 2018, Schoenenberger 1994, Scollo-Lavizzari 1980, Sinclair 2003, Singhi 1997, Swaminathan 1998, Thomas 1997, Weishmann 2003

2 Very serious risk of bias in the evidence contributing to the outcomes as per CEBMA checklist

3 Very serious heterogeneity (I^2>75%)

4 Daras 1987, De la Sayette, 1987, Ezeala-Adikaibe 2017, Holt-Seitz 1999, Hsu 1997, Ismail 2003, Perez Lopez 1985, Thomas 1997
5 Number of events <150
6 Coe 1989, Fritsch 1988, Garvey 1998, Hsieh 2010, Kumar 1997, Ladurner 1980, Nair 1997, Obajimi 2004, Otsubo 1995, Phukan 2002, Poudel 2017, Sinclair 2003, Singhi 1997

Table 6: Clinical evidence profile for proportion identified with vascular abnormalities

Quality assessment						Number of patients		Effect		
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Number with a clinically relevant abnormality	Number assessed	Proportion (95% CI)	Quality	Importance
Proportion identified with vascular abnormalities: overall estimate										
38[1]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	No serious imprecision	510	7035	0.07 (0.05 to 0.10)	⊕OOO VERY LOW	CRITICAL
Proportion of vascular abnormalities identified in adults										
8[4]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Serious[5]	196	1186	0.19 (0.14 to 0.25)	⊕OOO VERY LOW	CRITICAL
Proportion of vascular abnormalities identified in children (<18 years)										
14[6]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Serious[5]	153	2713	0.06 (0.04 to 0.09)	⊕OOO VERY LOW	CRITICAL
Proportion of vascular abnormalities identified in in patients with neurological deficits										
1[7]	Observational studies	Very serious[2]	No serious inconsistency	No serious indirectness	Very serious[8]	2	18	0.11 (0.01 to 0.35)	⊕OOO VERY LOW	CRITICAL

1 Bakhsh 2013, Bansal 1989, Chee 1993, Coe 1989, Daras 1987, De la Sayette 1987, Ezeala-Adikaibe 2017, Fritsch 1988, Garvey 1998, Holt-Seitz 1999, Hsieh 2010, Hsu 1997, Ismail 2003, Jan 2002, Kalra 1998, Keranen 1982, Kumar 1997, Ladurner 1980, Longe 1994, McGahan 1979, Minford 1992, Misra 1994, Nair 1997, Obajimi 2004, Ogunniyi 1994, Otsubo 1995, Patel 1986, Patel 2013, Perez Lopez 1985, Phukan 2002, Poudel 2017, Reinikainen 1987, Samanta 2018, Schoenenberger 1994, Scollo-Lavizzari 1980, Swaminathan 1998, Thomas 1997, Weishmann 2003
2 Very serious risk of bias in the evidence contributing to the outcomes as per CEBMA checklist

3 Very serious heterogeneity (I^2>75%)
4 Daras 1987, De la Sayette, 1987, Ezeala-Adikaibe 2017, Holt-Seitz 1999, Hsu 1997, Ismail 2003, Perez Lopez 1985, Thomas 1997
5 Number of events >150 but <300
6 Coe 1989, Fritsch 1988, Garvey 1998, Hsieh 2010, Kalra 1998, Kumar 1997, Ladurner 1980, Nair 1997, Obajimi 2004, Otsubo 1995, Patel 1986, Patel 2013, Phukan 2002, Poudel 2017
7 Oginniyi 1994
8 Number of events < 150

Table 7: Clinical evidence profile for proportion identified with scarring abnormalities

Quality assessment						Number of patients		Effect		
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Number with a clinically relevant abnormality	Number assessed	Proportion (95% CI)	Quality	Importance
Proportion identified with scarring abnormalities: overall estimate										
18[1]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Very serious[4]	138	4329	0.03 (0.02 to 0.06)	⊕OOO VERY LOW	CRITICAL
Proportion of scarring abnormalities identified in adults (>18 years)										
1[5]	Observational studies	Very serious[2]	No serious inconsistency	No serious indirectness	Very serious[4]	37	196	0.19 (0.14 to 0.25)	⊕OOO VERY LOW	CRITICAL
Proportion of scarring abnormalities identified in children (<18 years)										
8[6]	Observational studies	Very serious[2]	No serious inconsistency	No serious indirectness	Very serious[4]	50	1803	0.03 (0.02 to 0.04)	⊕OOO	CRITICAL

Quality assessment						Number of patients		Effect		
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Number with a clinically relevant abnormality	Number assessed	Proportion (95% CI)	Quality	Importance
									VERY LOW	

1 Bakhsh 2013, Bansal 1989, Chee 1993, Coe 1989, Ezeala-Adikaibe 2017, Hsieh 2010, Kalra 1998, Kumar 1997, Longe 1994, Misra 1994, Nikodijevic 2016, Obajimi 2004, Patel 2013, Phukan 2002, Samanta 2018, Shankar 2013, Swaminathan 1998, Weishmann 2003

2 Very serious risk of bias in the evidence contributing to the outcomes as per CEBMA checklist

3 Very serious heterogeneity (I^2>75%)

4 Number of events <150

5 Ezeala Adikaibe 2017

6 Coe 1989, Hsieh 2010, Kalra 1998, Kumar 1997, Obajimi 2004, Patel 2013, Phukan 2002, Shankar 2013

Table 8: Clinical evidence profile for proportion identified with congenital/developmental abnormalities

Quality assessment						Number of patients		Effect		
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Number with a clinically relevant abnormality	Number assessed	Proportion (95% CI)	Quality	Importance
Proportion identified with congenital/developmental abnormalities: overall estimate										
20[1]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Very serious[4]	137	3167	0.04 (0.03 to 0.07)	⊕OOO VERY LOW	CRITICAL
Proportion of congenital/developmental abnormalities identified in children (<18 years)										
15[5]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Very serious[4]	124	2746	0.05 (0.03 to 0.09)	⊕OOO VERY LOW	CRITICAL

1 Coe 1989, Fritsch 1988, Garvey 1998, Hsieh 2010, Kalra 1998, Koul 2001, Kumar 1997, Longe 1994, McGahan 1979, Nair 1997, Nikodijevic 2016, Ogunniyi 1994, Otsubo 1995, Patel 1986, Phukan 2002, Poudel 2017, Shankar 2013, Sinclair 2003, Singhi 1997, Swaminathan 1998

2 Very serious risk of bias in the evidence contributing to the outcomes as per CEBMA checklist

3 Very serious heterogeneity (I^2>75%)

4 Number of events <150

5 Coe 1989, Fritsch 1988, Garvey 1998, Hsieh 2010, Kalra 1998, Koul 2001, Kumar 1997, Nair 1997, Otsubo 1995, Patel 1986, Phukan 2002, Poudel 2017, Shankar 2013, Sinclair 2003, Singhi 1997

Table 9: Clinical evidence profile for proportion identified with inflammatory/infective/immune abnormalities

Quality assessment						Number of patients		Effect		
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Number with a clinically relevant abnormality	Number assessed	Proportion (95% CI)	Quality	Importance
Proportion identified with inflammatory/infective/immune abnormalities: overall estimate										
19[1]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	No serious imprecision	940	4287	0.14 (0.08 to 0.23)	⊕OOO VERY LOW	CRITICAL
Proportion of inflammatory/infective/immune abnormalities identified in adults (>18 years)										
2[4]	Observational studies	Very serious[2]	No serious inconsistency	No serious indirectness	Very serious[5]	9	188	0.04 (0.02 to 0.07)	⊕OOO VERY LOW	CRITICAL
Proportion of inflammatory/infective/immune abnormalities identified in children (<18 years)										
10[6]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	No serious imprecision	308	2388	0.15 (0.07 to 0.28)	⊕OOO VERY LOW	CRITICAL

1 Bansal 1989, Coe 1989, Fei 1992, Garg 1998, Garvey 1998, Hsieh 2010, Ismail 2003, Jha 2004, Kumar 1997, Misra 1994, Nair 1997, Nikodijevic 2016, Patel 2013, Phukan 2002, Poudel 2017, Samanta 2018, Shankar 2013, Singhi 1997, Swaminathan 1998

2 Very serious risk of bias in the evidence contributing to the outcomes as per CEBMA checklist

3 Very serious heterogeneity (I^2>75%)

4 Ismail 2003, Jha 2004

5 Number of events <150

6 Coe 1989, Garvey 1998, Hsieh 2010, Kumar 1997, Nair 1997, Patel 2013, Phukan 2002, Poudel 2017, Shankar 2013, Singhi 1997

Table 10: Clinical evidence profile for proportion identified with metabolic/genetic abnormalities

Quality assessment						Number of patients		Effect		
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Number with a clinically relevant abnormality	Number assessed	Proportion (95% CI)	Quality	Importance
Proportion identified with metabolic/genetic abnormalities: overall estimate										
6[1]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Very serious[4]	14	772	0.02 (0.01 to 0.04)	⊕OOO VERY LOW	CRITICAL
Proportion of metabolic/genetic abnormalities identified in children (<18 years)										
4[5]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	Very serious[4]	12	683	0.02 (0.01 to 0.04)	⊕OOO VERY LOW	CRITICAL

1 Bogdanoff 1975, Brooks 1990, Hsieh 2010, Nair 1997, Shankar 2013, Singhi 1997
2 Very serious risk of bias in the evidence contributing to the outcomes as per CEBMA checklist
3 Very serious heterogeneity (I^2>75%)
4 Number of events <150
5 Hsieh 2010, Nair 1997, Shankar 2013, Singhi 1997

Table 11: Clinical evidence profile for proportion identified with non-epilepsy related abnormalities

Quality assessment						Number of patients		Effect		
Number of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Number with a clinically relevant abnormality	Number assessed	Proportion (95% CI)	Quality	Importance
Proportion identified with non-epilepsy related abnormalities: overall estimate										
47[1]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	No serious imprecision	1654	7595	0.21 (0.17 to 0.27)	⊕OOO VERY LOW	IMPORTANT
Proportion of non-epilepsy related abnormalities identified in adults										
9[4]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	No serious imprecision	368	1301	0.24 (0.14 to 0.36)	⊕OOO VERY LOW	IMPORTANT
Proportion of non-epilepsy related abnormalities identified in children (<18 years)										
17[5]	Observational studies	Very serious[2]	Very serious[3]	No serious indirectness	No serious imprecision	529	2944	0.17 (0.13 to 0.24)	⊕OOO VERY LOW	IMPORTANT
Proportion of non-epilepsy related abnormalities identified in patients with neurological deficits										
1[6]	Observational studies	Very serious[2]	No serious inconsistency	No serious indirectness	Very serious[7]	16	18	0.89 (0.65 to 99)	⊕OOO VERY LOW	IMPORTANT

1 Bakhsh 2013, Bansal 1989, Bogdanoff 1975, Brooks 1990, Chee 1993, Coe 1989, Daras 1987, De la Sayette, 1987, Ezeala-Adikaibe 2017, Fritsch 1988, Garg 1998, Garvey 1998, Holt-Seitz 1999, Hsieh 2010, Hsu 1997, Ismail 2003, Jan 2002, Jha 2004, Kalra 1998, Keranen 1982, Koul 2001, Kumar 1997, Ladurner 1980, Longe 1994, McGahan 1979, Minford 1992, Misra 1994, Nair 1997, Nikodijevic 2016, Obajimi 2004, Ogunniyi 1994, Otsubo 1995, Patel 1986, Patel 2013,

Perez Lopez 1985, Phukan 2002, Poudel 2017, Reinikainen 1987, Rodrigues 1996, Samanta 2018, Schoenenberger 1994, Scollo-Lavizzari 1980, Shankar 2013, Singhi 1997, Swaminathan 1998, Thomas 1997, Weishmann 2003

2 Very serious risk of bias in the evidence contributing to the outcomes as per CEBMA checklist

3 Very serious heterogeneity (I^2>75%)

4 Daras 1987, De la Sayette, 1987, Ezeala-Adikaibe 2017, Holt-Seitz 1999, Hsu 1997, Ismail 2003, Jha 2004, Perez Lopez 1985, Thomas 1997

5 Coe 1989, Fritsch 1988, Garvey 1998, Hsieh 2010, Kalra 1998, Koul 2001, Kumar 1997, Ladurner 1980, Nair 1997, Obajimi 2004, Otsubo 1995, Patel 1986, Patel 2013, Phukan 2002, Poudel 2017, Shankar 2013, Singhi 1997

6 Oginniyi 1994

7 Number of events <150

Appendix G – Economic evidence study selection

Economic evidence study selection for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

A global search of economic evidence was undertaken for all review questions in this guideline. See Supplement 2 for further information

Appendix H – Economic evidence tables

Economic evidence tables for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

No evidence was identified which was applicable to this review question.

Appendix I – Economic evidence profiles

Economic evidence profiles for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

No evidence was identified which was applicable to this review question.

Appendix J – Economic analysis

Economic evidence analysis for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

No economic analysis was conducted for this review question.

Appendix K – Excluded studies

Excluded clinical and economic studies for review question: What is the yield of relevant abnormalities detected by CT scans in people with epilepsy?

Clinical studies

Table 12: Excluded studies and reasons for their exclusion

Excluded studies - Yield of CT scans	
Study	**Reason for Exclusion**
Allen, L., Jones, C. T., Emergency department use of computed tomography in children with epilepsy and breakthrough seizure activity, Journal of Child Neurology, 22, 1099-1101, 2007	Details on specific abnormalities detected not included
Alper, E., Koksal, N., Hacimustafaoglu, M., Akbunar, T., Eralp, O., Tc-99m HMPAO brain SPECT compared to CT and EEG after seizures in childhood, Clinical Nuclear Medicine, 20, 803-6, 1995	Details on specific abnormalities detected not included
Al-Rumayyan, A. R., Abolfotouh, M. A., Prevalence and prediction of abnormal CT scan in pediatric patients presenting with a first seizure, Neurosciences, 17, 352-6, 2012	Sample included patients with febrile seizures, results for afebrile seizures not reported seperately
Aprahamian, N., Harper, M. B., Prabhu, S. P., Monuteaux, M. C., Sadiq, Z., Torres, A., Kimia, A. A., Pediatric first time non-febrile seizure with focal manifestations: Is emergent imaging indicated?, Seizure, 23, 740-745, 2014	Abnormalities detected by CT not reported separately
Bautovich,T., Numa,A., Role of head computed tomography in the evaluation of children admitted to the paediatric intensive care unit with new-onset seizure, Emergency Medicine Australasia, 24, 313-320, 2012	Sample included patients with febrile seizures, results for afebrile seizures not reported seperately
Berg, A. T., Testa, F. M., Levy, S. R., Shinnar, S., Neuroimaging in children with newly diagnosed epilepsy: A community-based study, Pediatrics, 106, 527-532, 2000	Abnormalities detected by CT not reported separately
Blom, R. J., Vinuela, F., Fox, A. J., Blume, W. T., Girvin, J., Kaufmann, J. C., Computed tomography in temporal lobe epilepsy, Journal of Computer Assisted Tomography, 8, 401-405, 1984	Abnormalities detected by CT not reported separately
Blume, W. T., Clinical profile of partial seizures beginning at less than four years of age, Epilepsia, 30, 813-9, 1989	Abnormalities detected by CT not reported separately
Chopra, J. S., Sawhney, I. M. S., Suresh, N., Prabhakar, S., Dhand, U. K., Suri, S., Vanishing CT lesions in epilepsy, Journal of the Neurological Sciences, 107, 40-49, 1991	Abnormalities reported do not match protocol
Coryell, J., Gaillard, W. D., Shellhaas, R. A., Grinspan, Z. M., Wirrell, E. C., Knupp, K. G.,	Abnormalities detected by CT not reported separately

Excluded studies - Yield of CT scans	
Wusthoff, C. J., Keator, C., Sullivan, J. E., Loddenkemper, T., Patel, A., Chu, C. J., Massey, S., Novotny, E. J., Saneto, R. P., Berg, A. T., Neuroimaging of early life epilepsy, Pediatrics, 142 (3) (no pagination), 2018	
Dakaj, N., Kruja, J., Jashari, F., Boshnjaku, D., Shari, N., Zeqiraj, K., Accuracy of conventional diagnostic methods for identifying structural changes in patients with focal epilepsy, Acta Informatica Medica, 24, 351-353, 2016	Details on specific abnormalities detected not included
Dam, A. M., Fuglsang-Frederiksen, A., Svarre-Olsen, U., Dam, M., Late-onset epilepsy: Etiologies, types of seizure, and value of clinical investigation, EEG, and computerized tomography scan, Epilepsia, 26, 227-231, 1985	Abnormalities detected by CT not reported separately
Dayan, P. S., Lillis, K., Bennett, J., Conners, G., Bailey, P., Callahan, J., Akman, C., Feldstein, N., Kriger, J., Hauser, W. A., Kuppermann, N., Prevalence of and risk factors for intracranial abnormalities in unprovoked seizures, Pediatrics, 136, e351-e360, 2015	Abnormalities detected by CT not reported separately
Dietrich, R. B., El Saden, S., Chugani, H. T., Bentson, J., Peacock, W. J., Resective surgery for intractable epilepsy in children: Radiologic evaluation, American Journal of Neuroradiology, 12, 1149-1158, 1991	Details on specific abnormalities detected not included
Gandon, Y., Baraton, J., Aicardi, J., Goutieres, F., CT scan 'yield' in seizures and epilepsy in children. [French], Annales de Pediatrie, 30, 195-200, 1983	Article in French
Gelisse, P., Genton, P., Raybaud, C., Thomas, P., Dravet, C., Structural brain lesions do not influence the prognosis of juvenile myoclonic epilepsy, Acta Neurologica Scandinavica, 102, 188-91, 2000	Abnormalities detected by CT not reported separately
Gerard, G., Shabas, D., Rossi, D., MRI in epilepsy, Computerized Radiology, 11, 223-7, 1987	Abnormalities detected by CT not reported separately
Gibbs, J., Appleton, R. E., Carty, H., Beirne, M., Acomb, B. A., Focal electroencephalographic abnormalities and computerised tomography findings in children with seizures, Journal of Neurology Neurosurgery and Psychiatry, 56, 369-371, 1993	Sample included patients who experienced non-epileptic seizures, results not reported seperately
Harden, C. L., Huff, J. S., Schwartz, T. H., Dubinsky, R. M., Zimmerman, R. D., Weinstein, S., Foltin, J. C., Theodore, W. H., Reassessment: Neuroimaging in the emergency patient presenting with seizure (an evidence-based review): Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology, Neurology, 69, 1772-1780, 2007	Narrative review

Excluded studies - Yield of CT scans	
Harvey, A. S., Berkovic, S. F., Wrennall, J. A., Hopkins, I. J., Temporal lobe epilepsy in childhood: clinical, EEG, and neuroimaging findings and syndrome classification in a cohort with new-onset seizures, Neurology, 49, 960-8, 1997	Abnormalities detected by CT not reported separately
Heinz, E. R., Heinz, T. R., Radtke, R., Darwin, R., Drayer, B. P., Fram, E., Djang, W. T., Efficacy of MR vs CT in epilepsy, AJR. American Journal of Roentgenology, 152, 347-52, 1989	Abnormalities detected by CT not reported separately
Henneman, P. L., DeRoos, F., Lewis, R. J., Determining the need for admission in patients with new-onset seizures, Annals of Emergency Medicine, 24, 1108-14, 1994	Abnormalities detected by CT not reported separately
Isenberg, D. L., Lin, A., Kairys, N., Kanter, C., Reimer, H., Glaze, O., Palumbo, P., Souirov, G., Fenstermacher, R., Gentile, N., Derivation of a clinical decision instrument to identify patients with status epilepticus who require emergent brain CT, American Journal of Emergency Medicine., 2019	Abnormalities detected by CT not reported separately
Izuora, G. I., Ayadi, K. M., Okoroma, E., Neuroimaging findings in children with infantile spasms, Neurosciences, 9, 30-33, 2004	Abnormalities detected by CT not reported separately
Jabbari, B., Gunderson, C. H., Wippold, F., Magnetic resonance imaging in partial complex epilepsy, Archives of Neurology, 43, 869-872, 1986	Abnormalities detected by CT not reported separately
Jabbari, B., Huott, A. D., Di Chiro, G., Martins, A. N., Youngblood, L. A., Harper, M. G., Surgically correctable lesions solely detected by CT scan in adult-onset chronic epilepsy, Annals of Neurology, 7, 344-347, 1980	Not clear how many patients underwent scans or how many abnormalities were detected
Khodapanahandeh, F., Hadizadeh, H., Neuroimaging in children with first afebrile seizures: To order or not to order?, Archives of Iranian Medicine, 9, 156-158, 2006	Abnormalities detected by CT not reported separately
Khreisat, W. H., Clinical profile of epilepsy during the first two years of life, Pakistan Journal of Medical Sciences, 22, 55-59, 2006	Details on specific abnormalities detected not included
Kotisaari, K., Virtanen, P., Forss, N., Strbian, D., Scheperjans, F., Emergency computed tomography in patients with first seizure, Seizure, 48, 89-93, 2017	Sample not confirmed as epileptic
Kramer, U., Nevo, Y., Reider-Groswasser, I., Sheuer, E., Meyer, J. J., Leitner, Y., Phatal, A., Harel, S., Neuroimaging of children with partial seizures, Seizure, 7, 115-8, 1998	Abnormalities detected by CT not reported separately
Krumholz, A., Wiebe, S., Gronseth, G., Shinnar, S., Levisohn, P., Ting, T., Hopp, J., Shafer, P., Morris, H., Seiden, L., Barkley, G., French, J.,	Narrative review

Excluded studies - Yield of CT scans	
Practice parameter: Evaluating an apparent unprovoked first seizure in adults (an evidence-based review): Report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Epilepsy Society, Neurology, 69, 1996-2007, 2007	
Kvam, K., Douglas, V., Whetstone, W., Josephson, S. A., Betjemann, J., Yield of emergent computed tomography in epilepsy patients presenting with a seizure, Neurology. Conference: 70th Annual Meeting of the American Academy of Neurology, AAN, 90, 2018	Conference abstract
Landfish,N., Gieron-Korthals,M., Weibley,R.E., Panzarino,V., New onset childhood seizures. Emergency department experience, Journal of the Florida Medical Association, 79, 697-700, 1992	Sample not confirmed as epileptic
Latack, J. T., Abou-Khalil, B. W., Siegel, G. J., Patients with partial seizures: Evaluation by MR, CT, and PET imaging, Radiology, 159, 159-163, 1986	Abnormalities do not match protocol
Lertsinudom, S., Buranadilok, S., Chainirun, N., Tiamkao, S., Patients' characteristics and treatment outcomes of epilepsy clinic team: Experiences from University Hospital, Journal of the Medical Association of Thailand, 101, S191-S195, 2018	Abnormalities detected by CT not reported separately
Logar, C., The EEG mapping in the evaluation of patients with late onset epilepsy, Brain Topography, 4, 229-35, 1992	Abnormalities do not match protocol
Lompo, D. L., Diallo, O., Dao, B. A., Bassole, R., Napon, C., Kabore, J., Etiologies of non-genetic epilepsies of child and adolescent, newly diagnosed in Ouagadougou, Burkina Faso, Pan African Medical Journal, 31 (no pagination), 2018	Abnormalities detected by CT not reported separately
Lyons, T. W., Johnson, K. B., Michelson, K. A., Nigrovic, L. E., Loddenkemper, T., Prabhu, S. P., Kimia, A. A., Yield of emergent neuroimaging in children with new-onset seizure and status epilepticus, Seizure, 35, 4-10, 2016	Abnormalities detected by CT not reported separately
Manford, M. R., Fish, D. R., Shorvon, S. D., Startle provoked epileptic seizures:features in 19 patients, Journal of Neurology, Neurosurgery & Psychiatry, 61, 151-6, 1996	Abnormalities detected by CT not reported separately
Manford, M., Hart, Y. M., Sander, J. W., Shorvon, S. D., National General Practice Study of Epilepsy (NGPSE): partial seizure patterns in a general population, Neurology, 42, 1911-7, 1992	Abnormalities detected by CT not reported separately
Marti-Bonmati, L., Menor, F., Mulas, F., The Sturge-Weber syndrome: Correlation between the clinical status and radiological CT and MRI	Abnormalities do not match protocol

Excluded studies - Yield of CT scans	
findings, Child's Nervous System, 9, 107-109, 1993	
Matsuo, A., Matsuzaka, T., Tsuru, A., Moriuchi, H., Nakashita, Y., Tanaka, S., Baba, C., Tomimasu, K., Epidemiological and clinical studies of West syndrome in Nagasaki Prefecture, Japan, Brain & Development, 23, 575-9, 2001	Abnormalities detected by CT not reported separately
Maytal, J., Krauss, J. M., Novak, G., Nagelberg, J., Patel, M., The role of brain computed tomography in evaluating children with new onset of seizures in the emergency department, Epilepsia, 41, 950-954, 2000	Sample not confirmed as epileptic
McAbee, G. N., Barasch, E. S., Kurfist, L. A., Results of computed tomography in 'neurologically normal' children after initial onset of seizures, Pediatric Neurology, 5, 102-106, 1989	Sample not confirmed as epileptic
McFadyen, M. B., First seizures, the epilepsies and other paroxysmal disorders prospective audit of a first seizure clinic, Scottish Medical Journal, 49, 126-130, 2004	Sample included patients who did not have epilepsy and results not reported seperately
Mitsuyoshi, I., Tamaka, K., Okuno, T., Mutoh, K., Iwasaki, Y., Konishi, J., Mikawa, H., Regional cerebral blood flow in diagnosis of childhood onset partial epilepsy, Brain and Development, 15, 97-102, 1993	Abnormalities do not match protocol
Molla Mohammadi, M., Tonekaboni, S. H., Khatami, A., Azargashb, E., Tavasoli, A., Javadzadeh, M., Zamani, G., Neuroimaging findings in first unprovoked seizures: A multicentric study in Tehran, Iranian Journal of Child Neurology, 7, 24-31, 2013	Sample not confirmed as epileptic
Morrison, A. D., McAlpine, C. H., The management of first seizures in adults in a district general hospital, Scottish Medical Journal, 42, 73-75, 1997	Sample not confirmed as epileptic
Mower, W. R., Biros, M. H., Talan, D. A., Moran, G. J., Ong, S., E. MERGEencyID NET, Selective tomographic imaging of patients with new-onset seizure disorders, Academic Emergency Medicine, 9, 43-7, 2002	Sample not confirmed as epileptic
Murthy, J. M. K., Yangala, R., Etiological spectrum of localization-related epilepsies in childhood and the need for CT scan in children with partial seizures with no obvious causation - A study from South India, Journal of Tropical Pediatrics, 46, 202-206, 2000	Sample not confirmed as epileptic
Murthy, J. M. K., Yangala, R., Srinivas, M., The syndromic classification of the international league against epilepsy: A hospital-based study from South India, Epilepsia, 39, 48-54, 1998	Sample not confirmed as epileptic

Excluded studies - Yield of CT scans	
Murthy,J.M., Yangala,R., Etiological spectrum of symptomatic localization related epilepsies: a study from South India, Journal of the Neurological Sciences, 158, 65-70, 1998	Abnormalities detected by CT not reported separately
Mwipopo, E. E., Akhatar, S., Fan, P., Zhao, D., Profile and clinical characterization of seizures in hospitalized children, Pan African Medical Journal, 24 (no pagination), 2016	Abnormalities do not match protocol
Ndubuisi, C. A., Mezue, W. C., Ohaegbulam, S. C., Chikani, M. C., Ekuma, M., Onyia, E., Neuroimaging findings in pediatric patients with seizure from an institution in Enugu, Nigerian journal of clinical practice, 19, 121-127, 2016	Abnormalities detected by CT not reported separately
Olszewska, D. A., Costello, D. J., Assessment of the usefulness of magnetic resonance brain imaging in patients presenting with acute seizures, Irish Journal of Medical Science, 1-4, 2014	Abnormalities detected by CT not reported separately
Palmini, A., Andermann, F., Olivier, A., Tampieri, D., Robitaille, Y., Andermann, E., Wright, G., Focal neuronal migration disorders and intractable partial epilepsy: A study of 30 patients, Annals of Neurology, 30, 741-749, 1991	Abnormalities detected by CT not reported separately
Palmini, A., Andermann, F., Olivier, A., Tampieri, D., Robitaille, Y., Melanson, D., Ethier, R., Neuronal migration disorders: a contribution of modern neuroimaging to the etiologic diagnosis of epilepsy, Canadian Journal of Neurological Sciences, 18, 580-7, 1991	Abnormalities detected by CT not reported separately
Panayiotopoulos, C. P., Obeid, T., Tahan, A. R., Juvenile myoclonic epilepsy: A 5-year prospective study, Epilepsia, 35, 285-296, 1994	Results not reported in detail/clearly enough to extract
Parsons, S. J., Tomas, K., Cox, P., Outcome of pediatric status epilepticus admitted to intensive care, Journal of Intensive Care Medicine, 17, 174-179, 2002	Sample not confirmed as epileptic
Pathan, S. A., Abosalah, S., Nadeem, S., Ali, A., Hameed, A. A., Marathe, M., Cameron, P. A., Computed tomography abnormalities and epidemiology of adult patients presenting with first seizure to the emergency department in qatar, Academic Emergency Medicine, 21, 1264-1268, 2014	Sample not confirmed as epileptic
Poudel, P., Parakh, P., Mehta, K., Clinical profile, aetiology and outcome of afebrile seizures in children, Journal of the Nepal Medical Association, 52, 260-266, 2013	Data are also reported in 2017 paper by same author which has a larger sample and has been included in this review
Poudyal, P., Shrestha, R. P. B., Shrestha, P. S., Dangol, S., Shrestha, N. C., Joshi, A., Shrestha, A., Clinical profile and electroencephalogram findings in children with seizure presenting to	Abnormalities detected by CT not reported separately

Excluded studies - Yield of CT scans	
Dhulikhel Hospital, Kathmandu University Medical Journal, 14, 347-351, 2016	
Ramirez-Lassepas, M., Cipolle, R. J., Morillo, L. R., Gumnit, R. J., Value of computed tomographic scan in the evaluation of adult patients after their first seizure, Annals of Neurology, 15, 536-543, 1984	Abnormalities detected by CT not reported separately
Rathi, V., Thakur, L. C., Sarikwal, A., Non contrast-enhanced four-detector multisection CT for the detection of ring lesions in seizures, Clinical Radiology, 61, 1041-1046, 2006	Abnormalities detected by CT not reported separately
Reutens, D. C., Stewart-Wynne, E. G., Factors influencing the yield of cranial CT scanning in a private neurological practice, Clinical and experimental neurology, 26, 169-175, 1989	Included patients who did not have epilepsy and results are not reported separately
Roberts, M. A., Godfrey, J. W., Caird, F. I., Epileptic seizures in the elderly: I. Aetiology and type of seizure, Age and Ageing, 11, 24-28, 1982	Abnormalities detected by CT not reported separately
Ruggles, K. H., Haessly, S. M., Berg, R. L., Prospective study of seizures in the elderly in the Marshfield Epidemiologic Study Area (MESA), Epilepsia, 42, 1594-1599, 2001	Abnormalities detected by CT not reported separately
Saadah, L., Ayyanar, R., Saadah, M., Elaiyan, P., The use of artificial neural networks in predicting the yield of computed tomography (CT) brain study in generalized epileptic syndrome (GES) patients, Epilepsia, 4), 221-222, 2009	Conference abstract
Sadeq, H., Karim, J., Marwan, Y., Alsaleem, T., Neuroimaging Evaluation for First Attack of Unprovoked Nonfebrile Seizure in Pediatrics: When to Order?, Medical Principles and Practice, 25, 56-60, 2016	Abnormalities do not match protocol
Sanmaneechai, O., Danchaivijitr, N., Likasitwattanakul, S., Predictors of abnormal neuroimaging of the brain in children with epilepsy aged 1 month to 2 years, Journal of Child Neurology, 30, 1532-1536, 2015	Abnormalities detected by CT not reported separately.
Savic, I., Seitz, R. J., Pauli, S., Brain distortions in patients with primarily generalized tonic-clonic seizures, Epilepsia, 39, 364-370, 1998	Abnomalities reported do not match protocol
Sawhney, I. M. S., Lekhra, O. P., Shashi, J. S., Prabhakar, S., Chopra, J. S., Evaluation of epilepsy management in a developing country: A prospective study of 407 patients, Acta Neurologica Scandinavica, 94, 19-23, 1996	Included patients who did not have epilepsy and results are not reported separately
Scollo-Lavizzari, G., Eichhorn, K., Wuthrich, R., Computerized transverse axial tomography (CTAT) in the diagnosis of epilepsy, European Neurology, 15, 5-8, 1977	Abnormalities not reported in detail

Excluded studies - Yield of CT scans	
Scotoni, A. E., Manreza, M. L. G., Guerreiro, M. M., Recurrence after a First Unprovoked Cryptogenic/Idiopathic Seizure in Children: A Prospective Study from Sao Paulo, Brazil, Epilepsia, 45, 166-170, 2004	Sample not confirmed as epileptic
Sharma, S., Riviello, J. J., Harper, M. B., Baskin, M. N., The role of emergent neuroimaging in children with new-onset afebrile seizures, Pediatrics, 111, 1-5, 2003	Abnormalities detected by CT not reported separately
Shinnar, S., O'Dell, C., Mitnick, R., Berg, A. T., Moshe, S. L., Neuroimaging abnormalities in children with an apparent first unprovoked seizure, Epilepsy ResearchEpilepsy Res, 43, 261-9, 2001	Abnormalities detected by CT not reported separately
Simon Harvey, A., Berkovic, S. F., Wrennall, J. A., Hopkins, L. J., Temporal lobe epilepsy in childhood: Clinical, EEG, and neuroimaging findings and syndrome classification in a cohort with new-onset seizures, Neurology, 49, 960-968, 1997	Abnormalities detected by CT not reported separately
Sinclair, D. B., Wheatley, M., Aronyk, K., Hao, C., Snyder, T., Colmers, W., McKean, J. D. S., Pathology and neuroimaging in pediatric temporal lobectomy for intractable epilepsy, Pediatric Neurosurgery, 35, 239-246, 2001	Data reported in 2003 paper by same author which has been included in this review
Singer, W. D., Haller, J. S., Sullivan, L. R., The value of neuroradiology in infantile spasms, Journal of Pediatrics, 100, 47-50, 1982	Abnormalities detected by CT not reported separately
Steffenburg, U., Hedstrom, A., Lindroth, A., Wiklund, L. M., Hagberg, G., Kyllerman, M., Intractable epilepsy in a population-based series of mentally retarded children, Epilepsia, 39, 767-775, 1998	Details on specific abnormalities detected not included
Tanaka, A., Akamatsu, N., Shouzaki, T., Toyota, T., Yamano, M., Nakagawa, M., Tsuji, S., Clinical characteristics and treatment responses in new-onset epilepsy in the elderly, Seizure, 22, 772-775, 2013	Abnormalities detected by CT not reported separately
Tavassoli, A., Noormohamadi, S., Factors related to abnormal neuroimaging in children with first unprovoked seizure, Iranian Journal of Child Neurology, 5, 15-20, 2011	Abnormalities detected by CT not reported separatel
Thompson, J., Salinsky, M., The utility of cerebrospinal fluid examination in patients with partial epilepsy, Epilepsia, 29, 195-197, 1988	Sample not confirmed as epileptic
Uvebrant, P., Bjure, J., Hedstrom, A., Ekholm, S., Brain single photon emission computed tomography (SPECT) in neuropediatrics, Neuropediatrics, 22, 3-9, 1991	Abnormalities detected by CT not reported separately

Excluded studies - Yield of CT scans	
Van Donselaar, C. A., Geerts, A. T., Schimsheimer, R. J., Idiopathic first seizure in adult life: Who should be treated?, British Medical Journal, 302, 620-623, 1991	Abnormalities detected by CT not reported separately
Vodopic, S., Vujisic, S., Prevalence of epilepsy in Podgorica, Montenegro, Collegium antropologicum, 40, 127-132, 2016	Details on specific abnormalities detected not included
Wang, W. M., Fan, Z. Y., Zhang, Y. Q., Yang, Y. X., Liu, Y. Q., Dang, X. L., Song, W. J., Wu, Y. P., Ye, J., Tall gastrodis tuber combined with antiepileptic drugs repairs abnormal perfusion foci in focal epilepsy, Neural Regeneration Research, 8, 208-217, 2013	Abnormalities detected by CT not reported separately
Warden, C. R., Brownstein, D. R., Del Beccaro, M. A., Predictors of abnormal findings of computed tomography of the head in pediatric patients presenting with seizures, Annals of Emergency Medicine, 29, 518-523, 1997	Sample included patients with febrile seizures, results for afebrile seizures not reported seperately
Yang, P. J., Berger, P. E., Cohen, M. E., Duffner, P. K., Computed tomography and childhood seizure disorders, Neurology, 29, 1084-8, 1979	Sample not confirmed as epileptic

Economic studies

A global search of economic evidence was undertaken for all review questions in this guideline. See Supplement 2 for further information

Appendix L – Research recommendations

Research recommendations for review question:

No research recommendations were made for this review question.

Appendix M – Clinically relevant abnormalities

Clinically relevant abnormalities have been categorised as follows:

- Tumour
  - Brain metastases
  - Primary brain tumours, including meningiomas
- Vascular
  - Arterio-venous malformation (AVM)/vascular malformation/abnormality
  - Haemorrhage
  - Infarct/ Infarction
  - PRES (posterior reversible encephalopathy syndrome)
  - Vasculitis
  - Venous sinus thrombosis
- Scarring
  - Encephalomalacia/cystic encephalomalacia
  - Gliosis
  - Hippocampal sclerosis/ Mesial temporal sclerosis
  - Ulegyria
- Congenital/developmental
  - Dysmyelination
  - Hydrocephalus
  - Malformations of cortical development
  - Phakomatoses
- Inflammatory/infective/immune
  - Autoimmune encephalitis/limbic encephalitis
  - Demyelination
  - Infections
  - Oedema/edema
- Metabolic /Genetic
  - Congenital disorders of glycosylation/Carbohydrate deficient glycoprotein disorders
  - Disorders of amino acid metabolism
  - Glucose transporter deficiency
  - Leucodystrophy (including very long chain fatty acid disorders)
  - Lysosomal enzyme disorders
  - Mitochondrial Disorders
  - Molybdenum cofactor deficiency
  - Organic acidurias
  - Sulphite oxidase deficiency