Infectious Diseases: Late Breakers

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Infectious Diseases

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ACOi 2023 October 11-14 Tampa • Hybrid

Disclosures

Dr. Déry has no disclosures

Objectives

At the end of the lecture the attendee will be able to:

- Have a comprehensive understanding of DoxyPep
- Explain PEPFAR
- Articulate how Hansen's disease is endemic in Central Florida
- Evaluate how climate change in 2023 is responsible for an increase in the incidence of number of infectious diseases such as babesiosis, dengue fever, malaria and alpha gal syndrome
- Recognize that HPAI H5N1 has the potential to become an epidemic

DoxyPep

What is DoxyPep?

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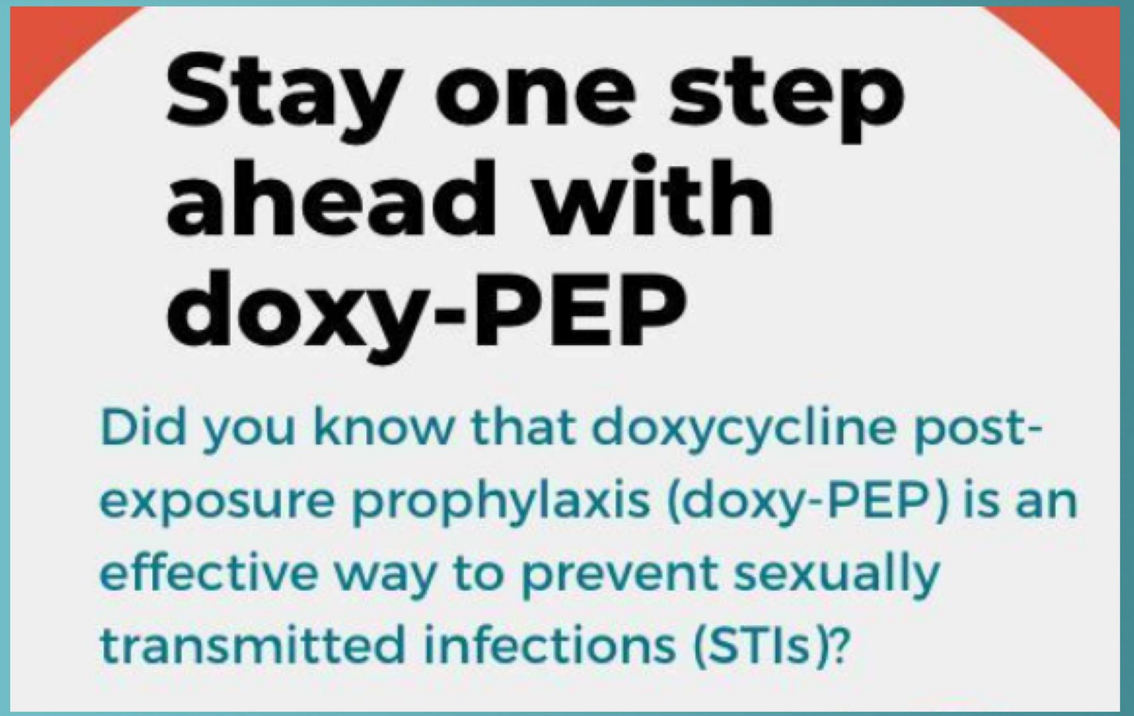
What is DoxyPep?

DoxyPEP:

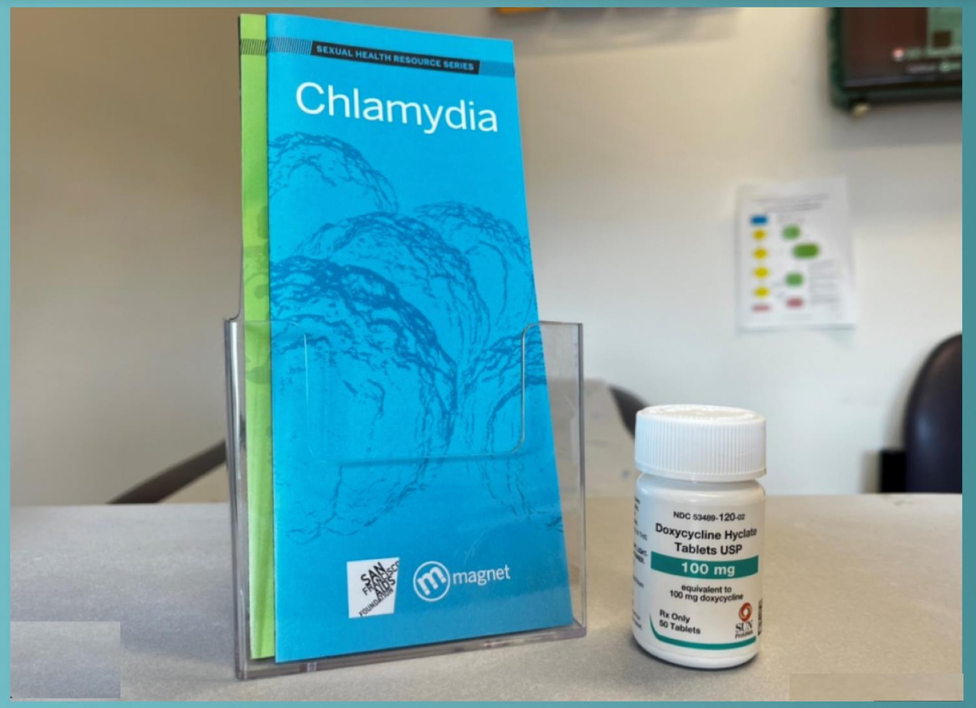
- Post-exposure preventative treatment for syphilis, chlamydia, and gonorrhea.
- Think of it as a morning-after pill but for bacterial STIs instead of pregnancy: take one dose after a condomless sexual encounter to greatly reduce your risk of contracting bacterial STIs.



Who Should Take DoxyPep?

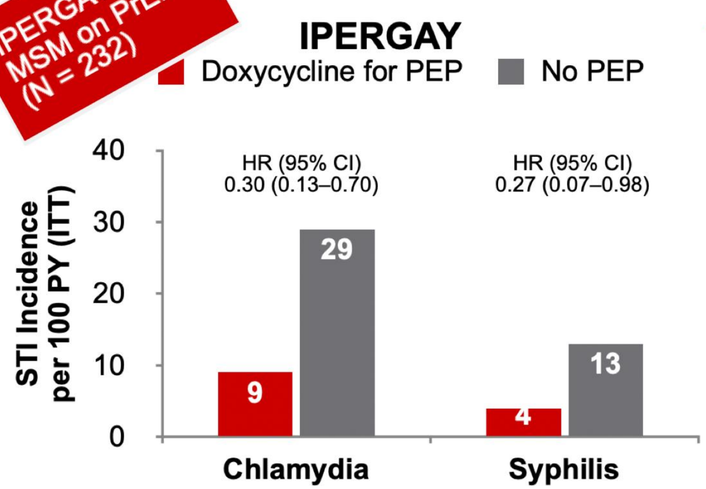
DoxyPEP:

- Assigned male at birth
- Have been diagnosed with at least one bacterial STI (i.e., chlamydia, gonorrhea, syphilis) in the last 12 months
- Have had condomless oral and/or anal sexual contact with at least one individual assigned male at birth in the last 12 months



3 Studies Support DoxyPep

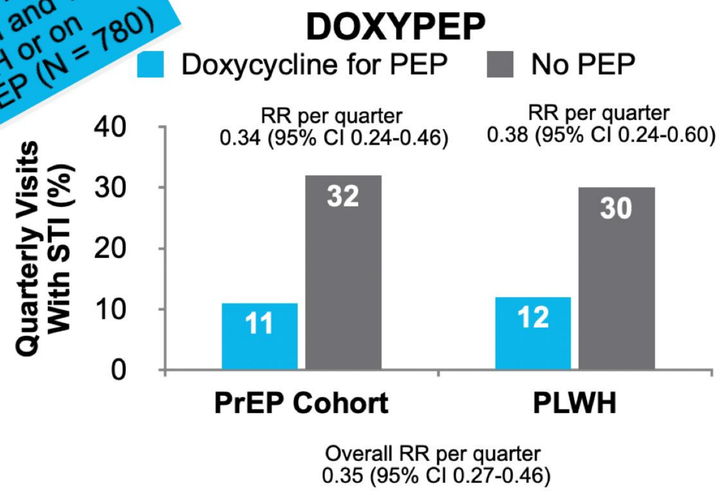
IPERGAY: MSM on PrEP (N = 232)



IPERGAY showed efficacy of doxycycline for PEP in reducing STI incidence in MSM

Lancet Infect Dis 2018 Mar;18(3):308-317

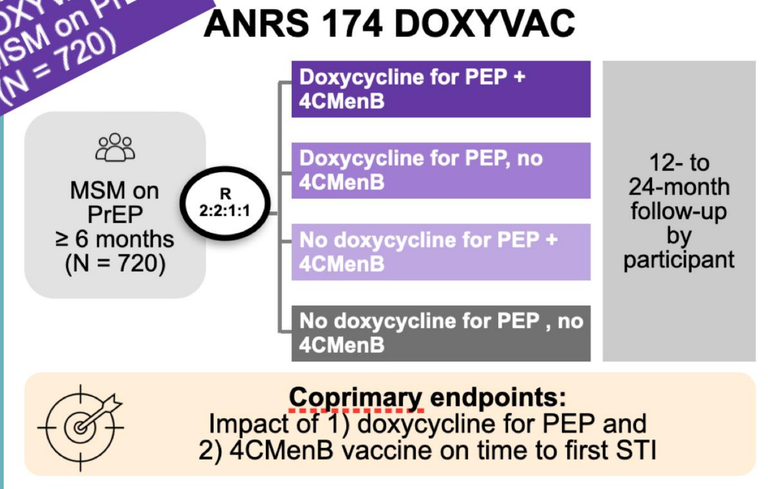
DOXYPEP: MSM and TGW LWH or on PrEP (N = 780)



DOXYPEP further supported doxycycline for PEP efficacy in both MSM and TGW

N Engl J Med 2023; 388:1296-1306

ANRS 174 DOXYVAC: MSM on PrEP (N = 720)



DSMB stopped enrollment at 556 due to significant effectiveness of both interventions

https://clinicaltrials.gov/ct2/show/NCT04597424

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3 Studies Support DoxyPep

ANRS 174 DOXYVAC: MSM on PrEP (N = 720)

ANRS 174 DOXYVAC

MSM on PrEP ≥ 6 months (N = 720)

R 2:2:1:1

- Doxycycline for PEP + 4CMenB
- Doxycycline for PEP, no 4CMenB
- No doxycycline for PEP + 4CMenB
- No doxycycline for PEP , no 4CMenB

12- to 24-month follow-up by participant

Coprimary endpoints:
Impact of 1) doxycycline for PEP and
2) 4CMenB vaccine on time to first STI

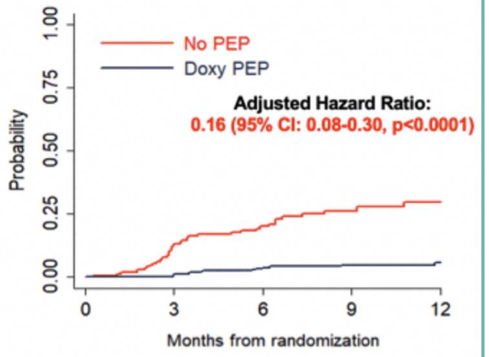
DSMB stopped enrollment at 556 due to significant effectiveness of both interventions

Doxycycline PEP
Time to First CT or Syphilis Infection

No interaction between Doxy PEP and 4CMenB vaccine (p=0.99)

Median follow-up: **9 months** (IQR: 6 to 12)

49 subjects infected
36 in No PEP arm
(incidence: 35.4/100 PY),
13 in Doxy PEP arm
(incidence: 5.6/100 PY)



Number at risk

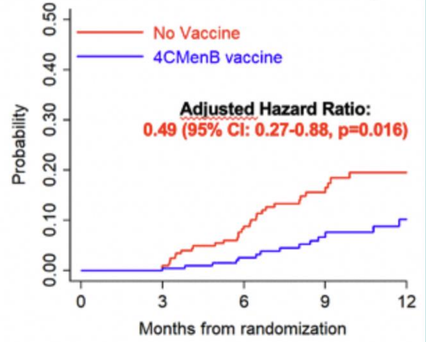
No PEP	170	137	99	47	22
Doxy PEP	332	271	220	144	83

4CMenB Vaccine
Time to First GC infection

No interaction between Doxy PEP and 4CMenB vaccine (p=0.41)

49 subjects infected
32 in No Vaccine arm
(incidence: 19.7/100 PY),
17 in 4CMenB vaccine arm
(incidence: 9.8/100 PY)

GC infections were considered from M3 visit (1 month after 2nd vaccine dose)



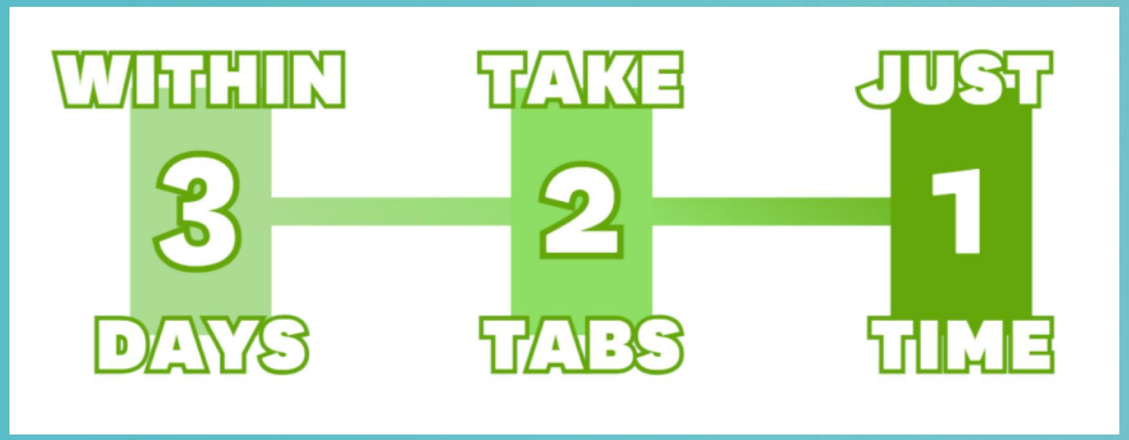
Number at risk

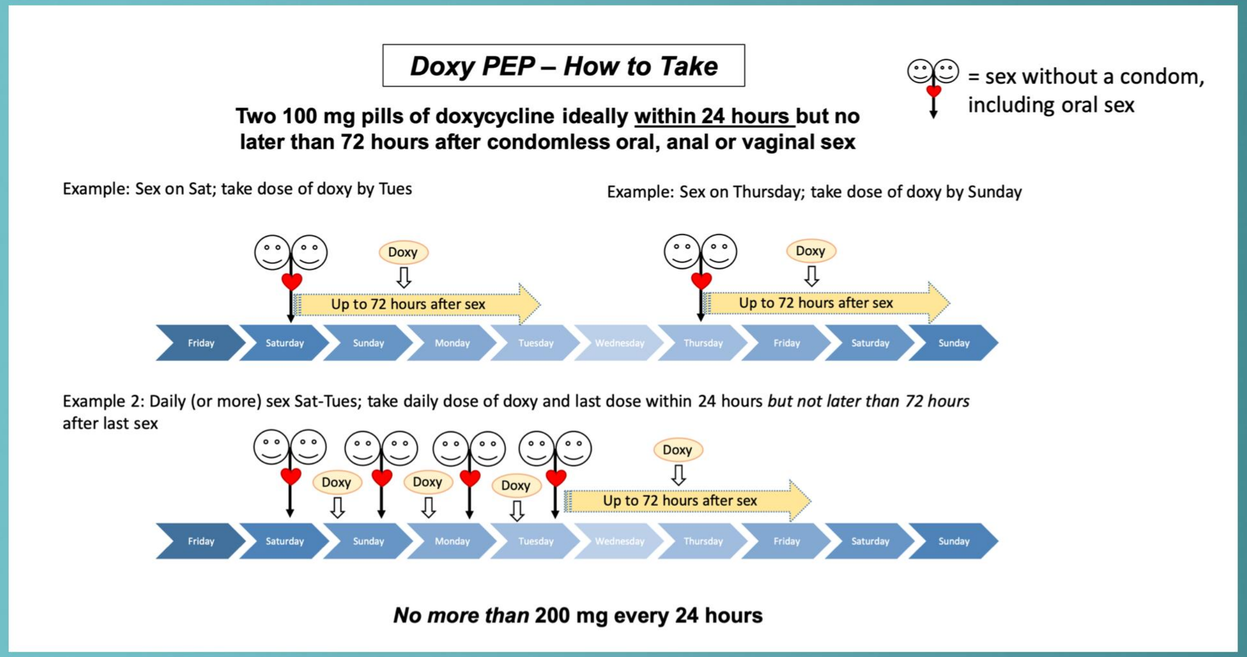
No Vaccine	245	208	150	91	49
4CMenB vaccine	257	208	170	102	49

https://clinicaltrials.gov/ct2/show/NCT04597424

Molina J-M, et al. HIV Glasgow 2022, Oral (New vaccines and DoxyPEP for STIs)

How is DoxyPep Taken?





DoxyPep Clinical

35 yo MSM with a previous history of treated and resolved late latent syphilis presents for a PrEP (PreExposure Prophylaxis) office visit. His PrEP office labs are negative (HIV, CT/GC, RPR, HBV, LFTs, CrCl) are all WNLs. He is in a relationship with an HIV negative man however does date other men and is inconsistent with condom usage.

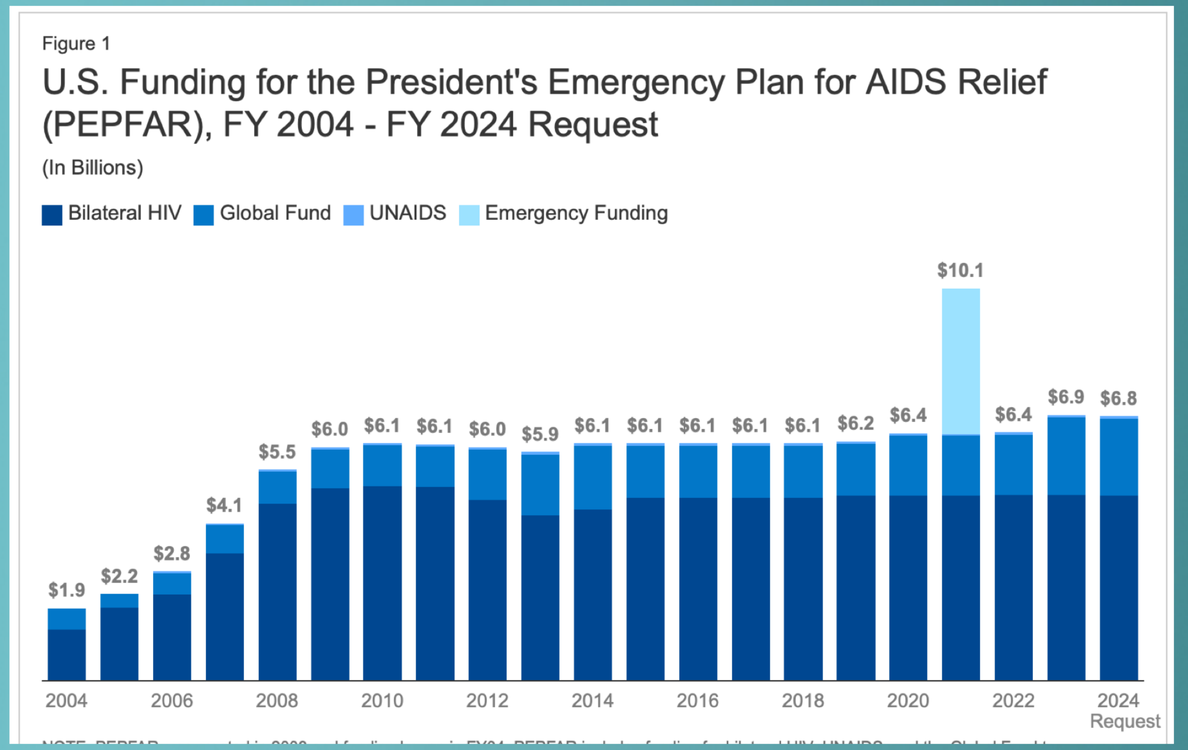
PEPFAR Funding is at Risk

PEPFAR Funding is at Risk

- The President's Emergency Plan for AIDS Relief (PEPFAR) had provided HIV treatment and support to millions of people in countries with high HIV prevalence.
- PEPFAR was launched in 2003, and it has made significant contributions to the fight against HIV around the world.

PEPFAR Funding is at Risk

- 20 years in, PEPFAR reports saving more than 25 million lives and is currently providing HIV prevention and treatment services to millions.



https://www.kff.org/global-health-policy/fact-sheet/the-u-s-presidents-emergency-plan-for-aids-relief-pepfar/

PEPFAR Funding is at Risk

- This U.S. government policy prohibits foreign NGOs receiving U.S. aid from providing information about, referrals for, or services for legal abortion, even with their own non-U.S. funds.
- The policy may limit the scope of reproductive health services provided by NGOs, including HIV prevention and treatment, potentially affecting the effectiveness of PEPFAR-funded programs.
- Reauthorization has become mired in a political fight over abortion as House Republicans seek to stop PEPFAR funding from going to organizations that offer abortion-related services.

https://www.kff.org/global-health-policy/fact-sheet/the-u-s-presidents-emergency-plan-for-aids-relief-pepfar/

Hansen's Disease

Hansen's Disease (Leprosy)

Medical News in Brief

August 16, 2023

Mounting Evidence Suggests Leprosy Is Endemic in Florida

Emily Harris

JAMA. 2023;330(9):798. doi:10.1001/jama.2023.13938

HEALTH

What's behind the increase in leprosy cases in Florida

August 6, 2023 · 8:06 AM ET

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

EMERGING INFECTIOUS DISEASES®

EID Journal > Volume 29 > Number 8—August 2023 > Main Article

Volume 29, Number 8—August 2023

Research Letter

Case Report of Leprosy in Central Florida, USA, 2022

Aashni Bhukhan, Charles Dunn✉, and Rajiv Nathoo
Author affiliation: Kansas City University–Graduate Medical Education/Advanced Dermatology Florida, USA

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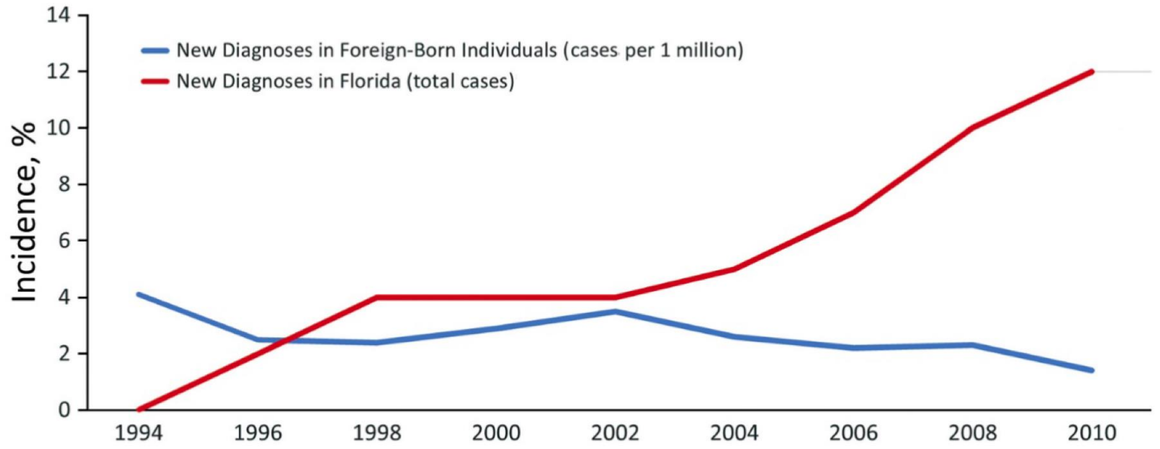
Hansen's Disease (Leprosy)

- Leprosy, also known as Hansen's disease, is an infection caused by slow-growing bacteria that can affect nerves, skin, eyes and the lining of the nose.
- While once "feared as a highly contagious and devastating disease," the CDC classifies leprosy as a slow spreading and easily treatable ailment.
- Left untreated, however, leprosy can cause nerve damage capable of crippling hands and feet, and causing paralysis and even blindness.

Appendix



Appendix Figure. Decreasing number of new diagnoses of leprosy in foreign-born individuals in the United States as the overall incidence increases in Florida during 1994–2010.

http://doi.org/10.3201/eid2908.220367

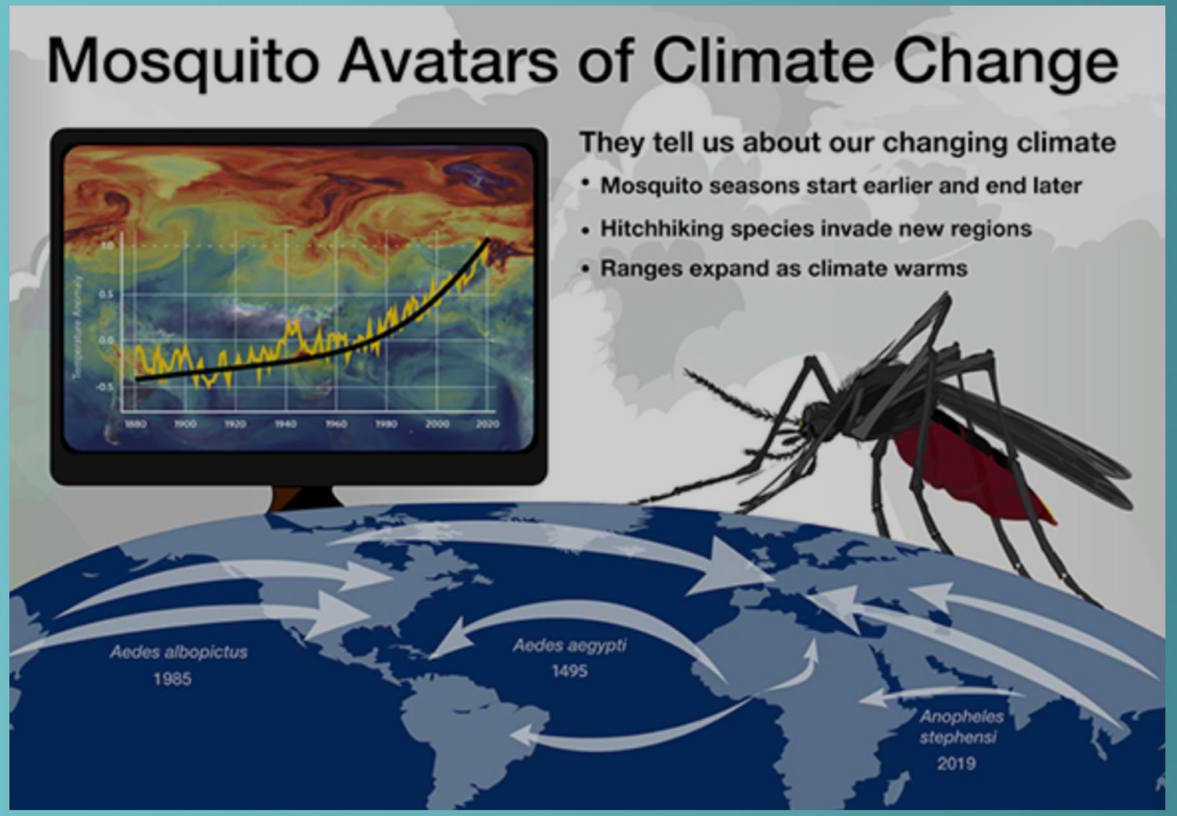
Hansen's Disease (Leprosy)

Figure. Lepromatous leprosy in a 54-year-old man in central Florida, USA, 2022. A, B) Leonine facies with waxy yellow papules. C) Violaceous nonblanching macules coalescing into patches along dorsum of feet bilaterally. D, E) Erythematous papules coalescing into plaques along extensor aspects of upper and lower extremities bilaterally. Plaques notably demonstrated a moderate degree of dysesthesia.

Climate Change and Infectious Diseases

Climate Change and Infectious Diseases

- Mosquito seasons are getting longer.
  - <u>Summers are longer, and winters are shorter,</u> which means there are more days per year when temperatures are over 50 degrees Fahrenheit (10 degrees Celsius).
- Mosquitoes are expanding their ranges.
  - With warming, Aedes aegypti are expanding their ranges to higher latitudes and altitudes that previously could not sustain the species.



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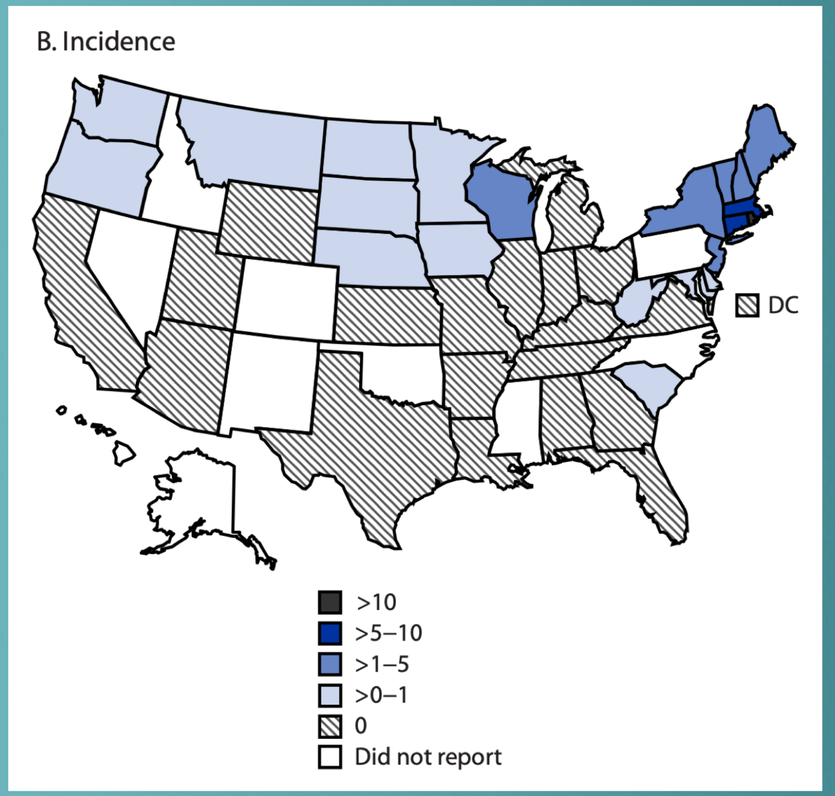
Trends in Reported Babesiosis Cases 2011-2019

- Babesiosis is an emerging zoonotic tick-borne parasitic disease in the United States and occurs primarily in the Northeast and Midwest.
- During 2011–2019, U.S. babesiosis incidence significantly increased in northeastern states. Three states (ME, NH, and VT) that were not considered to have endemic babesiosis had significantly increasing incidences and reported case counts similar to or higher than those in the seven states with known endemic transmission.



MMWR / March 17, 2023 / Vol. 72 / No. 11

Trends in Reported Babesiosis Cases 2011-2019

Doctor blames climate change for parasitic spread

FOX NEWS channel

Rare tick-borne babesiosis disease on the rise in northeastern US, says CDC: Here's why

Climate change is causing the uptick, says infectious disease doctor

March 17, 2023 8:47pm EDT

"As we've seen more effects of climate change, we expected that we would probably start to see different pathogens begin to expand the reach of their ecological niche," Dr. Déry said.

"Not only did we see an increase of cases in states where it was already endemic, but we also saw new endemic states, mostly in the New England area."

"I wouldn't be surprised to see other viral illnesses increase as well, like chikungunya, dengue or yellow fever, or parasitic infections like malaria," said Déry.

"As the climate gets warmer, it's more likely that pathogens we wouldn't normally see in the U.S. would expand into the country."

"Even one degree of a difference in temperature is enough for pathogens to expand their reach," he added.

https://www.foxnews.com/health/rare-tick-borne-babesiosis-disease-on-the-rise-in-northeastern-us-says-cdc-heres-why

Dengue Fever

The Washington Post
Democracy Dies in Darkness

What to know about dengue fever after Florida officials warn of cases

By Lyric Li

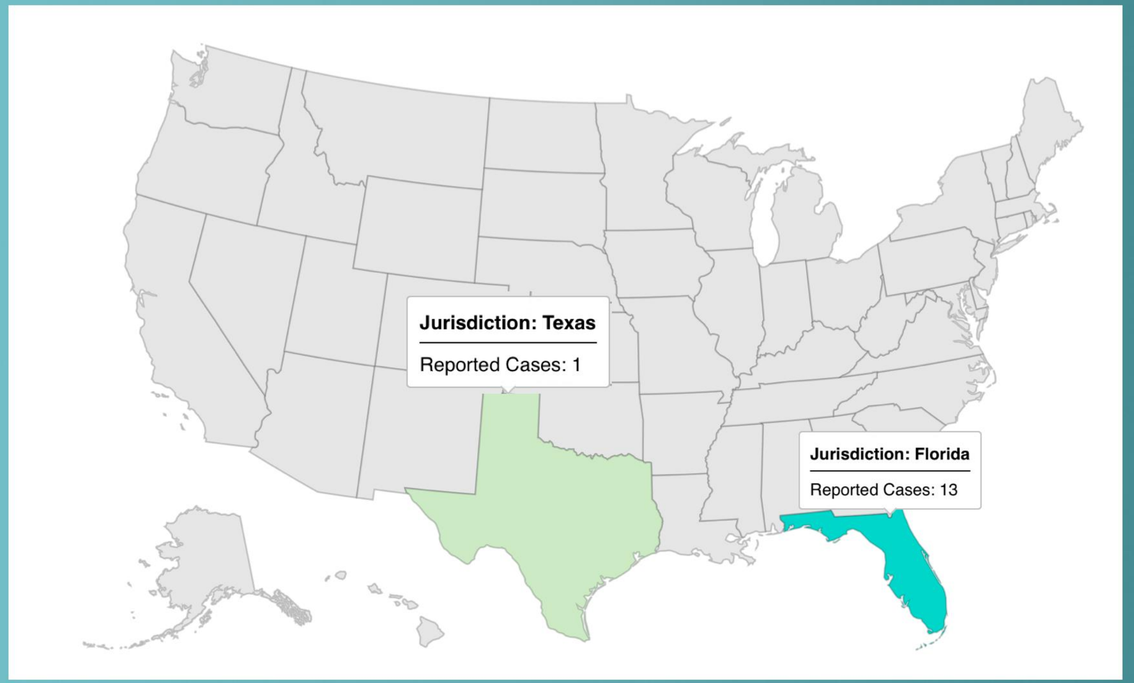
August 17, 2023 at 6:26 a.m. EDT

Dengue Fever; Locally Acquired

Current Data for 2023

Travel status

Locally acquired



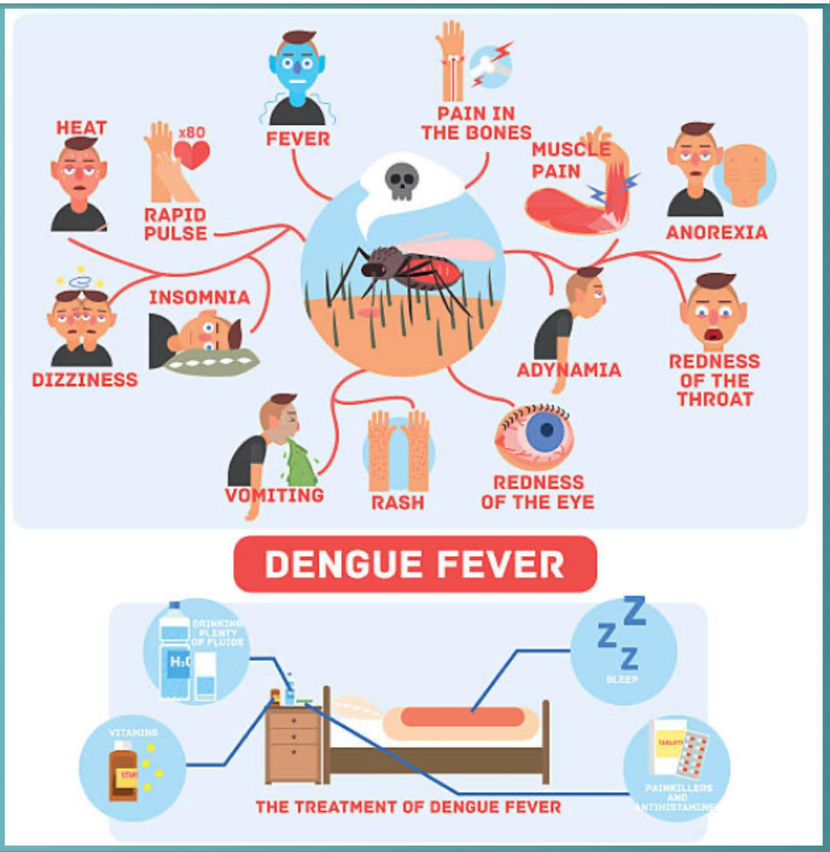
https://www.cdc.gov/dengue/statistics-maps/current-data.html

What is Dengue Fever?

- What is Dengue Fever?
  - Dengue fever is a mosquito-borne viral illness prevalent in tropical and subtropical regions around the world.
  - The virus that causes dengue, known as the dengue virus, is transmitted through the bite of an infected Aedes mosquito.

What is Dengue Fever?

- Dengue virus causes a wide spectrum of illnesses, from mild dengue fever to severe forms such as dengue hemorrhagic fever and dengue shock syndrome.
- Its symptoms typically begin 4-6 days after infection, lasting up to 10 days, manifesting as a high fever (40°C/104°F), severe headache, pain behind the eyes, muscle and joint pain, nausea, vomiting, and a characteristic skin rash.
- Treatment for dengue primarily revolves around relieving the symptoms.



Locally Acquired Malaria Cases Identified in the United States

Summary

The Centers for Disease Control and Prevention (CDC) is issuing this Health Alert Network (HAN) Health Advisory to share information and notify clinicians, public

1. Identificatio
   states (Flori

Maryland reports first local malaria 4 decades

Lisa Schnirring, *August 21, 2023*

Distributed via the CDC Health Alert Network
June 26, 2023, 5:00 PM ET
CDCHAN-00494

Maryland reports first local malaria case in 4 decades

Lisa Schnirring, *August 21, 2023*

In mid-June, **Florida** reported two local malaria cases, which were followed by a report of a local case from **Texas**, the state's first since 1994. The reports prompted the Centers for Disease Control and Prevention (CDC) to issue **a malaria advisory** noting that the cases weren't connected and involved *Plasmodium vivax*, the parasite that is the most frequent cause of malaria.

Florida has reported **seven local malaria cases this summer**, all from Sarasota County. Illness onsets for five patients were in June, with symptoms beginning in May for one patient and in July for another.

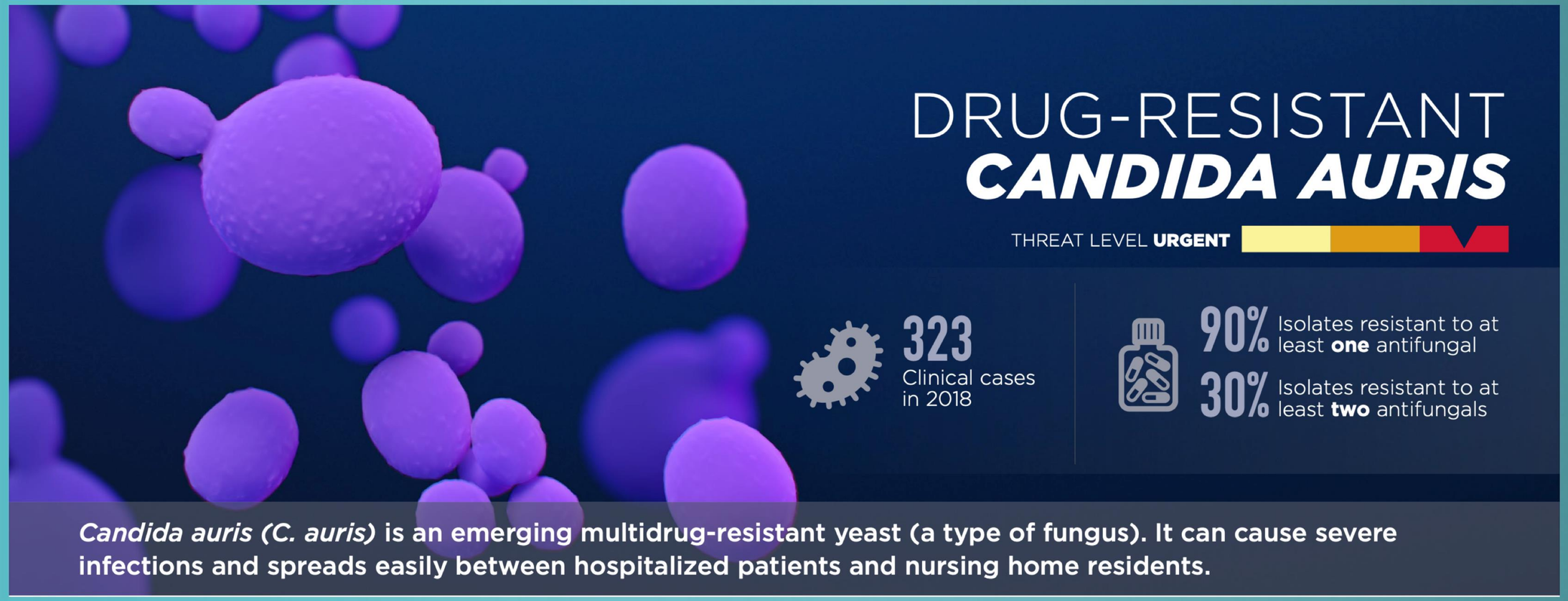
The CDC had warned that the risk of locally acquired malaria cases was low for most of the country but is higher in locations where *Anopheles* mosquitos survive most of the year and where travelers from malaria-affected counties are found.

Emerging Fungal Infection; Candida Auris

Emerging Fungal Infection; Candida Auris

- Candida auris is a multidrug-resistant and emergent pathogen that has caused healthcare-associated infection outbreaks.
- C. auris has spread worldwide; it was practically unknown before 2009.
- C. auris cannot be detected using conventional methods.
- Was first detected in Japan from an ear specimen.

Emerging Fungal Infection; Candida Auris



Emerging Fungal Infection; Candida Auris

WHAT YOU NEED TO KNOW

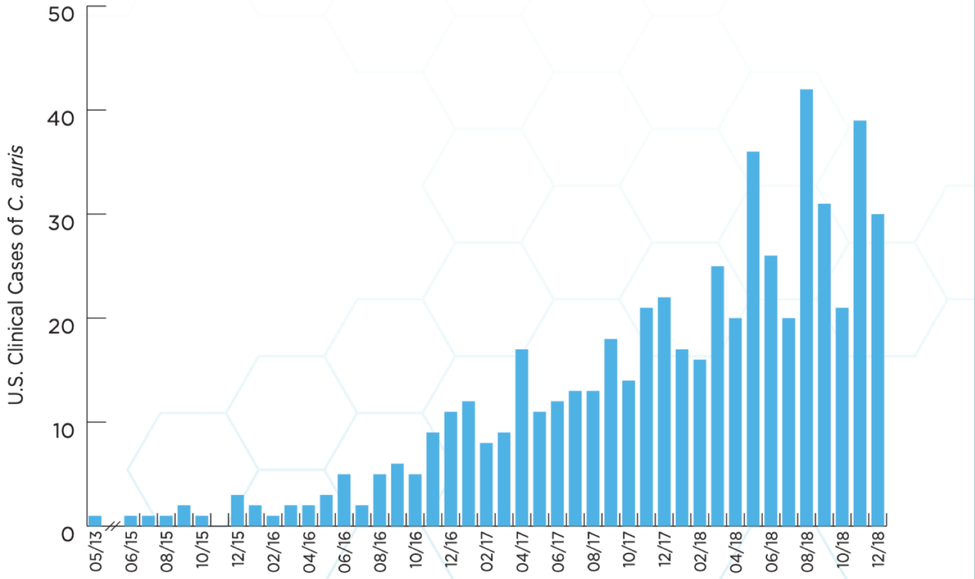
- *C. auris,* first identified in 2009 in Asia, has quickly become a cause of severe infections around the world.
- *C. auris* is a concerning drug-resistant fungus:
  - Often multidrug-resistant, with some strains (types) resistant to all three available classes of antifungals
  - Can cause outbreaks in healthcare facilities
  - Some common healthcare disinfectants are less effective at eliminating it
  - Can be carried on patients' skin without causing infection, allowing spread to others

Data represents U.S. cases only. Isolates are pure samples of a germ.

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

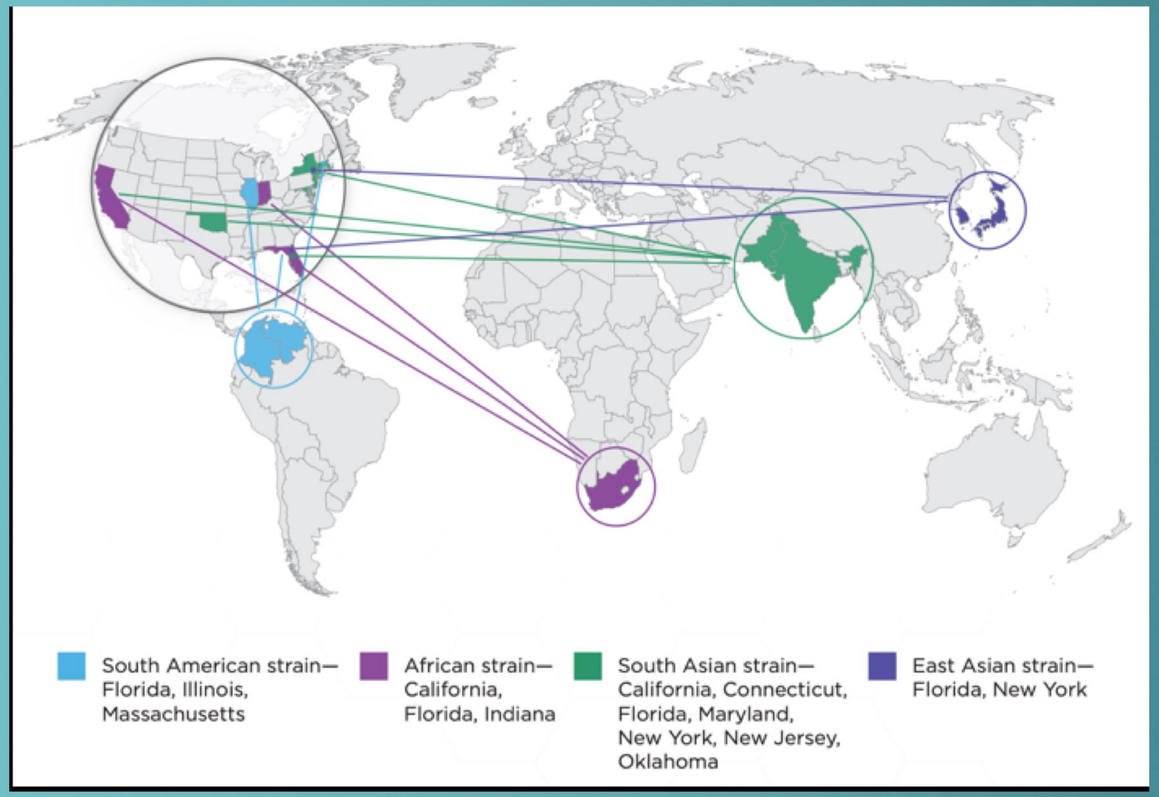
CASES OVER TIME

C. auris began spreading in the United States in 2015. Reported cases increased 318% in 2018 when compared to the average number of cases reported in 2015 to 2017.



Emerging Fungal Infection; Candida Auris

- 4 Strains Emerged Simultaneously
  - Investigators still do not know why four different strains of C. auris emerged around the same time across the globe.
  - All four strains have been found in the United States, likely introduced through international travel and subsequent spread in U.S. healthcare facilities.



Emerging Fungal Infection; Candida Auris

- Clinical;
  - C. auris is often isolated from the blood, urine, sputum, ear discharge, CSF, & soft tissue.
  - Discrimination between colonization and infection is difficult, except in the blood.
  - **The mortality rate of C. auris fungemia ranges to 30%-60%.**
  - **Mortality rate for general candidemia is roughly 25%.**
  - Demonstrates multi drug resistance to all classes of antifungals.

Table 2
Antifungals provisional breakpoint and resistance rate (RR) of *C. auris*.

	μg/mL [6,14]	RR (%) [36]	RR (%) in Japan (see Table 3)
Fluconazole	32	44.3	15.4
Voriconazole	2	12.7	7.7
Micafungin	4	1.3	0
Caspofungin	2	3.5	0[a]
Amphotericin B	2	15.5	0
Flucytosine	128	2.0	0

[a] Including eight strains with paradoxical effect. Despite a strain with caspofungin MIC of >16 μg/mL at first, repeat tests indicated that it was paradoxical effect, not true resistance (data not shown).

Iguchi et al. / J Infect Chemother 25 (2019) 743e749746

Emerging Fungal Infection; Candida Auris

Table 2. *Candida auris* and the tentative minimal inhibitory concentration breakpoints for antifungal drugs

Drugs	Tentative MIC breakpoints (mcg/ml)
Fluconazole	≥32
Voriconazole (and other second-generation azoles)	N/A
Amphotericin B	≥2
Anidulafungin (Echinocandins)	≥4
Caspofungin (Echinocandins)	≥2
Micafungin (Echinocandins)	≥4

Data sourced from Centers for Disease Control and Prevention - Antifungal Susceptibility Testing and Interpretation [21].
MIC, minimum inhibitory concentration; N/A, not available.

https://doi.org/10.3947/ic.2022.0008

Iguchi et al. / J Infect Chemother 25 (2019) 743e749746

Emerging Fungal Infection; Candida Auris

Key Takeaways

Why is *Candida auris* a problem?

- **It causes serious infections.** *C. auris* can cause bloodstream and other types of invasive infections, particularly in patients in hospitals and nursing homes who have many medical problems. More than 1 in 3 patients die within a month of being diagnosed with an invasive *C. auris* infection.
- **It is often multidrug-resistant.** Antifungal medications commonly used to treat other *Candida* infections often don't work for *C. auris*. Some *C. auris* isolates are resistant to all three major classes of antifungal medications.
- **It is becoming more common.** Although *C. auris* was just discovered in 2009, the number of cases has grown quickly. Since 2009, it has been reported in dozens of countries, including the United States.
- **It is difficult to identify.** *C. auris* can be misidentified as other types of fungus, unless specialized laboratory methods are used. Correctly identifying *C. auris* is critical for starting measures to stop its spread and prevent outbreaks.
- **It can spread and cause outbreaks in healthcare facilities.** Just like other multidrug-resistant organisms such as carbapenem-resistant Enterobacteriaceae (CRE) and methicillin-resistant *Staphylococcus aureus* (MRSA), *C. auris* can be transmitted in healthcare settings and cause outbreaks. It can colonize patients for many months, persist in the environment, and withstand some commonly used healthcare facility disinfectants.

Early detection and infection control can limit the spread of *C. auris.*

~~Questions~~

SCIENCE

BIRD FLU HAS NEVER DONE THIS BEFORE

Experts worry that H5N1 avian influenza is now endemic in North America.

By Katherine J. Wu

AUGUST 03, 2023

HPAI H5N1 Outbreak

- The 2022-2023 outbreak of Highly Pathogenic Avian Influenza (HPAI) H5N1 in the United States was a significant public health crisis for birds.
  - It decimated the poultry industry, leading to extensive economic loss as millions of birds had to be culled to contain the virus.
  - The potential for zoonotic transmission posed a tremendous threat to human health.
  - The rapid spread of the virus meant that large-scale containment efforts were essential, straining resources and manpower.
  - The outbreak illuminated gaps in the country's biosecurity measures, necessitating more comprehensive and stringent plans for the future.

Technical Report: Highly Pathogenic Avian Influenza A(H5N1) Viruses

Español | Other Languages Print

Updated October 5, 2023

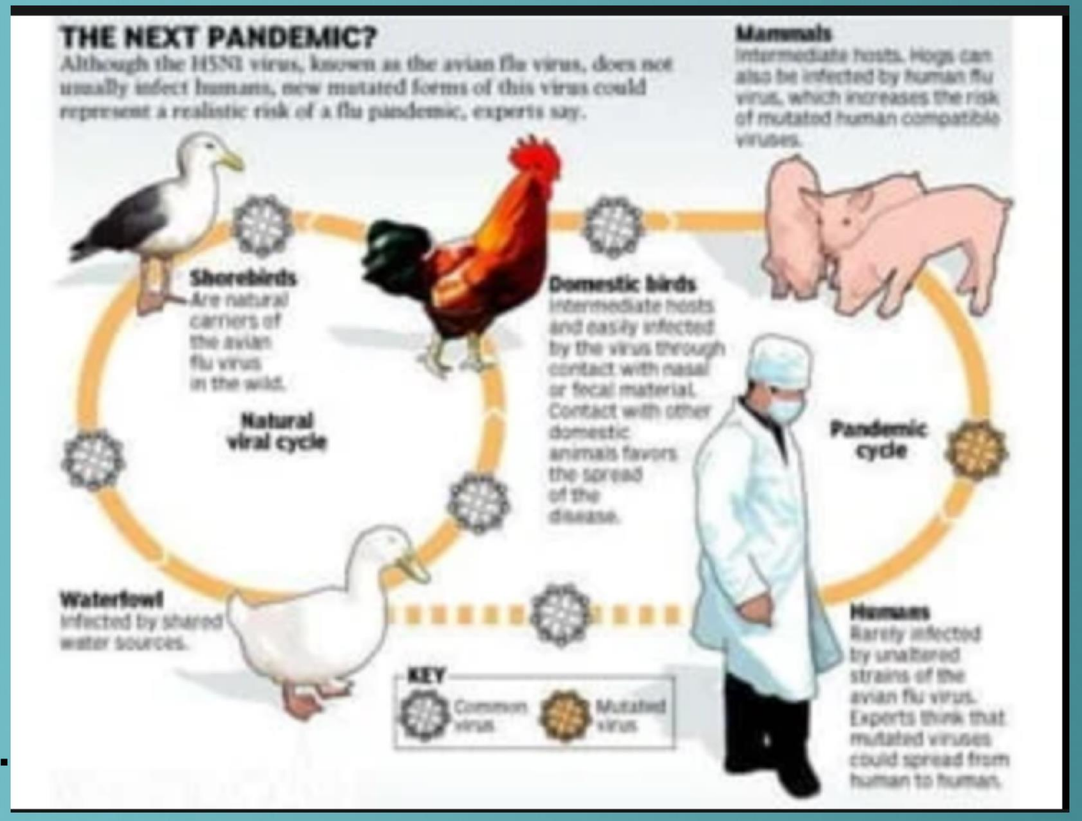
Executive summary

A small number of sporadic human cases of A(H5N1) have been identified since 2022, despite the panzootic of highly pathogenic avian influenza (HPAI) A(H5N1) viruses in wild birds and poultry. Nearly all reported human cases since 2022 were associated with poultry exposures, and no cases of mammal-to-human or human-to-human transmission of HPAI A(H5N1) virus have been identified. In a few cases, the source of exposure to HPAI A(H5N1) virus was unknown. To date, HPAI A(H5N1) viruses currently circulating in birds and poultry, with spillover to mammals, and those that have caused human infections do not have the ability to easily bind to receptors that predominate in the human upper respiratory tract. Therefore, the current risk to the public from HPAI A(H5N1) viruses remains low. However, because of the potential for influenza viruses to rapidly evolve and the wide global prevalence of HPAI A(H5N1) viruses in wild birds and poultry outbreaks, continued sporadic human infections are anticipated. Continued comprehensive surveillance of these viruses in wild birds, poultry, mammals, and people worldwide, and frequent reassessments are critical to determine the public health risk, along with ongoing preparedness efforts.

https://www.cdc.gov/flu/avianflu/spotlights/2022-2023/h5n1-technical-report_september.htm

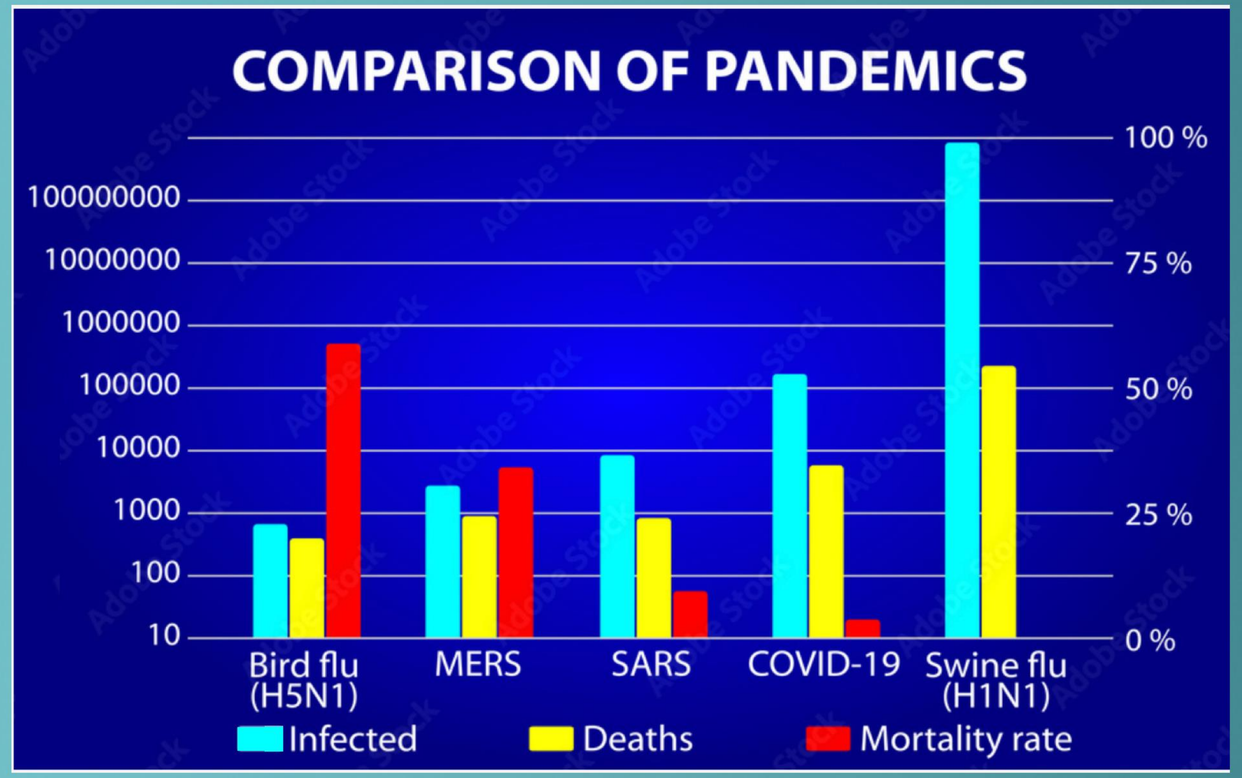
HPAI H5N1 Recombination

- The H5N1 avian influenza virus can recombine with the human influenza virus when both infect the same cell within a host.
- This process is termed as 'reassortment', resulting in a new subtype of virus that carries genetic material from both parent viruses.
- Such a new subtype could potentially infect humans and spread more readily, if it features the avian virus's virulence coupled with the human virus's ability to transmit between people.



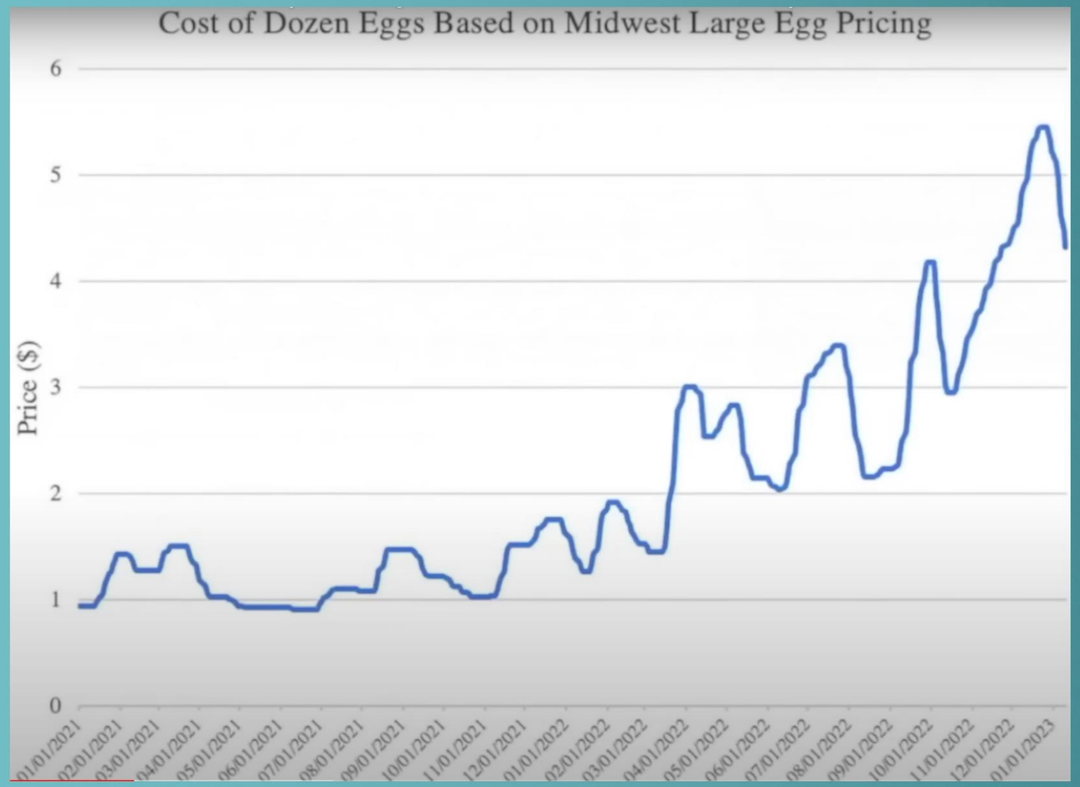
HPAI H5N1 Human Mortality Rate

- Since 2003, there have been 868 cases of human infection with H5N1.
- 457 were fatal
  - 53% mortality rate
  - Near 100% avian mortality rate



HPAI H5N1 Increase in Egg Prices

- The H5N1 outbreak led to a significant rise in egg prices due to a drastic reduction in supply following mass culling of infected birds.
- This spike in prices was further fuelled by heightened biosecurity measures and increased production costs borne by poultry farmers.



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THINGS TO KNOW

ABOUT H5N1
Highly Pathogenic Avian Influenza A

1

H5N1 viruses have traditionally caused worldwide poultry outbreaks

This season's bird flu outbreak is the worst in U.S. history

H5N1 is highly contagious and has nearly 100% fatality in birds

3

THINGS TO KNOW

ABOUT H5N1
Highly Pathogenic Avian Influenza A

2

Human infection is rare:
- 868 global cases reported since 2003
- 457 were fatal = 53% case fatality rate

Virus spillover into mammals has been reported

Mink-to-mink transmission raises concerns about the potential for human infections

Only one mild case has been reported in a person in the U.S. since 4/2022

3

THINGS TO KNOW

ABOUT H5N1
Highly Pathogenic Avian Influenza A

3

There are no effective treatments or vaccines available for H5N1

Essential

- ✔ Prompt identification
- ✔ Isolation
- ✔ Supportive care measures

~~Questions~~

Alpha Gal Syndrome

Vegetarianism in the United States

What percent of the population is vegetarian/vegan?

1–3%
actual vegetarians

3–6%
those who describe themselves as vegetarian

source: HRC

Who is reducing their meat consumption?

Most meat reduction is coming from part-time vegetarians.

13%
of U.S. adults eat meat with less than half of meals

26%
have reduced how much meat they consume vs. last year

source: HRC

We still eat more meat per person here than in almost any other country on the planet. Only the Luxembourgers eat more meat than we do.

Why do people choose a vegetarian/vegan diet?

	Reasons for Not Eating Meat	Primary*	Contributory*
	To reduce suffering of animals on farms	30%	55%
	To eat a healthier diet in general	20%	65%
	To eat preferred foods	10%	23%
	To reduce impact on the planet/ environment	10%	30%
	To reflect spiritual or religious beliefs	8%	20%

Alpha Gal Syndrome

HEALTH

Cases of alpha-gal syndrome caused by tick bites on the rise, CDC reports

By Bree Iskandar July 27, 2023

Alpha Gal Syndrome

- Allergies to the sugar galactose-alpha-1,3-galactose, or alpha-gal for short are increasing.
- Alpha-gal is found in many mammalian food products — like beef, pork, and dairy — but also in the saliva of some ticks.
- In response to a bite from such a tick, a person's immune system might produce a specific antibody to recognize alpha-gal called IgE.
- Long after inflammation from the tick bite subsides however, IgE still floats around, ready to alert the immune system to future alpha-gal intruders, including any alpha-gal from food we eat.
- Unfortunately, there are no cures or treatments for the condition, and allergies often last for years.

Alpha Gal Syndrome

What is already known about this topic?

Alpha-gal syndrome (AGS) is an emerging, tick bite–associated allergic condition characterized by potentially life-threatening hypersensitivity to an oligosaccharide found in most mammalian meat and products derived from it; however, in the absence of national surveillance, the geographic distribution and number of cases are largely unknown.

What is added by this report?

The number of suspected AGS cases in the United States has increased substantially since 2010, and states with established populations of lone star ticks are most affected, although suspected AGS cases were also identified in areas outside of this tick's range.

Weekly / July 28, 2023 / 72(30);815–820

Alpha Gal Syndrome

- People with AGS should stop eating mammalian meat (such as beef, pork, lamb, venison, rabbit, etc.).
- Depending on the sensitivity and the severity of the allergic reaction, avoidance of other foods and ingredients which may contain alpha-gal (such as cow's milk, milk-products, and gelatin) is recommended.

Who gets AGS?

Anyone can get AGS.

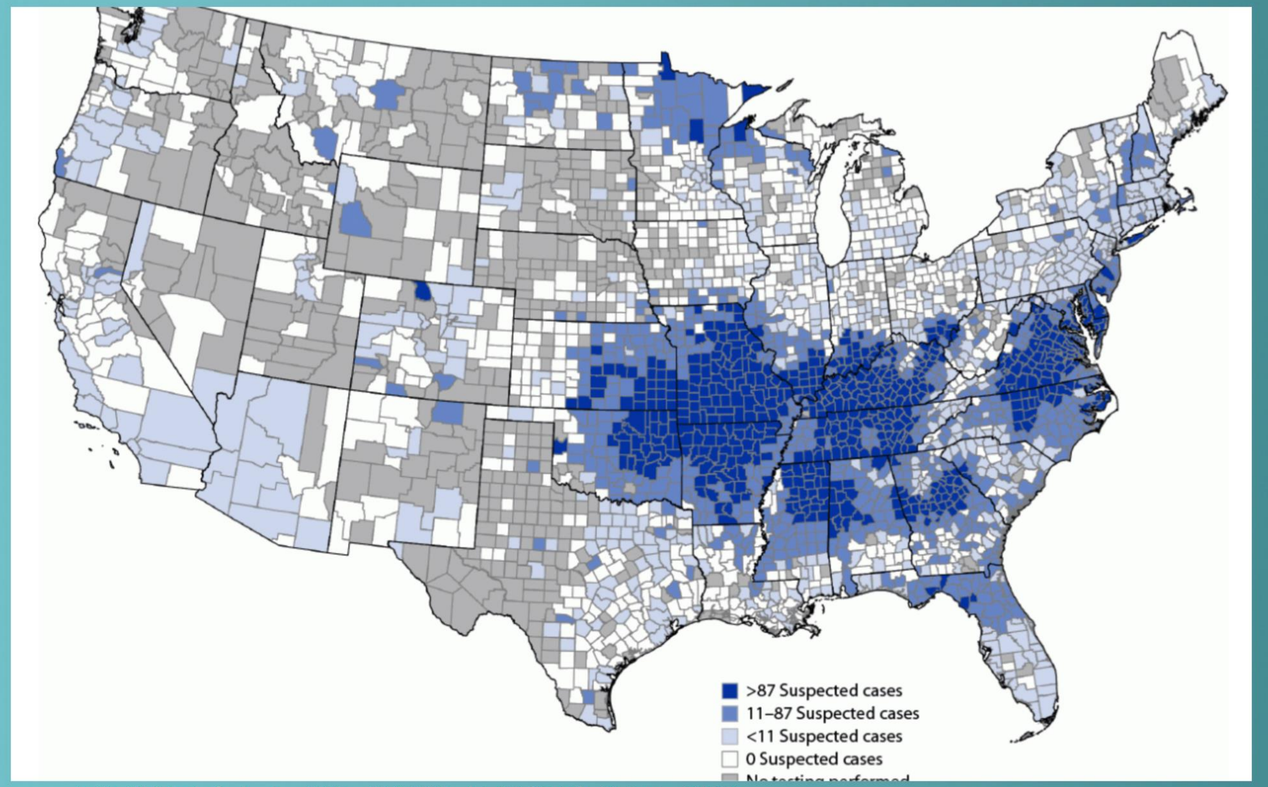
- Most reported cases of AGS in the United States are among people living in the South, East, and Central United States.
- While people in all age groups can develop AGS, most cases have been reported in adults.

Alpha Gal Syndrome

Table 1

Tick Species Associated with Alpha-Gal Sensitization

Scientific Name	Common Name(s)[a]	Geographic Range[a]
Amblyomma americanum	Lone Star Tick	North America (Southeastern US, Canada, Mexico)
Amblyomma cajennense	Cayenne Tick	North and Central America
Amblyomma hebraeum[b]	South African Bont Tick	South Africa
Amblyomma sculptum	N/A	South America (Brazil)
Amblyomma testudinarium	N/A	South Asia (India, Sri Lanka) and East Asia (including Japan)
Amblyomma variegatum[b]	Tropical Bont Tick	Southeast Asia, Africa
Haemaphysalis longicornis	Asian Longhorned Tick, Bush Tick	Japan
Ixodes australiensis	N/A	Australia
Ixodes holocyclus	Paralysis Tick	Australia, Southern Asia
Ixodes nipponensis[b]	Cattle Tick	Asia (including Korea, Japan)
Ixodes ricinus	Sheep Tick, Wood Tick, Deer Tick, Castor Bean Tick	North America, Europe and Northern Asia, Africa
Ixodes scapularis	Blacklegged Tick	Middle America, North America
Rhipicephalus spp (including *R. microplus; R. evertsi*)[b]	Asian Blue Tick, Australian Cattle Tick, Southern Cattle Tick, Cuban Tick, Madagascar Blue Tick, Puerto Rican Tick	Southern Asia, South America, North America, Caribbean, Australia, Africa



MMWR / July 28, 2023 / 72(30);815–820

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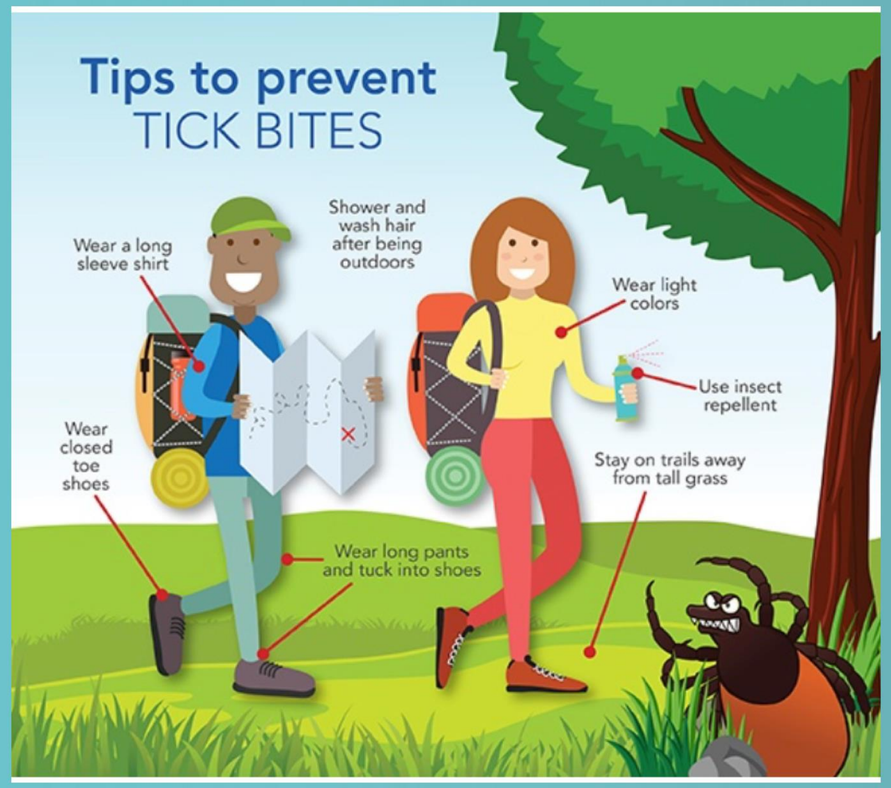
Prevent Tick Bites



Summary

- DoxyPEP prevents STIs.
- PEPFAR and millions of lives is at risk.
- Hansen’s disease is becoming endemic in Central Florida.
- Candida auris is a SERIOUS infection to be watching for
- Climate change and infectious diseases are becoming more apparent;
  - Babesiosis
  - Dengue
  - Malaria
  - Alpha Gal Syndrome
- HPAI H5N1 has the potential to become an epidemic.

Questions