

EVENT DEFINITION FORM

Event: Encephalitis

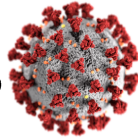
Outcome/covariate: outcome

Version: 1

Status: final

Contributing authors

authors	Role	Date
Philippine van Wijngaarden	Medical/draft v0.1	24-4-2020
Miriam Sturkenboom	Epi review	06-07-2020
Philippine van Wijngaarden	Adding search string, background rates and codes proposed by codemapper	07/07/2020
Miriam Sturkenboom	Code review	05/08/2020
Leila Belbachir	Medical review	12-08-2020
Miriam Sturkenboom	Final codes	14-2-2021
Carlos Durán	Rev. narrow/possible assignments	28-03-2021
Miriam Sturkenboom	Inclusion of codes used in final ACCESS report	23-08-2021



1. Event definition^[1]

Definition from the Brighton Collaboration

Encephalitis is defined as inflammation of the parenchyma of the brain. Strictly speaking, it is a pathologic diagnosis, in which the presence of inflammation, edema, and neuronophagia (neuronal cell death) is demonstrated by histopathology.

Level 1 of diagnostic certainty

(a) demonstration of acute inflammation of central nervous system parenchyma (\pm meninges) by histopathology

Level 2 of diagnostic certainty

(a) encephalopathy (e.g. depressed or altered level of consciousness, lethargy, or personality change lasting >24h),

AND INCLUDING

(b) **one more** of the following:

1. decreased or absent response to environment, as defined by response to loud noise or painful stimuli,
2. decreased or absent eye contact,
3. inconsistent or absent response to external stimuli,
4. decreased arousability,
5. seizure associated with loss of consciousness

OR

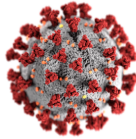
(c) focal or multifocal findings referable to the central nervous system, including one or more of the following:

1. focal cortical signs (including but not limited to: aphasia, alexia, agraphia, cortical blindness),
2. cranial nerve abnormality/abnormalities
3. visual field defect/defect(s),
4. presence of primitive reflexes (Babinski's sign, glabellar reflex, snout/sucking reflex),
5. motor weakness (either diffuse or focal; more often focal),
6. sensory abnormalities (either positive or negative; sensory level),
7. altered deep tendon reflex (hypo- or hyperreflexia, reflex asymmetry),
8. cerebellar dysfunction, including ataxia, dysmetria, cerebellar nystagmus

AND (for both possibilities to reach Level 2)

(d) **two or more** of the following indicators of inflammation of the CNS:

1. fever (temperature $\geq 38^\circ\text{C}$),
2. CSF pleocytosis (>5 WBC/mm³ in children >2 months of age; >15 WBC/mm³ in children <2 months of age)
3. EEG findings consistent with encephalitis, or
4. neuroimaging consistent with encephalitis



Level 3 of diagnostic certainty

(a) encephalopathy (e.g. depressed or altered level of consciousness, lethargy, or personality change lasting <24h),

AND INCLUDING

(b) **one or more** of the following:

1. decreased or absent response to environment, as defined by response to loud noise or painful stimuli,
2. decreased or absent eye contact,
3. inconsistent or absent response to external stimuli,
4. decreased arousability, or
5. seizure associated with loss of consciousness

OR

(c) focal or multifocal findings referable to the central nervous system, including **one or more** of the following:

1. focal, cortical signs (including but not limited to: aphasia, alexia, agraphia, cortical blindness),
2. cranial nerve abnormality/abnormalities,
3. visual field defect/defect(s),
4. presence of primitive reflexes (Babinski's sign, glabellar reflex, snout/sucking reflex),
5. motor weakness (either diffuse or focal; more often focal),
6. sensory abnormalities (either positive or negative; sensory level),
7. altered deep tendon reflexes (hypor- or hyperreflexia, reflex asymmetry), or
8. cerebellar dysfunction, including ataxia, dysmetria, cerebellar nystagmus

AND (for both possibilities to reach level 3)

(d) **one** of the following indicators of inflammation of CNS:

1. fever (temperature ≥ 38 °C),
2. CSF pleocytosis (>5 WBC/mm³ in children >2 months of age; >15 WBC/mm³ in children <2 months of age),
3. EEG findings consistent with encephalitis, or
4. neuroimaging consistent with encephalitis

Level 3A of diagnostic certainty

(a) insufficient information is available to distinguish case between acute encephalitis or ADEM; case unable to be definitively classified

Exclusion criterion for level 2 and 3 of diagnostic certainty

(a) other diagnosis for illness present

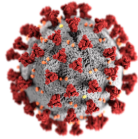
2. Synonyms / lay terms for the event

Encephalitis

Acute encephalitis

Cerebromeningitis

Encephalomeningitis



3. Laboratory tests that are specific for event^[2]

There is no specific laboratory test. Laboratory investigations are used to identify possible causes of meningoencephalitis. Performed tests are:

1. Central spine fluid (CSF) ^[3]

Investigations should include:

- Opening pressure
- Total and differential white cell count
- Red cell count
- Microscopy, culture and sensitivities (MC&S) for bacteria
- Protein
- Glucose, which should be compared with a plasma glucose taken just before the LP
- Viral investigation (PCR)
All patients with suspected encephalitis should have a CSF PCR test for HSV (1 and 2), VZV and enteroviruses, as this will identify 90% of cases due to known viral pathogens.
- Antibodies

2. Blood samples^{[4][5]}

Investigations should include:

- Routine blood cultures
- Serological testing
- Peripheral blood count and cellular morphology
- Antibody testing

The diagnostic evaluation in patients with encephalitis should include a complete blood cell count, tests of renal and hepatic function, coagulation studies and chest radiography, although results of these studies are generally nonspecific

3. Sputum, stool or nasopharynx swap

Cultures of body fluid specimens (e.g., from blood, stool, nasopharynx, or sputum), if clinical and epidemiologic clues are suggestive, should be performed in an attempt to identify various viral, bacterial, and fungal etiologies of encephalitis.

4. Diagnostic tests that are specific for event^{[6][7]}

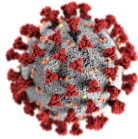
1. Lumbar puncture (LP)

All patients with suspected with suspected encephalitis should have an LP as soon as possible after hospital admission, unless there is a clinical contraindication. It is an essential investigation both to confirm the diagnosis and rule out other causes.

2. Neuroimaging (CT a/o MRI)

MRI:

MRI (including diffusion weighted imaging), is the preferred imaging modality and should be performed as soon as possible on all patients with suspected encephalitis for whom the diagnosis is uncertain; ideally this should be within 24 h of hospital admission, but certainly within 48 h.



Computed tomography (CT):

In patients with suspected encephalitis, an early CT scan has two clear roles: suggesting the diagnosis of viral encephalitis and indicating an alternative diagnosis. In patients with suspected encephalitis, an early CT scan has two clear roles: suggesting the diagnosis of viral encephalitis and indicating an alternative diagnosis.

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3. EEG

An EEG need not be performed routinely in all patients with suspected encephalitis. However, for patients with mildly altered behaviors and uncertainty whether there is a psychiatric or organic cause, an EEG should be performed to seek encephalopathic changes. EEG should also be performed in subtle motor, or non-convulsive seizures are suspected.

4. Biopsy

Biopsy of specific tissues with culture, antigen detection, nucleic acid amplification testing (e.g., PCR), and histopathologic examination of specimens may aid in the etiologic diagnosis.

5. Brain biopsy

Not standard in the initial assessment. Should be considered in patients with suspected encephalitis in whom no diagnosis has been made after the first week, especially if there are focal abnormalities on imaging. Brain biopsy should not be routinely used in patients with encephalitis but should be considered in patients with encephalitis of unknown etiology whose condition deteriorates despite treatment with acyclovir.

5. Drugs that are used to treat event^[8]

There are no specific drugs used for the treatment of (meningo)encephalitis because it depends on the cause of the encephalitis.

Empirical antimicrobial therapy for patients with suspected encephalitis should include rapid administration of intravenous acyclovir at appropriate dosages; if appropriate, treatment for bacterial meningitis and rickettsial or ehrlichial infection should be included.

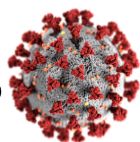
Once an etiologic agent of encephalitis is identified, antimicrobial therapy should be targeted to that infectious agent, or therapy should be discontinued if treatment directed against the etiologic agent is not available.

6. Procedures used specific for event treatment

There are no specific procedures for encephalitis.

7. Setting (outpatient specialist, in-hospital, GP, emergency room) where condition will be most frequently /reliably diagnosed

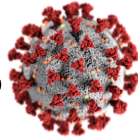
Emergency room/in-hospital



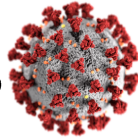
8. Diagnosis codes or algorithms used in different papers to extract the events in Europe/USA: seek literature for papers that have studied this event, and see how they extracted/measured the event.

VAESCO (2009)

CUI	UMLS CONCEPT	RCD-GPRD	ICD10	ICD9CM	ICP C
C0014059	Encephalomyelitis, Acute Disseminated		G36	323.61 or 323.81	
C0014070	Encephalomyelitis		G04.	323.51, 323.61, 323.62, 323.81, 323.9	
C0014070	Encephalomyelitis		G36		
C0014059	Encephalomyelitis, Acute Disseminated		G04.0	323.61 or 323.81	
C0751100	Postinfectious Encephalomyelitis			323.61 or 323.62	
C0014038	Encephalitis			323.51, 323.62, 323.81, 323.9	N71
C0014041	Encephalitis NEC			323.51, 323.62, 323.81, 323.9	
C0014077	Leukoencephalitis, Acute Hemorrhagic			323.61	
C0029533	Other causes of encephalitis			323.81, 323.9	
C0154659	Toxic Encephalitis			323.7	
C0155319	Inflammatory disorder of visual cortex			377.73	
C0276293	Rio Bravo fever			049.8	
C0338424	Bacterial encephalitis			036.1	
C0338430	Limbic Encephalitis				
C0393459	Post-infectious encephalitis		G04.8	323.62	
C0393482	Focal encephalitis				
C0393483	Brainstem encephalitis				
C0393484	Rasmussen Syndrome				
C0393634	Toxic encephalitis due to thallium			323.7	
C0393639	Autoimmune encephalitis			323.51, 323.62, 323.81, 323.9	
C0541930	Encephalitis toxic acute			323.7	
C0541931	Encephalitis toxic chronic			323.7	
C0596773	Infectious Encephalitis			323.62	
C0597559	telencephalic leukoencephalopathy			046.3	
C1719359	acute necrotizing hemorrhagic encephalopathy			323.61	
C2062592	acute necrotizing hemorrhagic leukoencephalitis			330.8	
C0014077	Leukoencephalitis, Acute Hemorrhagic			330.8	
C0751101	Post-Vaccinal Encephalitis		G04.0	323.51	
VIRAL ENCEPHALITIS					
C0025309	Meningoencephalitis (infectious origin)			323.4, 136.2,	

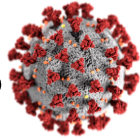


				056.01, 130.0, 054.3, 049.0, 094.1, 072.2, 013.0	
C0153066	Murray valley encephalitis		A83.4	062.4	
C0243010	Viral Encephalitis		A86	323.0, 049.9	N70
C0348168	Other mosquito-borne viral encephalitis		A83.8	062.8	
C0751098	Mosquito-borne viral encephalitis		A83.9,A83	062.9,062	
C0751445	Encephalitis, Polio			045.0	
C1720396	Encephalitis associated with AIDS			323.0	
C0554630	Progressive congenital rubella encephalomyelitis				
addition	Viral encephalitis, not otherwise specified			49,9	
C2197992	encephalitis due to infection classified elsewhere			323.4	
	READ CODES				
	Bacterial meningoencephalitis+meningomyelitis,NEC	F03X.00			
	[X]Bacterial meningoencephalitis+meningomyelitis,NEC	Fyu0500			
	Rubella encephalomyelitis	A560100			
	Encephalitis, myelitis and encephalomyelitis	F03..00			
	Encephalomyelitis	F03..11			
	Encephalomyelitis NOS	F03y.11			
	Myalgic encephalomyelitis	F03y.12			
	Encephalomyelitis NOS	F03z.11			
	Myalgic encephalomyelitis	F286.15			
	ME - Myalgic encephalomyelitis	F286.16			
	Enteroviral encephalitis	A4y0.00			
	Acute inclusion body encephalitis	A4zy000			
	Acute necrotising encephalitis	A4zy100			
	Epidemic encephalitis	A4zy200			
	Adenoviral encephalitis	A4zy500			
	Viral encephalitis NOS	A4zz.11			
	Postvaricella encephalitis	A520.00			
	Zoster encephalitis	A531400			
	Herpetic meningoencephalitis	A543.00			
	Postmeasles encephalitis	A550.00			
	Mosquito-borne viral encephalitis	A62..00			
	Japanese encephalitis	A620.00			
	Western equine encephalitis	A621.00			
	Eastern equine encephalitis	A622.00			
	St. Louis encephalitis	A623.00			
	Australian encephalitis	A624.00			
	Ilheus virus encephalitis	A62y.11			
	Tick-borne viral encephalitis	A63..00			
	Russian spring-summer (taiga) encephalitis	A630.00			
	Langat encephalitis	A63y000			
	Mumps encephalitis	A722.00			
	Late effects of viral encephalitis	AE20.00			
	[X]Unspecified viral encephalitis	Ayu8B00			
	Encephalitis in viral disease EC	F030.00			
	Encephalitis due to poliomyelitis	F030200			
	Poliomyelitis encephalitis	F030211			
	Encephalitis due to herpes simplex virus	F030400			



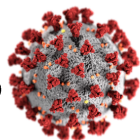
	Herpes simplex encephalitis	F030411			
	Encephalitis due to mumps virus	F030500			
	Mumps encephalitis	F030511			
	Rubella encephalitis	F030611			
	Encephalitis due to influenza-specific virus not identified	F030800			
	Encephalitis due to herpes zoster	F030900			
	Herpes zoster encephalitis	F030911			
	Encephalitis due to influenza-virus identified	F030A00			
	Encephalitis in viral disease NOS	F030z00			
	Encephalitis following chickenpox	F035000			
	Encephalitis due to varicella	F035011			
	Encephalitis following measles	F035100			
	[V]Screening for mosquito viral encephalitis	ZV73512			
	Tuberculous meningoencephalitis	A130300			
	Tuberculous encephalitis or myelitis	A136.00			
	Tuberculous encephalitis	A136000			
	Tuberculous encephalitis or myelitis NOS	A136z00			
	Meningococcal encephalitis	A361.00			
	Toxoplasma meningoencephalitis	AD00.00			
	Encephalitis, myelitis and encephalomyelitis	F03..00			
	Encephalitis due to rickettsia EC	F031.00			
	Malarial encephalitis	F032011			
	Encephalitis due to other infection EC	F033.00			
	Encephalitis due to meningococcus	F033000			
	Meningococcal encephalitis	F033011			
	Syphilis encephalitis	F033111			
	Encephalitis due to toxoplasmosis	F033400			
	Toxoplasmosis encephalitis	F033411			
	Unspecified encephalitis due to other infection EC	F033z00			
	Postimmunisation encephalitis	F034.00			
	Postinfectious encephalitis	F035.00			
	Postinfectious encephalitis NOS	F035z00			
	Toxic encephalitis	F036.00			
	Toxic encephalitis due to mercury	F036100			
	Toxic encephalitis due to thallium	F036200			
	Toxic encephalitis NOS	F036z00			
	Other causes of encephalitis	F03y.00			
	Encephalitis NOS	F03z.00			
	Acute and subacute haemorrhagic leukoencephalitis [Hurst]	F212.00			
	Progressive multifocal leukoencephalopathy	A413.00			
	Progressive multifocal leukoencephalopathy	A413.11			
	not included GPRD				
	Subacute sclerosing panencephalitis	A412.00	out		
	Encephalitis lethargica	A4zy300	out		
	Von Economo's encephalitis	A4zy400	out		

9. Codes used in ACCESS

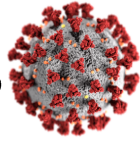


10. Algorithm proposal

Coding system	Code	Code name	Concept	Concept name	Algorithm
ICD10/CM	A69.22	Meningoencephalitis	C0025309	Meningoencephalitis	Narrow
ICD10/CM	G04	Encephalitis, myelitis and encephalomyelitis	C0014058	Encephalitis, myelitis and encephalomyelitis	Narrow
ICD10/CM	G04	meningoencephalitis	C0025309	Meningoencephalitis	Narrow
ICD10/CM	G04.0	Acute disseminated encephalitis	C3536864	Acute disseminated encephalitis	Narrow
ICD10/CM	G04.9	Encephalitis, myelitis and encephalomyelitis, unspecified	C0014058	Encephalitis, myelitis and encephalomyelitis	Narrow
ICD10/CM	G36	Other acute disseminated demyelination	C0494468	Other acute disseminated demyelination	Narrow
ICD10/CM	G93.4	Encephalopathy, unspecified	C0085584	Encephalopathies	Possible
ICD10/CM	G93.40	Encephalopathy, unspecified	C0085584	Encephalopathies	Possible
ICD9CM	323	Encephalitis, myelitis, and encephalomyelitis	C0014058	Encephalitis, myelitis and encephalomyelitis	Narrow
ICD9CM	348.3	Encephalopathy, not elsewhere classified	C0085584	Encephalopathies	Possible
ICD9CM	348.30	Encephalopathy, unspecified	C0085584	Encephalopathies	Possible
ICPC	N71	Meningitis/encephalitis	C0497299	Meningitis/encephalitis	Possible
ICPC	N71.03				Narrow
RCD2	F03..	Encephalit/myelit/encephalomye	C0014058	Encephalitis, myelitis and encephalomyelitis	Narrow
RCD2	F03z.	Encephalitis NOS	C0014038	Encephalitis	Narrow
RCD2	F283.	Encephalopathy unspecified	C0085584	Encephalopathies	Possible
SCTSPA	7125002	meningoencefalitis	C0025309	Meningoencephalitis	Narrow
SCTSPA	62950007	encefalomielitis	C0014070	Encephalomyelitis	Narrow
SCTSPA	81308009	encefalopatía	C0085584	Encephalopathies	Possible
SCTSPA	83942000	encefalomielitis diseminada aguda	C0014059	Encephalomyelitis, Acute Disseminated	Narrow
SCTSPA	95643007	encefalitis autoinmunitaria	C0393639	Hashimoto's encephalitis	Narrow
SCTSPA	155053002	encefalopatía no especificada	C0085584	Encephalopathies	Possible
SCTSPA	193051008	encefalopatía no especificada	C0085584	Encephalopathies	Possible
SCTSPA	230196000	encefalomielitis, SAI	C0014070	Encephalomyelitis	Narrow
SCTSPA	267576008	encefalitis, mielitis y encefalomielitis	C0014058	Encephalitis, myelitis and encephalomyelitis	Narrow
SCTSPA	267578009	encefalitis, SAI	C0014038	Encephalitis	Narrow
SCTSPA	286936006	encefalitis/mielitis, SAI	C0014070	Encephalomyelitis	Narrow
SCTSPA	771271000	encefalopatía sensible a los esteroides asociada con tiroiditis autoinmunitaria	C0393639	Hashimoto's encephalitis	Narrow
SNOMEDCT_US	7125002	Meningoencephalitis	C0025309	Meningoencephalitis	Narrow
SNOMEDCT_US	16631009	Transverse myelitis			narrow
SNOMEDCT_US	18071005	Meningococcal encephalitis			narrow
SNOMEDCT_US	26135000	Syphilis encephalitis			narrow
SNOMEDCT_US	31646008	Encephalitis due to mumps virus			narrow
SNOMEDCT_US	32735002	Encephalitis due to congenital syphilis			narrow
SNOMEDCT_US	34476008	Encephalitis in viral disease EC			narrow
SNOMEDCT_US	41370002	Myelitis			narrow
SNOMEDCT_US	45170000	Encephalitis	C0014038	Encephalitis	Narrow
SNOMEDCT_US	52702003	Myalgic encephalopathy			possible



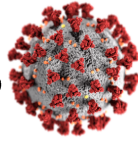
SNOMEDCT_US	62950007	Encephalomyelitis	C0014070	Encephalomyelitis	Narrow
SNOMEDCT_US	62950007	Encephalomyelitis			narrow
SNOMEDCT_US	71460009	Encephalitis due to trypanosomiasis			narrow
SNOMEDCT_US	76011009	Encephalopathy, NOS	C0085584	Encephalopathies	Possible
SNOMEDCT_US	81308009	Unspecified encephalopathy			possible
SNOMEDCT_US	83159006	Encephalitis due to cytomegalovirus			narrow
SNOMEDCT_US	83159006	Cytomegaloviral encephalitis			narrow
SNOMEDCT_US	83942000	Acute disseminated encephalomyelitis	C0014059	Encephalomyelitis, Acute Disseminated	Narrow
SNOMEDCT_US	91483004	Encephalitis due to tuberculosis			narrow
SNOMEDCT_US	95643007	Autoimmune encephalitis	C0393639	Hashimoto's encephalitis	Narrow
SNOMEDCT_US	111872008	Encephalitis following measles			narrow
SNOMEDCT_US	154991009	Encephalitis/myelitis NOS	C0014070	Encephalomyelitis	Narrow
SNOMEDCT_US	155053002	Unspecified encephalopathy	C0085584	Encephalopathies	Possible
SNOMEDCT_US	186509002	Encephalitis following chickenpox			narrow
SNOMEDCT_US	192682002	Encephalitis, myelitis and encephalomyelitis	C0014058	Encephalitis, myelitis and encephalomyelitis	Narrow
SNOMEDCT_US	192682002	Encephalomyelitis	C0014070	Encephalomyelitis	Narrow
SNOMEDCT_US	192686004	Encephalitis due to poliomyelitis			narrow
SNOMEDCT_US	192687008	Encephalitis due to arthropod-borne virus			narrow
SNOMEDCT_US	192689006	Encephalitis due to rubella virus			narrow
SNOMEDCT_US	192701001	Encephalitis due to toxoplasmosis			narrow
SNOMEDCT_US	192704009	Postimmunisation encephalitis			narrow
SNOMEDCT_US	192705005	Post BCG vaccination encephalitis			narrow
SNOMEDCT_US	192706006	Post typhoid vaccination encephalitis			narrow
SNOMEDCT_US	192707002	Post paratyphoid vaccination encephalitis			narrow
SNOMEDCT_US	192710009	Post tetanus vaccination encephalitis			narrow
SNOMEDCT_US	192712001	Post pertussis vaccination encephalitis			narrow
SNOMEDCT_US	192713006	Post smallpox vaccination encephalitis			narrow
SNOMEDCT_US	192714000	Post rabies vaccination encephalitis			narrow
SNOMEDCT_US	192715004	Post typhus vaccination encephalitis			narrow
SNOMEDCT_US	192716003	Post yellow fever vaccination encephalitis			narrow
SNOMEDCT_US	192717007	Post measles vaccination encephalitis			narrow
SNOMEDCT_US	192718002	Post polio vaccination encephalitis			narrow
SNOMEDCT_US	192719005	Post mumps vaccination encephalitis			narrow
SNOMEDCT_US	192720004	Post rubella vaccination encephalitis			narrow
SNOMEDCT_US	192721000	Post influenza vaccination encephalitis			narrow
SNOMEDCT_US	192722007	Post hepatitis A vaccination encephalitis			narrow
SNOMEDCT_US	192723002	Post hepatitis B vaccination encephalitis			narrow



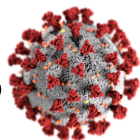
SNOMEDCT_US	192724008	Post mixed vaccination encephalitis			narrow
SNOMEDCT_US	192727001	Postinfectious encephalitis			narrow
SNOMEDCT_US	192727001	Postinfective encephalitis			narrow
SNOMEDCT_US	192727001	Postinfectious encephalitis NOS			narrow
SNOMEDCT_US	192735003	Encephalomyelitis NOS	C0014070	Encephalomyelitis	Narrow
SNOMEDCT_US	192736002	Encephalitis NOS	C0014038	Encephalitis	Narrow
SNOMEDCT_US	192736002	Encephalomyelitis NOS	C0014070	Encephalomyelitis	Narrow
SNOMEDCT_US	193051008	Unspecified encephalopathy	C0085584	Encephalopathies	Possible
SNOMEDCT_US	230176008	Encephalitis due to herpes zoster			narrow
SNOMEDCT_US	230191005	Rasmussen syndrome			narrow
SNOMEDCT_US	230196000	Encephalomyelitis NOS	C0014070	Encephalomyelitis	Narrow
SNOMEDCT_US	230198004	Varicella transverse myelitis			narrow
SNOMEDCT_US	267576008	Encephalitis, myelitis and encephalomyelitis	C0014058	Encephalitis, myelitis and encephalomyelitis	Narrow
SNOMEDCT_US	267578009	Encephalitis NOS	C0014038	Encephalitis	Narrow
SNOMEDCT_US	267682000	Encephalitis	C0014038	Encephalitis	Narrow
SNOMEDCT_US	267684004	Encephalitis/myelitis NOS	C0014070	Encephalomyelitis	Narrow
SNOMEDCT_US	309789002	Encephalitis due to influenza-specific virus not identified			narrow
SNOMEDCT_US	309806000	Encephalitis due to influenza-virus identified			narrow
SNOMEDCT_US	312215006	Unspecified encephalitis due to other infection EC			Narrow
SNOMEDCT_US	418455000	Encephalitis due to protozoa EC NOS			narrow
SNOMEDCT_US	419868009	Encephalitis due to rickettsia EC			narrow
SNOMEDCT_US	427796004	Herpes simplex encephalitis			narrow
SNOMEDCT_US	714279000	Tropical spastic paraplegia			narrow
SNOMEDCT_US	771271000	Steroid-responsive encephalopathy associated with autoimmune thyroiditis	C0393639	Hashimoto's encephalitis	Narrow
SNOMEDCT_US	96374100000101	Bacterial meningoencephalitis+meningomyelitis, NEC			narrow

11. Background rates

Search string: (((((((("meningoencephalitis"[MeSH Terms]) OR ("meningoencephalitis/epidemiology"[MeSH Terms]) OR ("encephalitis"[MeSH Terms]) OR (meningoencephalitis[Title/Abstract]) OR (encephalitis[Title/Abstract])) AND (incidence[Text Word])) AND (English[Language])) NOT (comment[Publication Type])) NOT (editorial[Publication Type])) NOT (news[Publication Type])) NOT (newspaper article[Publication Type])) AND (humans[MeSH Terms])



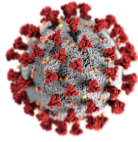
Number study	Reference study	Age strata	All		
			cases	person-years	rate/100,000
1	A Population-Based Acute Meningitis and Encephalitis Syndromes Surveillance in Guangxi, China, May 2007-June 2012	Annual incidence rate	2382		12.55
2	A Population-based Observational Study of Childhood Encephalitis in Children Admitted to Pediatric Intensive Care Units in England and Wales	0-17 years	1031		0.79 (0.74-0.84)
3	Acute encephalitis syndrome surveillance, Kushinagar district, Uttar Pradesh, India, 2011-2012	All ages	721	3560830	20.2
		0-6 years	428	551467	77.6
4	Encephalitis, Ontario, Canada, 2002-2013	Total			4.3 (4.2-4.4)
		<1 years			10.7 (9.1-12.1)
		1-4 years			5.7 (5.2-6.3)
		5-19 years			3.2 (3.0-3.4)
		20-44 years			2.8 (2.6-2.9)
		45-64 years			4.4 (4.3-4.7)
		≥ 65			8.3 (7.8-8.6)
5	New estimates of incidence of encephalitis in England		HES + PHE		
		All	508		5.23
			Encephalitis specific code in primary field only (positive predictive value 54%) 2006-2007		
		All	384		3.96
			HES incidence (2005-2009)		



		All	8848		4.32 (3.74-4.96)
		<1	300		11.63 (9.75-13.89)
		1-4 years	581		6.06 (5.14-7.13)
		5-19 years	1077		2.86 (2.43-3.39)
		20-44 years	2326		3.23 (2.78-3.80)
		45-64 years	2259		4.46 (3.86-5.08)
		≥ 65 years	1973		6.06 (5.28-7.56)
6	Review of the aetiology, diagnostics and outcomes of childhood encephalitis from 1970 to 2009	0-17 years	163	2100000	7.9

12. References

1. Sejvar JJ, Kohl KS, Bilynsky R, et al. Encephalitis, myelitis, and acute disseminated encephalomyelitis (ADEM): case definitions and guidelines for collection, analysis, and presentation of immunization safety data. *Vaccine*. 2007;25(31):5771-5792. doi:10.1016/j.vaccine.2007.04.060
2. Solomon T, Michael BD, Smith PE, et al. Management of suspected viral encephalitis in adults--Association of British Neurologists and British Infection Association National Guidelines. *J Infect*. 2012;64(4):347-373. doi:10.1016/j.jinf.2011.11.014
3. Hrishi AP, Sethuraman M. Cerebrospinal Fluid (CSF) Analysis and Interpretation in Neurocritical Care for Acute Neurological Conditions. *Indian J Crit Care Med*. 2019;23(Suppl 2):S115-S119. doi:10.5005/jp-journals-10071-23187
4. Venkatesan A, Tunkel AR, Bloch KC, et al. Case definitions, diagnostic algorithms, and priorities in encephalitis: consensus statement of the international encephalitis consortium. *Clin Infect Dis*. 2013;57(8):1114-1128. doi:10.1093/cid/cit458
5. Sigfrid L, Perfect C, Rojek A, et al. A systematic review of clinical guidelines on the management of acute, community-acquired CNS infections. *BMC Med*. 2019;17(1):170. Published 2019 Sep 6. doi:10.1186/s12916-019-1387-5



6. Sigfrid L, Perfect C, Rojek A, et al. A systematic review of clinical guidelines on the management of acute, community-acquired CNS infections. *BMC Med.* 2019;17(1):170. Published 2019 Sep 6. doi:10.1186/s12916-019-1387-5
7. Tunkel AR, Glaser CA, Bloch KC, et al. The management of encephalitis: clinical practice guidelines by the Infectious Diseases Society of America. *Clin Infect Dis.* 2008;47(3):303-327. doi:10.1086/589747
8. Tunkel AR, Glaser CA, Bloch KC, et al. The management of encephalitis: clinical practice guidelines by the Infectious Diseases Society of America. *Clin Infect Dis.* 2008;47(3):303-327. doi:10.1086/589747