

# Infection Associated Chronic Neuropsychiatric Impairments



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# Disease Models

## Most current disease models

Acute infection  
Acute toxic exposure  
Genetic defect  
Trauma  
Cancer  
Degenerative disease

Fairly well understood  
pathophysiology

Well-defined diagnostic  
signs and symptoms

## Model for complex disease with multiple variables

Complex and multiple  
contributors: genetic  
and environmental  
(e.g., infections,  
toxins and deficiencies)

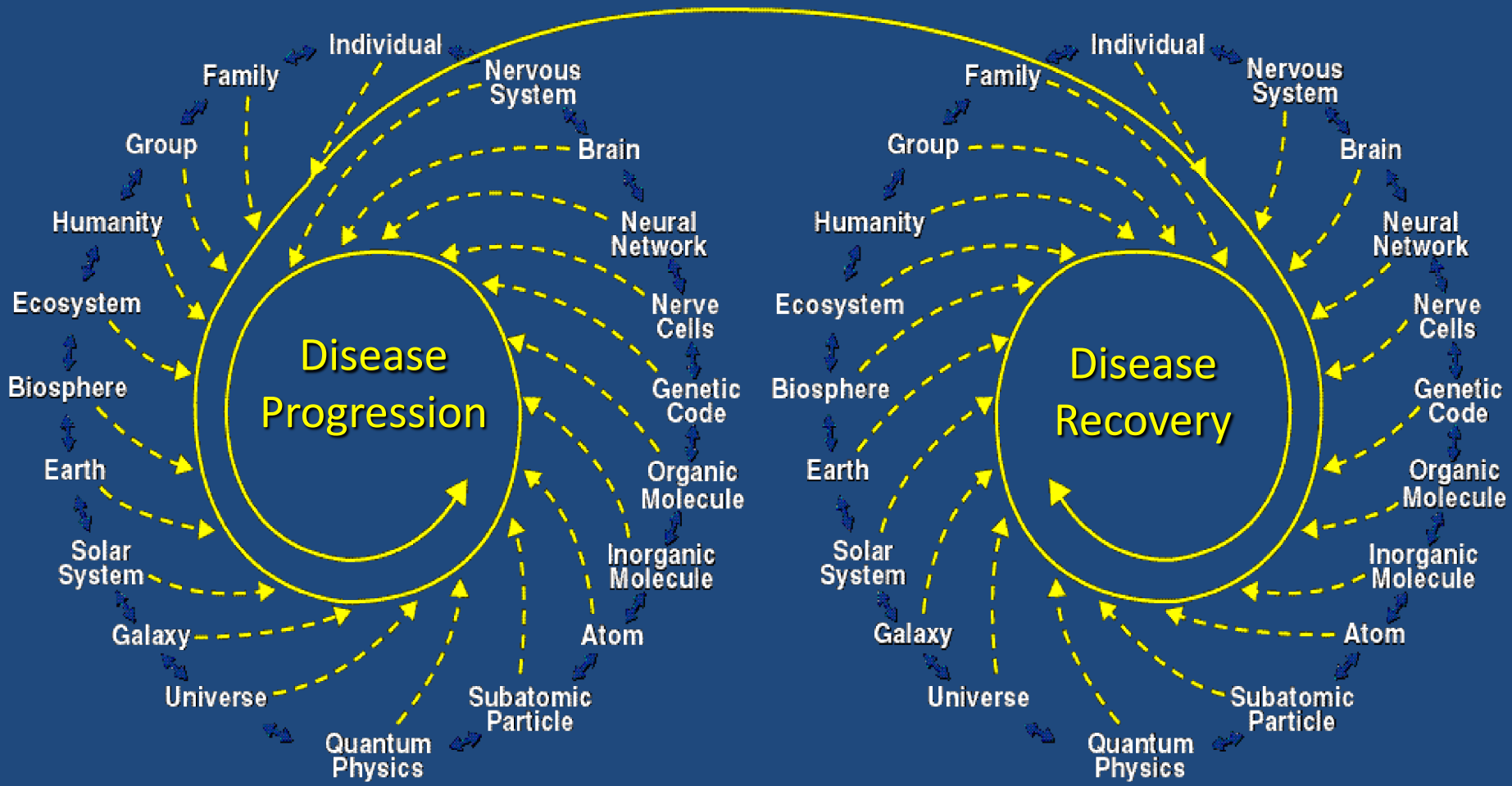
Complex and multiple  
pathophysiological processes

Complex and  
multiple clinical  
presentation with  
multiple signs  
and symptoms

# Disease Progression



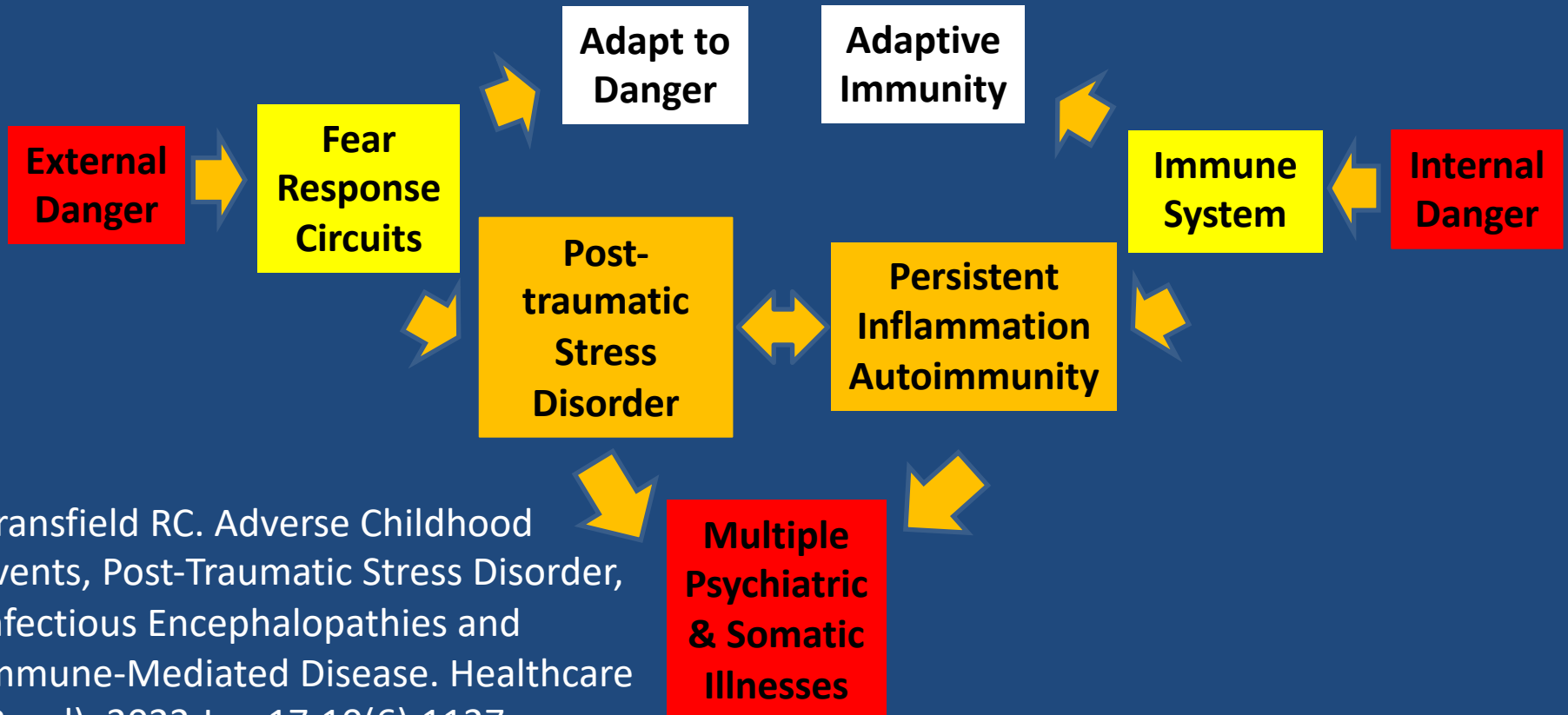
# Multi-Systemic Disease Model



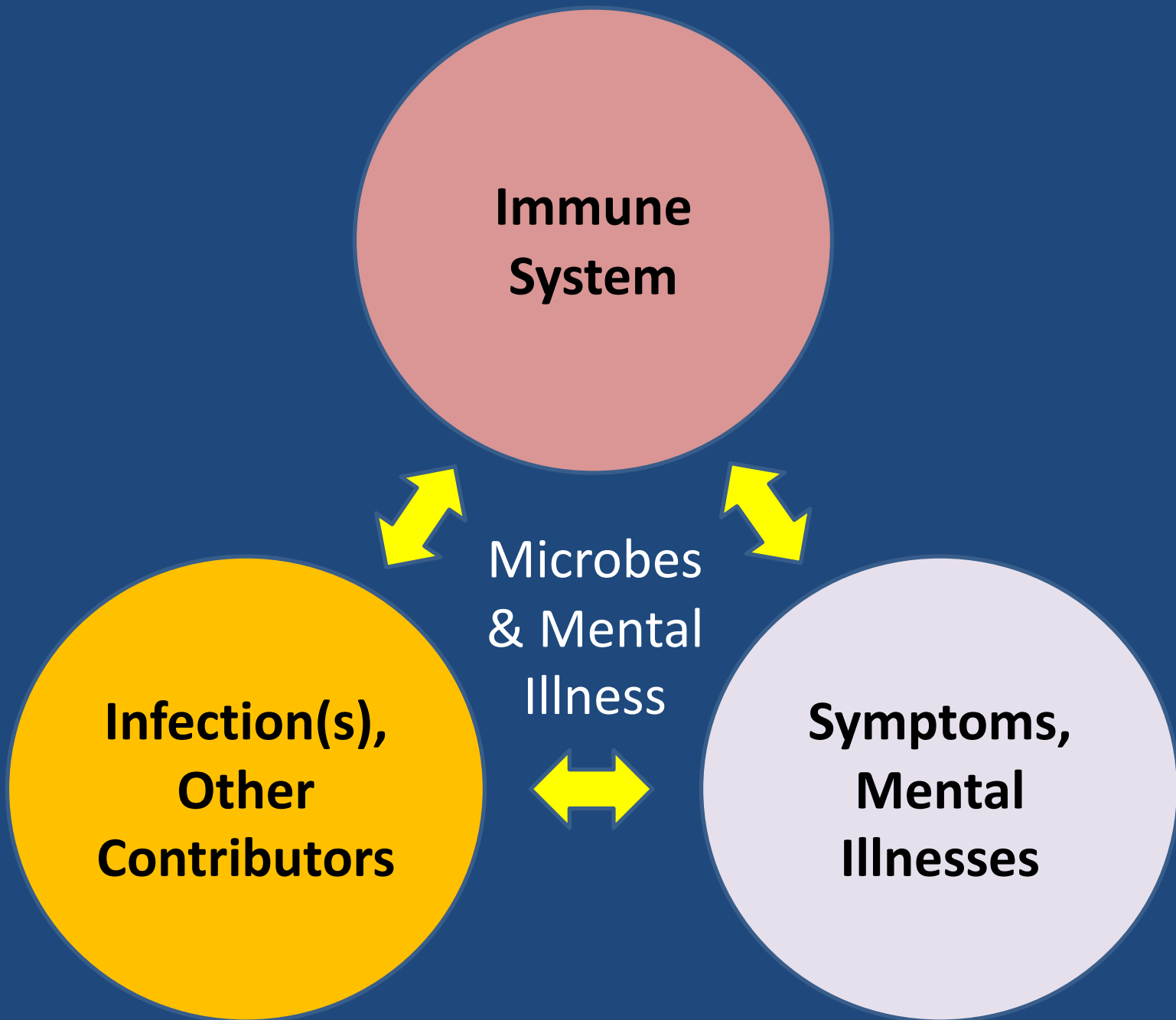


# Adaptive vs Maladaptive Response to Danger

- Danger response is adaptive or maladaptive



Bransfield RC. Adverse Childhood Events, Post-Traumatic Stress Disorder, Infectious Encephalopathies and Immune-Mediated Disease. Healthcare (Basel). 2022 Jun 17;10(6):1127.



# Are Mood and Anxiety Disorders Inflammatory Diseases?

- Studies demonstrate increases in inflammatory markers in:
  - Sleep deprivation: IL-6 [1]
  - Stress: IL-1 beta, TNF-alpha, IL-6 [2]
  - PTSD: IL-1 beta, IL-6, TNF-alpha [3]
  - Depression: IL-6, CRP, IL-1, TNF-alpha [3]
  - Bipolar: IL-6, TNF-alpha, CRP, sIL-2R, sIL-6R [3]
  - Schizophrenia: IL-6, IL-1 beta [4]
  - Autism: IL-6, autoimmune mechanisms [5]
  - Alzheimer's: IL-6, TNF-, IL-1, TGF-, IL-12 and IL-18 [6]

[1] M. Haack, E. Sanchez, J. Broussard, M. Regan, J. Mullington. *J Pain*. 2004;5(3)

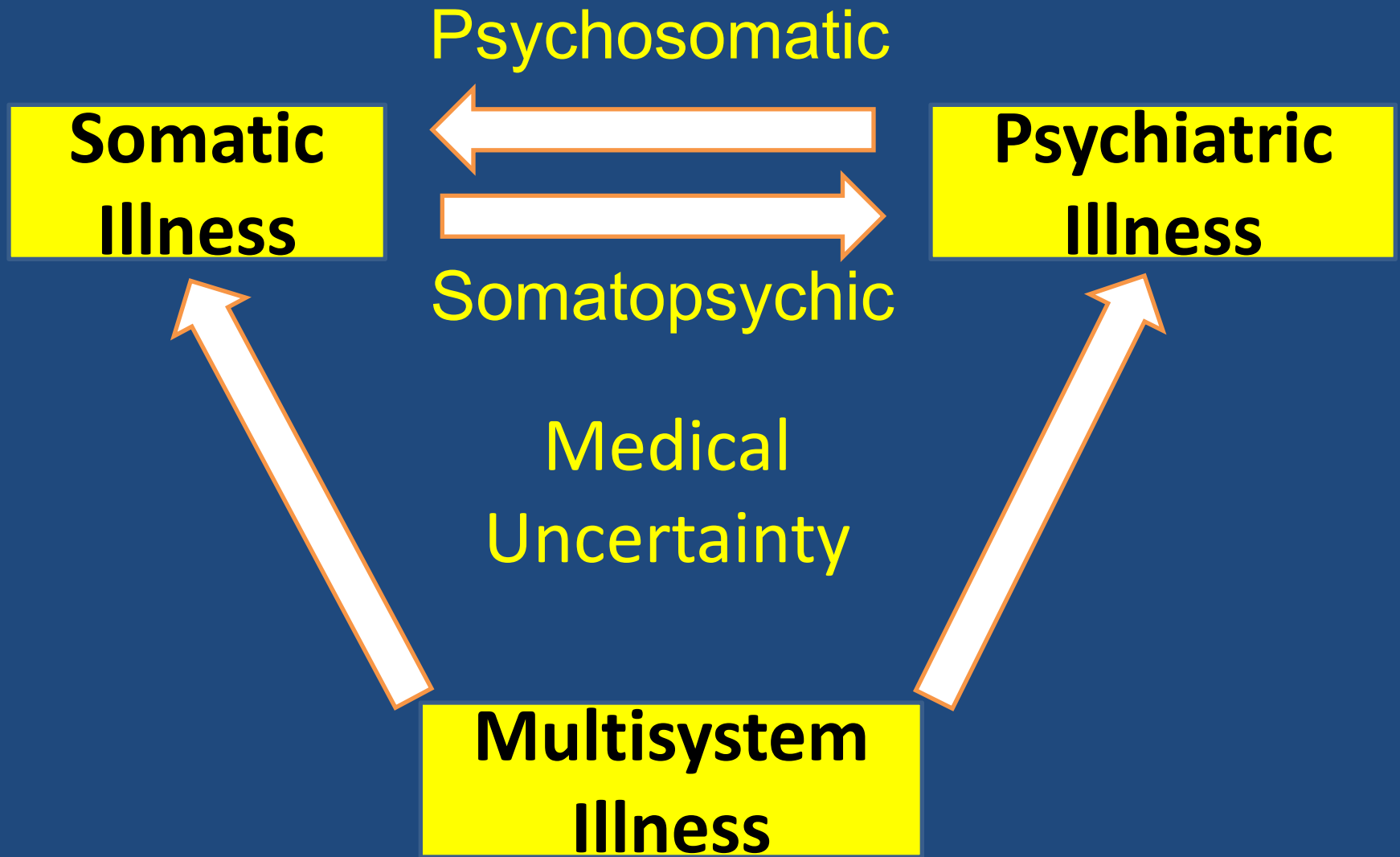
[2] Raison et al, *Arch Gen Psychiatry*. 2010;67(12):1211-1224.

[3] Boorman E et al. *Psychiatric Annals*. 2015;45(5):240-248.

[4] Schwieler L, et al. *J Psychiatry Neurosci*. 2015 Mar;40(2):126-33

[5] Bransfield R. *Pediatric Health*. 3(2):125-140. (2009)

[6] Swardfager W, et al. *BIOL PSYCHIATRY* 2010.



Bransfield RC, Friedman KJ. Healthcare (Basel). Differentiating Somatopsychic, Psychosomatic, Multisystem Illness and Medical Uncertainty 2019, 8;7(4).

# Serious Mental Illness Is a Multisystem Illness with Cardiometabolic Symptoms

- Najar, H., Karanti, A., Pålsson, E. *et al.* Cardiometabolic risk indicators in individuals with bipolar disorders: a replication study. *Diabetol Metab Syndr* **15**, 69 (2023).
- Bressington, D., Mui, J., Tse, M.L. *et al.* Cardiometabolic health, prescribed antipsychotics and health-related quality of life in people with schizophrenia-spectrum disorders: a cross-sectional study. *BMC Psychiatry* **16**, 411 (2016).
- Dhanasekara CS, Ancona D, Cortes L, et al. Association Between Autism Spectrum Disorders and Cardiometabolic Diseases: A Systematic Review and Meta-analysis. *JAMA Pediatr.* 2023;177(3):248–257.
- Huang YH, Wu SI, Lee MJ, et al. Excess Mortality in Individuals with Autism Spectrum Disorder: A Population-Based Cohort Study. *Neuropsychiatr Dis Treat.* 2024;20:247-255
- Bilder D, Botts EL, Smith KR, et al. Excess mortality and causes of death in autism spectrum disorders: a follow up of the 1980s Utah/UCLA autism epidemiologic study. *J Autism Dev Disord.* 2013 May;43(5):1196-204.

# Neuropsychiatric Consequences of Infectious Diseases

- Impairments can harm:
  - Cognitive functioning
  - Vegetative functioning (sleep, eating, sex, energy)
  - Emotional functioning
  - Electrical activity (seizures)
  - Cranial nerves
  - Headaches
  - Autonomic nervous system
  - Spinal cord
  - Nerve roots (radiculopathy)
  - Peripheral nerves (sensory and motor)

# Microbes and Mental Illness: Past, Present and Future

*Aspergillus*, *Babesia*, *Bartonella*, Borna disease virus, *Borrelia burgdorferi* (Lyme disease) and other tick-borne infections, *Candida*, *Chlamydia*, coronaviruses (e.g. SARS-CoV-2), *Cryptococcus neoformans*, cytomegalovirus, Epstein-Barr virus, hepatitis C, herpes simplex virus, human endogenous retroviruses, HIV, human herpesvirus-6 (HHV-6), human T-cell lymphotropic virus type 1, influenza viruses, measles virus, *Mycoplasma*, *Plasmodium*, rubella virus, Group A *Streptococcus* (PANDAS), *Taenia solium*, *Toxoplasma gondii*, *Treponema pallidum*, *Trypanosoma*, and West Nile virus.

Autism  
Schizophrenia  
Bipolar Illness  
Depression

Anxiety  
Suicidal  
Aggressiveness,  
etc.

# Infectious Agents with Potential Psychiatric Manifestations

- **Spirochetes:**
- *Borrelia burgdorferi* sensu lato, genus *Borrelia*
  - *Borrelia burgdorferi* sensu stricto (Lyme disease in USA, Europe)
  - *Borrelia afzelii* (Lyme disease mostly in Europe, Asia)
  - *Borrelia garinii* (Lyme disease mostly in Europe, Asia)
- *Relapsing Fever Group* (also known as relapsing fever group *Borrelia*)
- *Leptospira* species (leptospirosis)
- *Treponema pallidum* (syphilis)
- **Other bacteria:**
- *Actinomyces*
- *Bartonella henselae*, and other species (cat scratch disease, bartonellosis)
- *Brucella* species (brucellosis)
- *Chlamydia* species
- *Coxiella burnetii* (Q-Fever and "Post-Q Fever Fatigue Syndrome")
- *Ehrlichia chaffeensis* (human monocytic ehrlichiosis)
- *Helicobacter pylori*
- *Mycoplasma pneumoniae* and other species
- *Rickettsia* species (spotted fever, scrub typhus, African tick bite fever)
- *Streptococcus pyogenes* (group A beta hemolytic strep, PANDAS, Sydenham's Chorea, St Vitus Dance)
- *Tropheryma whipplei* (Whipple's disease)

# Infectious Agents with Potential Psychiatric Manifestations II

- **Viruses:**
  - Borna virus
  - Chikungunya virus
  - Coronaviruses (other than SARS-CoV-2)
  - Enterovirus
  - Cytomegalovirus
  - Ebola virus
  - Epstein-Barr virus
  - Tick-borne encephalitis virus
  - Hepatitis C virus
  - Human endogenous retroviruses
  - Human immunodeficiency virus
  - Human T-Cell lymphotropic virus type 1
  - Influenza virus
  - Measles virus
  - Parvovirus B19
  - Poliovirus
  - Rubella
  - SARS-COV-2 coronavirus
  - West Nile virus
- **Parasites**
  - *Plasmodium* species (Malaria)
  - *Babesia* species (*B. microti*, *B. duncani*, other *Babesia* species [Babesiosis])
  - *Filaria* (filariasis)
  - *Leishmania* species (Leishmaniasis)
  - *Toxoplasma gondii* (Toxoplasmosis)
  - *Taenia solium* (Neurocysticercosis or Cysticercosis)
  - *Trypanosoma* sp. (Trypanosomiasis)
- **Fungal**
  - *Aspergillus* species
  - *Candida*
  - *Cryptococcus neoformans* (Cryptococcosis)

Bransfield R, Mao C, Greenberg R. Microbes and Mental Illness: Past, Present and Future. Healthcare. 2023,12(1):83.

# Examples of Microbes Associated with Mental Illness

- Five infectious diseases described as examples of microbes associated with mental illness include **syphilis** (a sexually transmitted disease); **toxoplasmosis** (a zoonotic parasitic disease caused by *Toxoplasma gondii*); **COVID-19** (a viral disease); **Lyme borreliosis and associated diseases** (zoonotic vector-borne disease); and **Group A Beta Hemolytic Streptococcal** infections, **PANDAS/PANS**, (an autoimmune disease following infection).

# Potential or Postulated Association of Autism with Infectious Agents

- *Babesia*
- *Bartonella*
- Borna virus (mostly animal models)
- *Borrelia burgdorferi* and other tick-borne diseases
- *Chlamydia pneumoniae*
- Cytomegalovirus
- Enterovirus
- Fungi (*Aspergillus*, *Candida*)
- Herpes simplex virus
- Herpes simplex virus-6
- Infections early in childhood
- Intestinal microbiome composition changes
- Maternal infections or immune activation during pregnancy
- *Mycoplasma*: (*M. fermentans*, *M. genitalium*, *M. hominis*, *M. pneumoniae*)
- Measles virus
- *Plasmodium* (malaria)
- *Rubella*
- *Toxoplasma gondii* (Toxoplasmosis)
- Varicella zoster virus
- Viral infectious

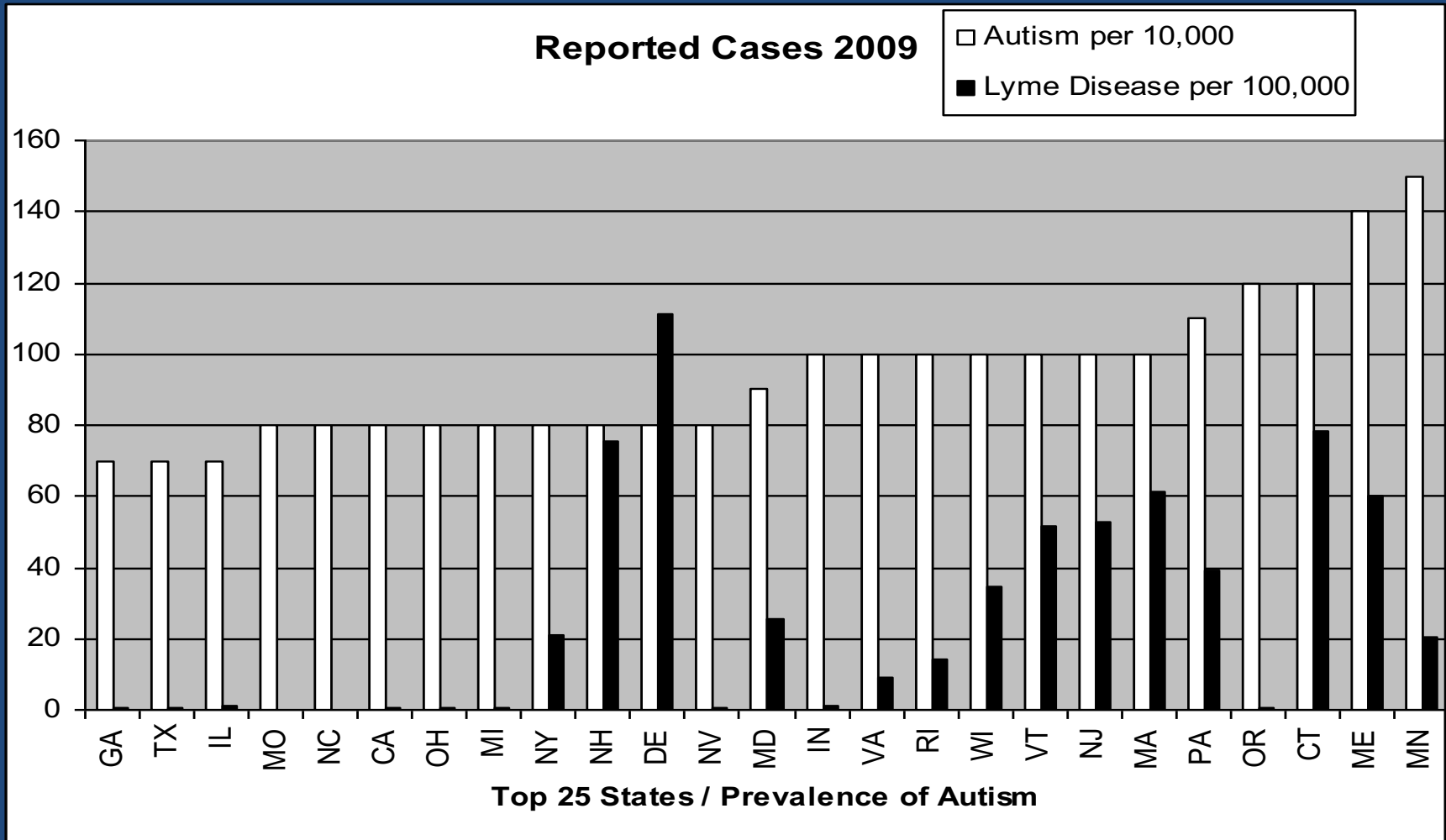
# Articles on Tick-Borne Disease and Autism Spectrum Disorders I

- Bransfield RC, Fallon BA, Raxlen B, Shepler L, Sherr VT. A Modest Proposal, *Psychiatric News*, 31(18):16 (1998)
- Nicolson GL, Gan R, Nicolson NL, Haier J. Evidence for *Mycoplasma*, *Chlamydia pneumoniae* and HHV-6 Co-infections in the blood of patients with Autism Spectrum Disorders. *J Neuroscience Res*. 2007;85:1143-1148.
- Bransfield RC, Wulfman JS, Harvey WT, Usman AI. The association between tick-borne infections, Lyme borreliosis and autism spectrum disorders *Medical Hypotheses*. 70(5):967-974 (2008)
- Nicholson G. Chronic Bacterial and Viral Infections in Neurodegenerative and Neurobehavioral Diseases *Laboratory Medicine*. 39(5)291-9 (2008)
- Vojdani A. Antibodies as predictors of complex autoimmune diseases and cancer. *Int J Immunopathol Pharmacol*. 21(3):553-66 (2008) Erratum in: *Int J Immunopathol Pharmacol*. 21(4):following 1051 (2008)
- Bransfield RC. Preventable cases of autism: relationship between chronic infectious diseases and neurological outcome *Pediatric Health*. 3(2):125-140. (2009)
- Bransfield R. Chronic Infections Contributing to Autism Spectrum Disorders. *Neurology Psychiatry & Brain Research*. Universitätsverlag. Heidelberg. 16, Suppl 1 (2009)

# Articles on Tick-Borne Disease and Autism Spectrum Disorders II

- Kuhn M, Grave S, Bransfield R, Harris S. Long term antibiotic therapy may be an effective treatment for children co-morbid with Lyme disease and autism spectrum disorder. *Med Hypotheses*. 78(5):606-15 (2012)
- Bransfield R. Relationship of Inflammation and Autoimmunity to Psychiatric Sequelae in Lyme Disease. *Psychiatric Annals*. 42(9):337-341. September 2012.
- Bransfield R. The Psychoimmunology of Lyme/Tick-Borne Diseases and its Association with Neuropsychiatric Symptoms. *The Open Neurology Journal*. 2012, 6, (Suppl 1-M3) 88-93
- Bransfield R. Kuhn M. Autism and Lyme Disease. *JAMA*. 310(8). (2013)
- Burbelo PD, Swedo SE, Thurm A, Bayat A, Levin AE, Marques A, Iadarola MJ. Lack of serum antibodies against *Borrelia burgdorferi* in children with autism. *Clin Vaccine Immunol*. 2013 Jul;20(7):1092-3
- Planche P, Botbol M. Lyme disease, Autism Spectrum Disorder and antibiotic therapy: A case report. *Annales Médico-psychologiques, revue psychiatrique* 171(10):711–715. (2013)
- Kuhn M, Bransfield R. Divergent opinions of Lyme disease diagnosis and implications for children co-morbid with Autism Spectrum Disorder. *Med Hypotheses*. 2014.
- Offutt A, Breitschwerdt EB. Case report: Substantial improvement of autism spectrum disorder in a child with learning disabilities in conjunction with treatment for poly-microbial vector borne infections. *Front Psychiatry*. 2023; 14:1205545.

# Top 25 US States for Prevalence of Autism

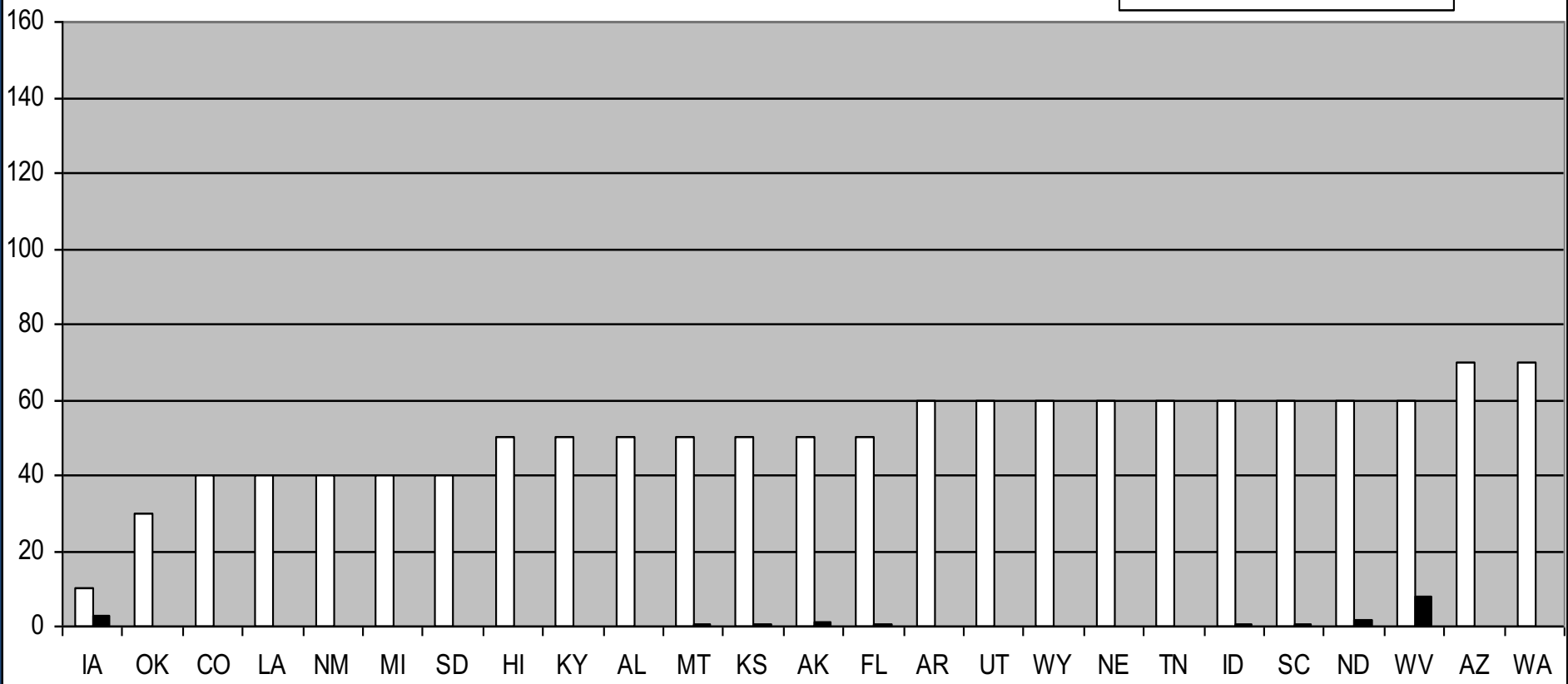


Kuhn M, Grave S, Bransfield R, Harris S. Long term antibiotic therapy may be an effective treatment for children co-morbid with Lyme disease and autism spectrum disorder. *Med Hypotheses*. 2012 May;78(5):606-15.

# Bottom 25 US States for Prevalence of Autism

Reported Cases 2009

□ Autism per 10,000  
■ Lyme Disease per 100,000



Bottom 25 States/ Prevalence of Autism

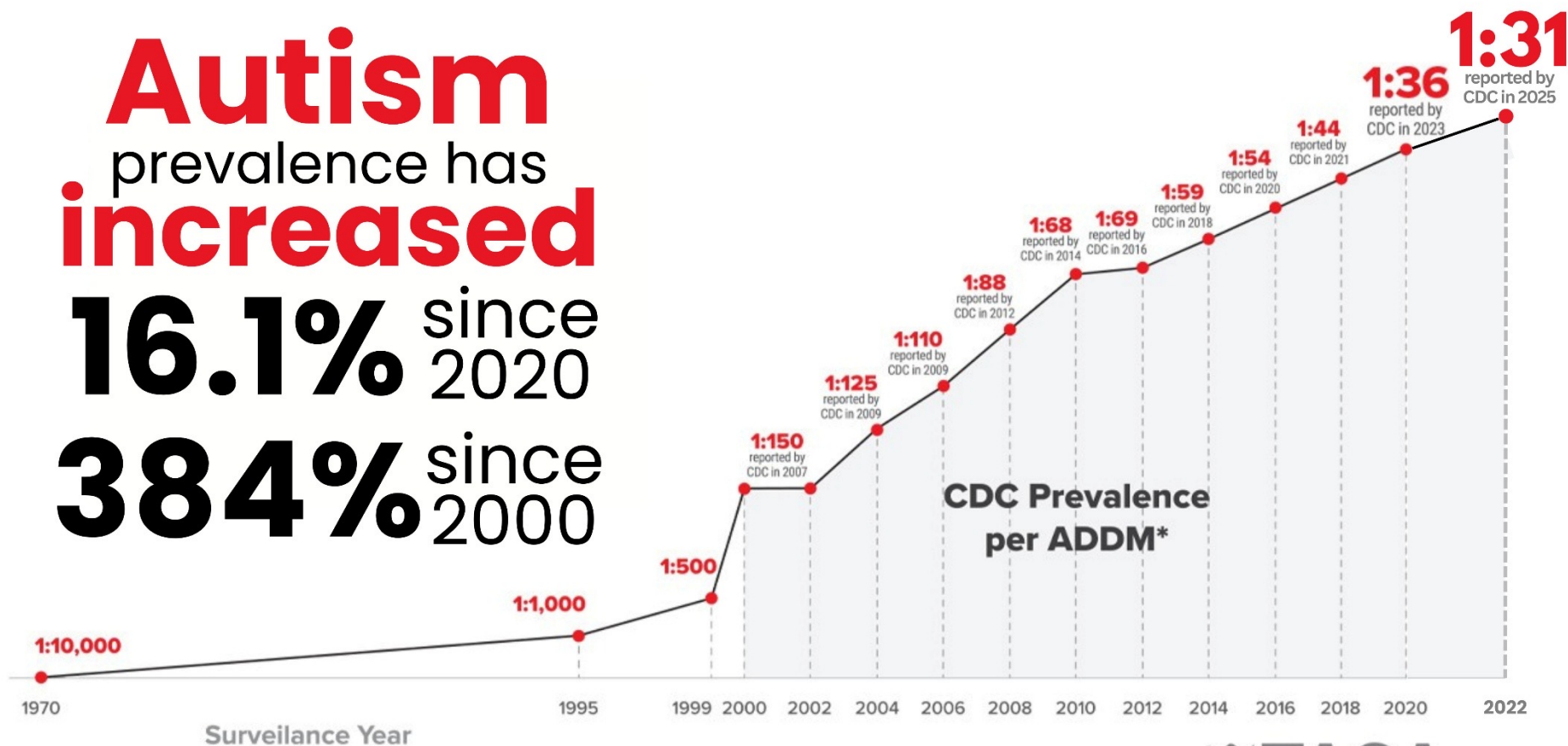
Kuhn M, Grave S, Bransfield R, Harris S. Long term antibiotic therapy may be an effective treatment for children co-morbid with Lyme disease and autism spectrum disorder. Med Hypotheses. 2012 May;78(5):606-15.

# Why Is Autism Increasing?

**Autism**  
prevalence has  
**increased**

**16.1%** since  
2020

**384%** since  
2000



\*ADDM (Autism and Developmental Disabilities Monitoring Network)

Adapted from:  **TACA**  
THE AUTISM COMMUNITY in ACTION

Modified by: MCCULLOUGH FOUNDATION

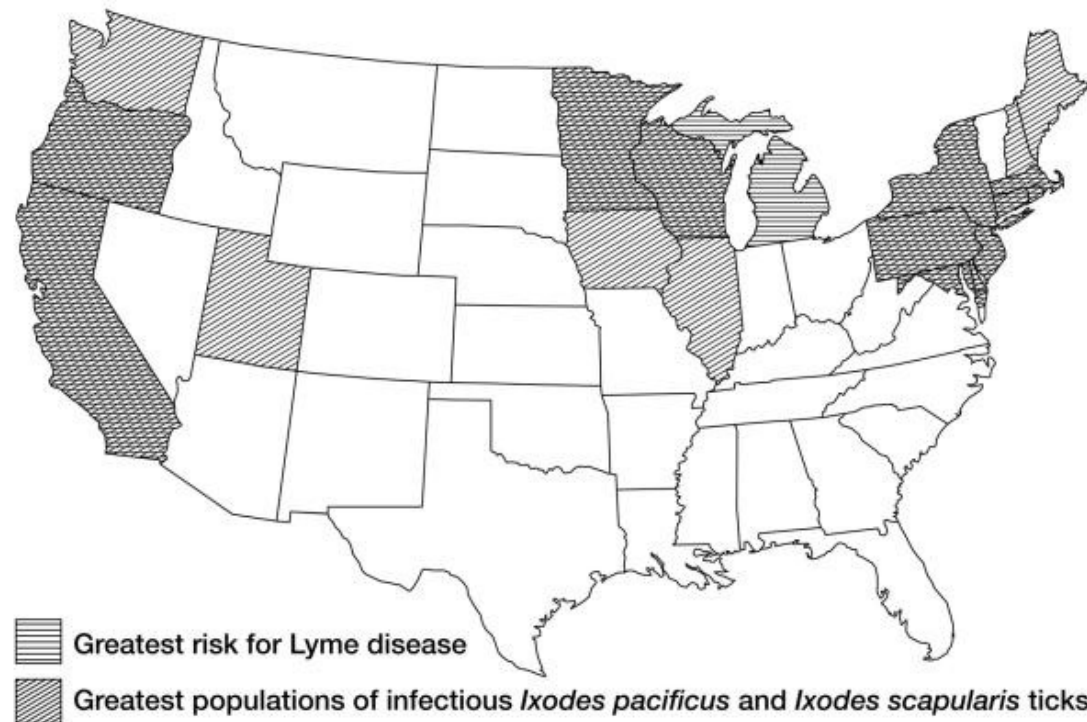
Shaw KA et al. Prevalence and Early Identification of Autism Spectrum Disorder Among Children Aged 4 and 8 Years - Autism and Developmental Disabilities Monitoring Network, 16 Sites, United States, 2022. MMWR Surveill Summ. 2025 Apr 17;74(2):1-22.

# Potential or Postulated Association of Schizophrenia with Infectious Agents

- *Aspergillus*
- Bacterial infections
- *Bartonella*
- *Borrelia burgdorferi* (Lyme disease)
- Borna disease virus
- *Candida albicans*
- *Chlamydia*, *C. psittaci*, *C. pneumoniae*
- Coronaviruses
- Cytomegalovirus
- Epstein-Barr virus (EBV)
- Herpes simplex virus
- Human Endogenous Retrovirus
- Infections early in childhood
- Influenza virus
- Maternal infections or immune activation during pregnancy
- Measles virus (Subacute sclerosing panencephalitis)
- Parvovirus
- Poliovirus
- Pneumonia and influenza
- Rubella
- *Taenia solium* (Neurocysticercosis or Cysticercosis)
- *Toxoplasma gondii*
- *Treponema pallidum* (syphilis)

# Geographical correlation of schizophrenia to *Ixodes* ticks and Lyme disease in the USA

- The epidemiological correlation between *Ixodes* ticks and schizophrenia originally published by Brown has been adjusted according to the more recent epidemiological data on the risk of Lyme disease including zoonophylaxis.
- Brown JS Jr. Geographic correlation of schizophrenia to ticks and tick-borne encephalitis. *Schizophr Bull.* 1994;20(4):755-75.



# Potential or Postulated Association of Bipolar Illness with Infectious Agents

- *Babesia*
- *Bartonella*
- *Borrelia burgdorferi*
- Human Endogenous Retroviruses
- *Mycoplasma*
- Parvovirus B19
- SARS-CoV-2
- Tick-borne diseases
- *Toxoplasma gondii*
- *Treponema pallidum* (syphilis)

# Potential or Postulated Association of Depression with Infectious Agents

- *Babesia*
- *Bartonella*
- Borna disease virus
- *Borrelia burgdorferi*
- Cytomegalovirus
- Enterovirus
- Hepatitis C virus
- Human immunodeficiency virus (HIV)
- Human T-Cell lymphotropic virus type 1 (HTLV-1)
- Infections early in childhood
- Measles virus (subacute sclerosing panencephalitis)
- *Plasmodium* (malaria)
- SARS-CoV-2 and other coronaviruses
- *Taenia solium* (Neurocysticercosis or Cysticercosis)
- *Treponema pallidum* (syphilis)
- West Nile virus

Bransfield RC, Mao C, Greenberg R. Microbes and Mental Illness: Past, Present, and Future. Healthcare (Basel). 2023,12(1):83.

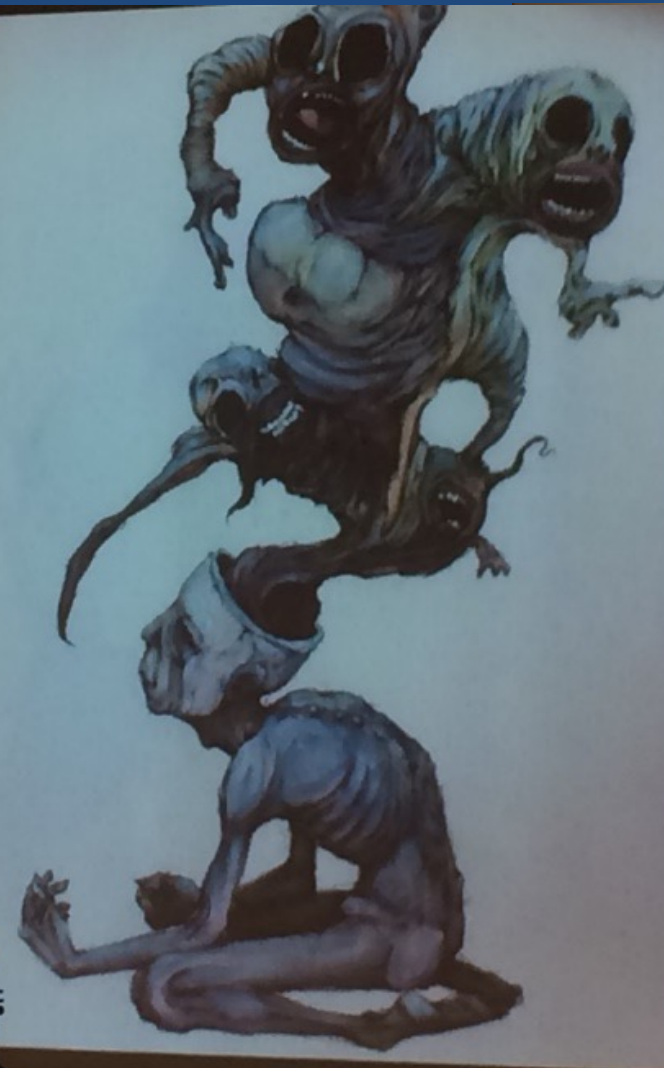
# Potential or Postulated Association of Anxiety with Infectious Agents

- *Bartonella*
- *Borrelia burgdorferi*
- Epstein-Barr virus
- Human T-Cell lymphotropic virus type 1
- *Mycoplasma pneumoniae*
- SARS-CoV-2
- *Streptococcus pyogenes* (Group A Strep)
- *Treponema pallidum* (syphilis)

# Potential or Postulated Association of Suicide with Infectious Agents

- All infections requiring hospitalization (including infections requiring hospitalization for COPD)
- *Bartonella*
- *Borrelia burgdorferi*
- Cytomegalovirus
- Hepatitis C virus
- Herpes Simplex Virus Type 1 (HSV-1)
- Human immunodeficiency virus (HIV)
- Influenza virus
- SARS-CoV-2
- *Streptococcus pyogenes* (group A)
- *Toxoplasma gondii*

# Lyme Disease and Suicide



Artwork by Daniel J. Levy with permission from Adam Levy

# Late-stage Borreliosis and Substance Abuse

- Late-stage borreliosis is associated with multiple symptoms that may contribute to an increased risk of substance abuse and addictive disorders. More effective diagnosis and treatment of borreliosis, and attention to substance abuse potential may help reduce associated morbidity and mortality in patients with borreliosis, particularly in endemic areas

# Late-Stage Borreliosis & Substance Abuse

- 1,100% (12-fold) increase in substance abuse after acquiring Lyme borreliosis.
- A fatal case of Lyme borreliosis and substance abuse is presented. He committed a homicide, two assaults, and suicide.
- Autopsy tissue evaluation demonstrated *Borrelia* in the pancreas and heart by immunofluorescence assay and fluorescence *in situ* hybridization. Activated microglia and quinolinic acid were found in the brain, indicating neuroinflammation.

# The Death Formula

Lyme and associated diseases infection→

Persistent proinflammatory cytokines→

Dysregulation of tryptophan metabolism→

Quinolinic acid→NMDA receptor agonism→

Glutamate dysregulation→

Neural circuit dysfunction→

Psychiatric dysfunction→

Suicidal, sometimes also homicidal

# Potential or Postulated Association of Aggressiveness with Infectious Agents

- *Babesia*
- *Bartonella*
- *Borrelia burgdorferi*
- Encephalitis lethargica agent
- Hepatitis E virus
- Herpes simplex virus
- Infection during childhood
- Measles virus
- *Mycoplasma*
- Parvovirus
- *Plasmodium* (Malaria)
- Rabies virus
- *Streptococcus pyogenes* (group A Strep)
- *Toxoplasma gondii* (Toxoplasmosis)
- *Treponema pallidum* (syphilis)
- viral encephalitis
- Animal models of infections associated with aggression include *Borrelia burgdorferi* in dogs, *Bartonella henselae* in dogs, *B. henselae* in horses, *B. burgdorferi* postulated in chimpanzee in lay news, rabies virus in multiple animal species, and gut microbiota changes in dogs, horses, and pigs.

# Did Infections Caused by World War I Contribute to Causing World War II?

- How many of those who recovered from WWI-associated infections had residual neurological impairments that increased their risk for violence?



# *Did the SARS-CoV-2 pandemic result in mental impairments that may have contributed to violence?*

- The pandemic was a possible contributor to an increase in **cognitive impairments, mental disorders, and substance abuse**. Collectively these impairments are associated with an increased risk of violence, and other studies have demonstrated an increase in violence associated with the SARS-CoV-2 pandemic, including **gun violence, violence against children, domestic violence, and elder abuse**.
- In summary, the SARS-CoV-2 pandemic result in mental impairments that may have contributed to violence.

# *Is there more global instability since the SARS-CoV-2 pandemic has occurred?*

- Based upon GPI data, conflict deaths are at the highest level in the century contributing to a decline in world peace. “Deaths from internal conflict, neighboring countries relations, and external conflicts fought all recorded significant deteriorations, with the total number of conflict-related deaths increasing by 96 per cent”.
- Although the conflict in Ukraine was the primary driver of this increase, increases in conflict were also seen in many other countries, particularly in sub-Saharan Africa and the Asia Pacific area. Even excluding the violence occurring in Ukraine, there has been an increase in the level of conflict since 2019. **Conflict-related deaths rose by 45 per cent in the year prior to Russia’s invasion of Ukraine, with over 100,000 total deaths being recorded in 2021. The war in Ukraine** had a significant impact on global peacefulness, with Ukraine and Russia having the largest and fifth largest deteriorations in GPI respectively.
- In summary, there is more global instability since the SARS-CoV-2 pandemic.

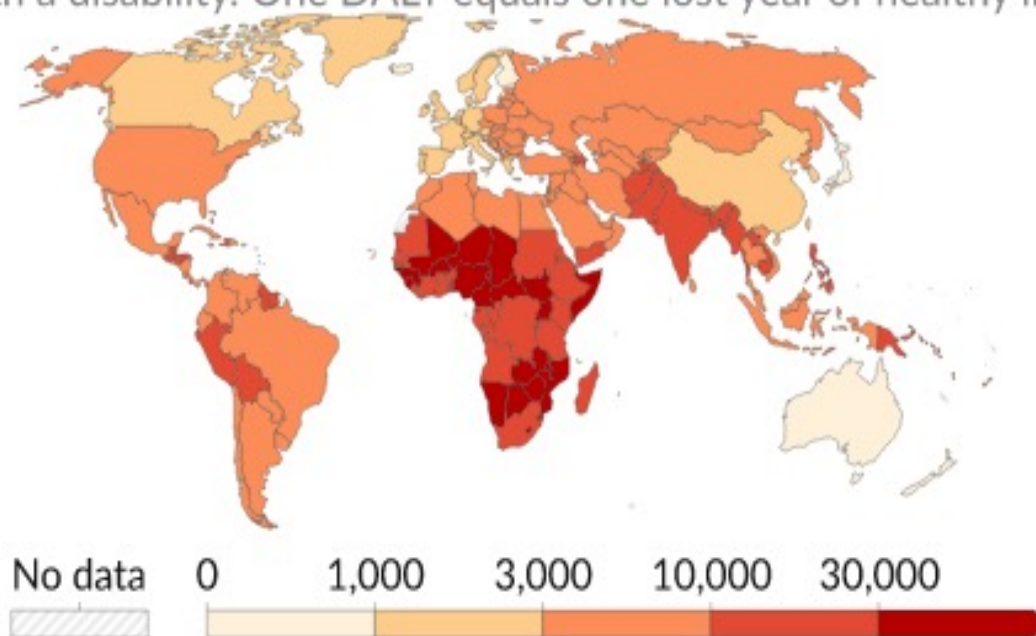
# Infectious Disease Sequence to Global Instability



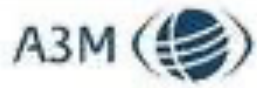
# Disability-Adjusted Life Years/100,000

## DALY rates from communicable, neonatal, maternal & nutritional diseases, 2021

Age-standardized DALY (Disability-Adjusted Life Year) rates per 100,000 individuals from communicable diseases. DALYs are used to measure total burden of disease - both from years of life lost and years lived with a disability. One DALY equals one lost year of healthy life.

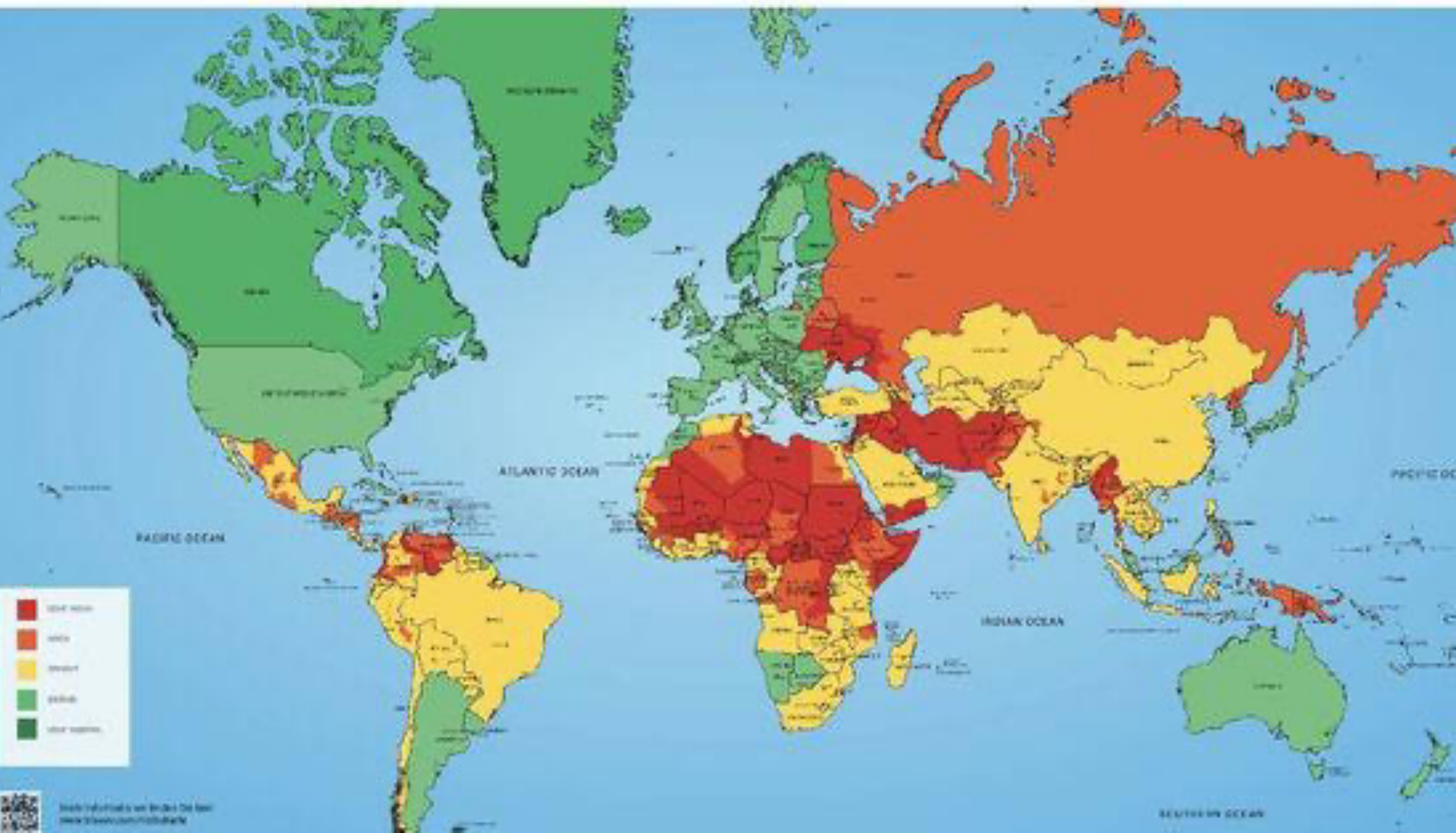


# Global Peace Risk 2024



RISK MAP 2024

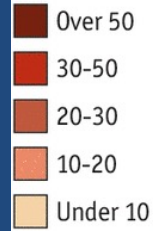
Global Monitoring



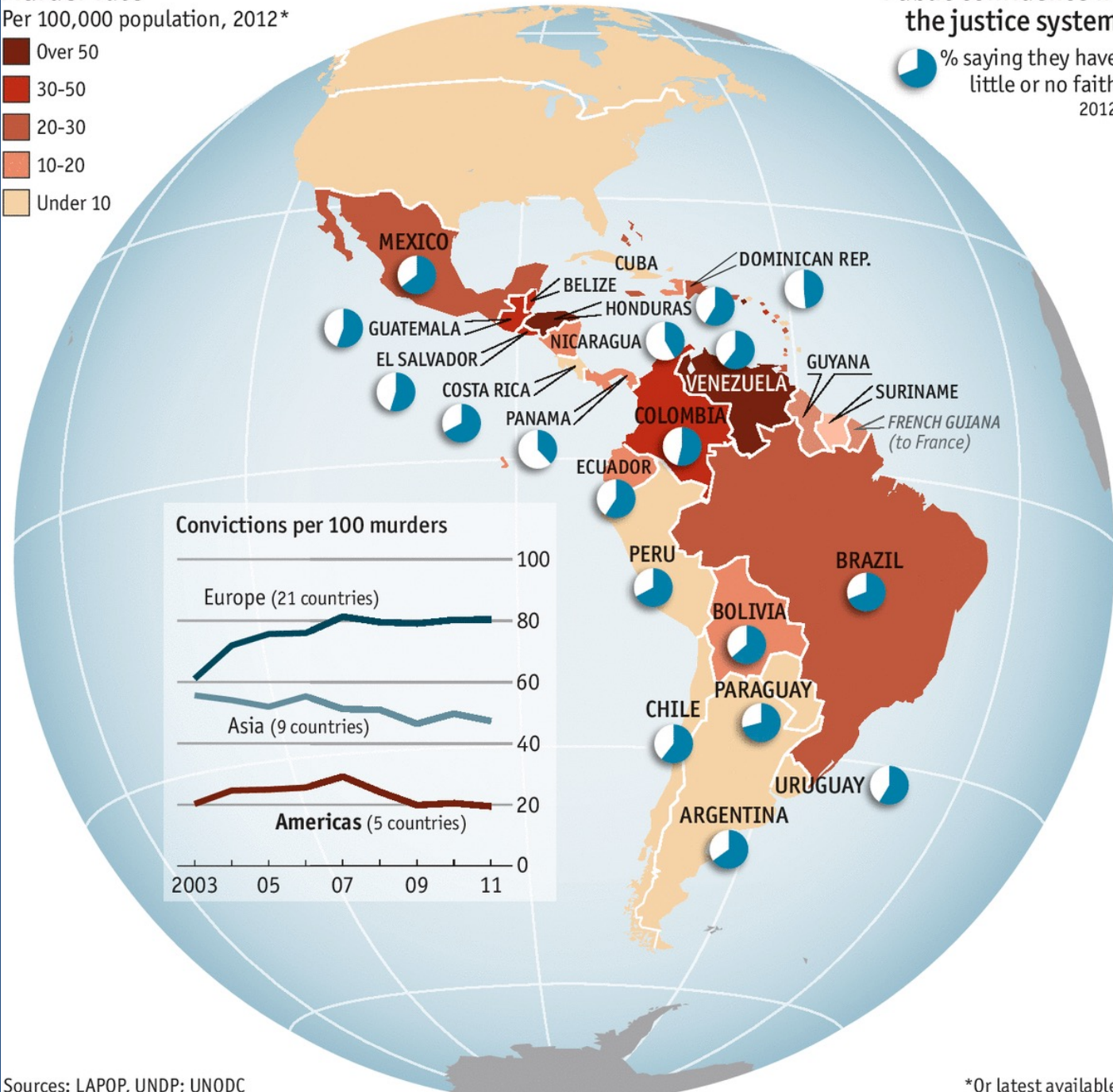
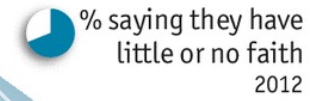
World Peace Index is an Index Of Peace  
[www.wpiworldpeaceindex.com](http://www.wpiworldpeaceindex.com)

# Murder rate

Per 100,000 population, 2012\*



# Public confidence in the justice system



Sources: LAPOP, UNDP; UNODC

\*Or latest available

# Disability Adjusted Life Years vs. Global Peace Index 163 Countries

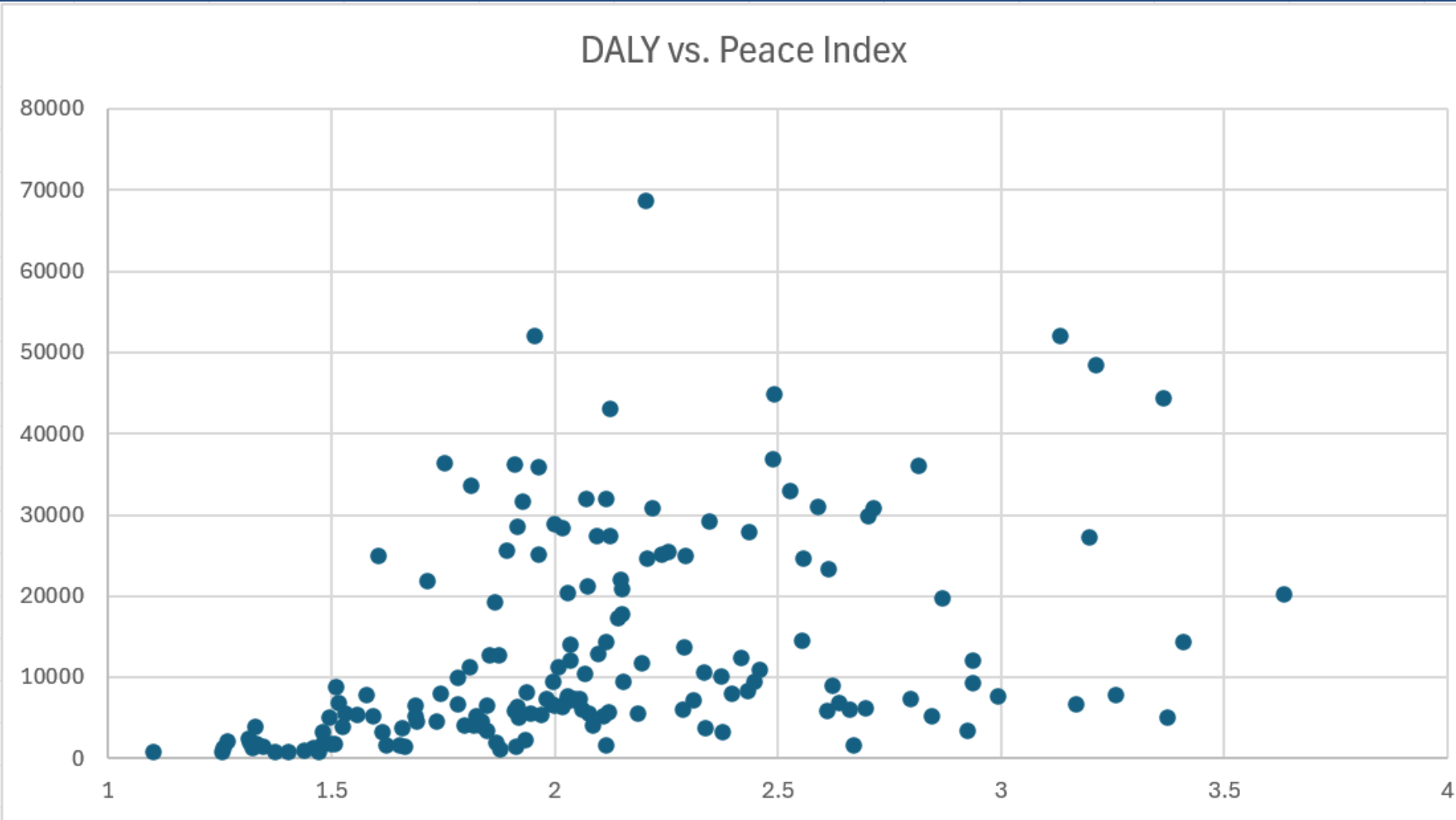


Figure 1: Disability Adjusted Life Years (DALY) scores compared to Global Peace Index (GPI) scores for 163 countries. Lower GPI scores (more peaceful) generally correlate with lower DALY (communicable disease rates) scores. Bransfield RC. Med Resch Arch. 2025

Country & GPS Rank (Highest & Lowest 10)	Global Peace Score (GPS)	Disability Adjusted Life Years (DALY)	Latitude
1 Iceland	1.1	846	65 N
2 New Zealand	1.253	949	35-47 S
3 Denmark	1.256	1,427	56 N
4 Portugal	1.267	2,143	30-42 N
5 Slovenia	1.315	2,520	45-47 N
6 Austria	1.317	2,000	47 N
7 Switzerland	1.323	1,421	47 N
8 Ireland	1.326	1,844	33 N
9 Czech Republic	1.329	4,071	48-51 N
10 Canada	1.33	1,915	42-83 N
154 Russia	2.993	7,666	41-82 N
155 Central African Republic	3.131	52,092	2-11 N
156 Libya	3.166	6,798	25 N
157 Democratic Republic of Congo	3.196	27,384	4 N-14 S
158 Somalia	3.211	48,505	10 N
159 Iraq	3.257	7,962	33 N
160 South Sudan	3.363	44,446	3-13 N
161 Syria	3.371	5,171	35 N
162 Yemen	3.407	14,370	15 N
163 Afghanistan	3.631	20,369	33 N

# Afghanistan Vector-borne Diseases

- Crimean-Congo Hemorrhagic Fever
- Malaria
- Sand Fly Fever
- Dengue Fever
- Yellow Fever
- Japanese Encephalitis
- African Trypanosomiasis
- Cutaneous Leishmaniasis
- Plague
- Rift Valley fever
- Chikungunya
- Schistosomiasis
- *aerosolized dust or soil contact disease*
- Lassa fever
- Filariasis
- Trench Fever
- Five-Day Fever
- Wolhynia Fever
- Boutonneuse (Mediterranean)
- Fever Cutaneous Leishmaniasis (zoonotic)
- Cutaneous Leishmaniasis (anthroponic)
- Visceral Leishmaniasis
- Q Fever
- Rocky Mountain Spotted Fever
- West Nile Fever
- Sindbis Fever
- Siberian Tick Typhus
- Mite-borne Typhus (Tsutsugamushi Fever)
- Louse-borne Typhus
- Epidemic Typhus
- Murine Typhus
- Endemic Typhus Fever
- Epidemic Relapsing Fever
- Tick-borne Relapsing Fever
- Leptospirosis
- *Leptospira icterohaemo-rhagiae,*
- *L. hebdomadis*
- *L. tarassovi,*
- *L. grippotyphosa,*
- *L. pomona,*
- *L. javanica,*
- *L. canicola,*
- *L. ballum,*
- *L. bataviae*

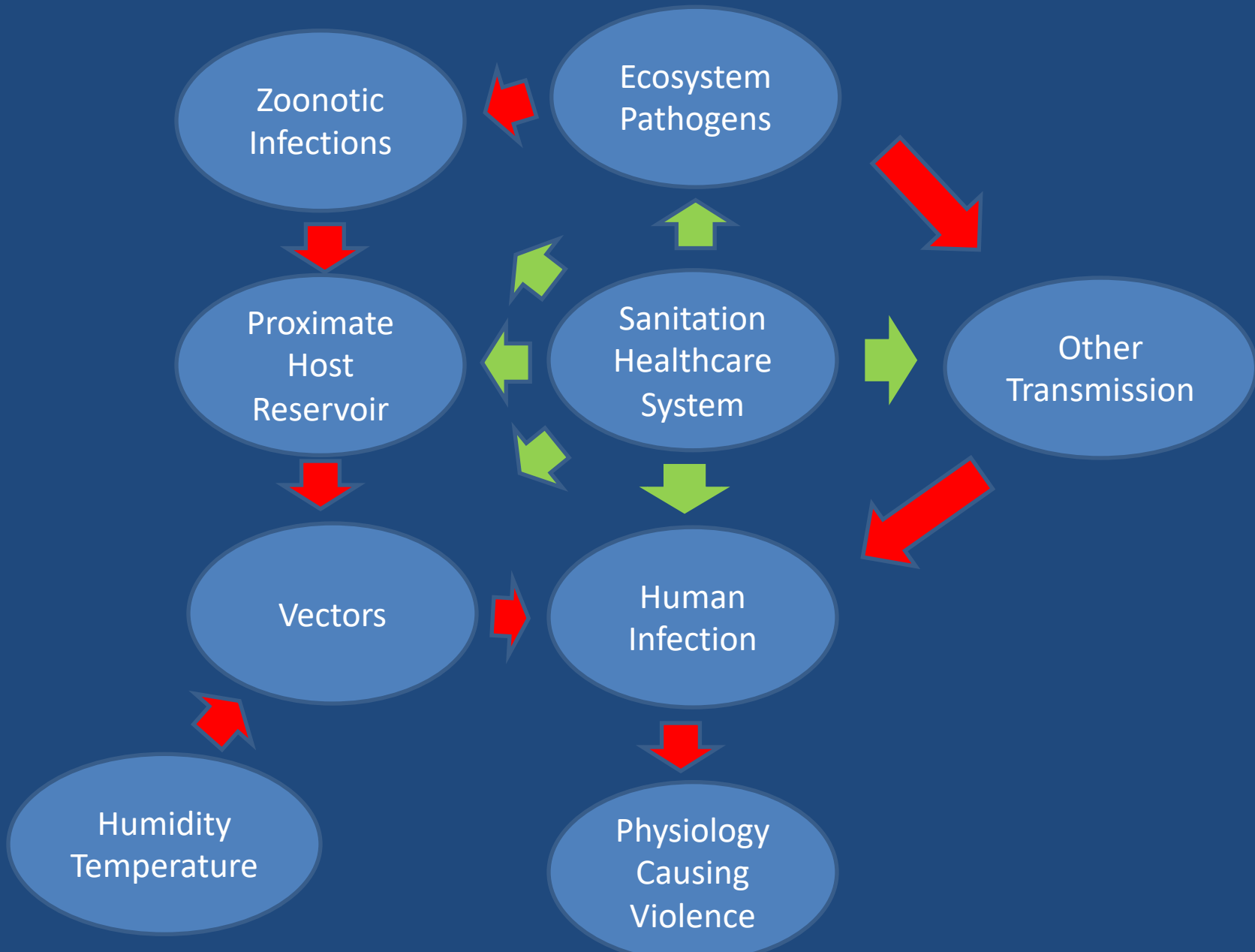
# Other Infectious Diseases in Afghanistan

- Measles
- Diphtheria
- Meningitis
- Influenza
- Tuberculosis
- Acute respiratory infections
- Meningococcal meningitis
- Poliomyelitis
- Anthrax
- Leptospirosis
- Rabies
- Enterotoxigenic Escherichia coli
- Campylobacter
- Shigella
- Salmonella
- Cryptosporidium spp.
- Giardia lamblia
- Entamoeba histolytica
- Amoebiasis
- Hepatitis A and E
- Typhoid
- Paratyphoid Fever

# Iceland, the Most Peaceful Country

- By comparison, Iceland has the most favorable GPI, and has longevity, and health and infectious diseases are considerably better. **There are no mosquitoes in Iceland. Ticks are rare in Iceland and Lyme disease has rarely been identified in Iceland.** Other countries with favorable GPI such as New Zealand and Denmark, also have low parasite, zoonotic disease and infectious disease burdens.

# Infections & Violence Regional Differences



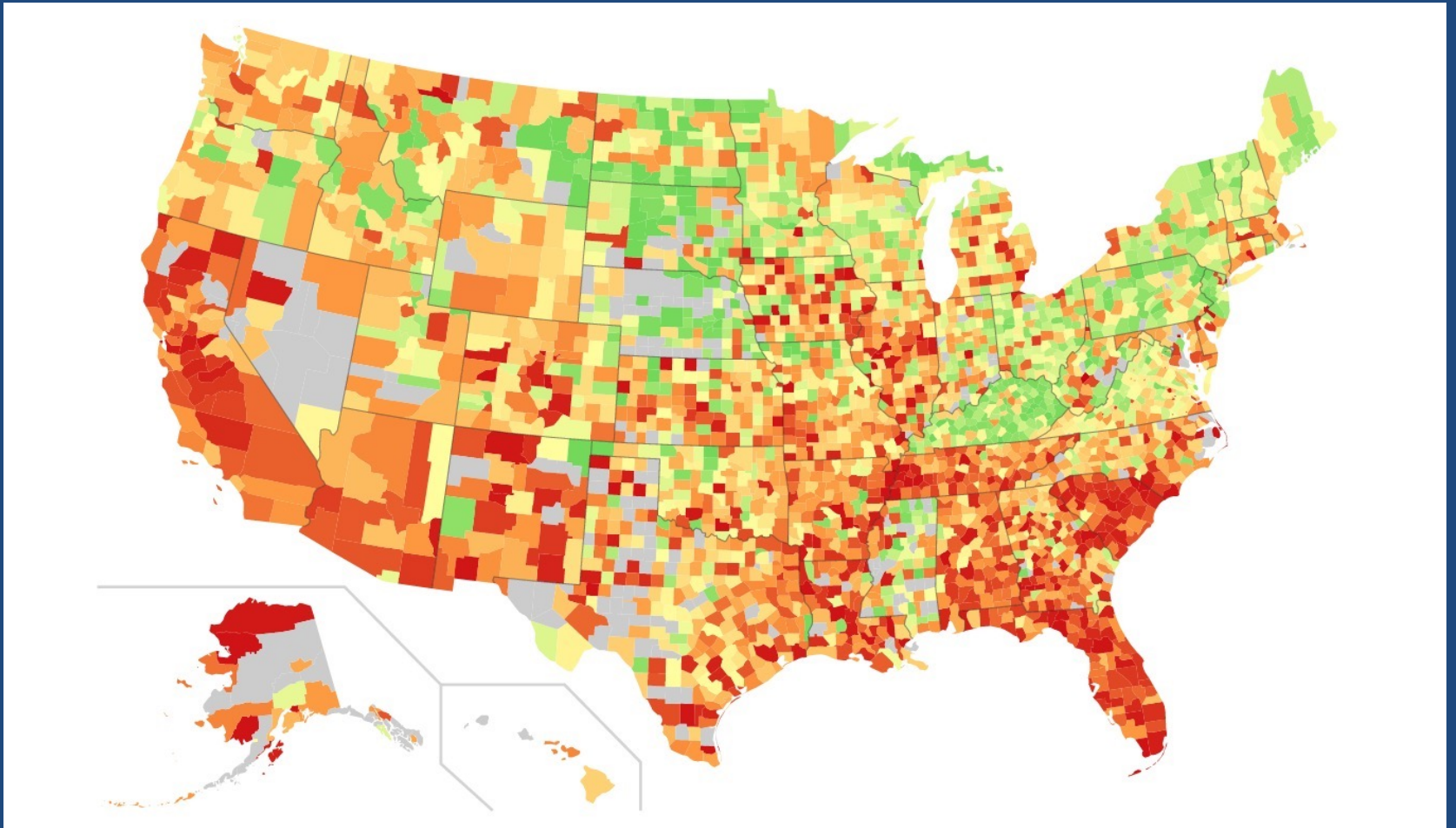
# The association between infectious diseases and violent behavior is dependent upon a number of variables

- Regional differences in ecosystems
- Pathogens
- Pathogen potential to contribute to violent behavior
- Transmission potential: Vector-borne, airborne, fecal, contact body fluids, sexual, congenital, food, water, soil, animal contact
- Animal pathogen reservoir in proximity to humans (zoonotic)
- Vectors (ticks, fleas, mosquitos, mites, lice, etc.)
- Temperature, humidity, season duration impact on vector survival
- Sanitation
- Healthcare system
- Social system stability
- Population density
- Toxoplasmosis (transmitted by cat feces, food, sexual)
- Reliability of data, veterinarians more attentive to zoonotic diseases

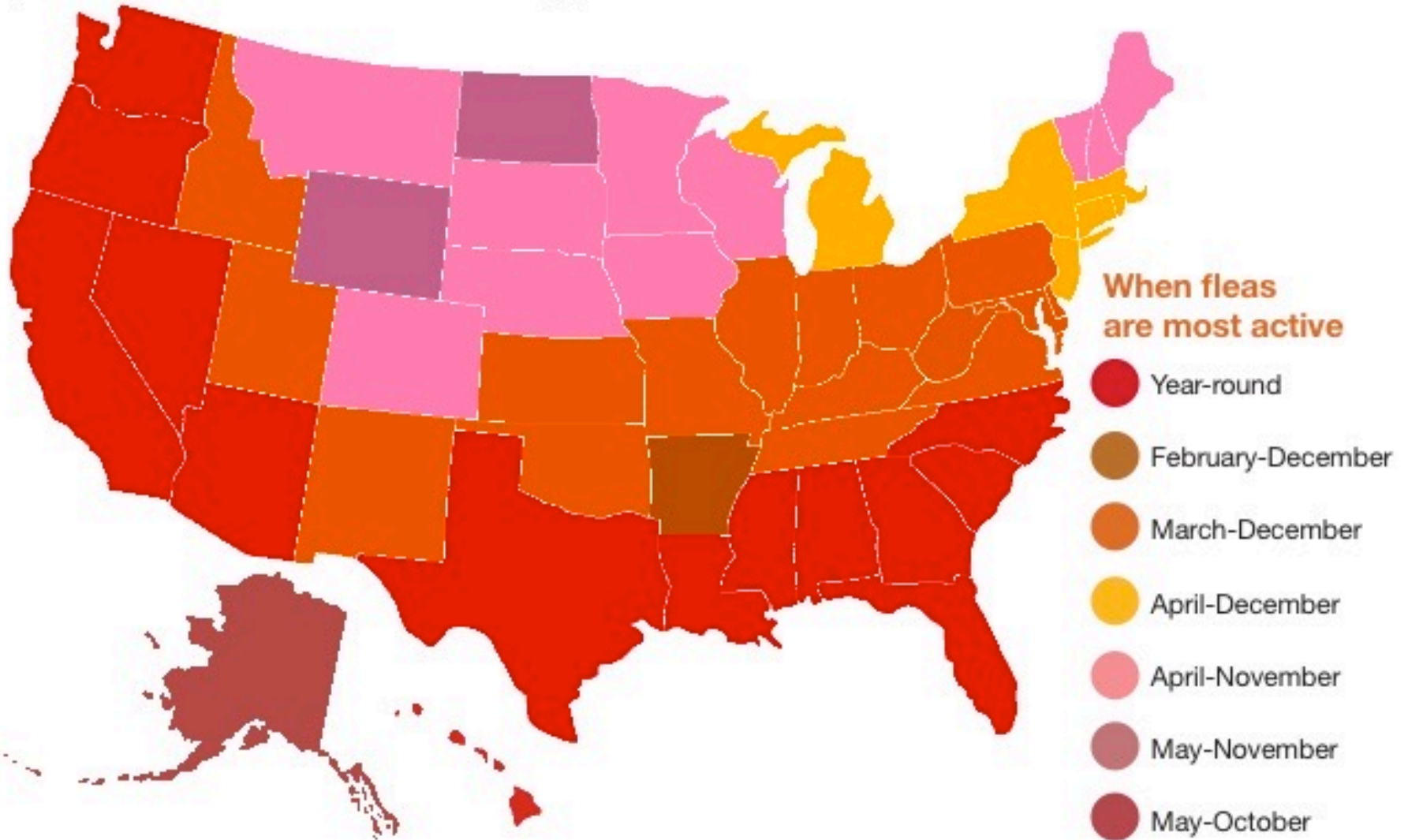
# Vectors & Diseases (Mostly Zoonotic)

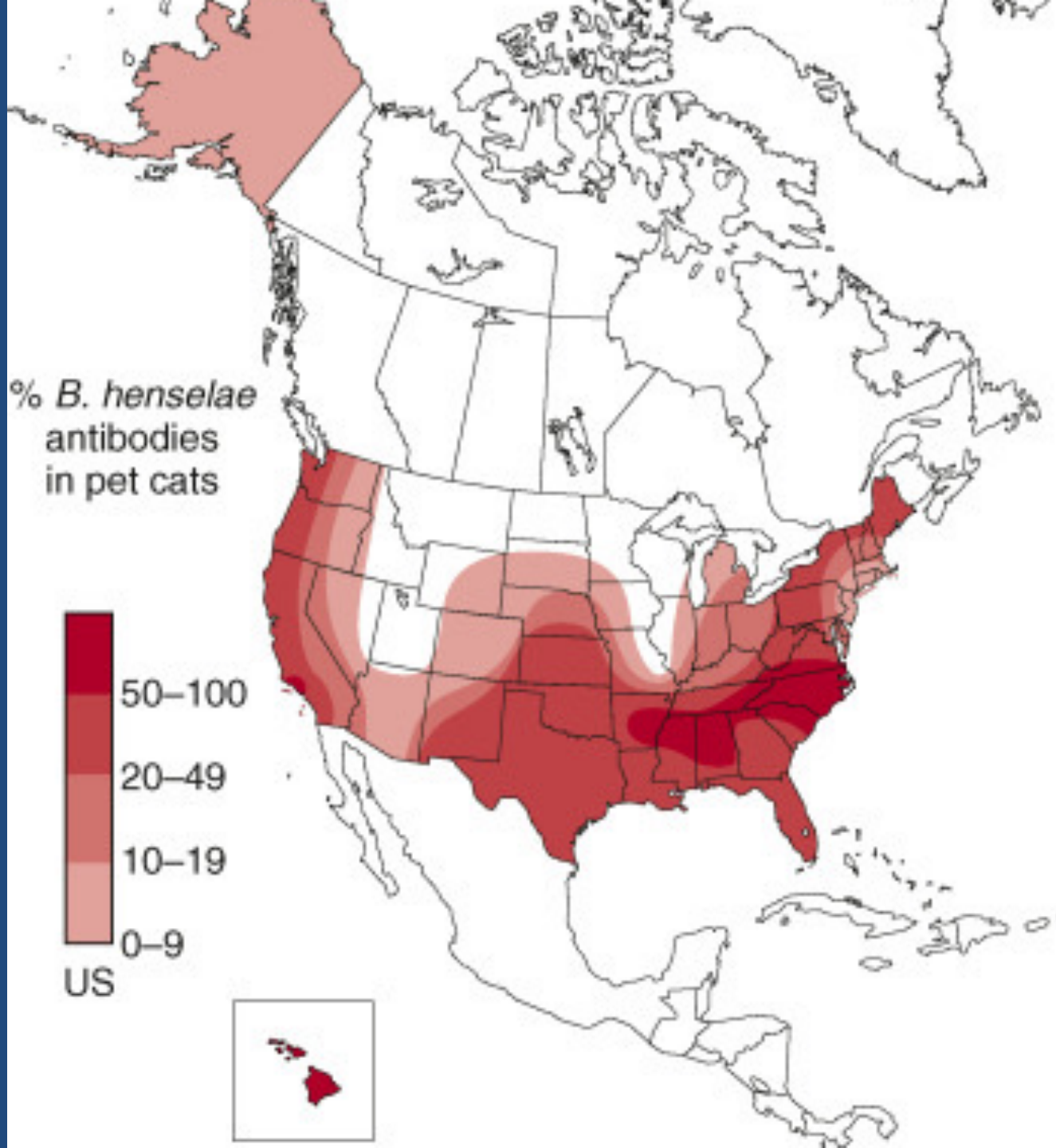
- Ticks, mosquitos, fleas, sand flies, black flies, tsetse flies, lice need high humidity and higher temperatures.
- **Mosquitos**: Malaria (parasite) Chikungunya (virus), Dengue (virus), Rift Valley fever (virus), Yellow Fever (virus), Zika (virus), West Nile fever (virus), Japanese encephalitis (virus), Lymphatic filariasis (parasite).
- **Ticks**: Lyme disease, Babesiosis, Bartonellosis, Relapsing Fever, Rocky Mountain spotted fever, Anaplasmosis, Ehrlichiosis, Powassan virus, Tularemia, Tick paralysis, etc.
- **Fleas**: Bartonellosis, Typhus, Plague, Tungiasis
- **Triatome bugs**: Chagas disease (American trypanosomiasis) (virus)
- **Black flies**: Onchocerciasis (river blindness) (parasite)
- **Lice**: Typhus (bacteria), Louse-borne relapsing fever (bacteria)
- Sandflies: Leishmaniasis (parasite), Sand-fly fever (phlebotomus fever) (virus)
- **Aquatic snails**: Schistosomiasis (bilharziasis) (parasite)

# Most Dangerous Cities in America



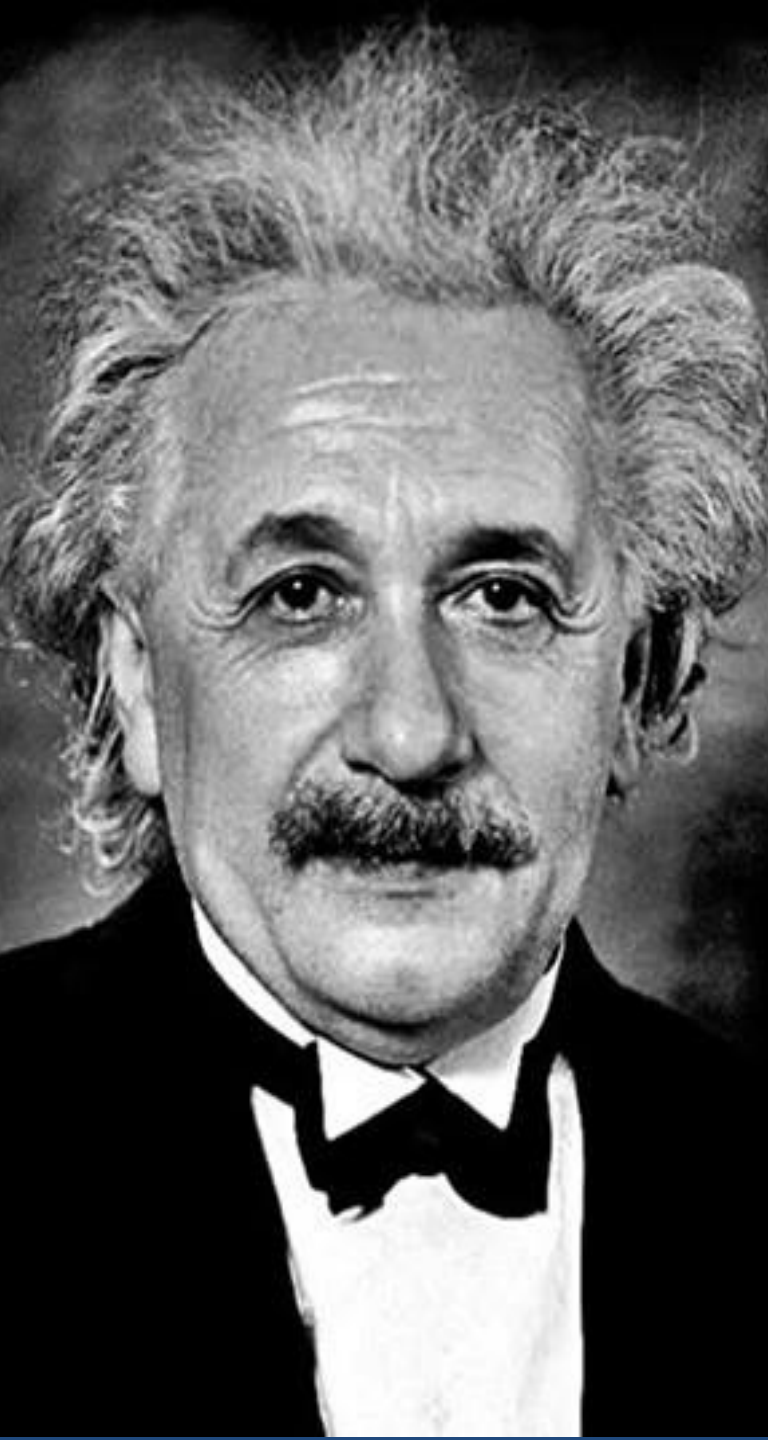
# Fleas





# This Raises a Concern

- Weapon technology is more advanced than mental health technology.
- The mental stability of the individuals controlling these weapons is a concern.



**"The world is a dangerous place to live; not because of the people who are evil, but because of the people who don't do anything about it."**

**Albert Einstein**

Khanaghutyun

Spokoj Béke

Mir Pace

Fred Heiwa

Vrede Peoning Hwa

Hetep Pax

Solh Pokoj

Rauha Paz

Paix Pace

Sochin Amani

Der friede Sidi

Irini Baris

Shanti Hoa Binh

Sholem Heddwch

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PEACE

# Forward Progress Will Require Uncommon Partners Working Together



# Proposed Action Plan

- Research:
  - Create a model incorporating variables
  - Epidemiological research: What infections, hosts & vectors in what regions. Compare regional violence & infection data.
  - Clinical research on violent individuals:
    - Create violence prevention bio bank
    - Autopsies of homicide/suicide cases, violent offenders who die in prison & violent individuals in conflict zones
    - Develop evaluation protocol for violent offenders & infectious diseases
    - Evaluate violent individuals in conflict zones for infectious diseases
    - Explain pathophysiology
- Education:
  - Psych learn ID and ID learn psych
  - Recognize immune link
  - One Health approach
  - Explain pathophysiology
- Implementation: Anti-infective strategies
  - Monitor violence reduction effectiveness, adjust model & action plan.

# Additional Videos

- **Mental Health and Illness:**
- Infection Associated Neuropsychiatric Illness Introduction: [Infection Associated Neuropsychiatric Illness Introduction — Mental Health & Illness](#)
- [Mental Health & Illness https://www.mentalhealthillness.net/](https://www.mentalhealthillness.net/)
- Infection Associated Neuropsychiatric Illness: Introduction [Infection Associated Neuropsychiatric Illness Introduction](#)
- **Contagion Live:**
- Rethinking Mental Illness: The Overlooked Impact of Infection
- Pandemics, Pathogens, and the Psychology of Violence
- [From Awareness to Prevention: Addressing the Infection–Mental Illness–Violence Continuum | Contagion Live](#)
- Infection Associated Neuropsychiatric Illness Introduction: [Infection Associated Neuropsychiatric Illness Introduction — Mental Health & Illness](#)
- **Infection-Associated Chronic Mental Impairments on VuMedi:**

# Infection Associated Neuropsychiatric

## Illness Outline

- Introduction
- History
- Infectious agents with potential psychiatric manifestations & Mental conditions potentially associated with infections
- Pathophysiology
- Epidemiology and Global Stability
- Microbes and Dementia
- Assessment
- Assessment of children
- Laboratory testing
- Treatment strategies
- Syphilis
- Toxoplasmosis
- COVID-19
- Lyme/tick-borne disease
- Strep, PANS/PANDAS
- Conclusions and Future Directions
- Participant discussion

# Contagion Live Videos

- Part 1: Rethinking Mental Illness: The Overlooked Impact of Infection
- Part 2: Microbial Infections and Mental Illness: Bridging Psychiatry and Infectious Disease
- Part 3: Psychiatric Symptoms Emerging Years After Infections Like Lyme and Tick-Borne Infections
- Part 4: A Psychiatrist's View on the Immune-Brain Connection
- Episode 2:
- Part 1: Pandemics, Pathogens, and the Psychology of Violence
- Part 2:
- The Microbe Manipulation Hypothesis: How Microbes May Influence Behavior and Free Will
- Part 3:
- Ecosystem Disruption, Infections, and Violence
- Part 4:
- When Infections Tip Aggression Into Violence
- Episode 3:
- From Awareness to Prevention: Addressing the Infection–Mental Illness–Violence Continuum

Thanks for your attention and your  
commitment to our patients

