

Biosafety:
What the general safety
practitioner should know

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Agenda

What's biosafety?

What are biohazards?

Regulatory environment

Examples

Biosafety management: risk assessment, controls

Biosafety in the lab





Introduction

- Biological hazards can be present in any industry, at any worksite, but many safety professionals have no formal training in biosafety management.



What is biosafety?

Biosafety is a framework for using practices, training, equipment, and design to protect the worker, community, and environment from biohazards.





Example: Healthcare

Biosafety and Infection
prevention and control

Same principles/concepts

Sometimes, same actions/
behaviors

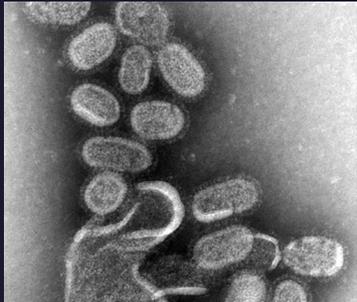
Different perspective



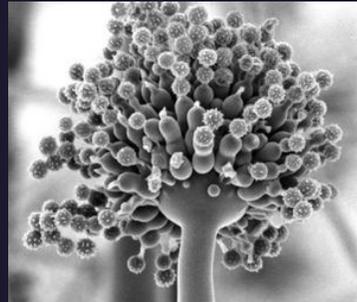
Where does biosafety happen?



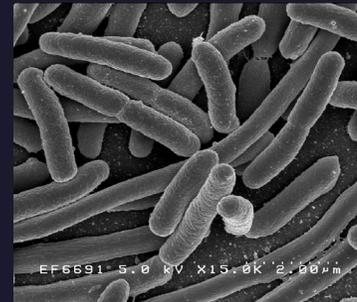
What are biohazards?



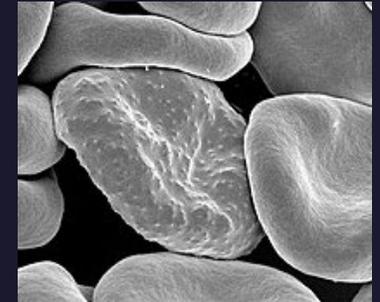
virus
influenza



fungi
aspergillus



bacteria
e. coli



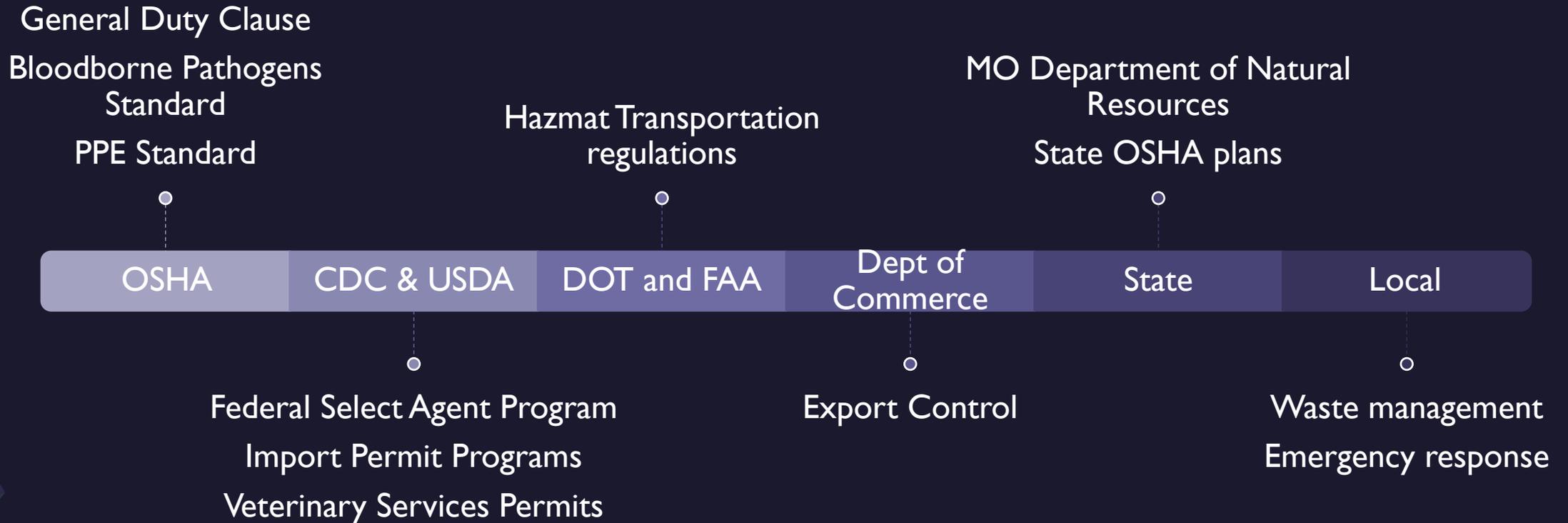
parasites
malaria



How to manage biohazards?

- Containment
- World Health Organization: Biosafety is containment principles, technologies and practices that are implemented to prevent unintentional exposure to biological agents or their inadvertent release
- Hierarchy of controls

Regulators and regulations



Guidelines and best practices



CDC

- Biosafety in Microbiological and Biomedical Laboratories

NIH

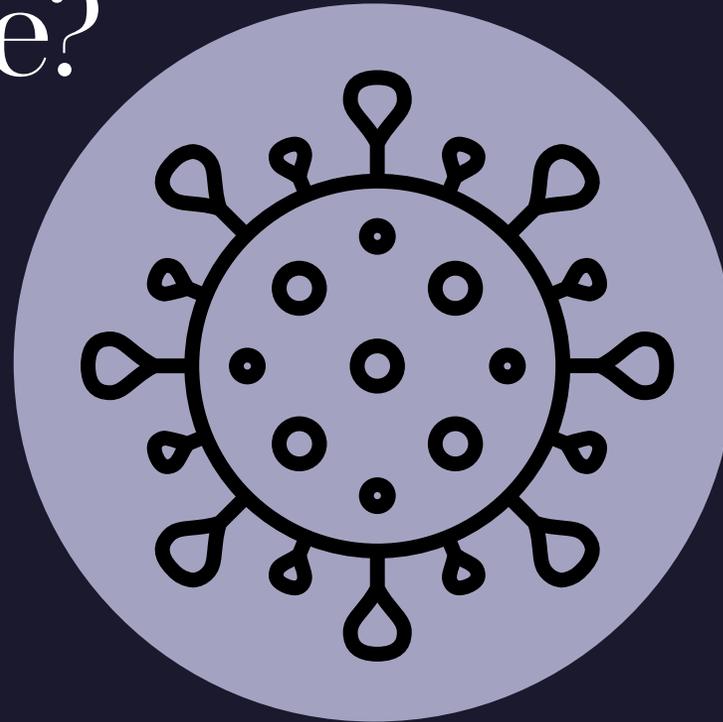
- Guidelines for Research involving Recombinant or Synthetic Nucleic Acid Molecules

ISO 35001

- Biorisk management for laboratories and other related organisations

Why should I care?

- Pandemic preparedness
- Political interest
- Employee safety

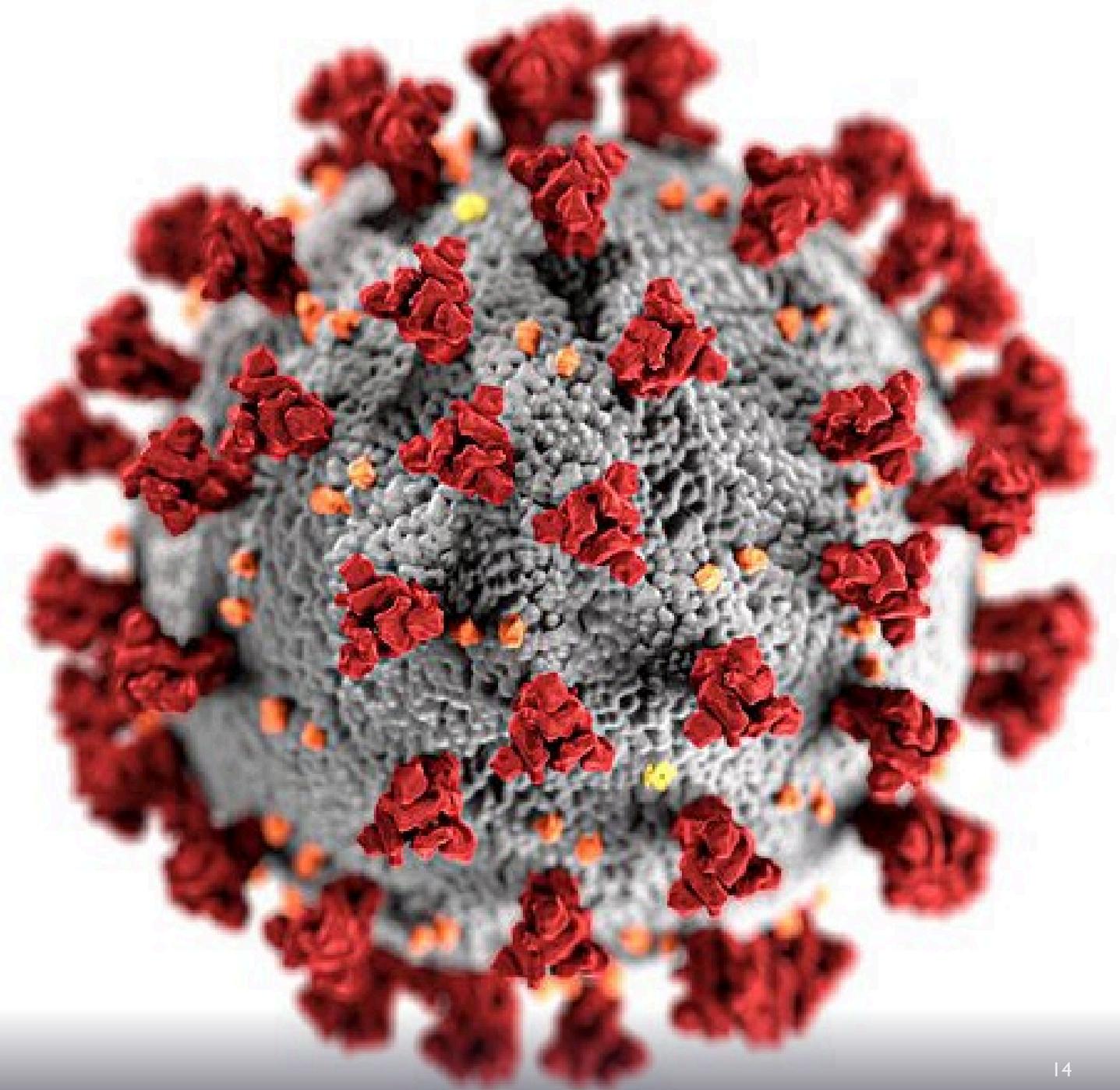


Biohazards

- Viruses
- Bacteria
- Fungi
- Prions
- Biological toxins
- Parasites
- Animals, plants, stinging insects...

Viruses

- Covid
- Influenza
- Norovirus



Bacteria

- Legionella
- Mycobacterium tuberculosis (TB)
- Staph aureus

The screenshot shows a research article page with the following details:

- Case Report** (tag in top right)
- Title:** Case of Severe, Difficult-to-Diagnose Legionnaires' Disease in a Young Welder
- Authors:** Dylan B. McBee, Ruth Mizu, Ahmed M. Hamdi
- Published:** July 21, 2023
- DOI:** 10.7759/cureus.42250
- Peer-Reviewed** (checked)
- Citation:** McBee D B, Mizu R, Hamdi A M (July 21, 2023) A Case of Severe, Difficult-to-Diagnose Legionnaires' Disease in a Young Welder. Cureus 15(7): e42250. doi:10.7759/cureus.42250
- Navigation Bar:** Article (selected), Authors etc., Metrics, Media, Comments
- Abstract:** s among welders and other metalworkers is a rare but potentially underappreciated occupational hazard. The same s that predispose welders to severe pneumonia from *Streptococcus pneumoniae* and *Bacillus cereus* may similarly them to *Legionella pneumophila* infection. We present a case of a previously healthy, immunocompetent 31-year-old male enting with three days of shortness of breath, hypoxia, high-grade fever, and blood-tinged sputum. Chest computed

Black Mold-Like Growth

The Rappahannock Area Health District recorded violations at several facilities around Fredericksburg during recent restaurant inspections.



Liam Griffin, Patch Staff

Posted Tue, Dec 19, 2023 at 2:07 pm ET



Fungi

Mold



Fungi

Blastomyces

1 Dead and Nearly 100 Sickened in Fungal Outbreak at Paper Mill

Local and federal investigators are investigating the source of a rare outbreak of blastomycosis at a paper mill in Escanaba, Mich.

 Share full article



FEBRUARY 1, 2024 | 6 MIN READ

Stopping the Latest Outbreak Threat: Chronic Wasting Disease

A spillover of the neurological disease to humans from deer, elk, and other animals could be devastating

BY JIM ROBBINS & KFF HEALTH NEWS



Prions

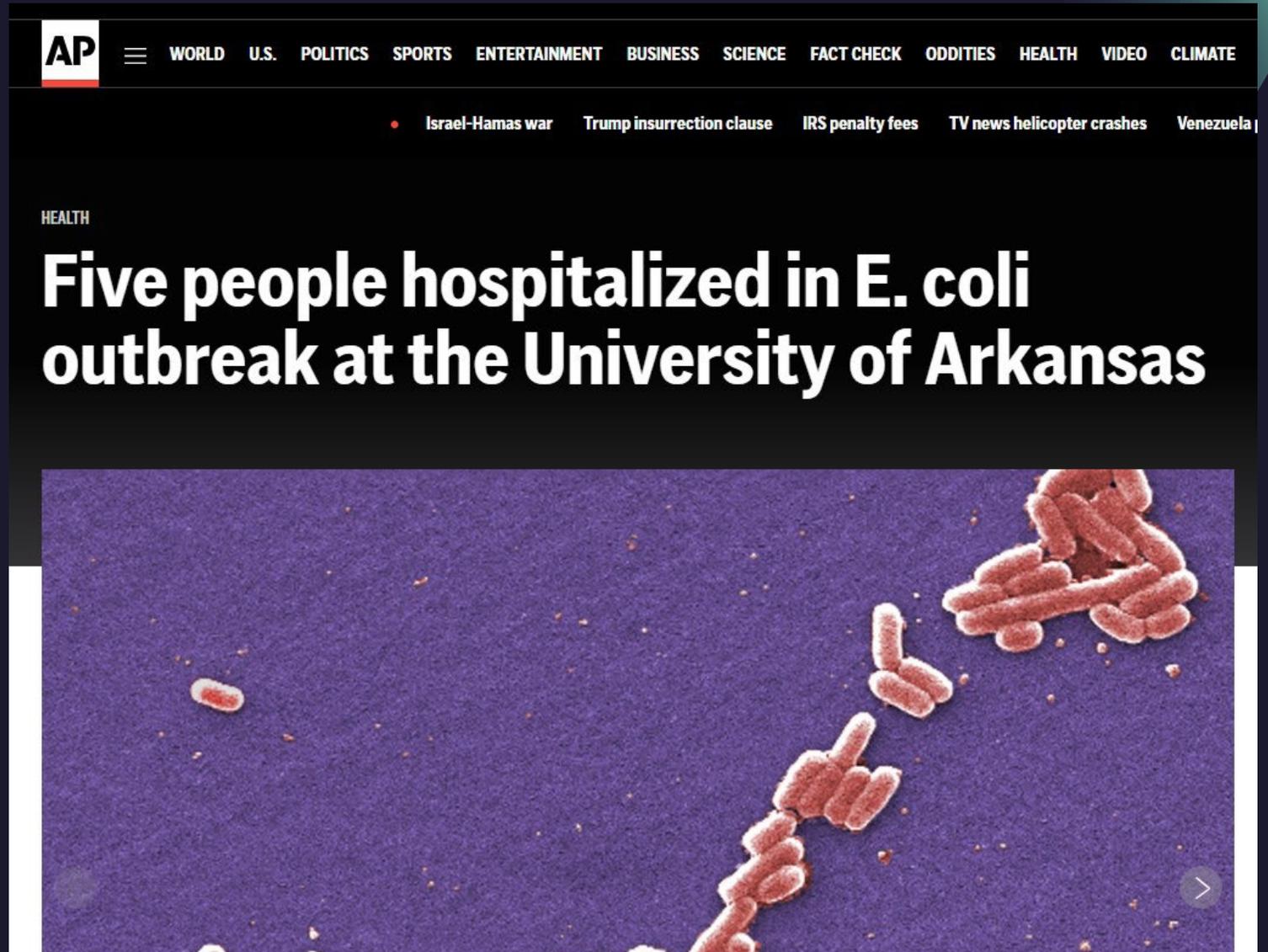
Occupational exposure is unlikely

“mad cow” (BSE)

Chronic Wasting Disease

Biological toxins

- Food poisoning caused by toxin-producing E. coli



The image is a screenshot of an AP news article. At the top, the AP logo is on the left, and a navigation menu includes 'WORLD', 'U.S.', 'POLITICS', 'SPORTS', 'ENTERTAINMENT', 'BUSINESS', 'SCIENCE', 'FACT CHECK', 'ODDITIES', 'HEALTH', 'VIDEO', and 'CLIMATE'. Below the menu, there are several news tickers: 'Israel-Hamas war', 'Trump insurrection clause', 'IRS penalty fees', 'TV news helicopter crashes', and 'Venezuela'. The main article is in the 'HEALTH' category and has the headline 'Five people hospitalized in E. coli outbreak at the University of Arkansas'. Below the headline is a photograph of E. coli bacteria, which are rod-shaped and pinkish-red, set against a dark purple background. A small white arrow icon is visible in the bottom right corner of the image area.

U.S. Sees First Cases of Local Malaria Transmission in Two Decades

Five people, four in Florida and one in Texas, have acquired malaria in the United States in recent months.

By **Emily Anthes**

Published June 27, 2023 Updated July 3, 2023

 Share full article



The News

In the last two months, at least five people, four in Florida and one in Texas, have been infected with malaria in the United States, the Centers for Disease Control and Prevention said [in a health advisory](#) on Monday. These are the first known cases of locally acquired malaria in the country since 2003.

Parasites

- Plasmodia (malaria)
- Cryptosporidium
- Giardia





Animals, Plants, Stinging Insects...

Primarily affect those working outdoors

Limit/prevent exposure by wearing loose-fitting, full-length clothing, shoes that cover the whole foot, work gloves...

Clean up outdoor job sites

Exposure response ranges from mild to lethal

Training is key!

Ectoparasites: Ticks, mosquitos

How much time will you need to be protected from biting insects? ⓘ

Any ▼

Do you need protection from mosquitoes, ticks or both ?

Mosquitoes and ticks ▼



All products work against mosquitoes, and not all against ticks.

You can refine your search by specifying one or more of the following options:

Which product are you interested in?

You can leave blank to get a list of all products which fall under your criteria

Are you interested in a particular [active ingredient](#)?

All Ingredients ▼

Are you looking for a specific company name?

All Companies ▼

Do you know the EPA registration number of the product you are looking for? ⓘ

You can leave blank to get a list of all products which fall under your criteria.

 [Export the entire insect repellent dataset to PDF format](#)

Search

Reset

Report on worker's death finds that marijuana-processing workers may be at high risk of developing asthma

By Brenda Goodman, CNN

🕒 3 minute read · Published 1:00 PM EST, Thu November 16, 2023



Plants

Poison ivy, oak, sumac



So, what are you
going to do?

No specific OSHA standard or NIOSH exposure limits for infectious/biological materials

No Safety Data Sheets

Fall back on your risk assessment skills!

Identify hazards and risks

What, where, and how is
the work occurring?

Who is involved in the
work?

What can go wrong?

What are the
consequences of exposure?

Evaluate the risks

How likely or probable is it?

How severe are the consequences?

Is the risk acceptable or unacceptable?

Determine and implement controls

- Identify control options
- Select controls
- Implement



Prevent exposure; eliminate the hazard



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FOOD SAFETY REMINDER: Seal cracks in walls and floors to keep pests from entering your establishment.



Implement controls: substitution



Latex

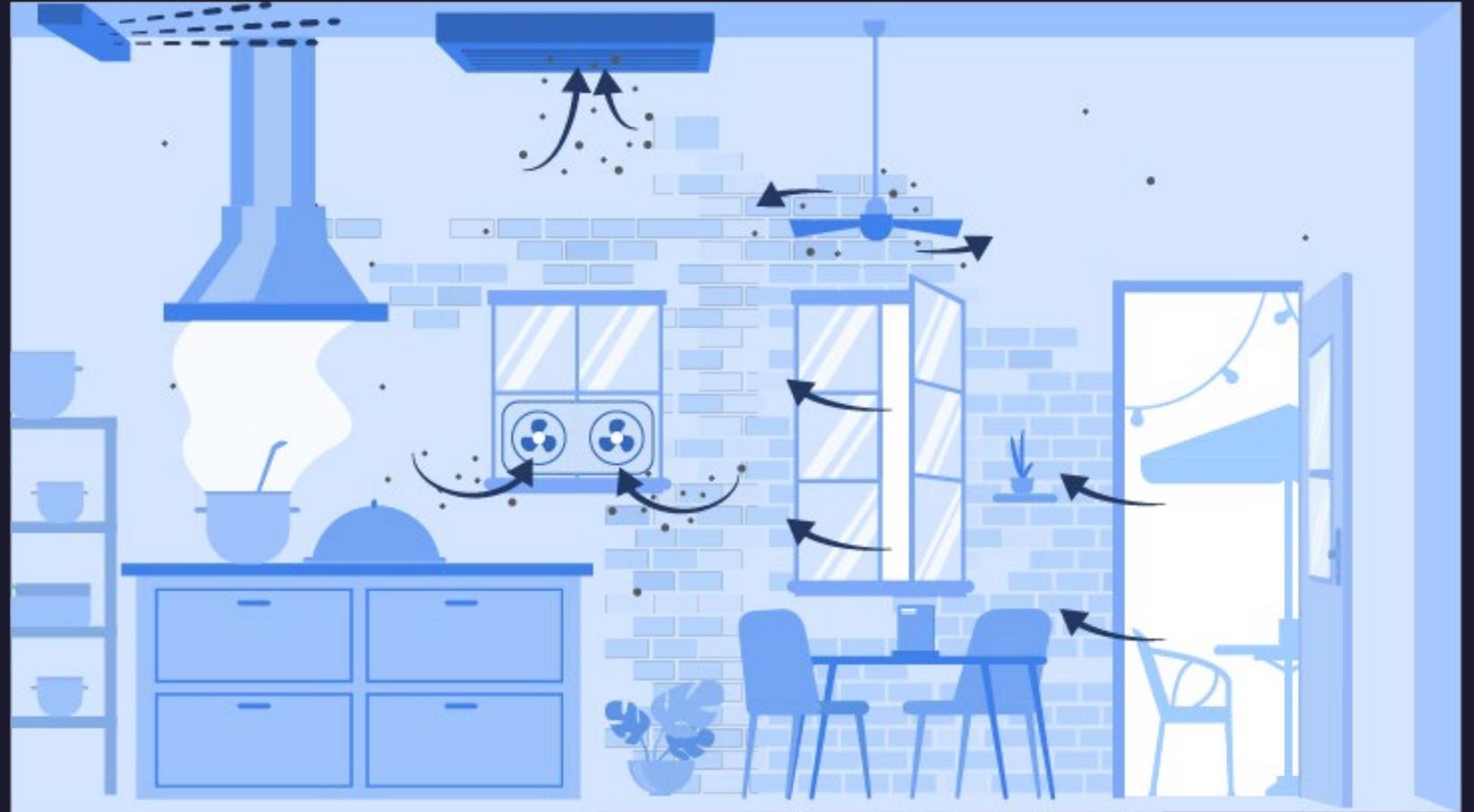


Vinyl



Nitrile

Implement controls: Engineering controls



Implement controls

- Administrative controls



Implement controls

- PPE



WEAR
PPE
WHEN HANDLING
MOLD.

Evaluate controls



Thank You

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