Psychiatric Aspect of Infectious Diseases

Common Infections and Risk of Dementia or Cognitive Decline

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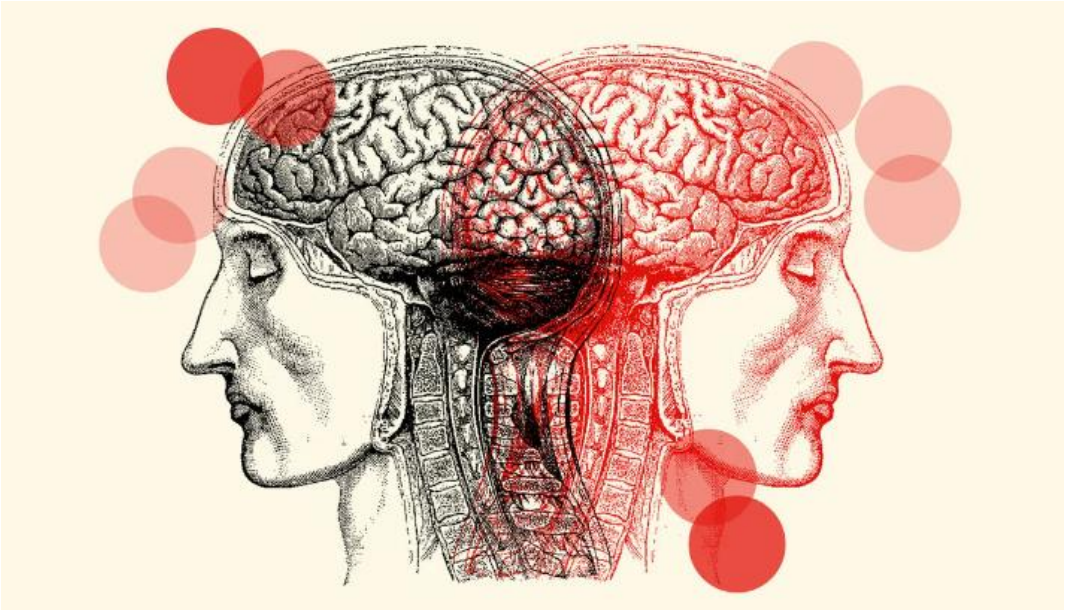
UPMC ID Division



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Disclosure

- I have no actual or potential conflict of interest to report.

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Learning Objectives

- Understand the definition of mental health.
- Recognize what can cause mental illnesses.
- Review the concept of infectious diseases and mental illnesses, is there a link?
- Understand in a simplified way the pathophysiology linking mental health and infectious diseases.
- Understand the risk of developing psychiatric conditions related to maternal infections/prenatal exposure to infections.
- Brief review of some infections that can be associated with neuropsychiatric symptoms: Lyme disease, toxoplasmosis, malaria, viral infections, syphilis, cysticercosis .
- Summary.
- References, resources and official websites.

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What is Mental Health

- Mental health includes our emotional, psychological, and social well-being.
- It affects how we think, feel, and act.
- It also helps determine how we handle stress, relate to others, and make healthy choices.
- Mental health is important at every stage of life, from childhood and adolescence through adulthood.

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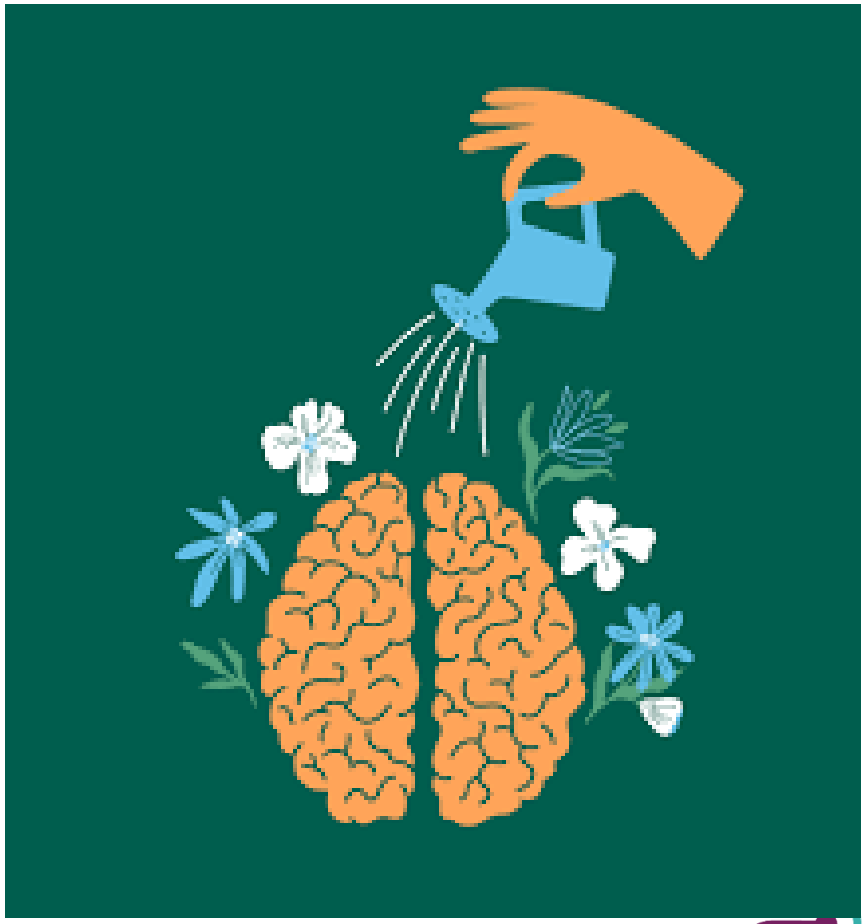
https://www.cdc.gov/mentalhealth/learn/index.htm

Why is Mental Health Important for Overall Health?

- Mental and physical health are equally important components of overall health.
- For example, depression increases the risk for many types of physical health problems, particularly long-lasting conditions like diabetes, heart disease, and stroke.
- Similarly, the presence of chronic conditions can increase the risk for mental illness.



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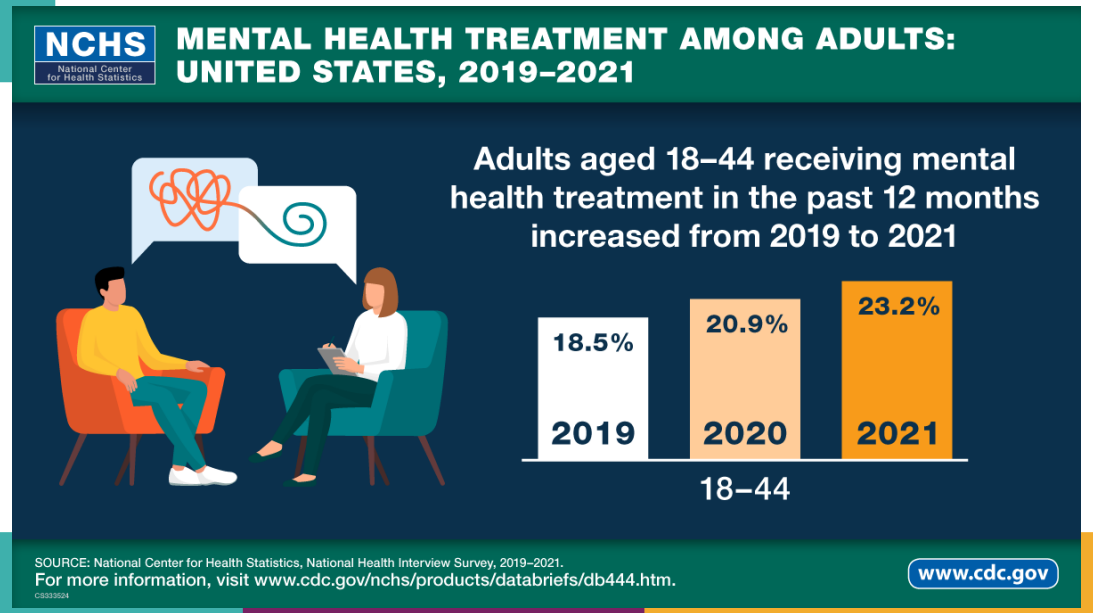
How Common are Mental Illnesses?

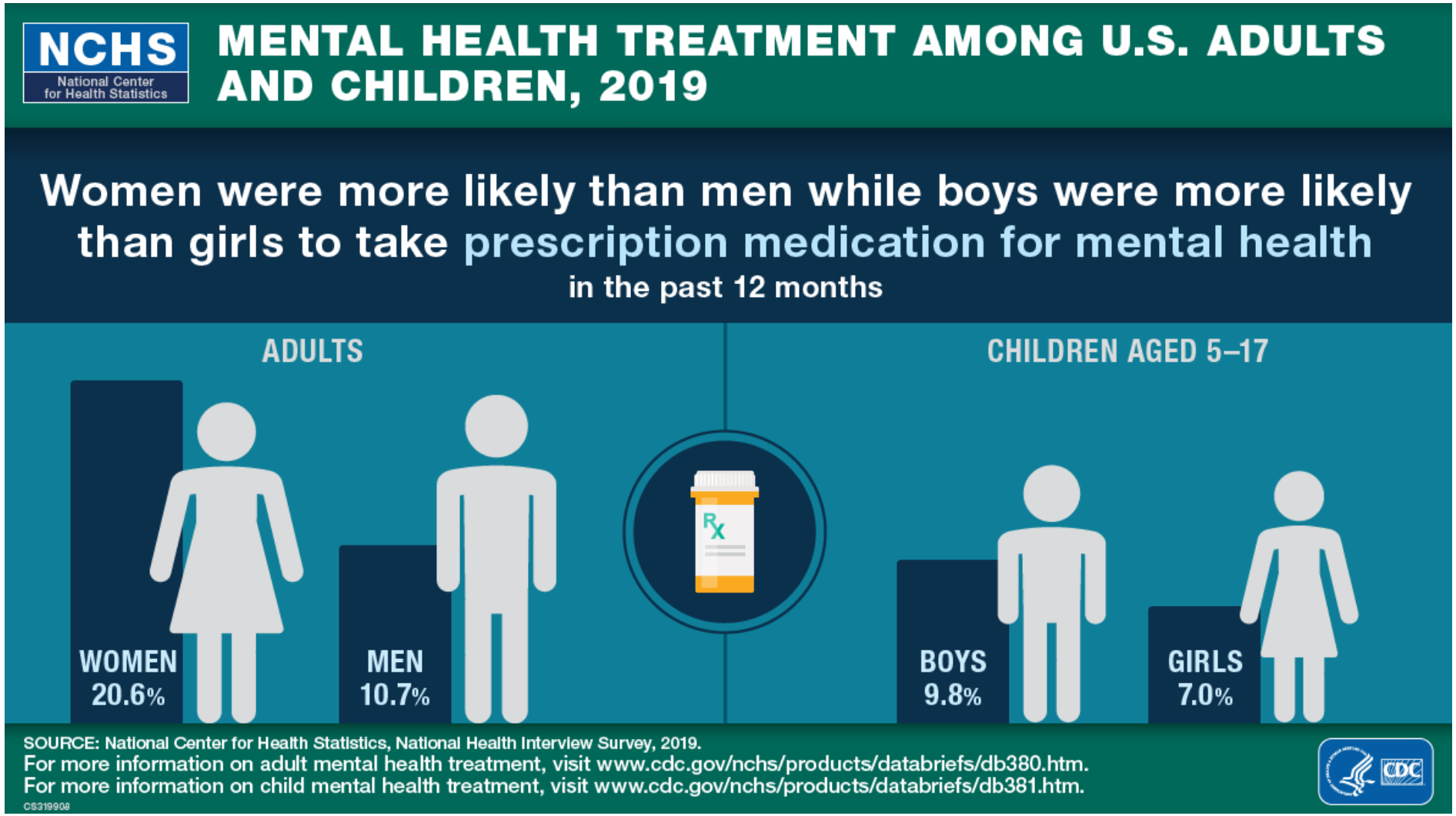
Mental illnesses are among the most common health conditions in the United States.

More than 1 in 5 US adults live with a mental illness.

Over 1 in 5 youth (ages 13-18) either currently or at some point during their life, have had a seriously debilitating mental illness.

About 1 in 25 U.S. adults live with a serious mental illness, such as schizophrenia, bipolar disorder, or major depression.





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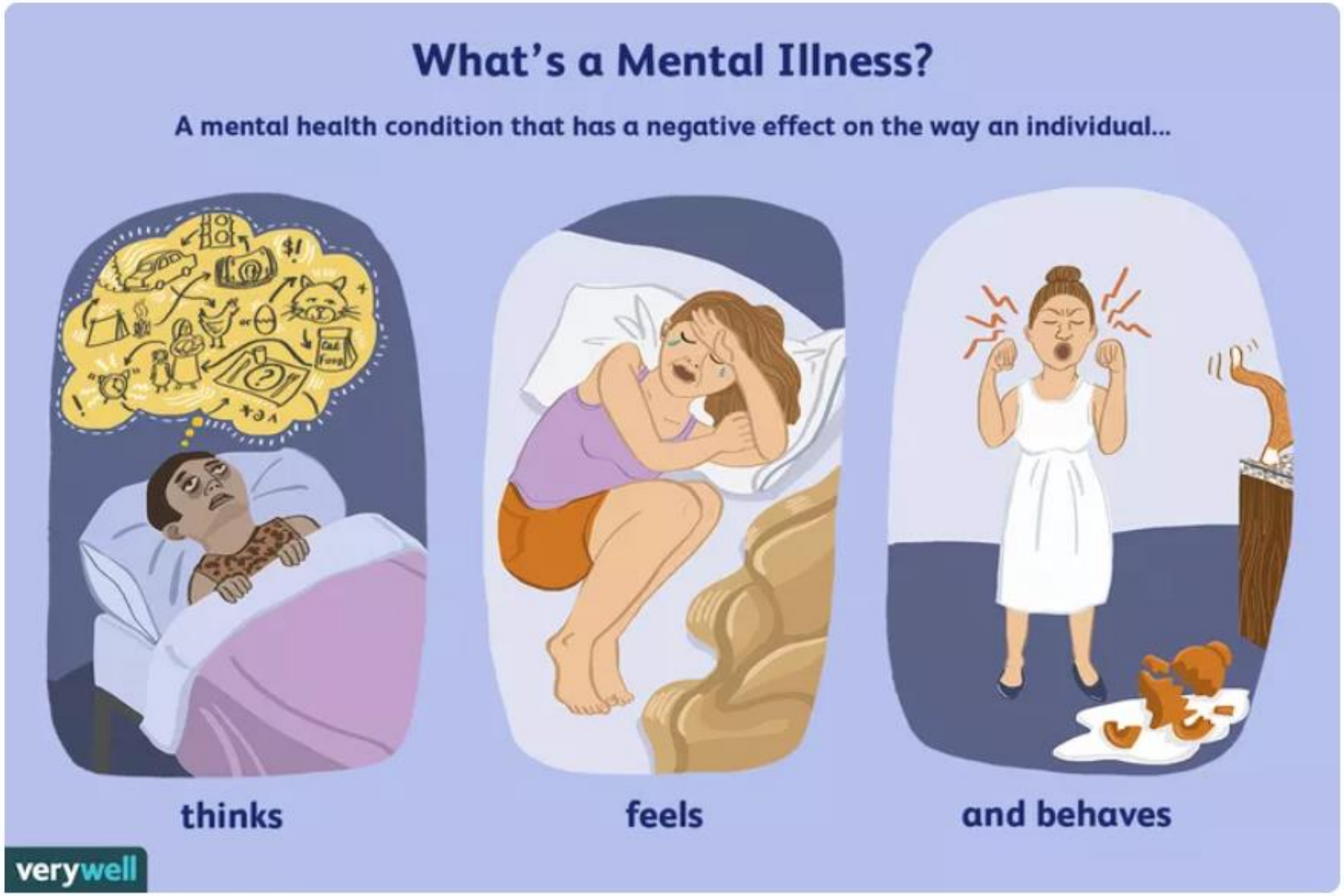
What is a mental illness?



Verywell / Jessica Olah

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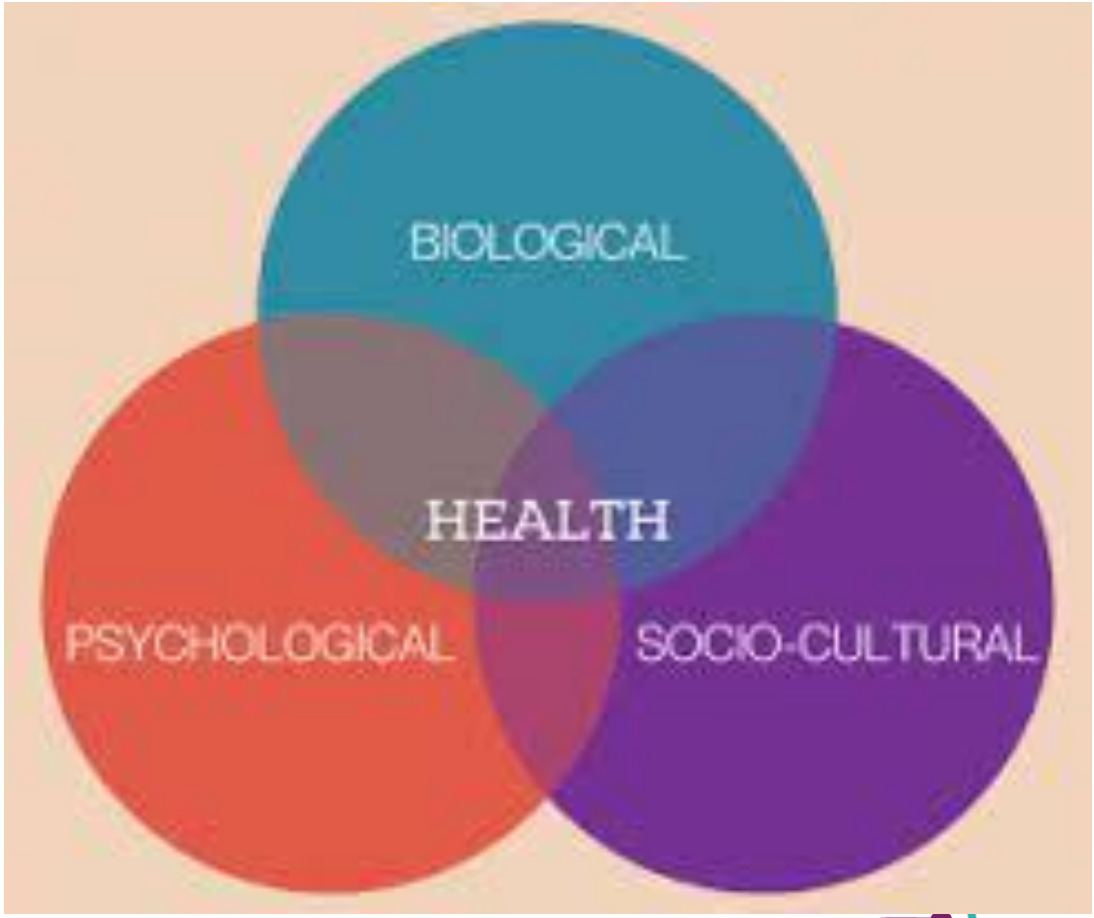
What Causes Mental Illness?

- Adverse Childhood Experiences: trauma or a history of abuse (for example, child abuse, sexual assault, witnessing violence, etc.)
- Experiences related to other ongoing (chronic) medical conditions: cancer or diabetes
- Biological factors or chemical imbalances in the brain
- Use of alcohol or drugs
- Having feelings of loneliness or isolation



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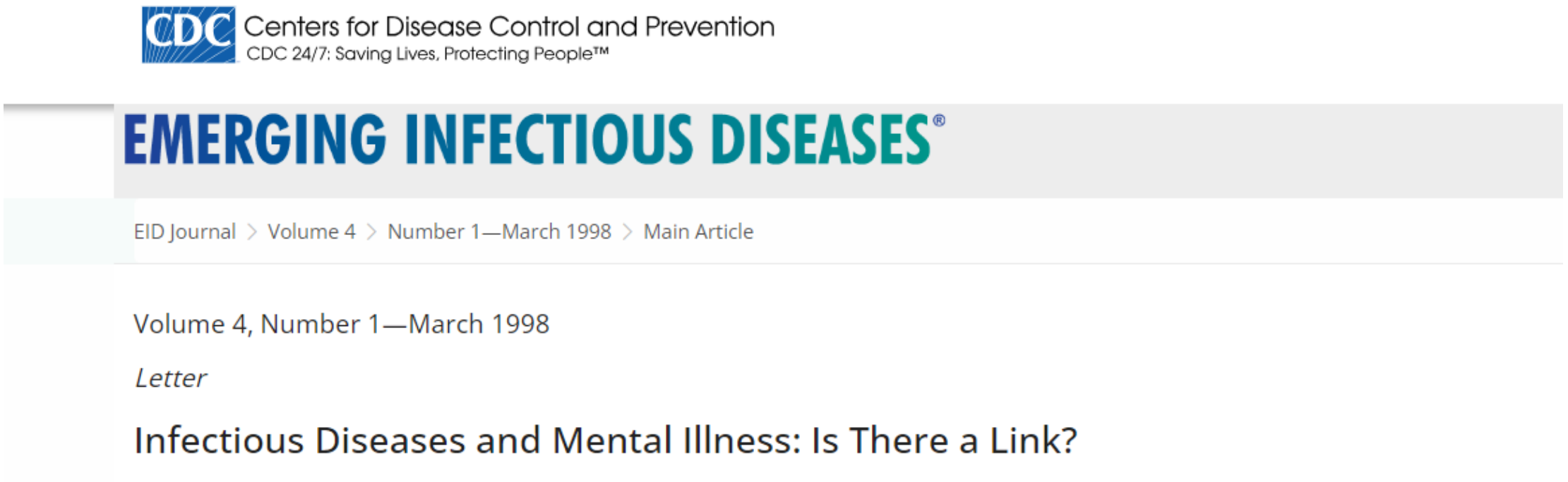
Infectious Diseases and Mental Illness: Is There a Link?



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Introduction

- Psychiatric symptoms can be associated with several **systemic** and **central nervous system infections.**
- Can be the **initial presenting** symptoms, occurring in the absence of neurological symptoms in some disorders as in some cases of viral encephalitis.
- They could also be part of the clinical picture in other cases such as **psychosis or mood symptoms** secondary to **brucellosis** or **toxoplasmosis**.

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Introduction

Late-onset neuropsychiatric complications may also occur **several years** following the infection such as in the case of **subacute sclerosing panencephalitis** due to **measles.**

Some Infectious diseases may have possible etiological role for major psychiatric disorders, based on yet **unconfirmed reports** for viral infectious diseases (e.g. **Influenza virus and HSV-1**) which are thought to have risk for developing **schizophrenia** and **psychosis.**

Neuropsychiatric adverse effects can occur due to **drugs** (e.g. mefloquine, interferon-alpha) that are used for treatment of infectious diseases.

Introduction

Psychiatric symptoms can also be reactivated resulting from chronic, complicated and serious infections such as **HIV** that can lead to **depression, anxiety or adjustment disorders.**

Although CNS involvement can also be a possible etiological factor.

Patients suffering from primary and severe psychiatric disorders are at increased risk of contracting infection.

Mainly related to high-risk behaviors in patients with **mania** or **schizophrenia**.

It is also important to consider that the **co-occurrence** of psychiatric symptoms and infection can be **incidental.**

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Facts/Pathophysiology

Infectious organisms can play an important role in pathophysiology of neurodegenerative and neurobehavioral diseases.

They may enter the brain within infected migratory macrophages, or they may cross the blood-brain barrier by the process of transcytosis or by intraneuronal transfer from peripheral nerves.

Psychiatric symptoms can occur as part of the clinical manifestations of several systemic and CNS infections.

On the other hand, psychological stress can affect the function of the immune system and predict infectious diseases susceptibility.

In psychiatric settings, people with severe mental illness have more susceptibility to develop physical illness than general population.

Facts

Screening of 588 adult psychiatric patients in 2 psychiatric inpatient units in University of Pennsylvania.

Evidence of undetected diseases was reported in:

10% of patients who had HIV.

32% who had hepatitis B

21% who had hepatitis C, and a considerable proportion of infectious diseases have been missed.

Occasionally, even a small focus of chronic infection can result in organic psychiatric disorder with symptoms of subtle cognitive dysfunction, irritability, depression, psychosis and delirium.

Occult infections are concealed infections that may occur anywhere in the body, and can be associated with various psychiatric symptoms.

Examples include: UTIs, abscess, sinusitis, chronic otitis, bronchiectasis, cholecystitis, parasitosis, osteomyelitis, endocarditis, and subclinical systemic infections (such as tuberculosis and HIV)

Maternal and Childhood Infections

Considered as risk factors for psychosis.

The fetal brain can be exposed to maternally derived substances, such as cytokines or stress hormones.

Several studies have found association between the later developments of psychosis and exposure to infections during fetal life.

Exposures to viruses with affinity to the CNS, (e.g. Influenza A virus, polio, rubella, and herpes simplex Type 2 viruses), have been proposed as risk factors for developing psychosis.

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How about Maternal Bacterial Infections?

Thought to be associated with risk of developing psychosis.

A study using Copenhagen Perinatal Cohort data has identified 85 cases of schizophrenia.

In these cases, first-trimester exposure to bacterial infections was associated with an elevated risk of developing schizophrenia.

Association between risk of schizophrenia and prenatal exposure to infections may be mediated through trans-placental passage of cytokines produced by the mother in response to infections.

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Relation between infectious diseases and psychiatric features.

Pattern of relation	Comment	Examples
Infectious diseases causing psychiatric symptoms	Psychiatric symptoms can be the initial presenting symptoms, or could be part of the clinical picture of the infectious disease.	• Viral encephalitis. • Psychosis or mood symptoms in brucellosis or toxoplasmosis.
Infectious diseases with possible etiological role for major psychiatric disorders	Unconfirmed reports for infectious diseases having possible etiological role for schizophrenia.	• Influenza virus. • HSV.
The primary psychiatric disorders can increase the risk of contracting infection	High risk behaviors may lead to increased risk of infection.	• Acute and severe psychiatric symptoms (e.g. Mania). • Chronic psychiatric symptoms (e.g. schizophrenia)
Psychiatric symptoms reactive to chronic and serious infections	Chronic, complicated and serious infections can lead to depression, anxiety or adjustment reactions.	• HIV.
Others/coincidental	Infectious diseases can occur in psychiatric patients regardless of the above mentioned factors.	

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Differential Diagnosis of Co-existing Psychiatric Symptoms and Infectious Diseases

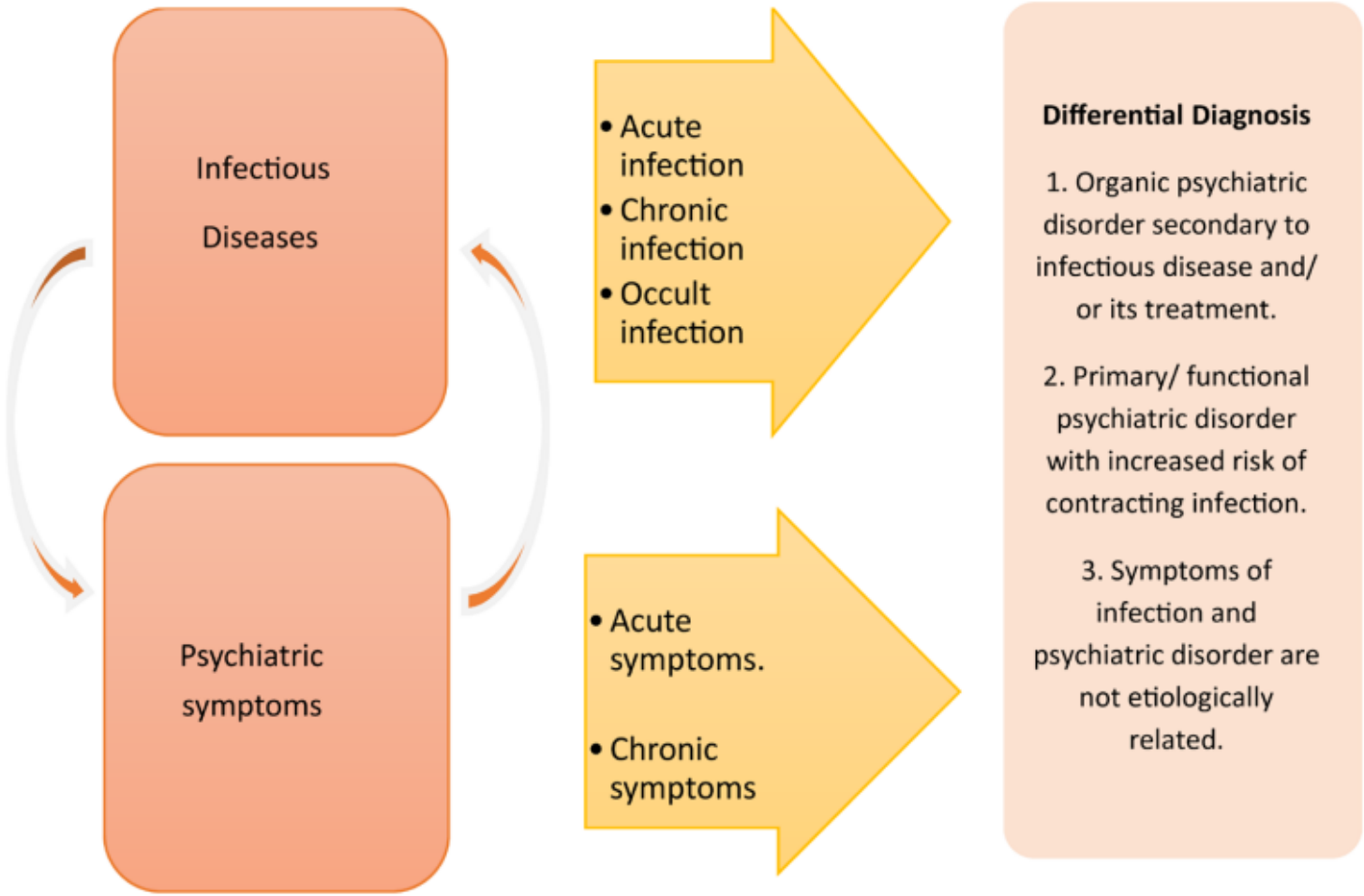

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Table 2. Examples for bacterial infections that can be associated with neuropsychiatric symptoms.

Bacterial infection	Causative organism	Clinical features	Neuropsychiatric symptoms	Diagnosis
Brucellosis	Gram-negative coccobacilli: *B. abortus*, *B. mellitensis*, *B. suis*, *B. canis*.	The incubation period for acute infection is 1 - 3 weeks. Malaise, headache, weakness, generalized myalgia and night sweat. The fever pattern is undulant. Lymphadenopathy, hepatosplenomegaly, spinal tenderness, scaroiliitis.	Behavioral changes, chronic psychosis, stupor, hallucination, delirium, and acute psychosis can be an early presentation of brucellosis. Depression is common in untreated chronic forms of brucellosis.	Blood or bone marrow cultures in acute phase. Serological tests for chronic brucellosis (brucella agglutination test). Polymerase chain reaction. ELISA.
Typhoid fever	*Salmonella typhi*	Abdominal pain, headache, fever	Common: delirium, encephalopathy. Less commonly: Persistent psychiatric symptoms (irritability, psychosis, and personality changes), complete recovery following treatment.	Blood culture (1st 2 weeks), Intestinal secretions and urine culture, Bone marrow culture is rarely required, leucopenia, Widal antigen test can be misinterpreted.
Syphilis	*Treponema pallidum* (*T. Pallidum*)	Primary stage: hard chancre, regional lymphadenopathy. Secondary stage: fever, malaise, arthralgia, sore throat, generalized lymphadenpathy. maculopapular rash, mucous patches, snail-track ulcers. Tertiary (late) stage: Gummas, aortitis, neurosyphilis.	Neurosyphilis: General Paralysis of Insane, symptoms similar to Alzheimer disease, progressive cognitive decline, seizures, personality change, encephalopathy.	Dark ground microscopy, serological, CSF examination for evidence of neurosyphilis, Chest X-ray.
Lyme disease	*Borrelia burgdorferi*	The first stage (7 - 10 days): Erythema migrans at the site of tick bite, headache, fever, malaise, myalgia, arthralgia, lymphadenopathy. The second stage: neurological symptoms, cardiac symptoms, arthritis.	Decreased memory, poor concentration, difficulties in formulating ideas and difficulty in word findings, irritability, daytime hypersomnolence, depression.	IgM antibodies are detectable in the first month. IgG antibodies invariably present later.
Leptospirosis	*Leptospira Interrogans*	*Leptospiraemic phase*: severe headache, malaise, fever, anorexia, myalgia, conjunctival suffusion, hepatosplenomegaly, lymphadenopathy, skin rash. *Immunological phase*:usually mild. Meningism.	Commonly: Confusion and delirium. Mania and psychosis may occur.	Usually clinical only. Blood/CSF culture, leucocytosis, thrombocytopenia, elevated creatine phosphokinase.
Mycoplasma pneumonia	*Mycoplasma pneumoniae*	Headache and malaise preceding the chest symptoms. Extrapulmonary: myocarditis, pericarditis, erythema multiforme, arthralgia, gastrointestinal symptoms, haemolyticanaemia, thrombocytopenia, meningoencephalitis.	Encephalitis, meningitis, myelitis, and polyradiculitis. Other reported presentations include coma, ataxia, psychosis, and stroke. Rarely: Kluver-Bucy syndrome	Chest X-ray, cold agglutinins, rising antibody titre,
Whipple's Disease	*Tropheryma whipplei*	Arthralgia, diarrhea, weight loss.	Commonly: Depression and personality changes. More common: cognitive dysfunction and dementia.	

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Lyme Disease

- Tick-borne multisystem inflammatory disease.
- Spirochete Borrelia burgdorferi.
- The disease occurs in acute and chronic stages with a wide spectrum of clinical picture.
- Most common early manifestation is a skin lesion at the site of the tick bite.
- The hall mark of the disease is the characteristic erythema migrans, rash manifests as an area of spreading erythema measuring >5 cm in diameter.
- Later manifestations are caused by spread of the spirochetes either **under the skin** or via **blood stream to the brain**, heart and joints.

Nicolson, G.L et al. (2010) Role of Chronic Bacterial and Viral Infections in Neurodegenerative, Neurobehavioral, Psychiatric, Autoimmune and Fatiguing Illnesses.
Hurley, R.A et al. (2008) Acute and Chronic Lyme Disease: Controversies for Neuropsychiatry. Journal of Neuropsychiatry

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Lyme Disease

Neurologic manifestations (Lyme Neuroborreliosis) occur **after several weeks to months** in 15% of patients.

A broad range of psychiatric conditions, including **paranoia, dementia, schizophrenia, bipolar disorder, panic attacks, major depression, anorexia nervosa and obsessive compulsive disorder.**

Depression is common among patients with **late Lyme** disease occurring in **26% to 66%** of cases.

Lyme disease should be included in the differential diagnosis of psychiatric symptoms in patients who live in its endemic areas, particularly if depressive features, lack of concentration and fatigue.

Common chronic symptoms due to Lyme disease may include:

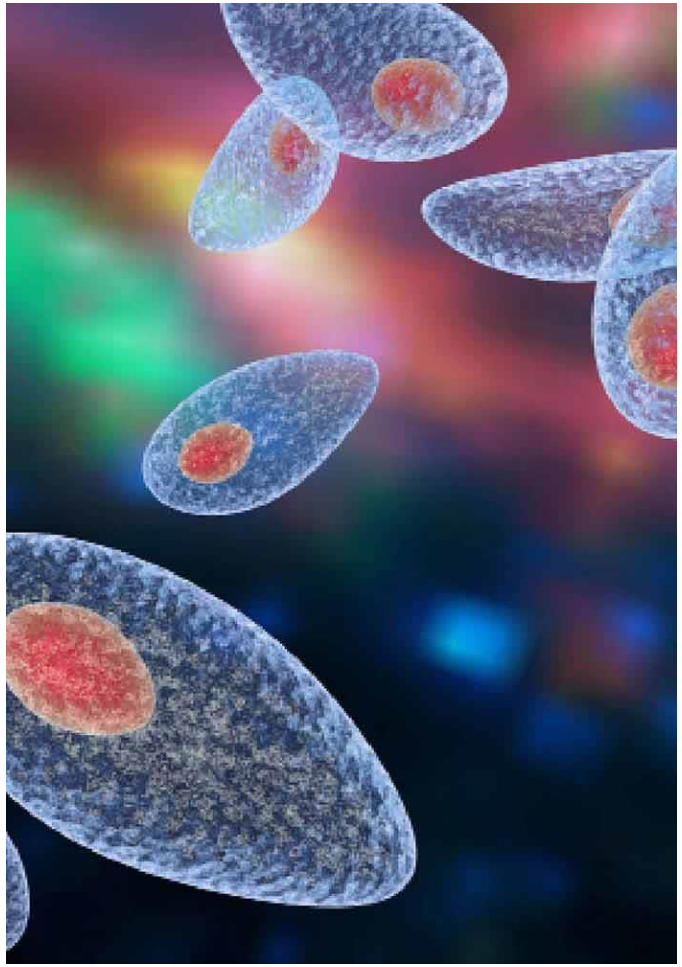
Cognitive deficits and subjective cognitive slowing: decreased memory, poor concentration, difficulties in formulating ideas and difficulty in word findings are significantly prominent in chronic post-treatment Lyme disease.

Long-standing fatigue.

Chronic musculoskeletal pain.

Toxoplasmosis

- Common protozoal infection caused by the intracellular protozoan parasite **Toxoplasma gondii**.
- Most infections are asymptomatic.
- Clinical features may include fever, myalgia and general malaise, lymphadenopathy.
- In severe cases pneumonia, myocarditis and choroidoretinitis may occur.
- Primary toxoplasmosis infection during pregnancy may cause **severe damage to the foetus**, and may cause microcephaly, hydrocephalus, encephalitis, mental retardation, seizures, blindness, and death.
- Acute T. gondii infection can cause **psychotic symptoms similar to symptoms of schizophrenia**.



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Toxoplasmosis

- Many studies found significant T. gondii Ab in persons with schizophrenia and other severe psychiatric disorders.
- The difference was statistically significant in some case-control studies.
- Psychiatric complications due to acute T. gondii infection or secondary reactivation of the disease in immunosuppressed: disorientation, anxiety, depression, and schizophreniform psychoses.
- In chronic toxoplasmosis, T. gondii forms **cysts** that can be located in various anatomical sites including the **brain**.

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Toxoplasmosis

- Several sero-prevalence case control studies have demonstrated significantly higher sero-prevalence and T. gondii IgG antibodies in patients with schizophrenia than in control subjects.
- Analysis of serum samples for the presence and level of immunoglobulin G (IgG) to T. gondii, CMV, HSV-1, and HSV-2 in an Ethiopian population; found the seroprevalence of T. gondii infection and IgG to CMV higher in individuals with **schizophrenia** and **bipolar disorder** than in unaffected controls.

JP Webseter et al. Parasites as causative agents of human affective disorders? The impact of anti-psychotic, mood-stabilizer and anti-parasite medication on *Toxoplasma gondii*'s ability to alter host behavior. Jan 2006

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Malaria

- Malaria is transmitted by female Anopheles.
- One of the most important parasitic diseases worldwide.
- Five species can cause malaria in humans: **Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, Plasmodium malariae and, recently discovered, Plasmodium knowlesi.**
- Can be associated with a wide range of neuropsychiatric symptoms.
- Occasionally frankly **psychotic behavior** can be the first manifestation of cerebral involvement during malarial infection.
- **Paranoid psychosis, mania, hallucinations, and delusions** were the commonest neuropsychiatric complications in some cases.

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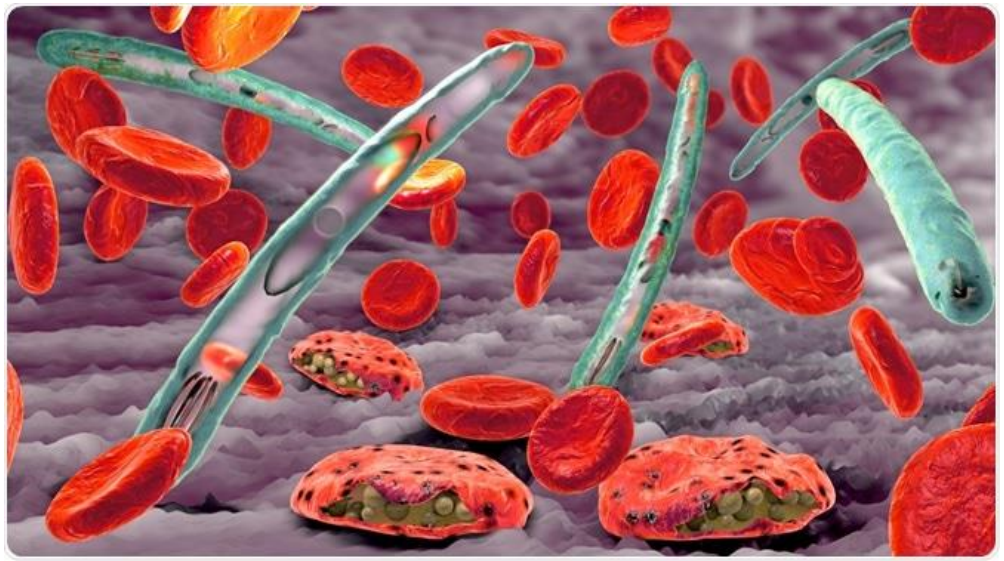
Malaria

- Other reported presentations include hemiplegia, cerebral palsy, rare cases of Gullain-Barre syndrome (GBS), peripheral neuropathy, isolated 6th nerve palsy, and foot drop have been reported, nystagmus, and sudden blindness due to vitreous hemorrhage.
- Neuropsychiatric impairments due to cerebral malaria in children include:
  - Long-term cognitive impairment.
  - Acquired language disorder, inattention, impulsiveness and hyperactivity
  - Conduct disorders
  - Impaired social development, and obsessive symptoms.
  - Self-injurious and destructive behaviors have also been observed.



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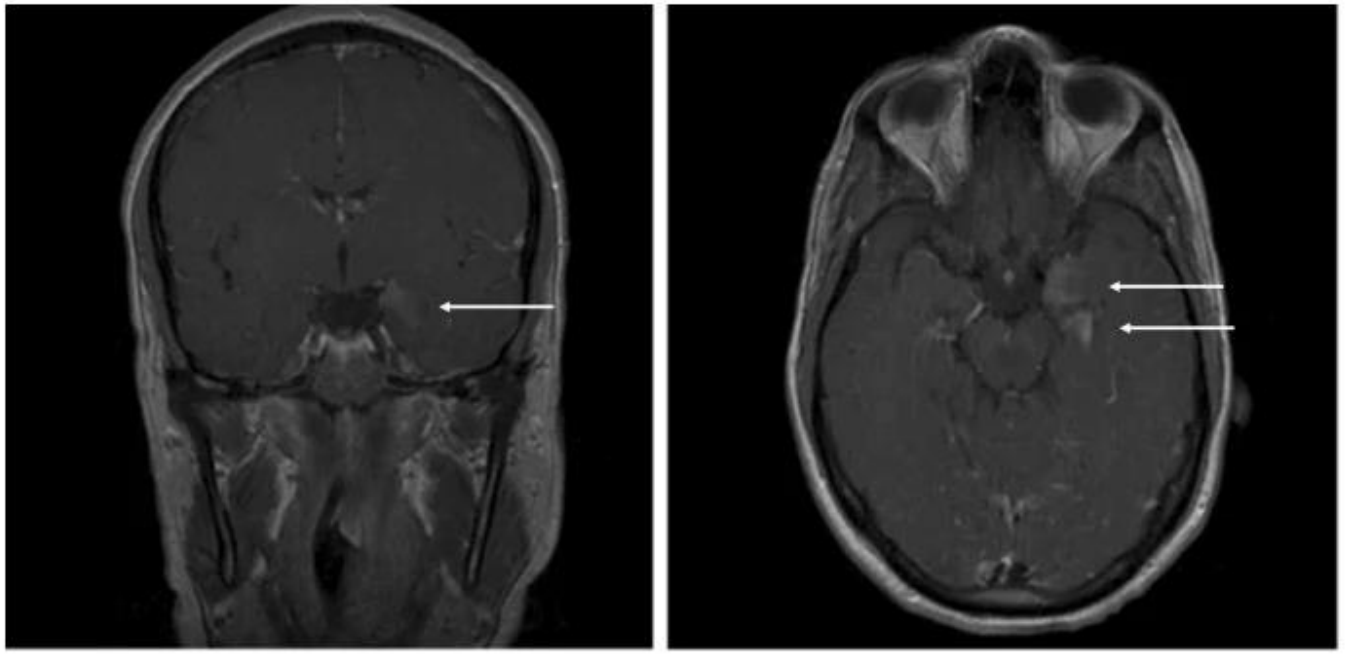
Post-Malaria Neurological Syndrome PMNS

- This syndrome occurs after symptomatic malarial infection & clearance of parasites from blood.
- Characterized by **development of neurological and psychiatric** symptoms that can occur **1 - 4 months after exposure.**
- Clinical manifestations include generalized convulsion, delayed cerebellar ataxia, psychosis, and tremors.
- The syndrome usually occurs in patients originally treated for severe malaria and is strongly correlated with **mefloquine treatment.**

Fig. 1



T1 gadolinium-enhanced MRI sequences at day 48 (case 2). Left limbic and hippocampal hypersignals are indicated with white arrows

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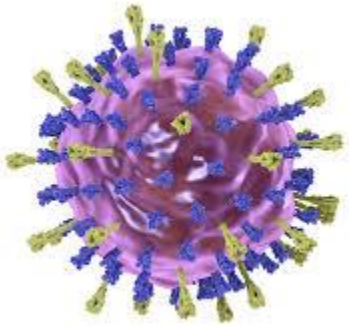
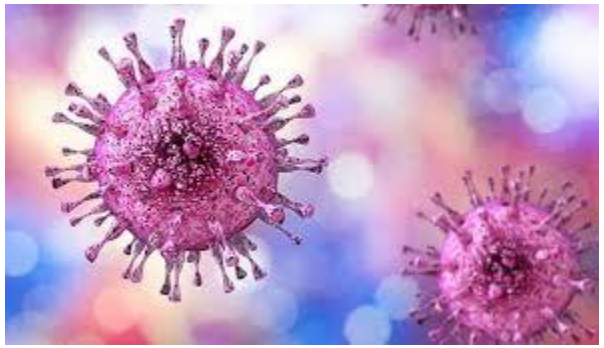
Viral Infections

- Viruses enter the CNS through several mechanisms.
- Replicate outside the CNS and then invade by hematogenous spread (e.g. enteroviruses).
- Viral particles pass directly across the blood-brain barrier, or through infected leukocytes (e.g. **mumps, measles or herpes viruses**), and then infect vascular endothelial cells.
- Other viruses invade through **peripheral** (e.g. polio) and **cranial nerves** (e.g. herpes simplex virus).
- Viruses may spread through the subarachnoid space leading to **meningitis**.
- They may also spread directly or via inflammatory leukocytes through neural tissue to neurons and glial cells.





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Viral Infections

- Most viruses that cause **encephalitis** can also cause **meningitis**.
- **Psychiatric symptoms are very common** in acute phase of viral encephalitis, and they are also common after recovery.
- Occasionally, **psychiatric symptoms without neurological** symptoms can be the initial presentation of viral encephalitis.
- Examples of Neuropsychiatric symptoms that can be associated with viral infections are summarized in next table.

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Neuropsychiatric Manifestations of Some Viral Infections

Viral infection	Causative organism	Clinical features	Neuropsychiatric manifestations	Diagnosis
Herpes simplex virus (HSV) infection	HSV-1 HSV-2	Herpetic stomatitis, herpes labialis, keratoconjunctivitis and encephalitis. Genital herpes, systemic infections in immunocompromised host.	Hypomania, personality changes, dysarthria, seizures, autonomic dysfunction, ataxia, delirium, and psychosis. Rarely; Kulver-Bucy syndrome	Detection of HSV DNA by polymerase chain reaction.
Epstein-Barr Virus infection	EBV (one of the herpes viruses)	Acute febrile illness known as infectious mononucleosis (glandular fever), headache, malaise, sore throat, cervical lymphadenopathy, slenomegaly, mild hepatitis.	Depression, chronic fatigue syndrome,	Atypical mononuclear cells in peripheral film. Positive Paul-Bunnel reaction detecting heterophile antibodies (IgM).
Cytomegalovirus infection	CMV (one of the herpes viruses)	Usually asymptomatic (>50% of the adult population has evidence for latent infection). Symptoms identical to infectious mononucleosis. Fever, hepatitis with or without jaundice, occasionally lymphocytosis with atypical lymphocytes.	Encephalitis in immunocompromised patients, depression, dementia.	Serological test: Latent (IgG) or primary (IgM) infection. Polymerase chain reaction. Direct immunofluorescence: characteristic intracellular "owl-eye" inclusions. Negative Paul-Bunnell test.
Measles	Paramyxoviruses	Incubation period: 8 - 14 days. Two distinct phases: The pre-eruptive and catarrhal stage, the eruptive or exanthematous stage.	Post infectious encephalomyelitis, subacute measles encephalitis, and subacutesclerosingpanencephalitis which occurs 7 - 10 years following measles (cognitive dysfunction, behavior change, headache, myoclonic jerks).	Most cases diagnosed clinically
Flaviviruses infections (a group of 60 viruses)	Dengue West Nile Virus	Incubation period is 5 - 6 days. Asymptomatic or mild infections are common. Can occur in two clinical forms: 1.calssic dengue fever, 2. Dengue haemorrhagic fever. Can be symptomless. Mild febrile illness. Severe symptoms may include meningitis and encephalitis.	encephalitis, delirium, confusion and seizures Difficulty with memory and word-finding, fatigue, extremity weakness, headache, personality changes, irritability and aggression.	Tissue culture in sera obtained the first few days of infection is diagnostic. ELISA, Complement-fixing antibodies. Leucopenia, thrombocytopenia.

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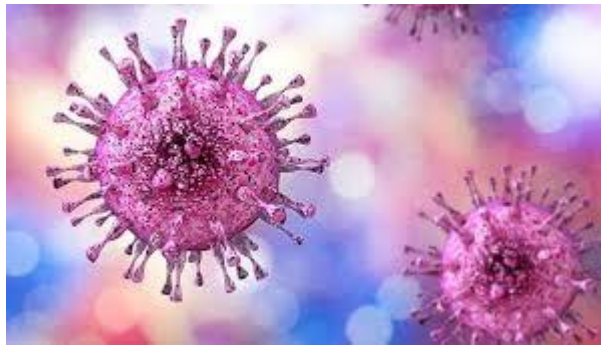
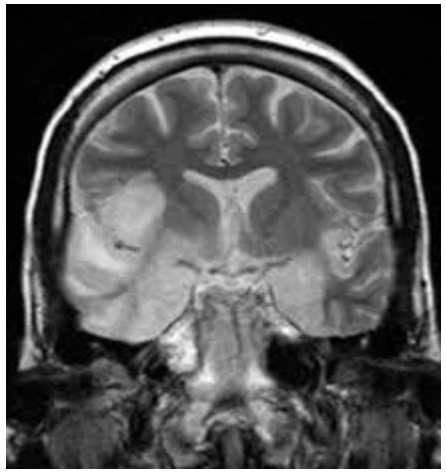
Herpes Simplex Virus (HSV) Virus Infection

- Herpes encephalitis usually caused by HSV-1.
- HSV-2 encephalitis mainly in neonates and immunocompromised adults.
- Clinical presentation: acute fever with various degrees of altered consciousness and behavioral abnormalities such as **hallucinations, personality changes, or a frankly psychotic state.**
- MRI: diffuse inflammation particularly in temporoparietal regions.
- Serological evidence of infection to HSV1 and cytomegalovirus (CMV) is associated with impaired cognitive functioning among patients with schizophrenia.
- Seropositivity to HSV-1, related to cognitive deficits and cerebral gray matter changes has been reported in adult schizophrenics.





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Human Immunodeficiency Virus (HIV)

- There is higher Incidence of HIV in patients with schizophrenia (4% - 23%) than in the general population.
- Psychiatric symptoms may occur as a consequence of HIV disease and vice versa.
- Patients with psychiatric illness have increased risk of contracting HIV infection and that can primarily be due to **risky behaviors such as hypersexuality, poor impulse control, self-destructive behavior, casual sexual relationships**, lack of risk awareness, impaired judgment, **substance abuse, and the potential for sexual victimization.**

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Human Immunodeficiency Virus (HIV)

- Causes of psychotic symptoms in HIV-seropositive patients include:
  - Delirium
  - Late-stage HIV-associated dementia,
  - Mania, psychoactive substance intoxication,
  - Antiretroviral medication toxicities (e.g., efavirenz)
  - General medical conditions (e.g., cryptococcal meningitis and neurosyphilis).
- Generalized anxiety disorder occurs in **15.8%** of HIV-seropositive persons compared with **2.1%** of the general population.
- Panic disorder occurs in **10.5%** of HIV-seropositive persons versus **2.5%** of the general population.
- Depressive disorders tend to occur following the first symptoms of HIV infection or in association with a high overall symptom burden.

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Some additional diseases of concern

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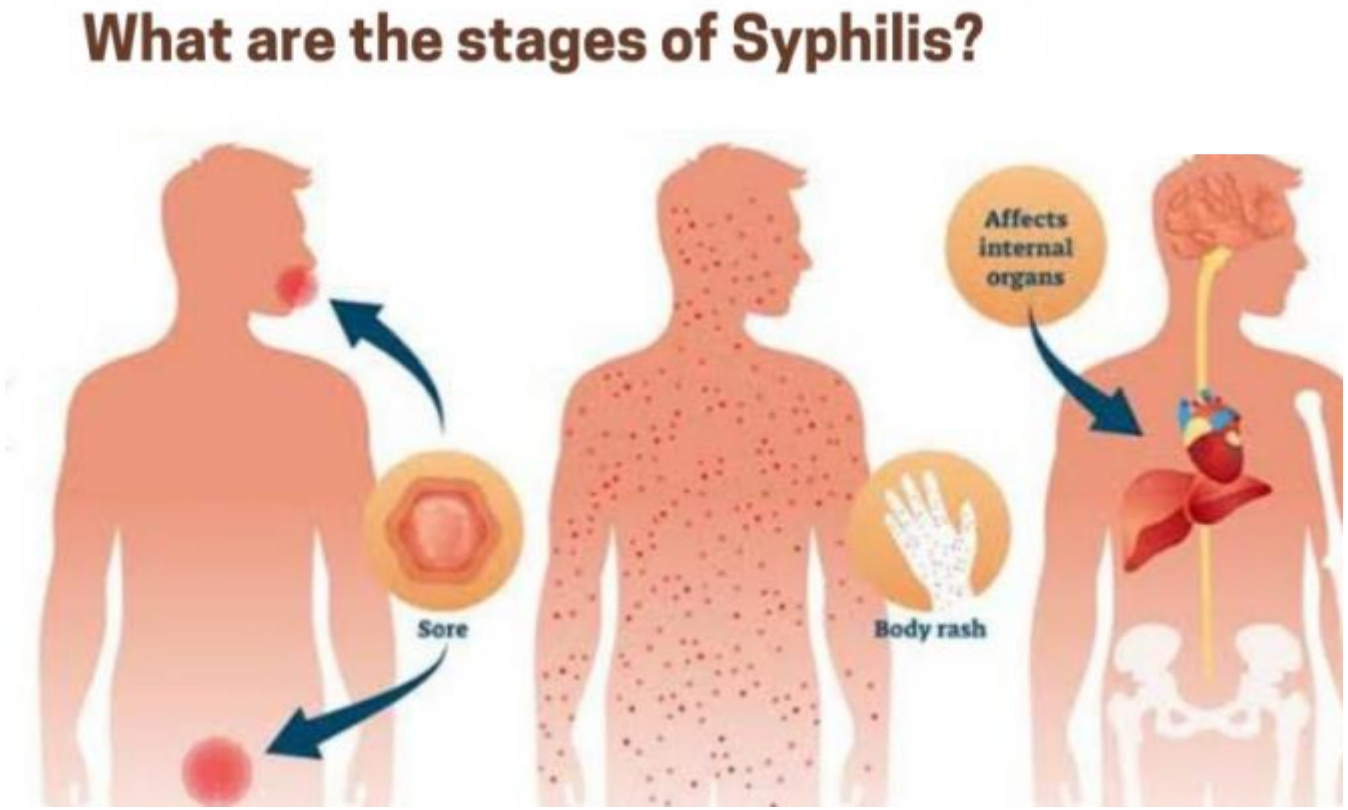
Syphilis

- Syphilis is a common sexually transmitted infection (STI) that can cause serious health problems without treatment.
- It can be cured with treatment.

Syphilis

- Infection develops in stages
- Four stages:
  - Primary
  - Secondary
  - Latent
  - Tertiary
- Each stage of syphilis has different signs and symptoms.



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Primary stage

- Presents with a localized painless single sore or multiple sores typically on the genitals, but can appear anywhere it entered body.
- The sore usually lasts 3 to 6 weeks and heals regardless of whether you receive treatment.
- Even after the sore goes away, you must still receive treatment.
- This will stop your infection from moving to the secondary stage.

Secondary stage

- Characterized by a disseminated disease with constitutional symptoms, maculopapular rash, condylomata lata (smooth, painless, wart-like white lesions on genitals), and lymphadenopathy.
- The rash can be on the palms of your hands and/or the bottoms of your feet
- The symptoms from this stage will go away whether you receive treatment.
- Without the right treatment, the infection will move to the latent and possibly tertiary stages .

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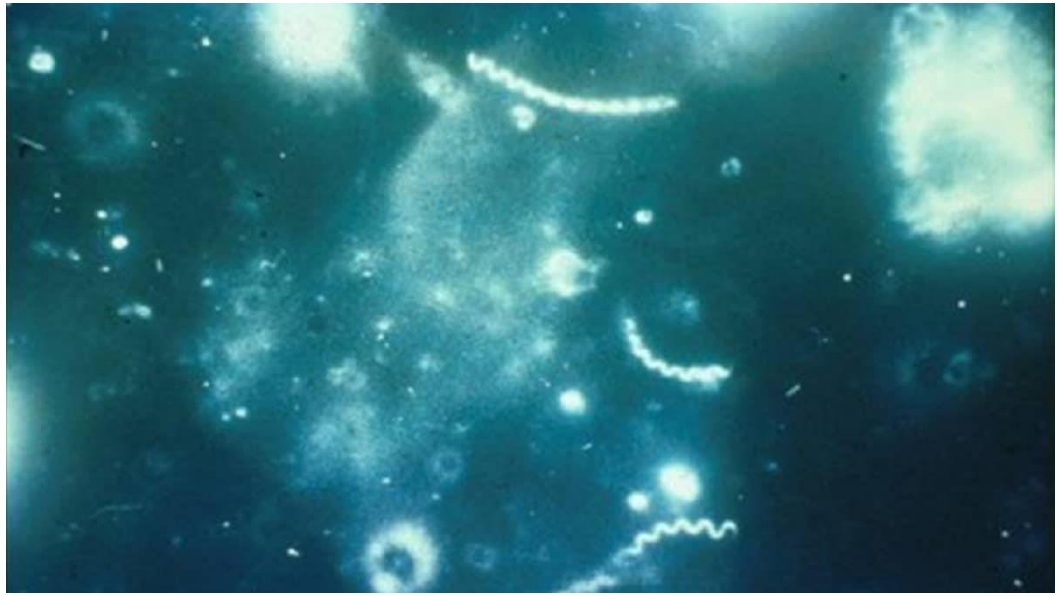
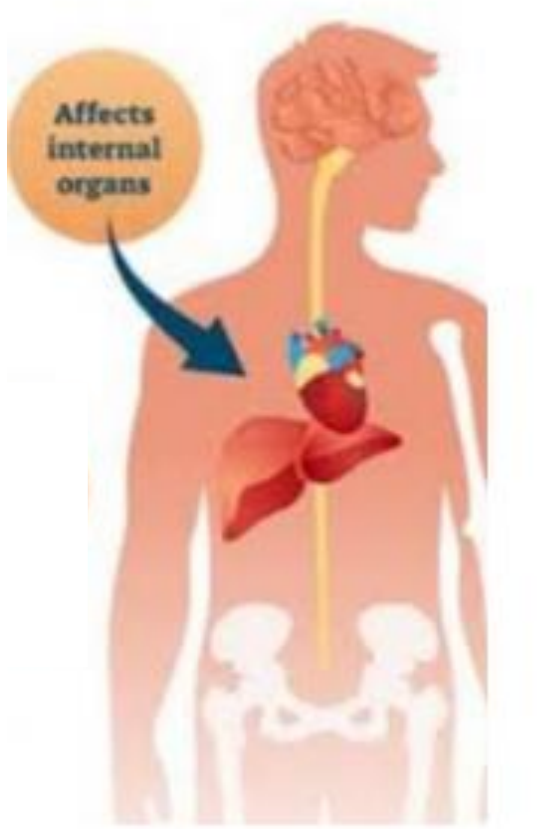
Latent stage

- The first two stages are followed by a latent, asymptomatic phase that can either resolve or progress to the tertiary stage leading to multi-organ dysfunction and central nervous system abnormalities.



Tertiary stage

- Most people with untreated syphilis do not develop tertiary syphilis. However, when it does happen, it can affect many different organ systems. These include the heart and blood vessels, and the brain and nervous system.
- Tertiary syphilis is serious and would occur 10–30 years after your infection began.



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Neurosyphilis, ocular syphilis, and otosyphilis

- This can happen during any of the stages described above.
- Signs and symptoms of neurosyphilis can include
  - Severe headache
  - Muscle weakness and/or trouble with muscle movements
  - Changes to your mental state (trouble focusing, confusion, personality change) and/or dementia (problems with memory, thinking, and/or decision making).
- Signs and symptoms of ocular syphilis can include
  - Eye pain and/or redness
  - Changes in your vision or even blindness
- Signs and symptoms of otosyphilis may include
  - Hearing loss
  - Ringing, buzzing, roaring, or hissing in the ears ("tinnitus")
  - Dizziness or vertigo (feeling like you or your surroundings are moving or spinning

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Neurosyphilis

- Neurosyphilis is a result of invasion of the central nervous system by *Treponema pallidum,* **which can occur at any stage of syphilis.**
- Neurosyphilis occurs **in up to 30% of people** with untreated syphilis and may occur at any stage of the infection
- Early neurologic clinical manifestations (e.g., **cranial nerve dysfunction, meningitis, stroke, and altered mental status**) are usually present within the first few months or years of infection.
- Late neurologic manifestations (e.g., **tabes dorsalis and general paresis**) occur 10–30 years after infection but can occur earlier in people who are immunocompromised.

Neurosyphilis

- **Neuropsychiatric** manifestations of syphilis are rare, due to the widespread use of penicillin and its efficacy in treating the disease.
- Patients often present in an early stage of syphilis, and **only 10%-15%** of cases progress to tertiary syphilis.
- Of these cases, **< 20% present with psychiatric symptoms,** which can include **paranoia, behavioral changes, hallucinations, mania, and cognitive impairment**
- Psychosis as the initial presentation of syphilis is exceedingly rare and has only been reported in a handful of cases.

Neurosyphilis

- Parenchymal Neurosyphilis is the most common presentation among symptomatic cases, presenting with clinical psychiatric picture, including **dementia, depression, rage, psychosis, and cognitive impairment**
- Late neurosyphilis tends to affect the brain and spinal cord, typically presenting as tabes dorsalis, general paresis, sensory ataxia, or bowel/bladder dysfunction
- The frequency of **psychiatric signs and symptoms** associated with neurosyphilis reported in literature ranges from **33% to 86%**
- The most common presenting neuropsychological symptoms comprise personality change and hallucinations **(in 48% of patients**).

Several recent studies have described cases with these symptoms as the principal signs of Neurosyphilis

Atypical behavioral and psychiatric symptoms: Neurosyphilis should always be considered

Lucas Lonardoni Crozatti,[a] Marcelo Houat de Brito,[a] Beatriz Noele Azevedo Lopes,[a] and Fernando Peixoto Ferraz de Campos[b]

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Abstract

Go to:

Syphilis still remains a major health concern worldwide because of the possibility of serious medica and psychological consequences, long-term disability, and death. Neurosyphilis (NS) may occur at any stage of infection. Its clinical presentation has been changing over recent years including psychiatric and neurocognitive symptoms. Several recent studies have described cases with these symptoms as the principal signs of NS. We present the case of neurosyphilis with a psychiatric presentation characterized by mood disturbance and auditory and visual hallucinations.

Neurosyphilis-Induced Psychosis: A Unique Presentation of Syphilis With a Primary Psychiatric Manifestation

Monitoring Editor: Alexander Muacevic and John R Adler

Zaid Taki El-Din,[1] Humzah Iqbal,[2] and Anil Sharma[3]

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Abstract

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Syphilis is a predominantly sexually transmitted infection caused by the spirochete Treponema pallidum. The infection presents with four different stages and although rare, can lead to behavioral symptoms if not treated in its earliest form. It can cause psychosis, mania, depression, anxiety, and personality changes. Screening and early treatment of syphilis are essential in preventing neurosyphilis and its neuropsychiatric symptoms. Neurosyphilis is rarely the initial presentation of syphilis. This is a case report of a 30-year-old female with neurosyphilis who presented with psychosis as the primary presentation.

Neurosyphilis: Neuropsychiatric aspects

- A study showed that:
  - 52 of the 169 patients presented psychiatric manifestations, and many of those patients had characteristics of more than one syndrome, including cognitive impairment, personality disorders, delirium, hostility, dysarthria, confusion, disruption of their sleep–wake cycle, fecal and urinary incontinence, dysphoria, paranoia, hallucinations, expansive mood, and mania.
  - These results indicate that NS mimics almost all psychiatric disorders.
- Another study reported:
  - 3 cases of NS where the treatment was delayed because of the non-specific neurocognitive presentation.
  - The patients presented hyperactivity, sleep disturbances, delusions of grandiosity, seizures, cognitive function impairment, memory alteration, lower-limb weakness and numbness, dysarthria with stuttering speech, and an inability to perform routine activities.

Regular Articles

Full A

Psychiatric Manifestations as Primary Symptom of Neurosyphilis Among HIV-Negative Patients

Li-Rong Lin, M.Med., Hui-Lin Zhang, M.Med., Song-Jie Huang, M.Med., Yan-Li Zeng, M.Med., Ya Xi, M.Med., Xiao-Jing Guo, M.Med., Gui-Li Liu, M.Med., Man-Li Tong, M.Med., Wei-Hong Zheng, M.Med., Li-Li Liu, M.Med., and Tian-Ci Yang, Ph.D.

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Practice

Neurocognitive and psychiatric changes as the initial presentation of neurosyphilis

Cecilia T. Costiniuk and Paul A. MacPherson

CMAJ April 02, 2013 185 (6) 499-503; DOI: https://doi.org/10.1503/cmaj.121146

Infectious Disease Connect

Cysticercosis

- Disease associated with the development of the larval form (cysticercus) of the pork tapeworm, *Taenia solium*, within an intermediate host.
- Cysticercosis is only acquired from the fecal-oral route (ingestion of eggs), **not** via the ingestion of cysticerci in undercooked pork,

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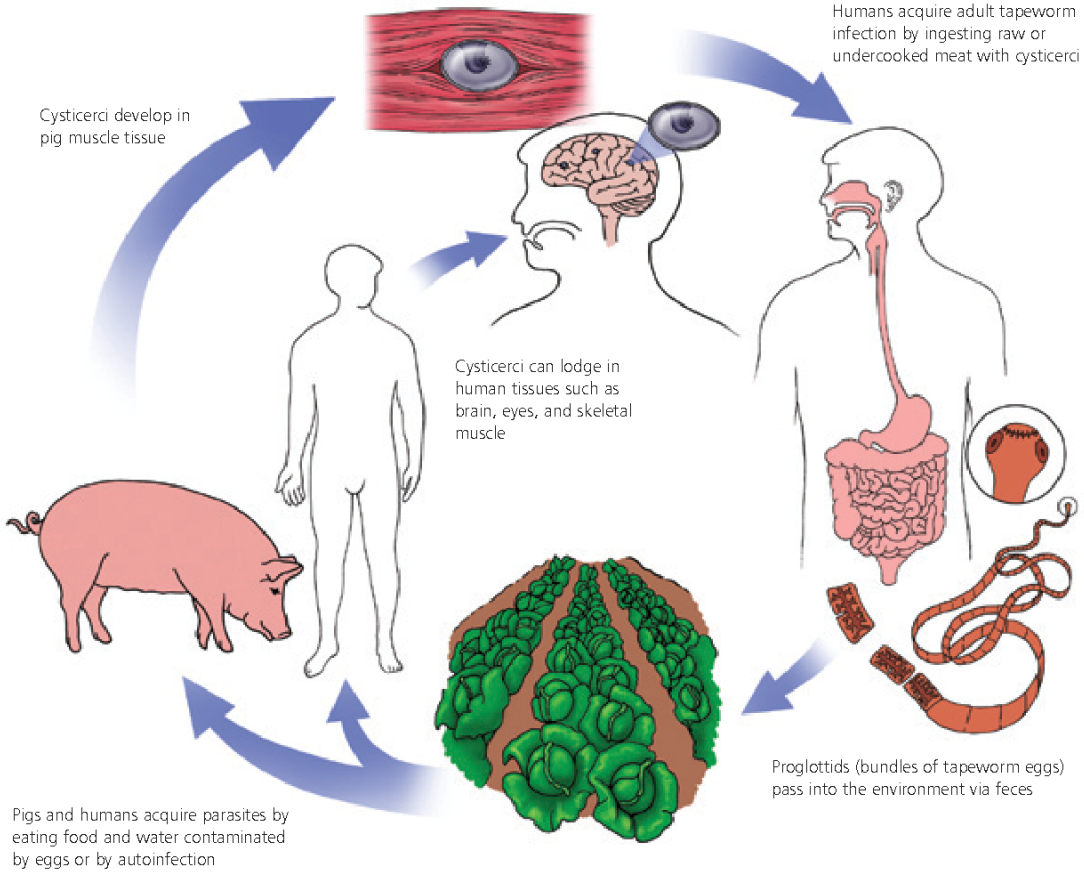
Cysticercosis

- *Taenia solium* is found nearly worldwide.
- Because pigs are intermediate hosts of the parasite, completion of the life cycle occurs in regions where humans live in close contact with pigs and eat undercooked pork.
- Poor sanitation leading to environmental fecal contamination is a major factor in transmission.
- Human cysticercosis is acquired by ingesting *T. solium* eggs shed in the feces of a human



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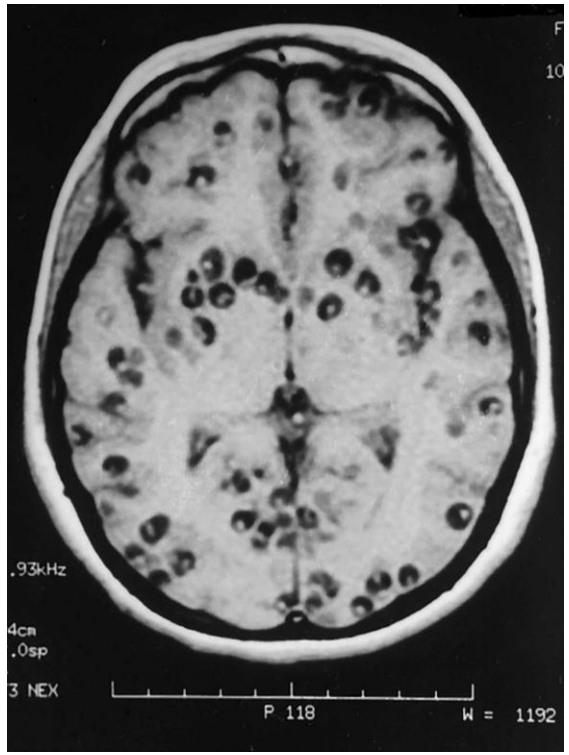
Neurocysticercosis: Clinical Presentation

- The symptoms vary depending upon the location and number of cysticerci (small fluid filled sacs of tapeworm) .
- Cysticerci can migrate to the central nervous system which is associated with serious neurological and epileptic manifestations. Death can occur suddenly.
- **Intraparenchymal** neurocysticercosis is mostly associated with seizures; **extraparenchymal** neurocysticercosis can cause mass effects and hydrocephalus, and has a poor prognosis



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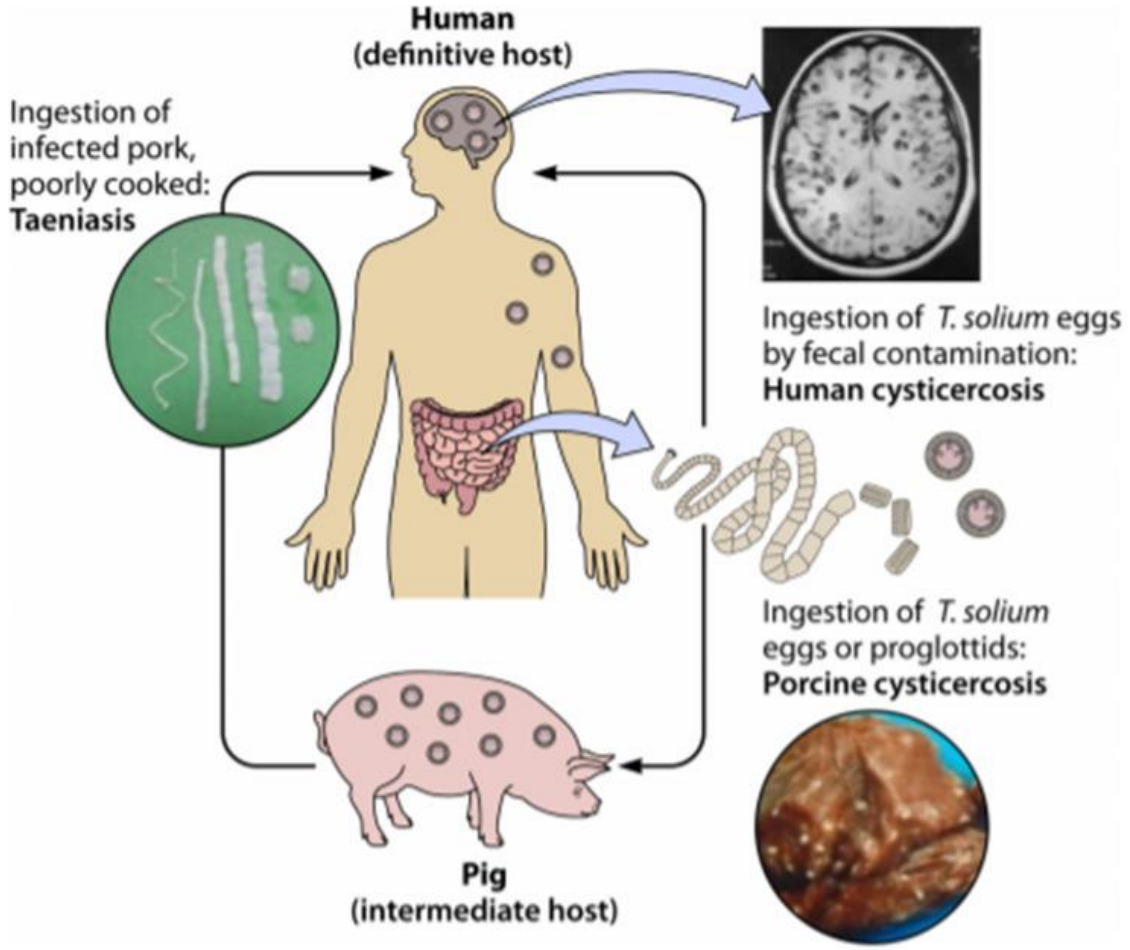
Neurocysticercosis

- It is the most common type of neuroparasitosis.
- As neurocysticercosis is prevalent in developing countries, the growing number of migrants and travelers increases prevalence in developed countries as well.
- In addition to neurological issues, **It can result in complex physiological and psychological syndromes.**



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Neurocysticercosis

- Very few publications, mostly anecdotal accounts from South America or brief explanations of clinical cases in neurological research, have considered neurocysticercosis's psychiatric symptoms.

- Along with neurobehavioral disorders associated with neurological and neurosurgical problems, the symptoms mimic different psychiatric disorders **in up to 15%** of patients with neurocysticercosis.

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PMCID: PMC8164720
PMID: 34079258

Psychiatric Disorders of Neurocysticercosis: Narrative Review

Asmaa M El-Kady,[1] Khaled S Allemailem,[2] Ahmad Almatroudi,[2] Birgit Abler,[3] and Mohamed Elsayed[3]

Abstract

Go to: ▸

Neurocysticercosis, the most common type of neuroparasitosis, is a condition in which the central nervous system (CNS) is infested with the pork tapeworm *Taenia solium* cysticercosis' larvae. Neurocysticercosis is the most widespread parasitic CNS disease worldwide, affecting more than 50 million individuals. As neurocysticercosis is prevalent in developing countries, the growing number of migrants and travelers increases prevalence in developed countries. Possible neuropsychiatric manifestations are depression, cognitive dysfunction, dementia, and visual hallucinations. Depending on the cysts' location in the CNS, focal neurology or psychiatric symptoms manifest. The diagnosis of neurocysticercosis is based on neuroimaging and serology. The correlation between specific symptoms and the cyst's location might help better understand psychiatric disorders' pathophysiology. Nonetheless, the exact prevalence of neurocysticercosis is seldom reported in patients with psychiatric disorders, which may be due to the lack of imaging availability in developing countries with a high prevalence.

Journal Article

Journal Article

Box 1

An Overview of Psychiatric Manifestations in Neurocysticercosis

Psychiatric Disorders in Association with Neurocysticercosis
1-Cognitive dysfunction
2- Depression/Mixed anxiety depression
3- Dementia
4-Psychosis
5-Personality changes

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Take Home Message

- Psychiatric symptoms can occur as part of the clinical manifestations of several systemic and CNS infections.
- On the other hand, psychological stress can affect the function of the immune system and predict infectious diseases susceptibility.
- Early identification of the underlying etiology for organic/secondary psychiatric symptoms is essential for appropriate intervention and early treatment of the primary condition that could be the etiology of psychiatric symptoms so as to
  - Avoid unnecessary long-term psychiatric treatment
  - And to avoid complications of possible misdiagnosis or delayed diagnosis of the primary condition.

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Thank you

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Questions?

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