Monthly Public Health Webinar

Melioidosis

Measles

COVID-19 Vaccine Efficacy

February 8, 2024

NH DIVISION OF
Public Health Services
Department of Health and Human Services

Healthcare Provider Resources Website

https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/bidc-resources-healthcare-providers

Agenda for Future Webinars:

March 14th Webinar:

- Chlamydia, Gonorrhea, and Doxycycline Post-Exposure Prophylaxis (PEP)

Watch the webinar on Syphilis

Healthcare Provider Webinar, 12/14/2023: Syphilis & Congenital Syphilis

Melioidosis

Melioidosis

Burkholderia (Pseudomonas) pseudomallei

“Vietnamese timebomb”

The History: Discovery in Animals and Humans

1912 Rangoon, Burma (Myanmar): Whitmore studied undernourished morphine-addicted persons with severe pneumonia that looked like TB and isolated a new bacteria

1913 Malaysia: Stanton and Fletcher identified "distemper-like" outbreak in animals and isolated same bacteria

Developed serological tests

Documented human cases and in wild and domestic animals in Vietnam, Sri Lanka and Indonesia

Alfred Whitmore
1876-1941

- Geography
- Humans and animals
- Vulnerabilities

William Fletcher

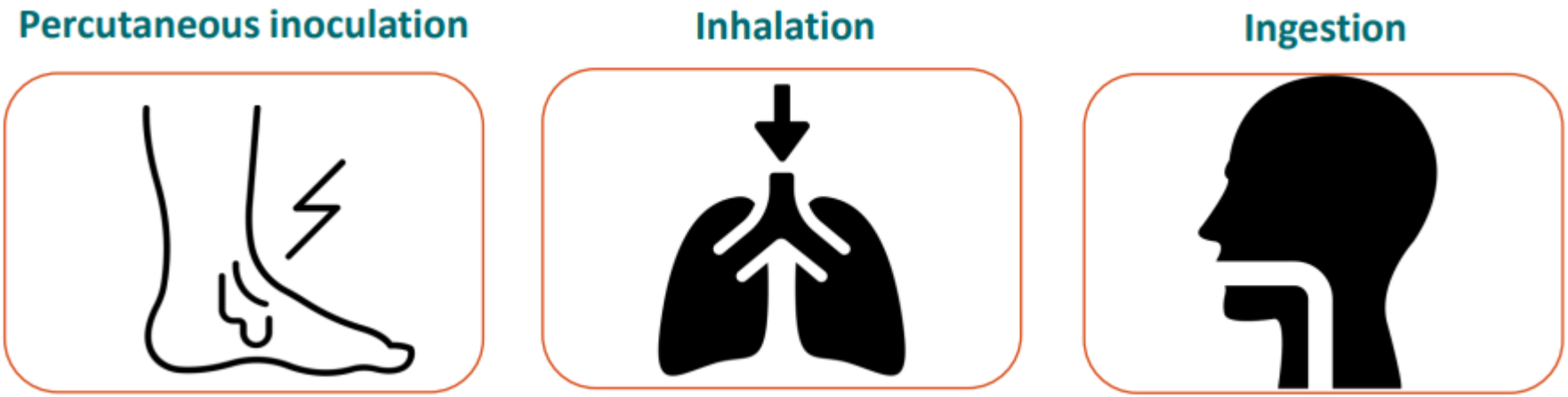
Ambrose Thomas Stanton

Wartime Lessons

- 1948-1954 Indo-China
  - >100 French soldiers in war of Vietnamese independence from French colonial rule with TB-like illness confirmed with melioidosis
- 1973 Vietnam
  - >300 American soldiers
    - Disproportionately in helicopter crews
    - Environmental saprophyte in fresh water and moist soil in tropics and subtropics
- “Vietnamese time bomb”
  - Infections reoccurred years later suggesting latency
  - Record >25 years

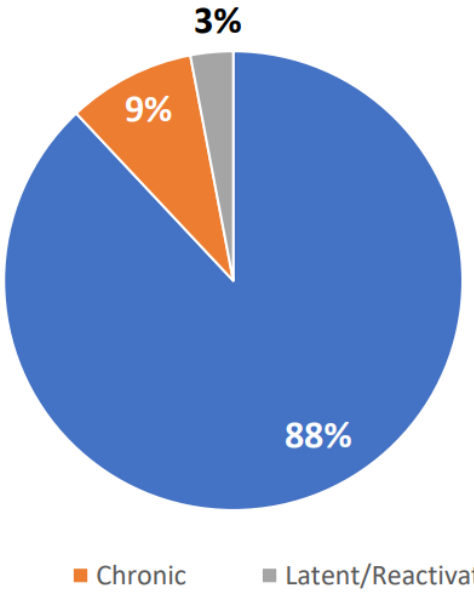
Current Understanding of *B. pseudomallei*

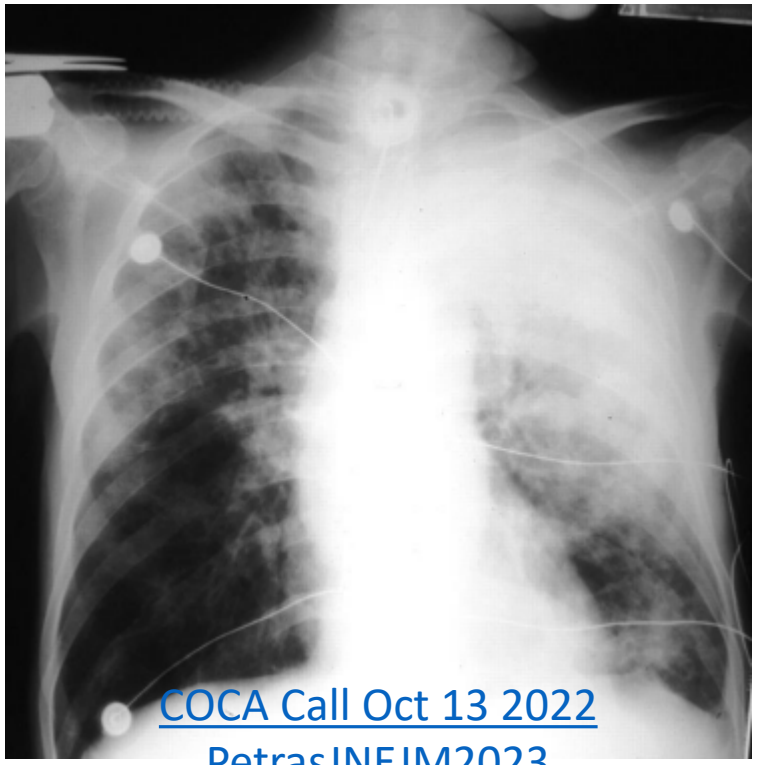
- Facultative, intracellular, gram-negative motile bacillus
- Most commonly infects animals and humans when damaged skin or mucous membranes come in contact with contaminated soil or water
- Inhalation
  - Dust from contaminated soil
- Ingestion
  - Contaminated water
- Very rarely person- or animal-to-person



Human Disease Features

- Opportunistic pathogen:
  - Diabetes, AUD, COPD, chronic renal disease, thalassemia, malignancy and nonHIV immune suppression
- Most infections asymptomatic
- Incubation period: <1 day to years
  - Median 4d
- Clinical forms
  - Acute pulmonary infection
    - Most common, looks like TB!
  - Localized infection
  - Bacteremia
  - Neurological (rare)





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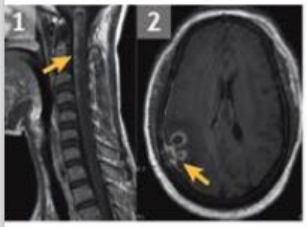
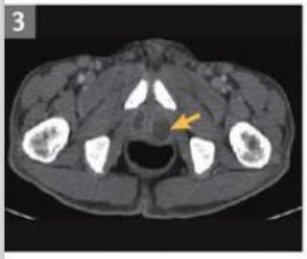
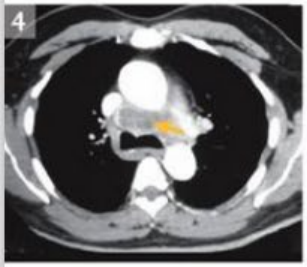
PetrasJNEJM2023

Clinical Manifestations of Melioidosis

Adapted from Figure 4: Wiersinga, W. J. *et al.* (2018) Melioidosis *Nat. Rev. Dis. Primers* doi:10.1038/nrdp.2017.107





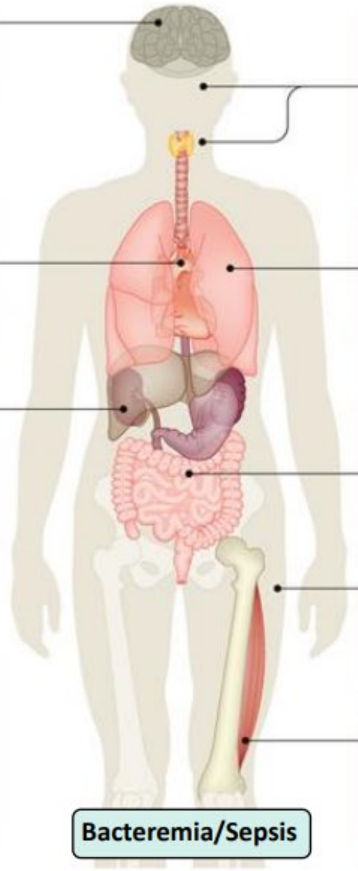


Central nervous system
- Encephalomyelitis
- Brain abscess

Cardiovascular system
- Bacteraemia
- Pericarditis
- Mycotic aneurysm

Urinary tract system
- Acute pyelonephritis
- Kidney abscess
- Prostatic abscess (20% of males in Austrailia)

Other
- Mastitis
- Mediastinal mass
- Corneal ulcer
- Epididymo-orchitis
- Scrotal abscess



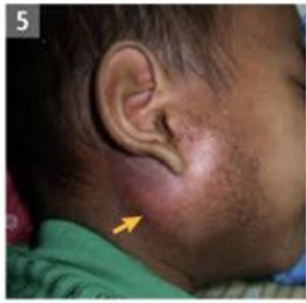
Head and neck
- Parotid abscess (30% of children in Thailand)
- Neck abscess
- Lymphadenitis

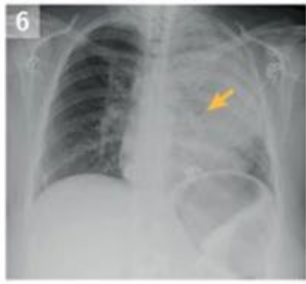
Respiratory system
- Pneumonia
- Pulmonary abscess
- Pleuritis

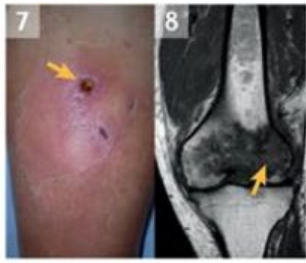
Gastrointestinal system
- Liver abscess
- Splenic abscess
- Para-intestinal mass

Skin and soft tissue
- Skin ulcer
- Soft tissue abscess

Musculoskeletal system
- Septic arthritis
- Myositis
- Osteomyelitis







*** Image:** Clinical images 1–4, 6–8 courtesy of Bart J. Currie, Menzies School of Health, Australia. Clinical image 5 is reproduced with permission from Rothe, C. *et al. Clinical Cases in Tropical Medicine* (Saunders Ltd., 2014), Elsevier

[COCA Call Oct 13 2022 DarwinProspectiveStudy]

Diagnosis, Treatment of Melioidosis

Culture, alert clinical lab staff

- Routine media for sterile sites
- Ashdown's selective agar for nonsterile sites
- Serology used but cannot confirm acute disease

Tier 1 select agent mandatorily reportable

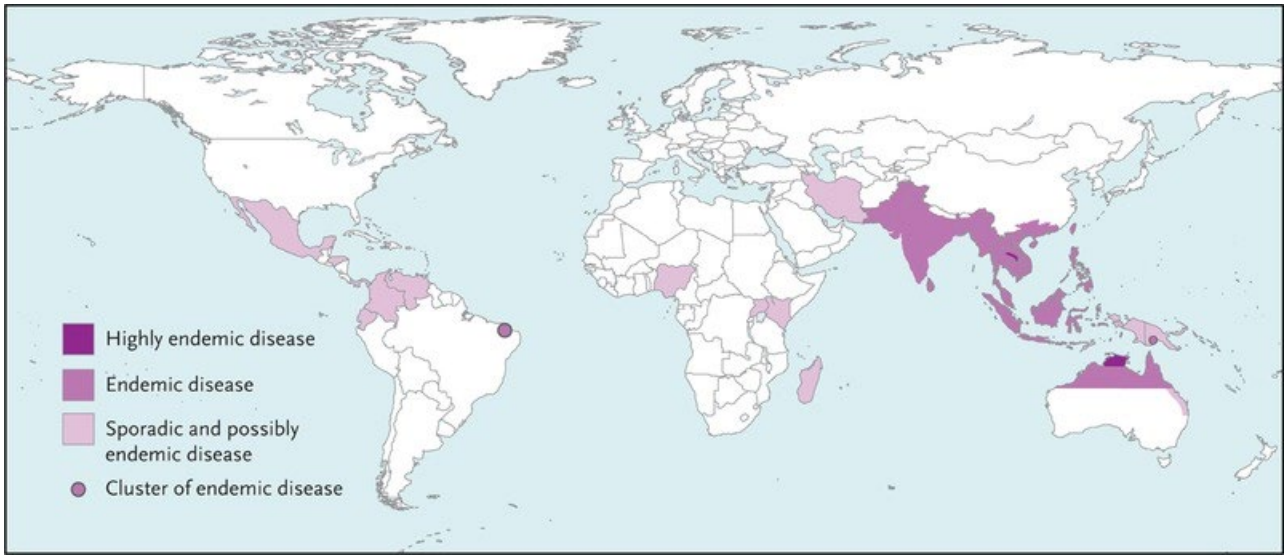
Two phase treatment

- Acute phase: 14d-8w IV
  - Ceftazidime
  - Meropenem for severe cases
- Eradication phase: 3–6m oral
  - Trimethoprim-sulfamethoxazole
  - Amoxicillin-clavulanic acid

UpToDate

Traditionally-Accepted Endemnicity and Burden of Melioidosis

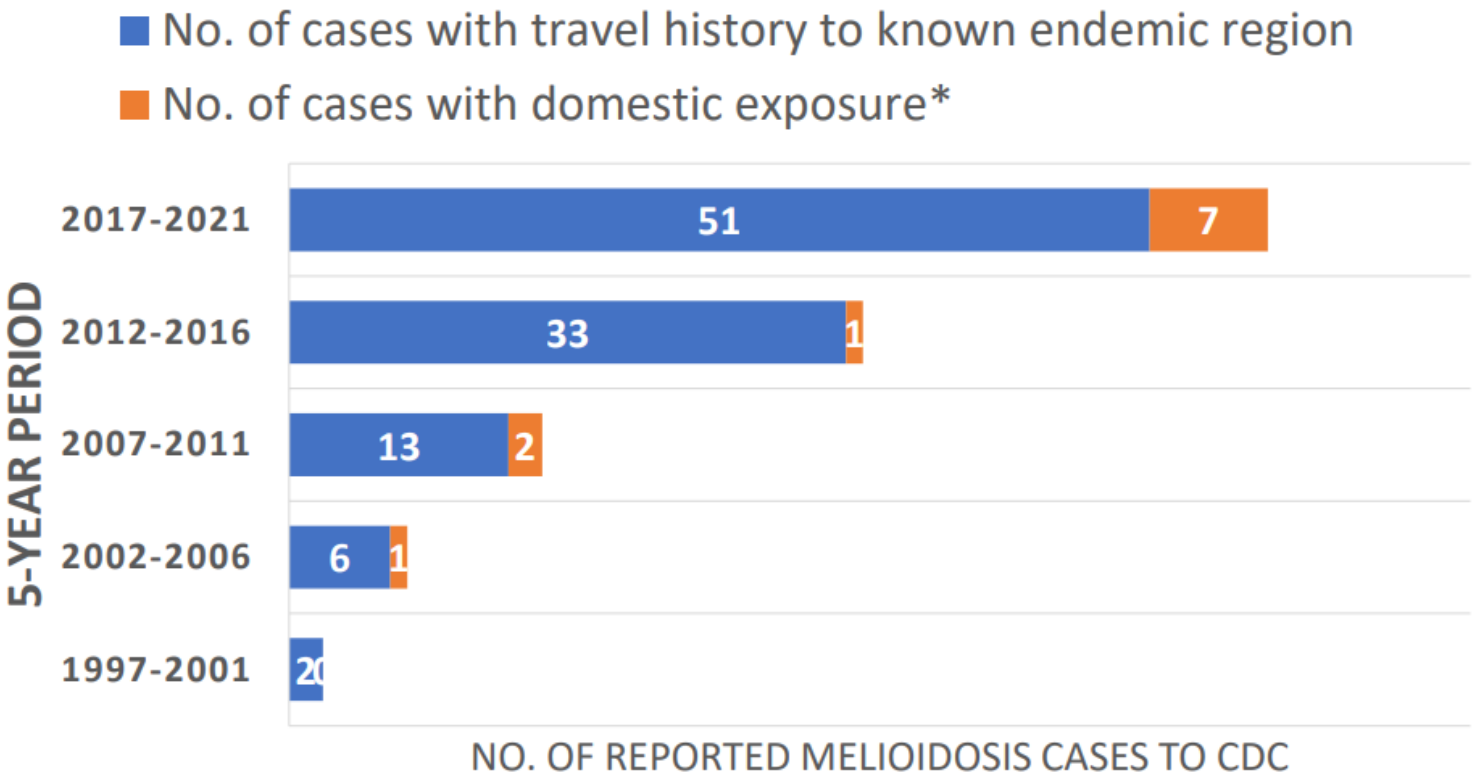
Underreported but ~>165k global cases annually
In US, 8-12 cases annually, usually travelers to endemic regions



Joost Wiersinga W, NEJM

ReviewMeloidosisAmericas

Emerging as Endemic in the US?



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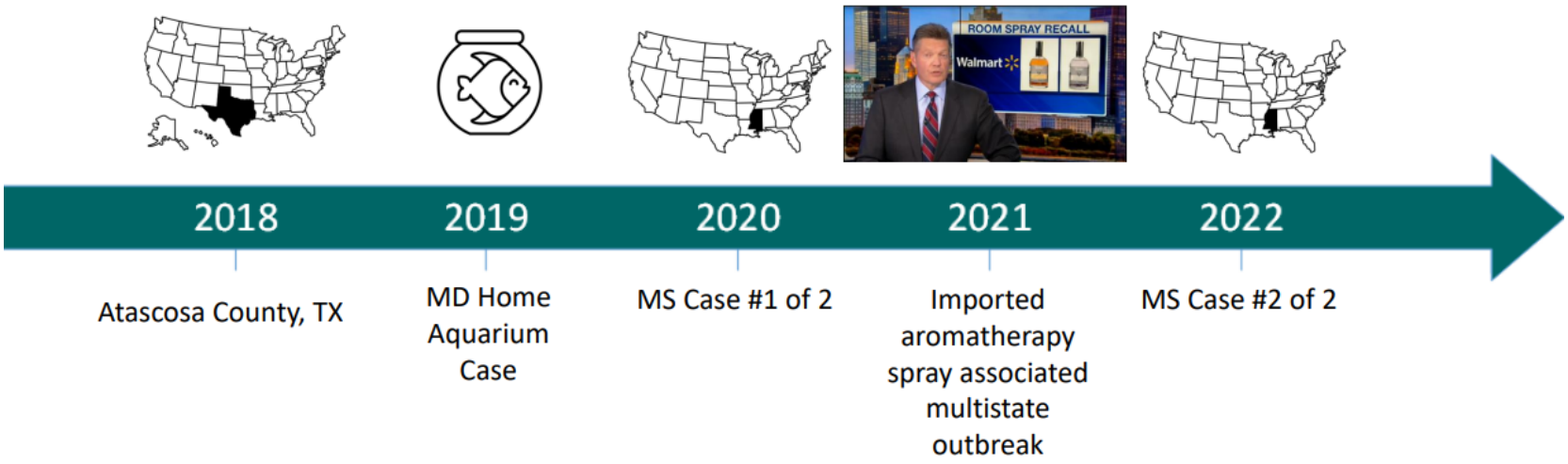
US Investigations



- Clonal match with isolates from aquarium
- Other nontravel cases with imported or exotic animal exposure
  - Iguanas, nonhuman primates and imported dog
- Four cases temporally clustered with common exposure to and clonal match with room spray
  - Better Homes and Gardens, Walmart, from India

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RoomSprayNEJM

The NEW ENGLAND JOURNAL of MEDICINE

BRIEF REPORT

Locally Acquired Melioidosis Linked to Environment — Mississippi, 2020–2023

Julia K. Petras, M.S.P.H., B.S.N., R.N., Mindy G. Elrod, B.A., Maureen C. Ty, Ph.D., Patrick Dawson, Ph.D., Kevin O'Laughlin, M.D., Jay E. Gee, Ph.D., Jennifer Hanson, R.N., Carla Boutwell, B.S.N., R.N., Gail Ainsworth, B.S.N., R.N., Cari A. Beesley, M.S., Elke Saile, Ph.D., Rebekah Tiller, M.P.H., Christopher A. Gulvik, Ph.D., Daphne Ware, Ph.D., Theresa Sokol, M.P.H., Gary Balsamo, D.V.M., Kathryn Taylor, M.D., Johanna S. Salzer, D.V.M., Ph.D., William A. Bower, M.D., Zachary P. Weiner, Ph.D., María E. Negrón, D.V.M., Ph.D., Alex R. Hoffmaster, Ph.D., and Paul Byers, M.D.

HAN

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- 3 melioidosis patients living within 20mi in same Mississippi Gulf Coast county within 3-year period
- Same Western Hemisphere *B. pseudomallei* strain as found in 3 environmental samples collected from property of one patient
- Confirms local acquisition from environment in Mississippi Gulf Coast

Exposure Risk Factors and Prevention

- Travel to endemic region
- Occupational/recreational exposure to soil
- Injury with soil exposure
- Severe weather events
  - Heavy rainfall
  - Aerosolized soil dust
  - Flood water exposure

☐ Avoid contact with soil or muddy water, particularly after heavy rains
☐ Protect open wounds, cuts, or burns. Use waterproof bandages to help keep damaged skin from contacting soil or water. Thoroughly wash any open wounds, cut, or burns that contact soil.
☐ For people with diabetes, foot care and preventing contamination of foot or other open wounds is important.
☐ Wear protective footwear and gloves when doing yard work, agricultural work.
☐ Wear waterproof boots during and after flooding or storms to prevent infection through the feet and lower legs.
☐ Avoid drinking untreated water and eating undercooked or raw foods.

	Climate Driver	Exposure	Health Outcome	Impact
Extreme Heat	More frequent, severe, prolonged heat events	Elevated temperatures	Heat-related death and illness	Rising temperatures will lead to an increase in heat-related deaths and illnesses.
Outdoor Air Quality	Increasing temperatures and changing precipitation patterns	Worsened air quality (ozone, particulate matter, and higher pollen counts)	Premature death, acute and chronic cardiovascular and respiratory illnesses	Rising temperatures and wildfires and decreasing precipitation will lead to increases in ozone and particulate matter, elevating the risks of cardiovascular and respiratory illnesses and death.
Flooding	Rising sea level and more frequent or intense extreme precipitation, hurricanes, and storm surge events	Contaminated water, debris, and disruptions to essential infrastructure	Drowning, injuries, mental health consequences, gastrointestinal and other illness	Increased coastal and inland flooding exposes populations to a range of negative health impacts before, during, and after events.
Vector-Borne Infection (Lyme Disease)	Changes in temperature extremes and seasonal weather patterns	Earlier and geographically expanded tick activity	Lyme disease	Ticks will show earlier seasonal activity and a generally northward range expansion, increasing risk of human exposure to Lyme disease-causing bacteria.
Water-Related Infection (*Vibrio vulnificus*)	Rising sea surface temperature, changes in precipitation and runoff affecting coastal salinity	Recreational water or shellfish contaminated with *Vibrio vulnificus*	*Vibrio vulnificus* induced diarrhea & intestinal illness, wound and bloodstream infections, death	Increases in water temperatures will alter timing and location of *Vibrio vulnificus* growth, increasing exposure and risk of waterborne illness.
Food-Related Infection (*Salmonella*)	Increases in temperature, humidity, and season length	Increased growth of pathogens, seasonal shifts in incidence of *Salmonella* exposure	*Salmonella* infection, gastrointestinal outbreaks	Rising temperatures increase *Salmonella* prevalence in food; longer seasons and warming winters increase risk of exposure and infection.
Mental Health and Well-Being	Climate change impacts, especially extreme weather	Level of exposure to traumatic events, like disasters	Distress, grief, behavioral health disorders, social impacts, resilience	Changes in exposure to climate- or weather-related disasters cause or exacerbate stress and mental health consequences, with greater risk for certain populations.

U.S. Global Change Research Program

[Impacts of CC on Human Health in US]

Measles

COCA Now

CDC Clinician Outreach and Communication Activity

January 25, 2024

Stay Alert for Measles Cases

Between December 1, 2023 and January 23, 2024, the Centers for Disease Control and Prevention (CDC) was notified of 23 confirmed U.S. cases of measles, including seven direct importations of measles by international travelers and two outbreaks with more than five cases each. Most of these cases were among children and adolescents who had not received a measles-containing vaccine (MMR or MMRV), even if age eligible.

Due to the recent cases, healthcare providers should be on alert for patients who have: (1) febrile rash illness and symptoms consistent with measles *(e.g.*, cough, coryza, or conjunctivitis), and (2) have recently traveled abroad, especially to countries with ongoing measles outbreaks. Infected people are contagious from 4 days before the rash starts through 4 days afterwards.

Recommendations for Healthcare Providers

1. **Isolate:** Do not allow patients with suspected measles to remain in the waiting room or other common areas of the healthcare facility; isolate patients with suspected measles immediately, ideally in a single-patient airborne infection isolation room (AIIR) if available, or in a private room with a closed door until an AIIR is available. Healthcare providers should be adequately protected against measles and should adhere to standard and airborne precautions when evaluating suspect cases regardless of their vaccination status.
2. **Notify:** Immediately notify local or state health departments about any suspected case of measles to ensure rapid testing and investigation. Measles cases are reported by states to CDC through the National Notifiable Diseases Surveillance System (NNDSS) and can also be reported directly to CDC at measlesreport@cdc.gov.
3. **Test:** Follow CDC's testing recommendations and collect either a nasopharyngeal swab or throat swab for reverse transcription polymerase chain reaction (RT-PCR), as well as a blood specimen for serology from all patients with clinical features compatible with measles. RT-PCR is available at CDC, at many state public health laboratories, and through the APHL/CDC Vaccine Preventable Disease Reference Centers.
4. **Manage:** In coordination with local or state health departments, provide appropriate measles post-exposure prophylaxis (PEP) to close contacts without evidence of immunity, either MMR or immunoglobulin. The choice of PEP is based on elapsed time from exposure or medical contraindications to vaccination.
5. **Vaccinate:** Make sure all your patients are up-to-date on measles vaccine, especially before international travel. People 6 months of age or older who will be traveling internationally should be protected against measles.

Top 10 Countries with Measles Outbreaks*

Rank	Country	Number of Cases
1	Yemen	23,066
2	India**	13,997
3	Kazakhstan	12,801
4	Ethiopia	11,042
5	Russian Federation	7,137
6	Pakistan	6,199
7	Kyrgyzstan	4,701
8	Democratic Republic of the Congo (DRC)***	3,917
9	Iraq	3,541
10	Azerbaijan	3,291

Provisional data based on monthly data reported to WHO (Geneva) as of early December 2023. Data covers June 2023 – November 2023.
* Countries with highest number of cases for the period.

https://www.cdc.gov/globalhealth/measles/data/global-measles-outbreaks.html

World Health Organization | Europe

A 30-fold rise of measles cases in 2023 in the WHO European Region warrants urgent action

14 December 2023 | News release | Reading time: 2 min (675 words)

The WHO European Region is experiencing an alarming rise in measles cases. Over 30 000 measles cases were reported by 40 of the Region's 53 Member States between January and October 2023. Compared to 941 cases reported in all of 2022, this represents a more than 30-fold rise. The rise in cases has accelerated in recent months, and this trend is expected to continue if urgent measures are not taken across the Region to prevent further spread.

https://www.who.int/europe/news/item/14-12-2023-a-30-fold-rise-of-measles-cases-in-2023-in-the-who-european-region-warrants-urgent-action

NH DIVISION OF Public Health Services
Department of Health and Human Services

Vaccine Efficacy (VE) Data for Updated COVID-19 Vaccines

RAPID COMMUNICATION

Early COVID-19 vaccine effectiveness of XBB.1.5 vaccine against hospitalisation and admission to intensive care, the Netherlands, 9 October to 5 December 2023

CORRESPONDENCE | ONLINE FIRST

THE LANCET Infectious Diseases

Short-term effectiveness of the XBB.1.5 updated COVID-19 vaccine against hospitalisation in Denmark: a national cohort study

- Short-term analysis showed the updated COVID-19 vaccines (targeting XBB.1.5) reduced the risk of COVID-19 associated hospitalization by 70-75% in older adults

https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2024.29.1.2300703
https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(23)00746-6/fulltext

Morbidity and Mortality Weekly Report

Early Estimates of Updated 2023–2024 (Monovalent XBB.1.5) COVID-19 Vaccine Effectiveness Against Symptomatic SARS-CoV-2 Infection Attributable to Co-Circulating Omicron Variants Among Immunocompetent Adults — Increasing Community Access to Testing Program, United States, September 2023–January 2024

- Assessed VE of updated COVID-19 vaccines against symptomatic disease
- Compared vaccination in symptomatic adults who tested positive (cases) vs. negative (controls) for COVID-19
- Utilized data from CDC's ICATT pharmacy testing program (Increasing Community Access to Testing) from 9/21/23 – 1/14/24
- Overall VE against symptomatic disease was 58% (up to 60 days after vaccination) and 49% (from 60-119 days after vaccination)

https://www.cdc.gov/mmwr/volumes/73/wr/mm7304a2.htm

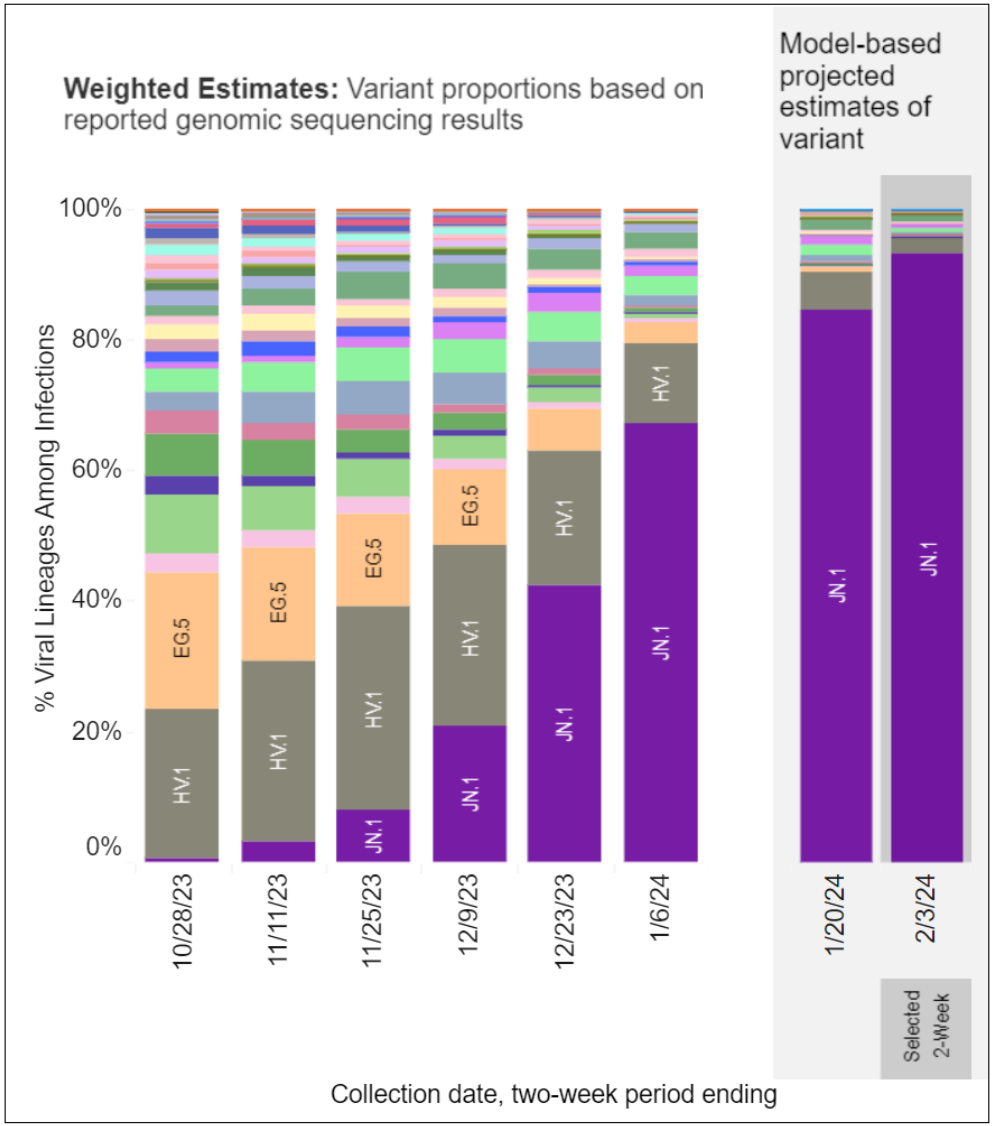
Vaccine Efficacy by Time and Variant

Age group, yrs/COVID-19 vaccination dosage pattern	Total no. of tests	SARS-CoV-2–positive test results, no. (row %)	Median days (IQR) since last dose among vaccinated	VE* (95% CI)
≥18				
No updated dose (Ref)	**8,097**	3,014 (37)	670 (422–843)	Ref
Received updated dose	**1,125**	281 (25)	52 (29–75)	54 (46–60)
7–59 days earlier	**634**	140 (22)	32 (19–46)	58 (48–65)
60–119 days earlier	**491**	141 (29)	79 (68–90)	49 (36–58)

		SARS-CoV-2–negative test results		SARS-CoV-2–positive test results (n = 679)					
				SGT presence (likely non-JN.1)			SGT failure (likely JN.1)		
COVID-19 vaccination dosage pattern	Total no. of tests N = 2,199	No. (row %) n = 1,520	Median (IQR) days since last dose among vaccinated	No. (row %) n = 421	Median (IQR) days since last dose among vaccinated	VE* (95% CI)	No. (row %) n = 258	Median (IQR) days since last dose among vaccinated	VE* (95% CI)
No updated dose (Ref)	**1,972**	1,346 (68)	637 (398–805)	398 (20)	672 (402–800)	Ref	228 (12)	674 (412–816)	Ref
Updated dose, 60–119 days earlier†	**227**	174 (77)	80 (69–90)	23 (10)	73 (68–82)	60 (35–75)	30 (13)	80 (69–90)	49 (19–68)

https://www.cdc.gov/mmwr/volumes/73/wr/mm7304a2.htm

COVID-19 Variant Proportions



USA

WHO label	Lineage #	%Total	95%PI
Omicron	JN.1	93.1%	91.5-94.4%
	HV.1	2.3%	2.0-2.8%
	JG.3	1.1%	0.8-1.4%
	JD.1.1	0.8%	0.6-1.0%
	BA.2.86	0.7%	0.5-0.9%
	HK.3	0.4%	0.4-0.5%
	GE.1	0.4%	0.1-1.0%
	EG.5	0.3%	0.2-0.4%
	BA.2	0.3%	0.0-1.9%
	EG.5.1.8	0.1%	0.1-0.1%
	JF.1	0.1%	0.1-0.1%
	FL.1.5.1	0.1%	0.0-0.1%
	XBB.1.9.1	0.0%	0.0-0.1%
	XBB	0.0%	0.0-0.1%
	XBB.1.16.6	0.0%	0.0-0.1%
	XBB.1.16.11	0.0%	0.0-0.1%
	XBB.1.5.70	0.0%	0.0-0.1%
	GK.1.1	0.0%	0.0-0.0%
	XBB.1.16.15	0.0%	0.0-0.0%
	HF.1	0.0%	0.0-0.0%
	XBB.2.3	0.0%	0.0-0.0%
	XBB.1.16	0.0%	0.0-0.0%
	GK.2	0.0%	0.0-0.0%
	XBB.1.5	0.0%	0.0-0.0%
	CH.1.1	0.0%	0.0-0.0%
	EG.6.1	0.0%	0.0-0.0%
	XBB.1.16.1	0.0%	0.0-0.0%
	XBB.1.42.2	0.0%	0.0-0.0%
	XBB.1.9.2	0.0%	0.0-0.0%
	XBB.1.5.68	0.0%	0.0-0.0%
	XBB.1.16.17	0.0%	0.0-0.0%
	XBB.1.5.72	0.0%	0.0-0.0%
Other	Other*	0.1%	0.1-0.2%

https://covid.cdc.gov/covid-data-tracker/#variant-proportions

JAMA | Original Investigation

Effectiveness of Bivalent mRNA COVID-19 Vaccines in Preventing SARS-CoV-2 Infection in Children and Adolescents Aged 5 to 17 Years

- VE estimates for the updated 2023-2024 COVID-19 vaccines are consistent with VE estimates in children and adolescents from last seasons (2022-2023) bivalent COVID-19 vaccine at protecting against infection and symptomatic COVID-19

Table 2. Bivalent COVID-19 Vaccine Effectiveness Against Laboratory-Confirmed SARS-CoV-2 Infection and Symptomatic COVID-19 Among Children and Adolescents Aged 5 to 17 Years

			Laboratory-confirmed SARS-CoV-2 infection				Symptomatic COVID-19			
	No.[a]	Observation time after vaccination, median (IQR), d[b]	No. of cases	Crude incidence rate/1000 person-days (95% CI)	COVID-19 vaccine effectiveness, % (95% CI)		No. of cases[d]	Crude incidence rate/1000 person-days (95% CI)	COVID-19 vaccine effectiveness, % (95% CI)	
					Unadjusted	Adjusted[c]			Unadjusted	Adjusted[c]
Primary analysis										
COVID-19 vaccine effectiveness										
Unvaccinated or received any monovalent vaccine[e]	2703	276 (142 to 350)	383	1.38 (1.25 to 1.53)	[Reference]	[Reference]	164	0.59 (0.51 to 0.69)	[Reference]	[Reference]
Bivalent vaccine[f]	795	50 (27 to 74)	43	0.84 (0.62 to 1.12)	48.1 (27.7 to 62.8)	54.0 (36.6 to 69.1)	20	0.39 (0.25 to 0.59)	40.6 (5.3 to 62.7)	49.4 (22.2 to 70.7)

https://jamanetwork.com/journals/jama/fullarticle/2814536?resultClick=1

NH DIVISION OF Public Health Services
Department of Health and Human Services

Summary

- The updated 2023-2024 COVID-19 vaccines boost protection against severe disease and complications from SARS-CoV-2 infection, but also protect against symptomatic disease
- Early Vaccine efficacy (VE) data show:
  - 50% reduced risk of symptomatic disease in adults
  - 70-75% reduced risk of COVID-19 related hospitalizations in older adults
- VE estimates reflect the additional benefit of vaccination in people who have previous vaccine- or infection-induced immunity
- Protection is expected to decrease over time, but vaccination still provides a high level of protection when administered to coincide with periods of greater viral activity

Q&A