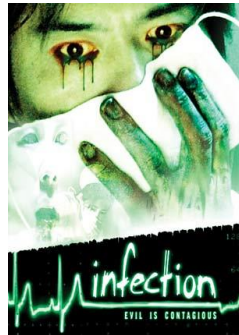
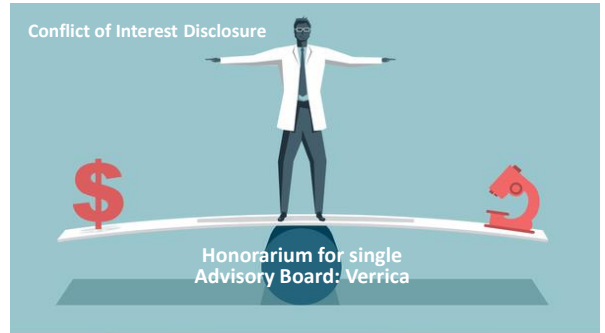


**Infectious Disease Update
Maui Derm NP-PA Summer 2024**

**Ted Rosen, MD
Professor and Vice-Chair
Dermatology Department
Baylor College of Medicine**



1



2

- When I start talking about infections...
- You will itch, retch and run



3

COVID-19 By The Numbers; Per CDC and WHO

Global cases	>772,200,000
Global deaths	>6,900,000
US Cases	>105,500,000
US Deaths (total)	>1,160,000

https://covid.cdc.gov/covid-data-tracker/#cases_casespersooklastyday
<https://covid19.who.int/s>



4

Is COVID Relevant to Dermatology?

- Patients with ANY skin manifestation during early COVID pandemic
- ~30%
- Rashes (see figure)
- Hair loss (see next)
- **Delta dominant 17.6%**
- **Omicron dominant 11.4%**

TYPE	PERCENT	MEAN AGE
COVID toes	40.4%	23
Mac-pap	21.3%	53
Vesicular	13%	40+
Vascular	4%	60+
EM-Like	3.7%	<12
Unclassified	17.6%	?

Am J Clin Dermatol 2020;21:627-634
Br J Dermatol 2022; July 22. doi: 10.1111/bjd.21784

5

Is COVID *STILL* Relevant to Dermatology?

- What about later Omicron variants?
- Skin manifestations remain polymorphic
- But have become increasingly more uncommon (~4%)
- What about Long Covid patients?
- Largest series suggests only 3% have/had any skin abnormalities (47/1665)

Rom J Morphol Embryol. 2023;64(3):291-304.
Am J Physiol Cell Physiol. 2022;322(1):C1-C11.

6

Hair Loss and COVID-19



- Retrospective review 1826 patients
- Most common assoc: AGA, but this preceded COVID
- *Second most common assoc: Telogen effluvium*
- Third, but uncommon: Alopecia areata

JAAD Int. 2022;7:67-77

7

Hair Loss and COVID-19

Research Letter

January 10, 2024

Risk of Alopecia Areata After COVID-19

Jong-Seung Kim, MD, PhD^{1,2,3}, Geon-Jong Lee, MD⁴, Cho-Yun Jeong, MS³, et al

> Author Affiliations | Article Information

- Retrospective review 259,369 COVID patients
 - Versus age-matched controls without COVID
- Hazard ratio for telogen effluvium 6.4
- Hazard ratio for alopecia areata 1.8

JAMA Dermatol. 2024 Jan 10:e235559

8

Long COVID (Post-acute COVID)

- Elevated levels of any of these four proteins: **Ba**, **iC3b**, **C5a**, and **TCC** predicts Long Covid with 78.5% sensitivity and 80% specificity
- Anti-factor B: iptacoplan
- Anti-C3: pegcetacoplan
- Anti-C5: zilucoplan

Immunobiology. 2023;228(3):152393
Immunology. 2023;168:473-492

9

The Bivalent and Monvalent Boosters Help.... But for how long? Concern with new variants

Current booster about 54% effective

MMWR Morb Mortal Wkly Rep. 2022 Feb 4; 71(5): 177-181
JAMA. 2022;327(7):639-651
N Engl J Med. 2022;386(15):1397-1408
Clin Infect Dis. 2023;76(3):e342-e349.

10

The Bivalent and Monvalent Boosters Help.... But for how long? Concern with new variants

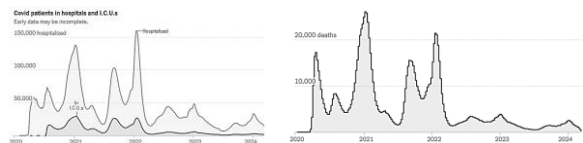
Emerging Strains
KP.1 KP.2 KP.3
35%, May, 2024

MMWR Morb Mortal Wkly Rep. 2022 Feb 4; 71(5): 177-181
JAMA. 2022;327(7):639-651
N Engl J Med. 2022;386(15):1397-1408
Clin Infect Dis. 2023;76(3):e342-e349.

11

Is COVID-19 over? **YES!**

- Total COVID cases/month or week decreased 90%
- Hospitalizations/month or week are down 90%
- Deaths/month or week are down 90%



12

Is COVID-19 over? **NOT REALLY!**

- Between 100-200 Americans die daily due to COVID-19
- COVID-19 the #4 cause of death; New strains worrisome
- American life expectancy has fallen by 3 full years
- 26 million Americans suffer from Long COVID
- Old monoclonal antibodies no longer work and have been withdrawn from production
- We are down to remdesivir, molnupiravir, nirmatrelvir w/ ritonavir

13

Is COVID-19 over? **NOT REALLY!**

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- 26 million Americans suffer from Long COVID
- Old monoclonal antibodies no longer work and have been withdrawn from production
- We are down to remdesivir, molnupiravir, *nirmatrelvir w/ ritonavir*

14

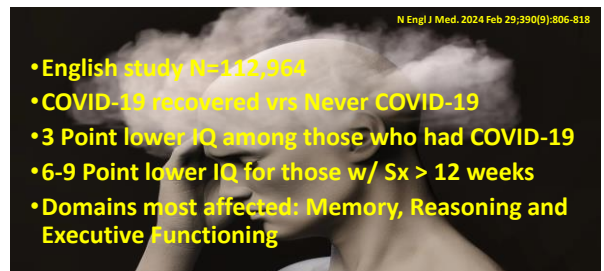


- “The time to sustained alleviation of signs and symptoms of Covid-19 did not differ significantly between those participants who received nirmatrelvir–ritonavir and those who received placebo”

N Engl J Med 2024;390:1186-1195

15

COVID-19: Is “Brain Fog” Real?



16



17

	CASES	DEATHS*
USA	32,063	58
GLOBAL	91,973	181

USA > Brazil > Spain > France = Columbia > Mexico

***Most deaths associated with uncontrolled HIV+**

18

STATE	CASES
California	6015
New York	4365
Texas	3085
Florida	2923
Georgia	2034
Illinois	1557
Pennsylvania	872
New Jersey	787

19

THE NEW ENGLAND JOURNAL OF MEDICINE

ORIGINAL ARTICLE

Monkeypox Virus Infection in Humans across 16 Countries — April–June 2022

J.P. Thornhill, S. Barkati, S. Walmsley, J. Rockstroh, A. Antonini, L.B. Harrison, P. Palick, A. Noori, I. Benves, M.S. Habib, V. Apea, C. Boersma, L. Vanelderskijve, M. Yalabeyeva, E. Sondagorta, J.L. Blanco, E. Florence, D. Moschese, F.M. Maltez, A. Goochuis, V. Pouchier, P. Mijtsal, S. Noe, C. Pinedo, F. Maggi, A.-B.E. Hanson, C. Hoffmann, J. Lorzana, C. Mussini, A.M. Catalan, R. Makufane, D. Tan, S. Nozza, J. Nemeth, M.B. Klein, and C.M. Orkin, for the SHARE-net Clinical Group[†]

Apr-Jun, 2022

- 98% gay or bisexual men
- 75% Caucasian, 41% HIV+
- 40% had sex w/ 2-4 partners
- 14% had sex w/ 5-9 partners
- 19% had sex w/ >10 partners
- 38% attended gay sex party

Short incubation (median < 1 week) following sexual contact (95%)

13% hospitalized (mostly pain relief); **saliva + 12/12; semen + 7/9**

Oral lesions w/ pain and difficulty swallowing

Single/Multiple anal lesion(s) may be present, 15% anorectal pain

Just genital lesions may be present

N Engl J Med 2022 Aug 25;387(8):679-691

20



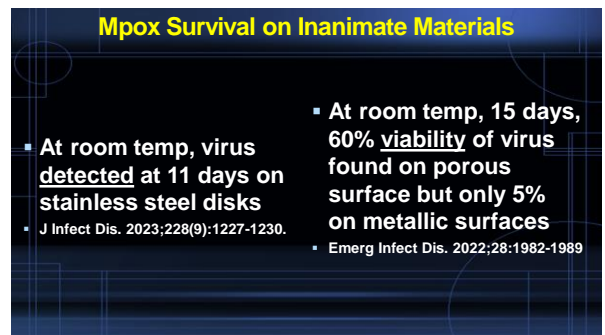
21



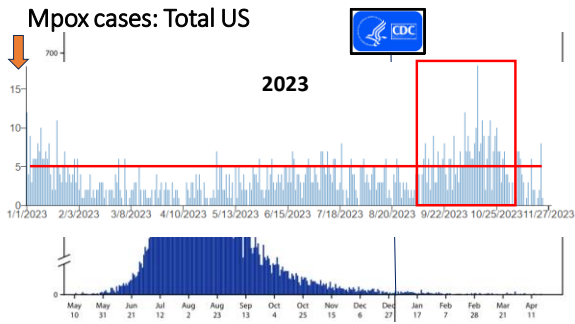
22



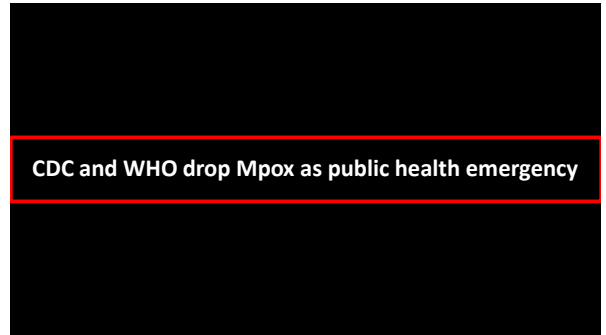
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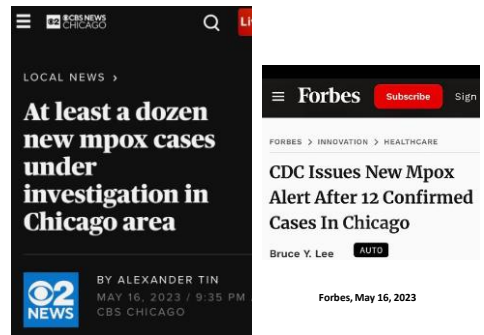


26

BUT

27

BUT...



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BOTTOM LINE....

Mpx still circulating in USA
Vaccination rate too low; Vaccine not 100% effective

CDC Press Release, May 17, 2023

29

Effectiveness of JYNNEOS Vaccine Against Diagnosed Mpox Infection — New York, 2022 **MMWR.2023;72(20): 559-563**

Estimated Effectiveness of JYNNEOS Vaccine in Preventing Mpox: A Multijurisdictional Case-Control Study — United States, August 19, 2022–March 31, 2023 **MMWR.2023;72(20): 553-558**

Vaccine Effectiveness of JYNNEOS against Mpox Disease in the United States **N Engl J Med. 2023;388:2434-2443**

30

Efficacy Mpox Vaccine

EFFICACY AFTER....	ONE DOSE	TWO DOSES ★
NEW YORK	68.1%	88.5%
USA, 12 JURISDICTIONS	75%	86%
NATIONWIDE, EHR	35.8%	66%

MMWR.2023;72(20): 553-558
 MMWR.2023;72(20): 559-563
 N Engl J Med. 2023;388:2434-2443

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Free Mpox vaccine

• <https://www.cdc.gov/poxvirus/mpox/vaccines/vaccine-recommendations.html>

32

What about treatment efficacy? (Tecovirimat)

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

EMERGING INFECTIOUS DISEASES* Emerg Infect Dis. 2023;29:2426-32

EID Journal > Volume 29 > Number 12—December 2023 > Main Article

**Resistance based on F13 gene mutation
 Leads to abnormal F13 protein
 Single amino acid change
 Mostly in uncontrolled HIV+**

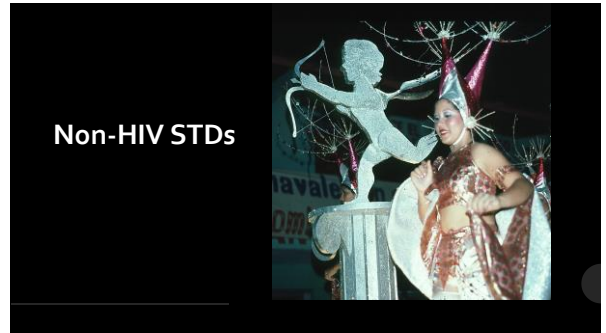
Volume 29, Number 12—December 2023

Research

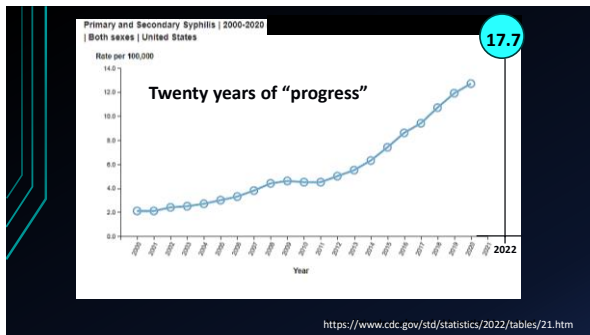
Tecovirimat Resistance in Mpox Patients, United States, 2022–2023

Todd G. Smith, Crystal M. Gigante, Nhien T. Wynn, Audrey Matheny, Whitney Davidson, Yong Yang, Rene Edgar Condori, Kyle O'Connell, Lynsey Kovar, Tracie L. Williams, Yon C. Yu, Brett W. Petersen, Nicolle Baird, David Lowe, Yu Li, Panayampalli S. Satheshkumar, and Christina L. Hutson
 Author affiliations: Centers for Disease Control and Prevention, Atlanta, Georgia, USA (T.G. Smith, C.M. Gigante, N.T. Wynn, A. Matheny, W. Davidson, Y. Yang, R.E. Condori, K. O'Connell, L. Kovar, T.L. Williams, Y.C. Yu, B.W. Petersen, N. Baird, D. Lowe, Y. Li, P.S. Satheshkumar, C.L. Hutson); Deloitte Consulting LLC, Arlington, Virginia, USA (K. O'Connell); Leidos Inc., Reston, Virginia, USA (L. Kovar)
[Cite This Article](#)

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DISEASE	2018	2019	2020	2021
Syphilis (all stages)	115,062	129,818	133,955	176,713
Syphilis (1° & 2°)	35,063	38,992	41,655	53,767
Syphilis (congenital)	1323	1875	2158	2855
Disease	2022			
Syphilis (all stages)	207,255		▲	
Syphilis (1° and 2°)	59,016		▲	
Syphilis (Congenital)	3755		▲	

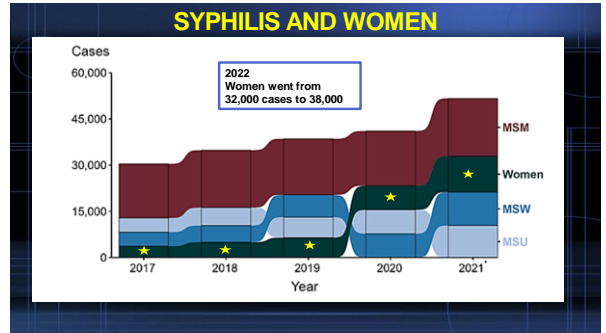
36

Syphilis Gone Wild: Primary/Secondary

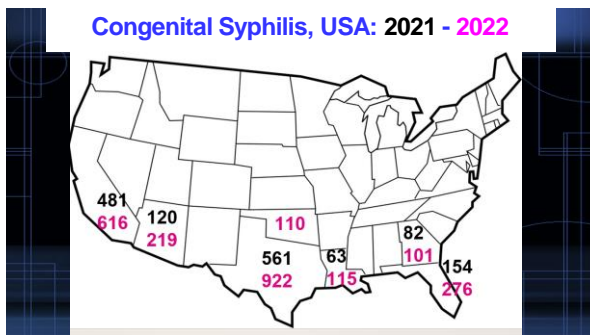
<https://www.cdc.gov/std/statistics/2022/tables/13.htm>

RANK	STATE	RATE/100,000	RANK	STATE	CASES
1	★ South Dakota	84.3	1	★ California	7849
2	New Mexico	36.0	2	★ Texas	4655
3	Arkansas	32.9	3	Florida	4618
4	Oklahoma	31.8	4	New York	3603
5	Mississippi	31.1	5	North Carolina	2473
6	Arizona	29.2	6	Ohio	2402
7	★ Montana	28.9	7	Georgia	2182
8	Nevada	28.4	8	Arizona	2151
9	★ Louisiana	26.7	9	Washington	1920
10	Oregon	26.3	10	Illinois	1457

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But wait!

FDA U.S. FOOD & DRUG ADMINISTRATION


Penicillin G Benzathine Injectable Suspension
 Status: Currently in Shortage ←

- » Date first posted: 04/26/2023
- » Therapeutic Categories: Anti-Infective

https://www.accessdata.fda.gov/scripts/drugshortages/dsp_ActiveIngredientDetails.cfm?AI=Penicillin%20G%20Benzathine%20Injectable%20Suspension&st=c

40

Details: From the FDA



Presentation	Availability and Estimated Shortage Duration	Related Information	Shortage Reason (per FDA)
Bicillin L.A. Injection, 600000 IU(1 mL, NDC 60793-706-70)	Unavailable	Next Delivery: February 2025, Estimated Recovery: March 2025	Demand increase for the drug
Bicillin L.A. Injection, 1200000 IU(2 mL, NDC 60793-701-70)	Limited Availability	Limited Supply Available. Next Delivery: April 2024, Estimated Recovery: December 2024	Demand increase for the drug
Bicillin L.A. Injection, 2400000 IU(4 mL, NDC 60793-702-70)	Limited Availability	Limited Supply Available. Next Delivery: May 2024, Estimated Recovery: December 2024	Demand increase for the drug

https://www.accessdata.fda.gov/scripts/drugshortages/dsp_ActiveIngredientDetails.cfm?AI=Penicillin%20G%20Benzathine%20Injection&st=c

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But wait!



World Health Organization

Home Health Topics Countries Newsroom Emergencies

Global Sexually Transmitted Infections Programme

Back to Treatment & Care

Shortages of benzathine penicillin **Global shortages of penicillin**

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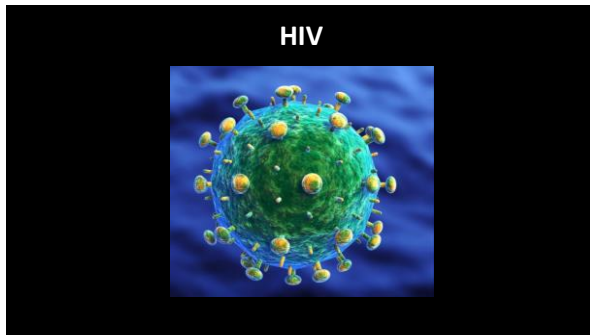
Postexposure Doxycycline to Prevent Bacterial Sexually Transmitted Infections

Anne F. Lantieri, M.D., Deborah Donnell, Ph.D., Julia C. Dombrowski, M.D., M.P.H., Stephanie Cohen, M.D., M.P.H., Cole Grabow, M.P.H., Clare E. Brown, Ph.D., Cheryl Malinski, B.S., Rodney Perkins, R.N., M.P.H., Melody Nasser, B.A., Carolina Lopez, B.A., Eric Vittinghoff, Ph.D., Susan P. Buchbinder, M.D., et al., for the DoxyPEP Study team*

- 501 participants (PrEP or HIV+ w/STD in past year)
- 2:1 Within 72 hours single 200mg doxy or nothing
- Followed quarterly for syphilis, GC or chlamydia
- PrEP Doxy group 10.7% No intervention 31.9%
- HIV+ Doxy group 11.8% No intervention 30.5%
- Bacterial STD lower by 2/3 in those w/ doxy

N Engl J Med. 2023;388:1286-1306

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46

HIV SURVEILLANCE REPORT

Diagnoses of HIV Infection in the United States and Dependent Areas, 2021

94% new cases occur in these high risk groups

Men who have sex with men (gay, bisexual)

Commercial sex workers and their clients

Self-injection with drugs

Transgender individuals and their sex partners

<http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>

47

HIV SURVEILLANCE REPORT

Diagnoses of HIV Infection in the United States and Dependent Areas, 2021

56% new HIV aged 13-34

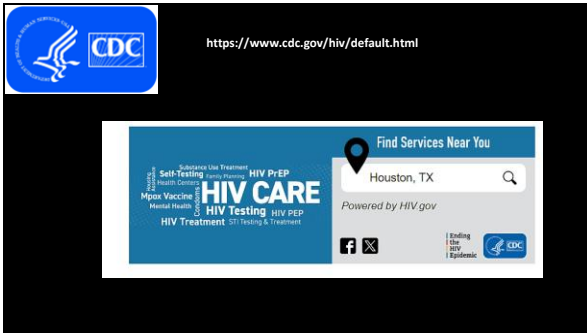
18% new HIV are cis-gender women

22% new HIV are strictly heterosexual

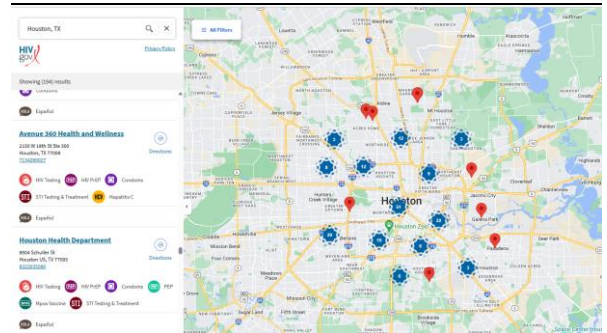
Highest incidence: TX, CA, FL, GA, NY, NC

<http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>

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Chikungunya Vaccine

Approved November 9, 2023
Age ≥ 18 with increased risk (Travel)
Single IM injection, Live, attenuated
Study: 3500 recipients v. 1000 control
Disease-like AEs: fever, H/A, myalgia
Side effects severe in 1.6% recipients
“Efficacy” based on antibody response

Cell. 2024 Feb 15;187(4):813-813.

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Chikungunya

YEAR	TOTAL US CASES	ACQUIRED IN USA
2014	2799	12 (FLORIDA)
2015	896	1 (TEXAS)
2016	175	None
2017	156	None
2018	116	None
2019	192	None
2020	33	None
2021	36	None
2022	81	None

Fever and Arthralgia, Headache, Myalgia, Petechial-Purpuric rash



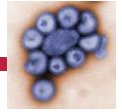
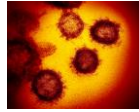
52

Chikungunya active outbreaks: EAST TIMOR

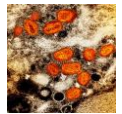
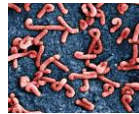


<https://wwwnc.cdc.gov/travel/images/chikungunya-timor-leste.png>

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Just a Few More Viruses



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1986 Poltergeist II



MEASLES

55

Alaskapox

- Another non-smallpox orthopox virus
 - First described and differentiated in 2015
- Only <10 cases, all in Alaska (one death - 2024)
- Very similar clinically to Mpox
 - Natural hosts small mammals
 - Short incubation period
 - Umbilicated pustules
- Tecovirimat would be therapeutic intervention
- For now, not realistic worry for most providers

56

Molluscum contagiosum: New FDA-approved Rx's

- **Cantharidin 0.7%** HCP applied, precision applicator
- July 21, 2023
- Q3weeks, four times; Wash off ≤ 24 hrs; \geq Age 2
- Epidermal-Dermal separation, Induces inflammation
- EOS 50% complete clearance
- **Berdazimer gel 10.3%** Home applied; Mixture two tubes
- January 5, 2024
- Daily x 12 weeks; NO wash off; \geq Age 1
- Releases anti-viral nitric oxide
- EOS 31.2% complete clearance



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Difference, bringing in from Canada...



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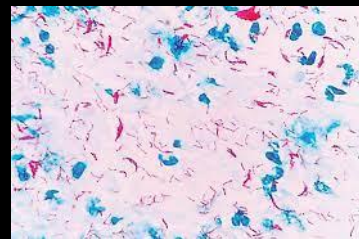
Difference, bringing in from Canada...

FDCA prohibits the importation of unapproved drugs from Canada
 Also considered misbranded due to multiple factors
 Receipt of misbranded agents: risk civil/criminal punishment
 Opening/closing top allows evaporation of ether solvent, altering drug concentration
 Limited shelf life



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Tuberculosis: Emerging Threat



According to the WHO more die from TB than from COVID
 2/3 active TB in Bangladesh, China, DRC, India, Indonesia, Nigeria, Pakistan, Philippines

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Tuberculosis

YEAR	CASES
2023	9615
2022	8331
2021	7870
2020	7171

Highest incidence
California
Texas
New York
Florida

<https://www.cdc.gov/tb/statistics/default.htm>

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5/17/2024

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

Search

Morbidity and Mortality Weekly Report (MMWR)

Tuberculosis — United States, 2023

Weekly / March 28, 2024 / 73(12):265–270

[Print](#)

Paula M. Williams, DrPH^{1,2}; Robert H. Pratt¹; William L. Walker, DVM, PhD¹; Sandy F. Price³; Rebekah J. Stewart, MSN, MPH⁴; Pei-jean I. Feng¹

After decreasing for 27 yrs, number US cases risen yearly since 2020
16% increase in U.S. tuberculosis cases from 2022 to 2023
2023 represents highest number of TB cases in the country since 2013
Larger increase among people born outside the United States vs. U.S.-born individuals
Migrants: estimated 1 in 50 carry TB; No testing

MMWR, 2024-73(12):265-270
PloS One, 2022;17(6):e0268696

62



63



64

Most virulent food-borne infection in USA
Consumption of raw or under-cooked oysters or shellfish from Gulf of Mexico (> during Summer)
 Also occurs with **skin wound** exposed to contaminated water or related to **injury** by contaminated marine life (shrimp, fish)
LIVER INSUFFICIENCY predisposes!
 Most common in summer (more microbes)
 Ceftriaxone + Doxycycline or Minocycline
 Debridement if indicated

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scientific reports

Explore content ▾ About the journal ▾ Publish with us ▾

1988-2018, domain moved 30 miles/year further North

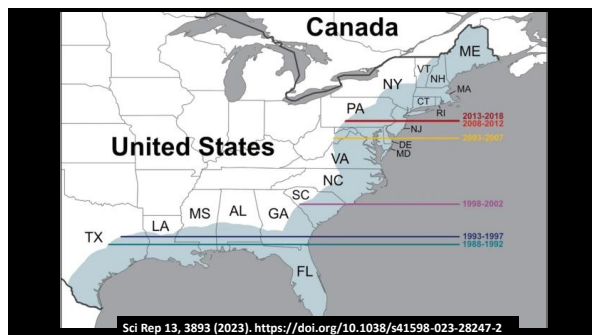
Climate warming and increasing *Vibrio vulnificus* infections in North America

[Elizabeth J. Archer](#), [Craig Baker-Austin](#), [Timothy J. Osborn](#), [Natalia R. Jones](#), [Jaime Martinez-Urtaza](#), [Joaquin Trinanes](#), [James D. Oliver](#), [Felipe J. Colón González](#) & [Jain R. Lake](#) 

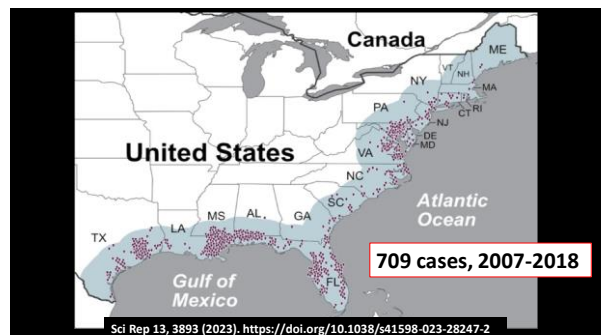
Scientific Reports 13, Article number: 3893 (2023) | [Cite this article](#)

Sci Rep 13, 3893 (2023). <https://doi.org/10.1038/s41598-023-28247-2>

66



67



68

Is this important?



69

3 people have died after infection with rare flesh-eating bacteria in Connecticut and New York

The *Vibrio vulnificus* pathogen thrives in hot coastal waters, and beachgoers can contract it via a small cut or scrape. It can also kill them in two days.

By Rob Frehse and Zenebou Sylla, CNN
Updated 5:07 PM EDT, Thu August 17, 2023

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What About Fungi?

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General review

Trichophyton indotineae, from epidemiology to therapeutic

Arnaud Jabet^{a,b,c}, Anne-Cécile Normand^b, Sophie Brun^c, Eric Dannaoui^{d,e,f}, Claude Bachmeyer^g, Renaud Piarroux^{h,i}, Christophe Hennequin^a, Alicia Moreno-Sabater^a

New dermatophyte species: India (started, remains prevalent) and now Iran

Also reported SE Asia, Asia, Middle East, Africa, Europe, Australia, Canada

Tinea corporis, cruris, faciei (20%); Rarely others; **No reports *tinea capitis***

Highly resistant to terbinafine (75%+), itraconazole (20-40%)

Associated with use of steroids (alone or in combination agents)

Familial spread, possibly due to shared fomites

NOT associated with diabetes or immunosuppression

73



Journal of Medical Mycology
J Med Mycol. 2023, Mar 29;33(3):101383
journal homepage: www.elsevier.com

General review

Trichophyton indotineae, from epidemiology to therapeutic

Arnaud Jabet^{a,b,c}, Anne-Cécile Normand^d, Sophie Brun^e, Eric Dannaoui^{d,e,f}, Claude Bachmeyer^d, Renaud Piarroux^{g,h}, Christophe Hennequin^g, Alicia Moreno-Sabater^g

Hard diagnosis by standard mycology (mimics *T. mentagrophytes*); Genomics

Persistent (average at presentation 8+ months)

Recurrent (2 weeks after seeming cure) and Relapsing (8 weeks after cure)

Multiple lesions and very inflammatory, or double ring of scale

Terbinafine 250mg BID; Itraconazole 200mg/d or 400mg/d (better, shorter)

Griseofulvin, Fluconazole (less efficacy), Posaconazole, Voriconazole

Whitfield's Ointment (3% salicylic acid, 6% benzoic acid)

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Trichophyton indotineae: India



75

Trichophyton indotineae: India

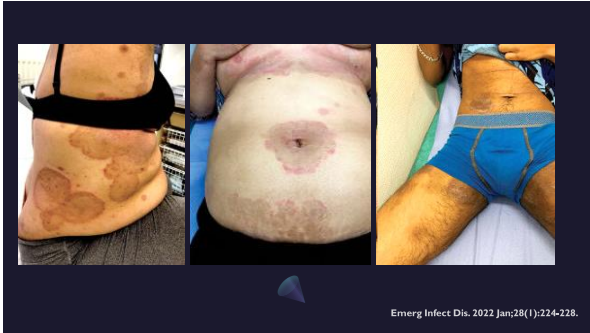


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Trichophyton indotineae: India



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Emerg Infect Dis. 2022 Jan;28(1):224-228.

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J Med Mycol. 2023, Mar 29;33(3):101383

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First Reported U.S. Cases of Tinea Caused by *Trichophyton indotinea* — New York City, December 2021–March 2023

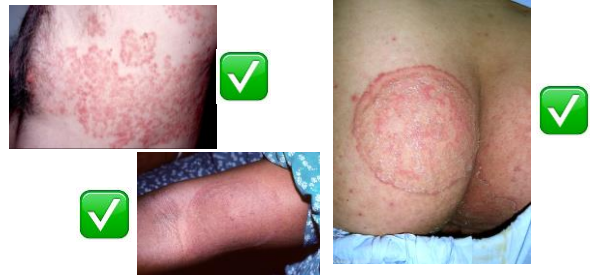
Avrom S. Caplan, MD¹; Sudha Chaturvedi, PhD²; YanChun Zhu, MS²; Gabrielle C. Todd, PhD²; Lu Yin, MD¹; Adriana Lopez, MD³; Lisa Travis, MD³; Dallas J. Smith, PharmD^{3,4}; Tom Chiller, MD³; Shawn R. Lockhart, PhD³; Karen A. Alroy, DVM⁵; William G. Greendyke, MD³; Jeremy A. W. Gold, MD³



MMWR.2023;72(19):536-537

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Tinea indotinea in Houston?



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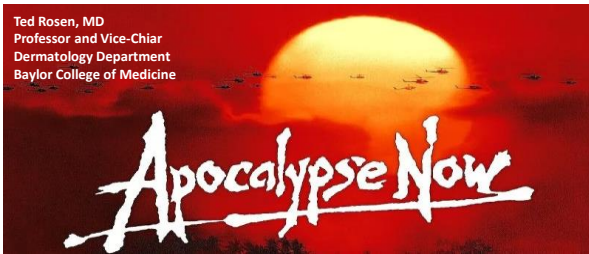


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The Infectious Disease Apocalypse is Now



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