Mosquitoes: The World's Deadliest Animal

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MVCAC

Mosquito and Vector Control Association of California

About MVCAC

The Mosquito and Vector Control Association (MVCAC) provides leadership to and advocacy on behalf of 70+ mosquito and vector control agencies in California.

The mission of MVCAC is to provide quality public information, comprehensive mosquito and vector-borne disease surveillance, training to high professional standards, and effective legislative advocacy on behalf of California mosquito and vector control districts in an effort to protect the health of people living and visiting California.

About Mosquitoes

- More than 50 mosquito species in California and they need standing water to reproduce.
- Mosquito-borne diseases spread by bite of an infected mosquito.
- Only female mosquitoes bite.
- The best ways to prevent bites and mosquito-transmitted diseases is to use EPA-registered repellent and dump and drain all standing water in and around homes and outdoor spaces.

Mosquitoes are a Serious Public Health Threat

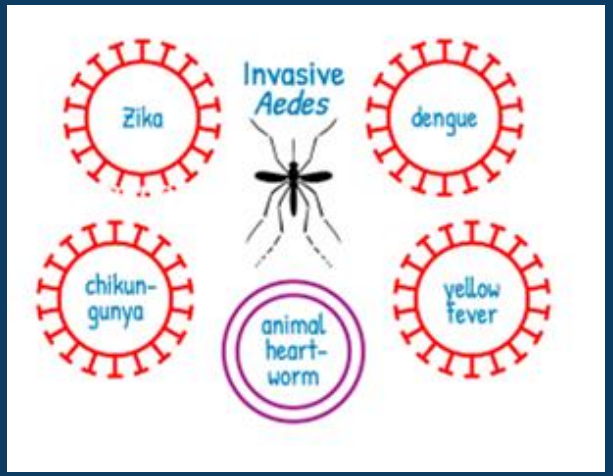
- West Nile virus is the most prevalent and serious disease transmitted by mosquitoes in California.
- WNV is endemic in CA and has sickened over 8,000 Californians and killed nearly 400 residents since it was first detected in 2003.
- *Culex* genus species of mosquito spreads West Nile virus.
- No human vaccines for many mosquito-transmitted viruses - costly to treat and long-term health and economic consequences.

Culex tarsalis

Invasive *Aedes* Mosquitoes are Spreading Throughout CA

- Climate change has created more favorable environments for invasive mosquitoes to develop.
- Surveillance and treatment for invasive *Aedes* mosquitoes are very expensive and labor-intensive.
- First detected in 2011, *Aedes* mosquitoes are now in 25+ counties and 300 cities and towns.
- Resistant to commonly used insecticides and can transmit diseases not endemic in California.

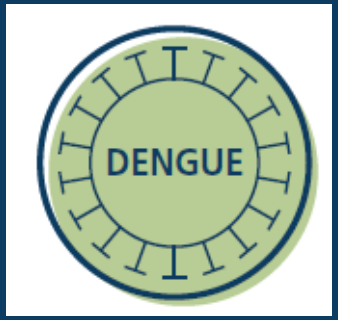
Yellow Fever Mosquito
Aedes aegypti



Asian Tiger Mosquito
Aedes albopictus

Locally-Transmitted Dengue in California

- In 2023, for the first time in California, there were cases of locally transmitted dengue.
- In 2024, there was a record number of returning travelers diagnosed with dengue, which led to 18 reported locally acquired dengue infections in California.
- This year, that number could increase as the dengue outbreak continues in Latin America.



St. Louis Encephalitis on the Rise in California

- People can get SLEV from the bite of an infected *Culex* mosquito.
- Re-emerged in California in 2015 after a decade.
- Positive mosquito pools in Imperial, Riverside, Placer, Yolo, Tulare counties and more from 2023-2025.
- Human cases remain rare but rising.
- 12 human cases in 2023, first in Long Beach since 1984.

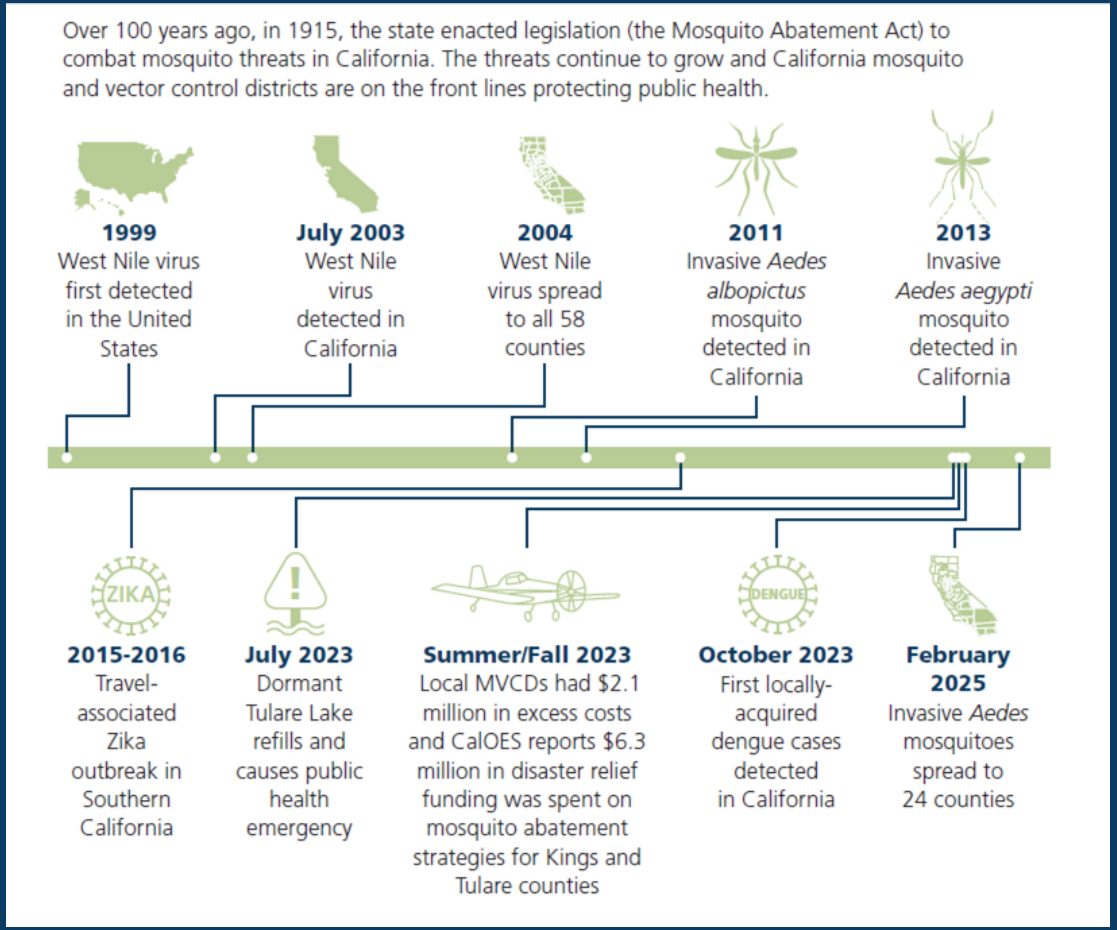
Tick-borne Diseases More Prevalent

- Climate change is creating more favorable conditions for tick-borne diseases.
- Lyme Disease is the most common tick-borne disease in CA.
- Ehrlichiosis and Rocky Mountain Spotted Fever spread by the Brown Dog Tick are on the rise for pets and people in California.

Plague Cases Increase in California

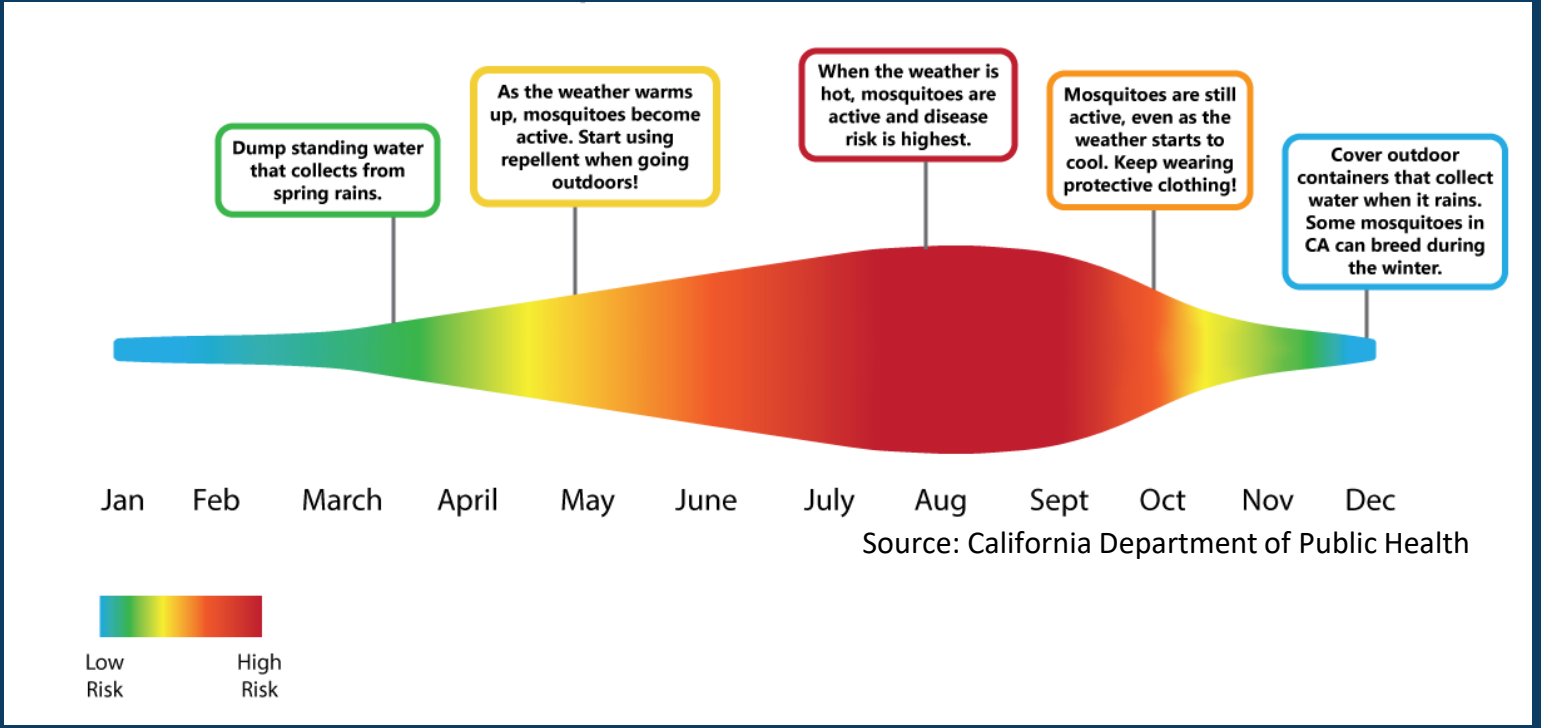
- Human plague cases are rare in the U.S., but serious if not treated promptly with antibiotics.
- Four rodents have tested positive for plague within the Tahoe Basin this year, 1 human case.
- The CDC estimates that there is an average of 7 human plague cases a year in the U.S., with most of the human cases occurring in the western U.S.

Timeline of Important Mosquito Control Events



Annual Risk of Mosquito Bites and Disease Transmission in CA

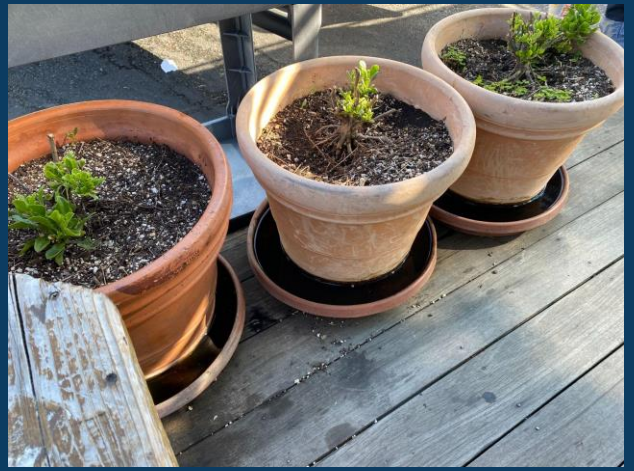
Risks in different areas vary from year to year and can change quickly, making quality surveillance data essential for targeting mosquito control operations.



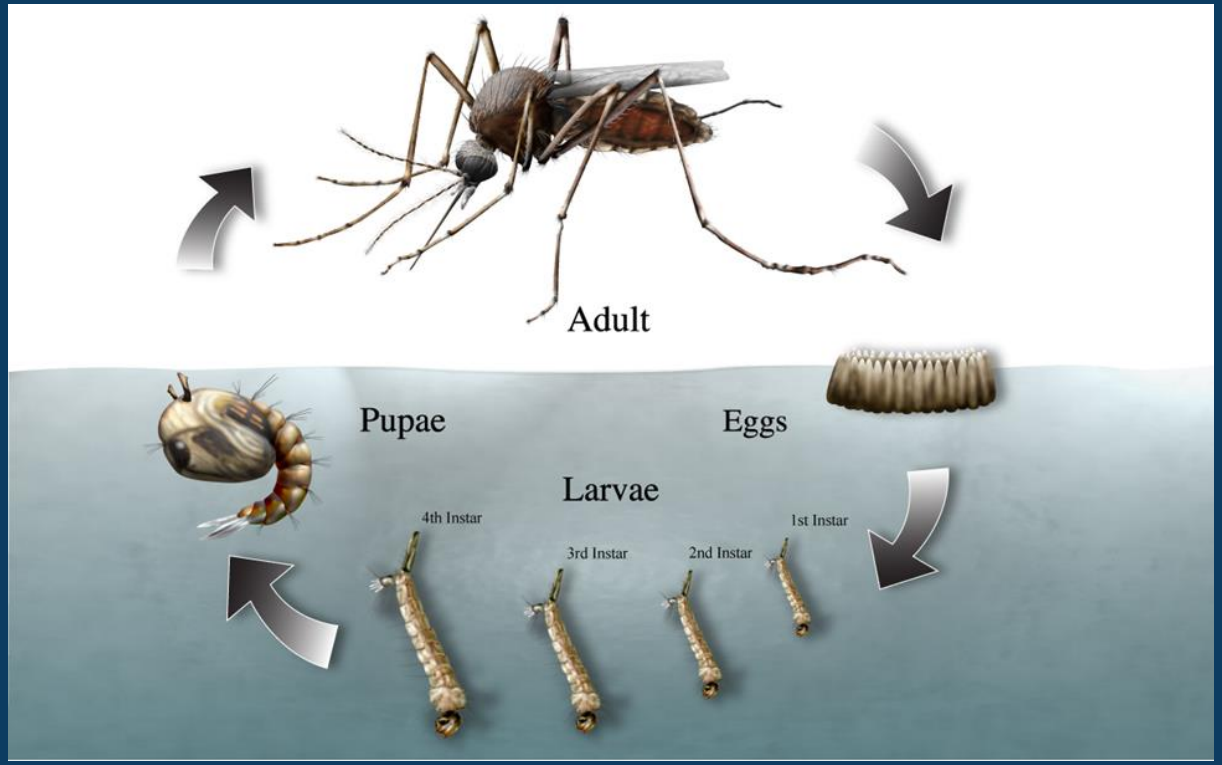
Source: California Department of Public Health

Mosquito Production Sources

- Mosquitoes can develop in water sources as small as a bottle cap.
- All standing water can be a mosquito source.
- Invasive mosquitoes tend to develop in and around people’s homes.



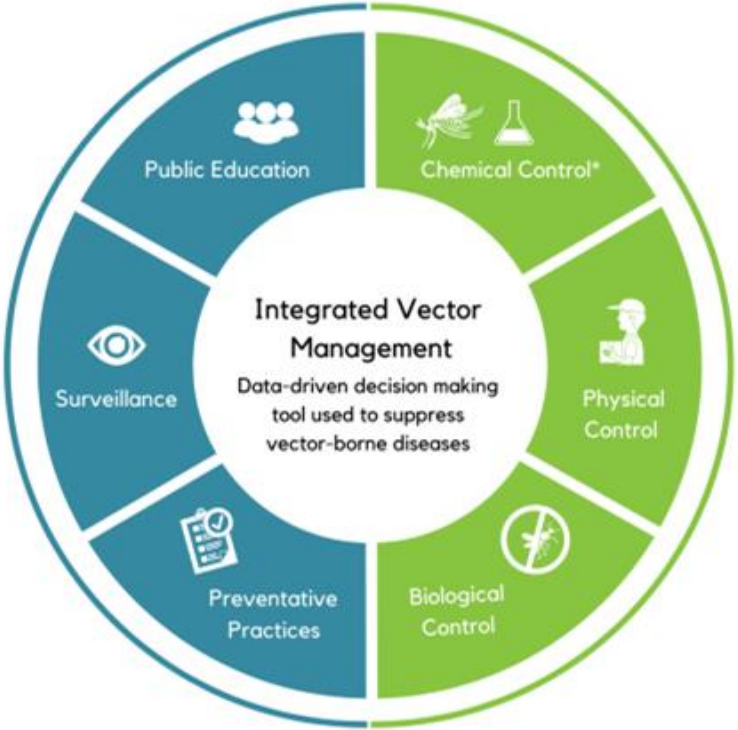
Mosquito Life Cycle Takes 5-7 Days



Integrated Vector Management

All components of IVM target mosquitoes at their different lifecycle stages but chemical control is the sole means of eliminating adult mosquitoes over a large area.

Districts continually evaluate the strengths, weaknesses, risks, and cost of each type of intervention to determine what combination in a given area is most appropriate for the current public health risk.

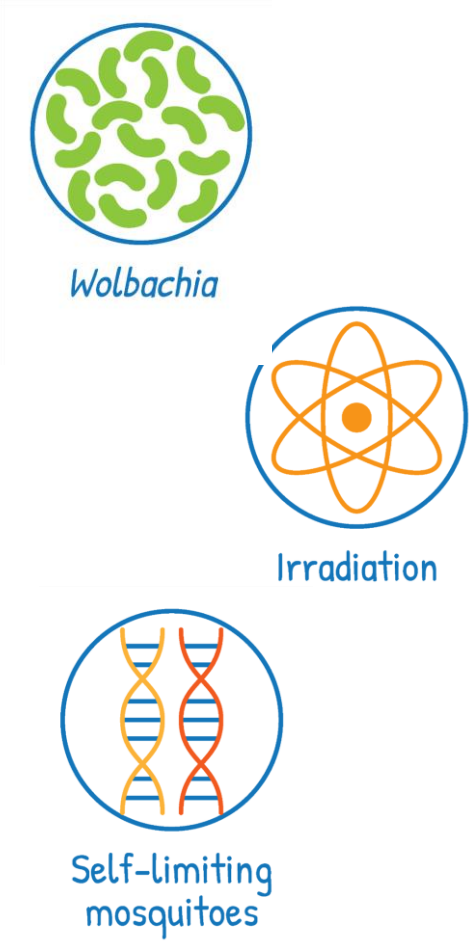


Need for Innovation

New tools are needed as the efficacy of traditional mosquito control approaches are limited as mosquitoes become resistant to insecticides commonly used to control them.

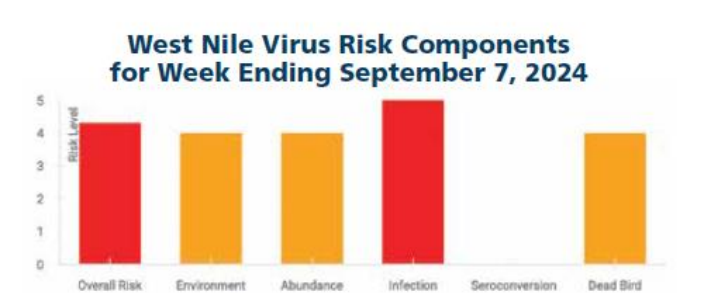
New and innovative technologies being considered or being used in CA include *Wolbachia*, irradiation, and self-limiting mosquitoes.

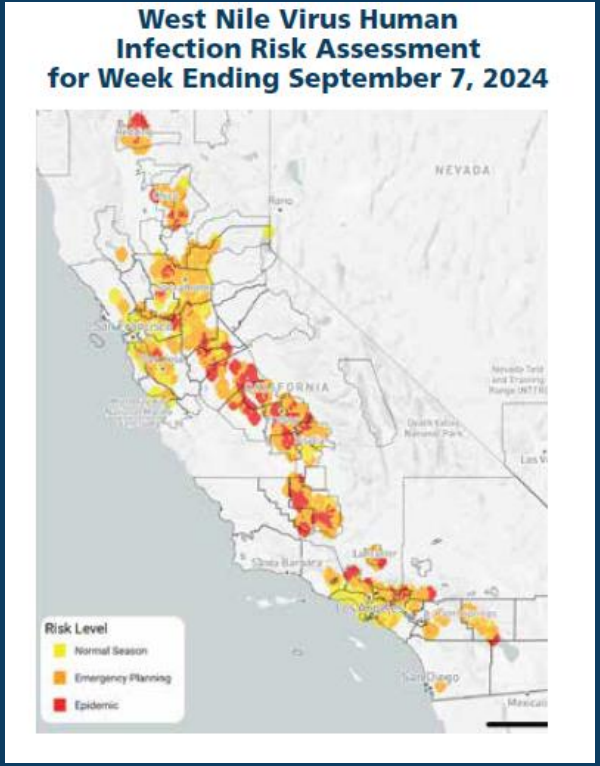
Drones also play an important role in surveillance and control efforts.



Partnership With CalSurv

MVCAC secured state support for CalSurv, an online interactive platform housed at UC Davis, which enables real-time collection, visualization, and analysis of data on vector-borne diseases.





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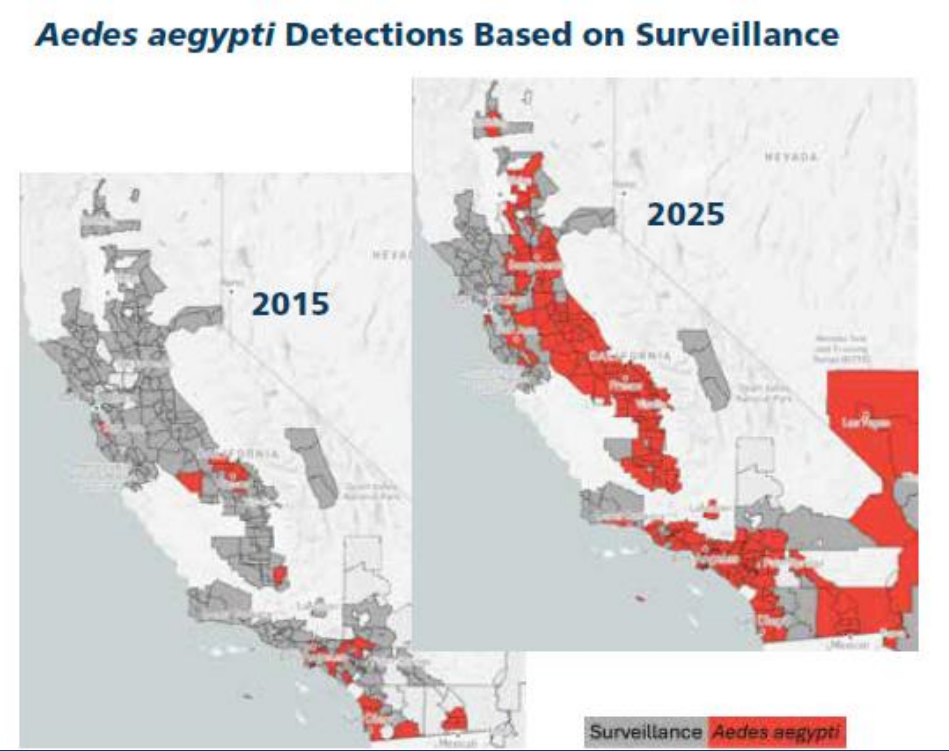
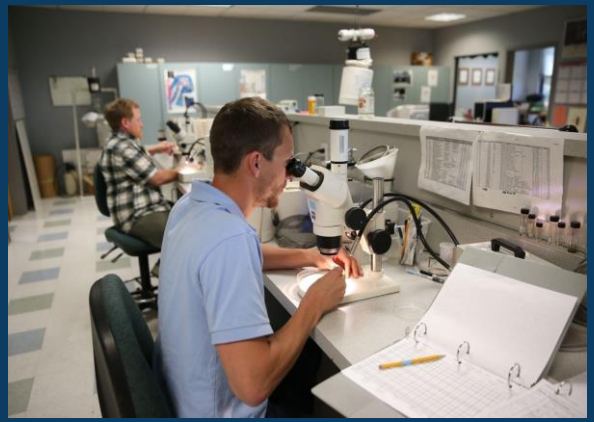
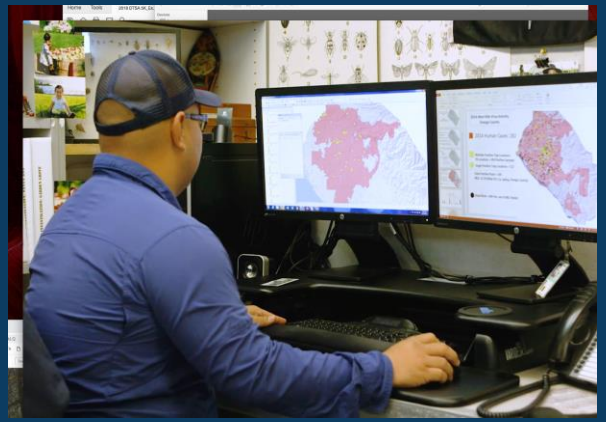


Services Local MVCDs Provide: Disease Surveillance

Testing pathogens in mosquitoes, ticks, and other vectors, monitoring mosquito counts and newly introduced mosquitoes, and conducting environmental assessments.





Services Local MVCDs Provide: Mosquito and Vector Control

Control of mosquitoes and other vectors

- Source reduction
- Biological control – Mosquitofish
- Chemical control - larvicide, adulticide

Services Local MCVDs Provide: Education and Outreach

School presentations, events, stakeholder meetings, multilingual printed and digital materials, website, earned, paid, and social media, and direct outreach to residents.

Natural Disaster and MVCD Impacts

- Tulare Lake disaster relief includes millions for mosquito abatement
- Mosquitoes possibly breeding in unattended swimming pools in Eaton Fire zone raise health concerns
- Could chikungunya virus spread in the Bay Area? Locally transmitted dengue on the rise in CA.
- Mosquito control is vital after natural disasters, especially floods, because they create ideal breeding grounds for mosquitoes, leading to increased populations and the risk of mosquito-borne diseases.

Partnering with Public Health Departments

- Annual update presentation, meet and greets and District tours with local public health staff
- Include public health employees on MVCD communications so they are informed on mosquito and vector control activities
- Information sharing on mosquito-borne illness cases before they are closed in Cal REDIE to enable quick mosquito control actions
- Coordinate on press releases involving human illness or a new detection of mosquito-borne disease
- Team calls as needed to provide for ongoing collaboration and working relationships
- **Prompt human data reporting to MVCDs**

What’s Next for Mosquito Control in California

Climate change is creating weather whiplash that facilitates the spread of invasive mosquitoes and intensifies the transmission of mosquito-borne diseases.

Mosquito and vector control districts throughout the state are preparing for this new normal but more than ever we need to enhance partnerships and ensure that we have adequate funding and resources to keep pace with increasing mosquito-related public health threats.

Learn more about what is happening on the ground in your region by connecting with your local mosquito and vector control district.