Dengue Virus & *Aedes aegypti* Frequently Asked Questions

About the Current Dengue Situation

Is there a dengue outbreak in our area?

Yes. There is an ongoing regional public health concern involving locally acquired dengue virus infections in the greater Tampa Bay area, with the largest concern originating in Hillsborough County. Because dengue is transmitted by mosquitoes, the response requires close coordination among local mosquito control agencies, county governments, the Florida Department of Health, the Florida Department of Agriculture and Consumer Services, and other state and local partners.

The presence of locally acquired dengue means that the virus is being transmitted by mosquitoes in our communities rather than only being associated with people who acquired the infection while traveling abroad.

The Pasco County Mosquito Control District is actively responding to the increased risk in Pasco County and monitoring the developing situation in the greater Tampa Bay region.

Should I be alarmed?

Residents should take the situation seriously, but there is no reason to panic.

Dengue is transmitted primarily through the bite of an infected *Aedes aegypti* mosquito. The best way residents can help reduce their risk is to prevent mosquito bites and eliminate places around their homes and businesses where *Aedes aegypti* can lay eggs.

PCMCD is conducting an aggressive mosquito surveillance and control response, working in coordination with our public health and government partners. But residents and business owners have a role to play in the response as well.

Protect yourself from mosquito bites by using a US EPA-approved insect repellent containing DEET or Picaridin and wear loose-fitting, long sleeve shirts and pants, shoes with socks whenever possible outdoors.

Reduce the potential for *Aedes aegypti* to grow. This mosquito uses items around your homes and businesses to lay eggs. Something as small as a bottle cap can produce hundreds of mosquitoes! Dump and drain any standing water in containers after rainfall and irrigation. Things like buckets, used tires, clogged rain gutters, children’s toys, pet’s dishes, bird baths can provide sufficient habitat for this mosquito. Don’t let those items collect water.

What Is Pasco County Mosquito Control Doing?

What is PCMCD doing to help stop dengue?

PCMCD has significantly intensified mosquito surveillance and control activities in response to the current regional dengue situation.

Our response includes:

- Increased targeted adult mosquito surveillance and trapping to collect *Aedes aegypti* mosquitoes which are then tested for the presence of dengue virus;
- Expanded targeted larval habitat inspections and treatment specifically for *Aedes aegypti* mosquitoes;
- Wide-Area-Larvicide-Spraying (WALS) via trucks in neighborhoods to target water-holding containers around homes and business;
- Wide-Area-Larvicide-Spraying (WALS) via low-flying helicopters flying directly over houses during the day to target water-holding containers around homes and business;
- Ground Ultra Low Volume (ULV) adult mosquito spraying via trucks in neighborhoods;
- Aerial adult mosquito spraying when conditions and surveillance indicate it is appropriate;
- Targeted property inspections and treatment including personnel canvasing neighborhoods to conduct source reduction measures by emptying water-holding containers and performing resident education;
- Coordination with the Florida Department of Health-Pasco County and other local, state, and regional partners;
- Continued monitoring of mosquito populations and treatment effectiveness;
- Spreading awareness to the community through media alerts, outreach presentations, and social media.

We are treating in full force — both during the day and at night — using different tools for different stages of the mosquito's life cycle.

This is a comprehensive **Integrated Mosquito Management (IMM)** response using best-management practices that are effective at reducing *Aedes aegypti* mosquito populations.

Why are you doing so many different types of treatment?

Because *Aedes aegypti* is a particularly challenging mosquito to control due to its close association with humans. This mosquito does not use marshes, swamps, flooded areas, or road-side ditches as their preferred habitat. *Aedes aegypti* will specifically use items around your homes and businesses as their preferred habitat to lay their eggs and develop.

Effective control requires us to attack the mosquito at multiple stages of its life cycle.

Larviciding targets mosquitoes while they are developing in water, before they become flying and biting adults that have the potential to spread dengue virus.

Adulticiding targets adult mosquitoes that are already flying and capable of biting and transmitting disease.

Source reduction eliminates the water-holding containers where mosquitoes can develop in the first place.

Surveillance tells us where mosquito populations are occurring, what mosquito species we have in any geographic area, where they are increasing, and whether our control efforts are working.

No single one of these tools is sufficient by itself during a dengue response. They have to work together.

"We Never Hear the Mosquito Truck Anymore. Are You Still Spraying?"

Why don't I hear the mosquito truck anymore?

Yes — PCMCD is still actively conducting mosquito control applications, during the day and at night.

One reason you may not hear our trucks is that we transitioned our ground ULV fleet to **electric spray equipment last summer**. The electric equipment is substantially quieter than traditional gas-powered mosquito control trucks.

That means you may not hear a truck approaching or leaving your neighborhood even when treatment is occurring.

Quiet does not mean inactive.

During the current response, our crews are working extensively throughout the county, and our treatment decisions are based on surveillance, mosquito populations, disease activity, weather, operational conditions, and the biology of the target mosquito.

"I never see you spraying. Now we have dengue. Why?"

Mosquito control is not limited to visible truck spraying.

Much of the most important work occurs through surveillance, larval control, property inspections, source reduction, aerial applications, and targeted treatments.

Aedes aegypti is also very different from the mosquitoes many residents associate with traditional mosquito spraying. It develops in small containers around homes and

businesses and spends much of its time close to people. These mosquitoes commonly use containers such as buckets, bowls, animal dishes, flowerpots, and other water-holding items around your homes and businesses.

That means a community can have significant *Aedes aegypti* production even when residents are not seeing or hearing a mosquito truck.

Understanding *Aedes aegypti*

What is *Aedes aegypti*?

Aedes aegypti is the primary mosquito species capable of transmitting dengue, Zika, chikungunya, and yellow fever viruses. This mosquito is prevalent throughout the greater Tampa Bay region including Pasco County and surrounding communities. It's most commonly found in urban areas and around homes in neighborhoods.

It is a small, dark mosquito with distinctive white markings. It is highly adapted to living around people and commonly develops in relatively small amounts of water found in containers around home and businesses.

It can live both indoors and outdoors and can bite during the day and night.

Why is *Aedes aegypti* so difficult to control?

Aedes aegypti is exceptionally well adapted to urban and residential environments.

It can develop in very small amounts of water — sometimes in containers that may seem insignificant to us as small as a bottle cap.

Examples include:

- Flowerpot saucers;
- Buckets;
- Toys;
- Pet bowls;
- Tarps;
- Trash containers;
- Gutters;
- Tires;
- Pool covers;
- Bird baths;
- Bromeliad plants;
- Decorative items;
- Containers around businesses;
- Any other object capable of holding water.

The mosquito does not need a pond or large body of water to develop and complete their life cycle.

Is *Aedes aegypti* found throughout Pasco County?

Aedes aegypti is well established in Florida and can occur wherever suitable habitat exists.

That means the mosquito itself is not confined to a single neighborhood or a single treatment area and can be found throughout Pasco County.

The risk of local dengue transmission exists wherever the vector (*Aedes aegypti)* is present and the virus is introduced into that mosquito population.

That is why our response cannot simply focus on one address or one small area. And government alone cannot completely control this mosquito. Every resident and business owner has a role to play in this response to help reduce areas where this mosquito can lay eggs.

At this point, we are particularly concerned about interrupting the **transmission cycle** — infected people being bitten by mosquitoes, those mosquitoes becoming infected, and then transmitting the virus to additional people.

How Does Dengue Spread?

How does someone get dengue?

Dengue is primarily transmitted when a person is bitten by an infected *Aedes* mosquito.

The cycle works like this:

Infected person → mosquito bites infected person → mosquito becomes infected → mosquito bites another person → virus is transmitted.

Once dengue is introduced into an area where competent mosquito vectors are present, controlling both the infected mosquito population and opportunities for mosquitoes to acquire the virus becomes important.

Why are you concerned about people moving around the region?

Thousands of people move throughout the Tampa Bay region every day for work, school, healthcare, shopping, recreation, and other activities.

A person infected with dengue may travel while infected. If an infected person is bitten by a competent mosquito in another location, that mosquito can potentially become infected and contribute to local transmission by biting other people.

This is one reason the current situation requires a **regional response**.

Mosquito populations and human movement do not stop at county boundaries. The viruses move with them!

What Happens When DOH Reports a Dengue Case?

What happens when the Florida Department of Health sends PCMCD information about a suspected or confirmed dengue case?

Dengue is a reportable disease in Florida and once an individual is tested for dengue, the Florida Department of Health is notified that tests to determine infection were ordered by a physician. When the Department of Health (DOH) identifies a suspected or confirmed dengue infection that requires a mosquito control response, public health officials notify the appropriate mosquito control agency of the general geographic location of concern.

PCMCD then initiates an operational response based on the information available to us.

Our response can include:

1. **Reviewing the location and available case information;**
2. **Conducting intensified mosquito surveillance;**
3. **Canvassing the surrounding area;**
4. **Attempting to access properties to identify mosquito production sites;**
5. **Inspecting for larval habitat;**
6. **Treating mosquito production sites when appropriate;**
7. **Educating residents about source reduction and bite prevention;**
8. **Increasing surveillance to determine mosquito abundance and distribution;**
9. **Conducting targeted larviciding and/or adulticiding;**
10. **Evaluating the area for continued or additional control measures.**

Our response is not simply "spray the address."

The objective is to identify and interrupt the conditions that could allow transmission to continue.

Will PCMCD inspect my property if there is a dengue case nearby?

A dengue response can involve targeted property inspections and neighborhood canvassing. This can be done directly in response to a suspected case or in neighborhoods with high *Aedes aegypti* populations in order to reduce the potential for dengue transmission.

Our staff may look for containers or other locations capable of producing *Aedes aegypti*, and we may provide residents with information about eliminating those sites.

During periods of heightened surveillance and control activity, however, our operational priorities may change as we concentrate resources on wide-area disease response.

Why Doesn't PCMCD Publish the Locations of Dengue Cases?

Why don't you tell us exactly where the positive dengue cases are?

Individual patient information is protected health information, and PCMCD does not know the exact address of a suspected or confirmed dengue case, therefore PCMCD will not publish identifying information about individual dengue patients.

More importantly, mosquito control decisions should not be interpreted as meaning that one particular address is "the dengue area."

The mosquito vector can occur beyond the location where a case was identified, and people move throughout the region.

Our job is to use available public health information, mosquito surveillance, environmental conditions and operational data to determine where control activities are needed.

We will continue to provide information about our treatment activities and response efforts while protecting individual patient privacy.

What Treatments Are You Using?

What products are you using to control mosquitoes?

PCMCD uses US EPA and FDACS-registered mosquito control products that are approved for their intended use and applied according to product labels and applicable regulations.

Different products are used for different mosquito life stages and treatment situations.

Our website's **Mosquito Control Products** section provides information about the products currently used by PCMCD.

What is Bti?

Bti stands for *Bacillus thuringiensis israelensis*.

It is a naturally occurring soil bacterium used as a biological larvicide. Bti targets mosquito larvae and is used to control mosquitoes before they mature into biting adults. This is the primary larvicide product used in PCMCD’s response to controlling immature mosquitoes.

The US EPA states that Bti specifically targets mosquito, blackfly, and fungus gnat larvae and has no toxicity to people and pets when used as intended and based on product label directors.

Why are you using larvicide for dengue?

Because controlling mosquitoes before they become adults is a critical part of breaking the transmission cycle.

Larvicides target immature mosquito larvae developing in water. Reducing larvae reduces the number of adult mosquitoes that can emerge later and have the potential to spread disease.

US EPA identifies larviciding as an important mosquito control tool because it targets mosquitoes before they become adults and disperse.

What is WALS?

WALS stands for **Wide-Area Larvicide Spray**.

PCMCD can use aircraft or ground equipment to apply larvicide across larger areas containing suitable mosquito production habitat.

Aerial WALS allows us to treat large areas efficiently and reach habitat that may be difficult or impossible to treat individually from the ground. Helicopters fly at low levels over homes and in neighborhoods during the day to apply a liquid Bti designed to deposit into mosquito production habitat around homes and businesses. This method is proven effective at controlling *Aedes aegypti* by interrupting the life cycle.

Why are you treating during the day?

Aedes aegypti larval control is focused on mosquito development habitat, rather than simply when adult mosquitoes are flying.

Wide-area larviciding can therefore occur during daylight hours when operational and weather conditions are appropriate.

The goal is to reach mosquito production habitat and reduce the number of mosquitoes that emerge as adults.

Why are you spraying adulticide after sunset?

Adult mosquito control is often conducted during periods when many adult mosquitoes are active and when environmental conditions are appropriate for effective ULV application. Additionally, applying adulticide after sunset minimizes affects on beneficial insects like bees and butterflies because they are not active after the sun goes down.

PCMCD conducts aerial and ground adulticide operations after sunset when conditions permit.

Adulticide applications use ultra-low-volume (ULV) sprays that produce very small droplets designed to drift along in the air and contact flying adult mosquitoes. EPA recognizes both aircraft and truck-mounted ULV applications as tools used for adult mosquito control during disease outbreaks and periods of high mosquito activity.

Adulticide is just one component of an integrated response. It should not be relied upon as the only strategy for controlling *Aedes aegypti*.

If we only kill adult mosquitoes without addressing the places where new mosquitoes are developing, new adults can continue to emerge, and the potential for disease transmission remains high.

Why Doesn't Spraying Once Solve the Problem?

If you spray my neighborhood, why are there still mosquitoes?

Mosquito control is not a one-time event.

Aedes aegypti populations can be continually replenished when suitable water-holding containers remain available.

Larviciding can reduce mosquitoes developing in treated habitat, while adulticiding can rapidly reduce adult mosquitoes in the treatment area. But if untreated production sites remain, mosquitoes can emerge again. Mosquitoes can also fly in from areas not under treatment.

That is why sustained control requires **surveillance + source reduction + larviciding + adulticiding + community participation.**

Why do treatment areas need to be continuous?

Wide-area treatment is designed to suppress mosquito populations across an operational area.

Leaving substantial untreated areas between treatment blocks can allow mosquitoes to remain in or recolonize areas surrounding treated blocks.

For that reason, PCMCD carefully considers treatment boundaries and continuity when planning wide-area applications.

The objective is to use available resources as efficiently as possible and avoid creating disconnected treatment areas that undermine the overall response.

What Can Residents Do?

I found mosquito larvae in standing water. Should I dump the water?

Yes — if you can safely and completely eliminate the water, that is one of the best things you can do.

Empty, drain, remove, or cover containers that hold water. Simply pouring the water out onto grass or paved areas will kill the developing mosquito larvae, as they require water to complete their life cycle.

Whenever possible:

Empty it. Scrub it. Turn it over. Remove it. Cover it.

CDC recommends emptying and scrubbing, turning over, covering, or throwing away water-holding items at least once a week.

What about mosquito eggs that are already in the container?

This is important. *Aedes* eggs can be deposited on surfaces just above the water line. Simply dumping the water may not eliminate the eggs.

Whenever practical, empty and scrub the container before refilling it.

If the item is not needed, remove it entirely.

What if I have water that cannot be dumped?

For water-holding sites that cannot reasonably be drained or eliminated, an appropriate larvicide may be used according to its label. Examples can include certain water-holding structures, rain barrels, animal troughs, unkept pools, or other areas where water must remain.

Residents should always follow the product label and use only products approved for the intended use. Several effective Bti products are commercially available to residents at big box stores.

Biological tools like mosquito-eating fish from the genus *Gambusia* are effective at controlling larvae by eating them in the water. PCMCD can provide *Gambusia* mosquitofish to place in such items.

What should I do around my home?

Once a week, **Drain and Cover.**

Look for:

- Flowerpots and saucers;
- Buckets;
- Children's toys;
- Pet dishes;
- Birdbaths;
- Pool covers;
- Tarps;
- Clogged rain gutters;
- Used tires;
- Trash containers;
- Decorative items;
- Outdoor furniture;
- Any container that can hold rain or irrigation water.

Remember: **If it can hold water, it can potentially become mosquito habitat.**

Why is community participation so important?

Because a mosquito control district cannot eliminate every water-holding container on every property in a county.

Aedes aegypti thrives around homes and businesses.

Our crews can conduct wide-area treatments, surveillance, and targeted inspections, but residents and businesses control many of the most important mosquito production sites.

Mosquito control is a shared responsibility. Please help us reduce *Aedes aegypti* populations by reducing areas for them to complete their life cycle.

Protecting Yourself From Dengue

How can I protect myself from dengue?

The best way to prevent dengue is to prevent mosquito bites.

CDC recommends:

- Use a US EPA-registered insect repellent containing active ingredients DEET or picaridin;
- Wear loose-fitting, long-sleeved clothing and long pants with shoes and socks when practical;
- Use screens on windows and doors;
- Keep mosquitoes out of homes when possible;
- Eliminate standing water around your property;

- Take additional precautions when mosquitoes are active.

Dengue mosquitoes can bite during both the day and night.

If someone in my household has dengue, should we take extra precautions?

Yes.

A person infected with dengue can potentially infect *Aedes aegypti* mosquitoes that bite them. Those mosquitoes can then transmit the virus to other people.

For this reason, someone who has dengue should be especially diligent about avoiding mosquito bites while they are infectious.

CDC recommends continued bite prevention for people with dengue, particularly during the first 2 weeks of infection.

What About the Upcoming Cooler Weather as the seasons change?

Will cooler weather make dengue go away?

Cooler weather can affect mosquito activity and development to some extent, however residents should not assume that cooler temperatures will immediately eliminate the problem.

Aedes aegypti is adapted to Florida's climate, and individual mosquitoes and their eggs can persist when conditions are suitable. Central Florida temperatures are mild enough throughout the winter to sustain *Aedes aegypti* production.

Transmission risk generally changes with temperature, rainfall, mosquito abundance, and other environmental conditions. CDC notes that warmer temperatures and rainfall can increase conditions favorable to *Aedes* mosquitoes and dengue transmission.

There is therefore no specific date we can provide for when the current dengue situation will "be over." If the area experiences a mild winter, it is possible that dengue transmission could occur throughout the winter months. Do not let your guard down and remain vigilant. Sustained, continuous temperatures below 50 degrees for more than 2 weeks is required to really have an impact on *Aedes aegypti.*

Our response will continue to be guided by public health information, mosquito surveillance, environmental conditions, and operational data, rather than a calendar date.

Do residents still need to invest in mosquito prevention when temperatures cool down?

Yes.

The cost and effort of prevention should be considered in relation to the conditions around each property.

Removing water-holding containers is one of the simplest and most effective things residents can do, and it does not depend on the weather.

What Does the Local State of Emergency Mean?

Why did Pasco County declare a Local State of Emergency?

The declaration provides Pasco County with additional flexibility and tools to respond to the evolving dengue situation and to rapidly coordinate resources during an ongoing regional public health concern.

The declaration does **not** mean residents should panic.

It reflects a proactive approach: recognizing the seriousness of the situation and taking steps to make additional resources and response capabilities available as needed.

Does the declaration mean there is an emergency at my house?

No.

A countywide declaration does not mean that every neighborhood or household has the same level of risk.

It allows the County and its partners to respond more efficiently to a situation that extends beyond any single property or neighborhood.

Why is a regional response necessary?

Mosquitoes do not recognize county boundaries, and neither does human movement.

People routinely travel throughout Pasco, Hillsborough, Pinellas, Hernando, Citrus, and the broader Tampa Bay region every day.

The current dengue situation therefore requires agencies to coordinate resources, share information and support one another.

This is bigger than any one agency, mosquito control district, or county.

Why Can't PCMCD Inspect Every Property?

Why don't you come inspect every house?

Aedes aegypti can develop in thousands of small water-holding containers throughout a community. Even something as small as a bottle cap left out in the rain can produce hundreds of *Aedes aegypti.*

It is not operationally possible for mosquito control personnel to inspect every property every day. Additionally, not every single property in a community is always accessible to mosquito control personnel to perform source reduction activities.

Our staff must prioritize resources based on surveillance, disease information, mosquito populations, treatment needs, and other operational factors.

Residents play an essential role by routinely checking their own properties and eliminating mosquito production sites.

What if I need PCMCD assistance?

Residents can contact PCMCD to report mosquito concerns or request assistance.

During the current heightened dengue response, however, our resources are being prioritized toward wide-area mosquito control, intensified surveillance, and disease-response activities.

This may mean that individual property inspections are not immediately available.

Are You Going to Keep Treating?

Will PCMCD continue mosquito control after the current outbreak?

Yes.

Mosquito control is an ongoing public health infrastructure function in Pasco County. We conduct mosquito surveillance and control activities year-round.

The current dengue response has resulted in an **intensification and expansion** of our normal operations, but our responsibility to monitor and control mosquitoes continues beyond this particular event.

How long will the intensified response continue?

There is no predetermined end date.

PCMCD will continue evaluating:

- Dengue activity;
- Mosquito surveillance results;
- *Aedes aegypti* abundance;
- Disease transmission indicators;

- Environmental conditions;
- Treatment effectiveness;
- Regional conditions; and
- Available resources.

Our response will evolve as the situation changes.

Why Is PCMCD Asking for Additional Resources?

Why does mosquito control need more people and equipment?

A comprehensive dengue response is extremely labor intensive.

Effective control requires people in the field conducting surveillance, inspecting individual properties, treating larval habitat, operating equipment, planning aerial and ground missions, analyzing data, communicating with residents, and evaluating treatment results.

At the same time, routine mosquito control responsibilities do not stop.

Additional resources allow PCMCD to expand treatment while maintaining the broader mosquito control infrastructure that protects Pasco County from dengue and other mosquito-borne diseases.

Does more spraying automatically mean better control?

No.

The goal is not simply to spray more.

The goal is to **apply the right control method, in the right place, at the right time, at the appropriate frequency, based on surveillance and mosquito biology.**

That is why Integrated Mosquito Management is so important.

A Message From PCMCD

What does PCMCD want residents to know right now?

Your Pasco County Mosquito Control District is working around the clock to respond to this evolving public health concern.

Our staff are working long hours, conducting surveillance, treating mosquito populations, responding to disease information, supporting regional partners, and adapting our operations as conditions change.

But mosquito control cannot do this alone.

We need our community to be part of the response.

Every bucket emptied, every flowerpot saucer drained, every tire removed, every container covered, and every mosquito bite prevented helps.

We will continue doing everything within our capabilities to reduce mosquito populations and interrupt the transmission cycle.

You have a role. We have a role. Together, we can make a difference.

Quick Dengue Prevention Checklist

DRAIN
Empty standing water at least once a week.
SCRUB
Scrub containers to remove mosquito eggs.
COVER
Cover water-storage containers and repair screens.
REMOVE
Throw away or eliminate unnecessary water-holding items.
PROTECT
Use US EPA-registered repellent and wear protective clothing.
REPORT
Contact PCMCD when you have significant mosquito concerns or identify areas that may require mosquito control attention.
STAY INFORMED
Follow PCMCD and Florida Department of Health updates for information about the ongoing response.

Mosquito Control Is Infrastructure.

And protecting our community from mosquito-borne disease is a shared responsibility. Please help us Fight The Bite!