



BORDER HEALTH NEWSLETTER - April 2016

WELCOME!

Hi everybody, it was nice to see some of you at the Health Protection Forum in Wellington recently and I have enjoyed the visit to the Port of Tauranga resulting in many productive discussions. I am interested in seeing the results of different light bulbs used in the light traps. The number and distribution of *Culex quinquefasciatus* this season is still interesting and we will definitely keep an eye on this. Please visit our website for checklists that you can download, laminate and add to your surveillance folder, especially for staff who are new or those that haven't carried out mosquito surveillance in a while:

<http://www.smsl.co.nz/NZBEL/Entomology+Laboratory.html>

SAMPLES

During April 881 samples were collected by staff from 12 District Health Boards with 269 positive. This is approximately what has been samples in April last year but this season is apparently longer as the numbers of the two most common species (introduced) *Aedes notoscriptus* and *Culex quinquefasciatus* are still very high but however, we notice a drastic decrease compared to last month, which is a relief, realizing that the *Cx. quinquefasciatus* population at AIAL seems to lose ground (but Wellington Airport is now catching up.) Personally we are very happy about the endangered *Maorigoeldia argyropus* specimen, thanks to Peter Haslemore who dug out historic sample sites.

Species	Adults		
	April 15	March 16	April 16
New Zealand Mozzies			
<i>Aedes antipodeus</i> (winter mosquito)	Nil	753	43
<i>Ae. australis</i> (saltwater mosquito)	3	5	Nil
<i>Ae. notoscriptus</i> (striped mosquito)	5	2914	885
<i>Coquilletidea iracunda</i>	Nil	57	Nil
<i>Coq. tenuipalpis</i>	Nil	1	Nil
<i>Culex astilae</i>	Nil	Nil	Nil
<i>Cx pervigilans</i> (vigilant mosquito)	17	138	20
<i>Cx. quinquefasciatus</i> (southern house mosquito)	269	2211	546
<i>Maorigoeldia argyropus</i>	Nil	Nil	Nil
<i>Opifex fuscus</i> (rockpool mosquito)	Nil	2	5
Total	297	6081	1499



Species	Larvae		
	April 15	March 16	April 16
New Zealand Mozzies			
Aedes antipodeus (winter mosquito)	Nil	Nil	Nil
Ae. australis (saltwater mosquito)	16	1	24
Ae. notoscriptus (striped mosquito)	2485	6080	2637
Coquilletidea iracunda	Nil	Nil	Nil
Coq. tenuipalpis	Nil	Nil	Nil
Culex astilae	37	5	Nil
Cx pervigilans (vigilant mosquito)	963	2448	867
Cx. quinquefasciatus (southern house mosquito)	4160	7217	4826
Maorigoeldia argyopus	Nil	2	122
Opifex fuscus (rockpool mosquito)	79	118	244
Total	7740	15871	8720

INCURSIONS/INTERCEPTIONS

During April 8 suspected interceptions were detected and responded to, all of them turned out to be *Culex quinquefasciatus* – whether of local origin or from outside New Zealand is not always possible to confirm. Strikingly we have received 3 interception notification from Wellington, suggesting that *Cx quinquefasciatus* is strengthening in the capital.

Please note that the interceptions of live unwanted mosquitoes are highlighted in red. Exotic species in general are highlighted in light blue.

- 2.4.2016 One live female *Cx. quinquefasciatus* was found at AIAL in the BASK office – likely to be a local one.
- 4.4.2016 One live female *Cx. quinquefasciatus* was found at AIAL MPI search area – likely to be a local one.
- 8.4.2016 One live female and one male *Cx. quinquefasciatus* were found at Freshmax Transitional Facility, Mt. Wellington, in the MPI inspection room – associated with Watermelon from Australia
- 18.4.2016 One live female *Cx. sp.* was found at Sub Euro in Wellington in a container with car parts from Japan, too damaged for ID.
- 18.4.2016 One live male *Cx. quinquefasciatus* was found at Wellington Airport in the MPI Lab– likely to be a local one.
- 25.4.2016 One live female *Cx. quinquefasciatus* was found at Wellington International Airport at the arrival screening area– likely to be a local one.
- 25.4.2016 One live male *Cx. quinquefasciatus* was found at AIAL MPI search bench – associated with a flight from Singapore.
- 26.4.2016 One live male *Cx. quinquefasciatus* was found at AIAL baggage claim room in a chilly bin with sand, water and rocks, probably from a beach in Samoa, badly damaged, ID was possible after the preparation of the male genitalia.



PICTURES OF THE MONTH



Prime Minister **Narendra Modi** talks about the need to take preventive measures, like keeping surroundings clean, to get rid of dengue in India.

STORY OF THE MONTH

In Memoriam

On Tuesday, April 19th two experienced pilots from the St. Tammany Parish Mosquito Abatement District, Slidell, LA lost their lives in the name of public health when one of our spray planes crashed on approach to the Slidell Airport after having completed as pray mission. The details of the accident remain unclear, but we hope that the National Transportation Safety Board will provide some clarity. We all know that mosquito control pilots have a disproportionate amount of risk in the work that they do to protect our communities. The commitment of these two men and the sacrifice of their families inspire our work.

Aerial mosquito spraying resumes in St. Tammany following fatal plane crash

Ashley Rodrigue, WWL 5.5 2016



LACOMBE - With spring-like weather at its peak, it's a challenge for Joanna Parr to wrangle her 19-month-old when outdoors. But she's had to take on that feat because of mosquitos. "It's hard with the little ones because they want to go outside and he can't go outside and play, we've got to bring



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him inside," she said, "He's getting lots of bites." She said the increase in her Lacombe neighborhood has been noticeable over the past two weeks, when the parish spray plane has not been flying. Mosquito Control says that's, on one hand, due to the loss of their large plane, and two esteemed pilots, in a heartbreaking crash. But St. Tammany Mosquito Abatement Director Chuck Palmisano said it's mostly because, "The populations are not that high right now. They're relatively low. But light traps indicated an increase in certain areas across the parish so we did conduct an aerial operation Tuesday night in south Slidell and also Lacombe. Tonight, we're going to go aerielly in the Mandeville area." Ground and preventative efforts haven't missed a beat though, and as the bug-riddled summer months creep closer, leaders have a plan to keep the aerial attack active. "We're going to utilize this plane as much as we can, also, we've been talking with a couple of aerial spray contractors, looking to maybe engage their service at least until the time we get another airplane and put it in service," said Palmisano.

VECTOR-BORNE DISEASES - OUTBREAK NEWS

South Pacific



Pacific syndromic surveillance report – Week 17, ending 1 May 2016

Zika virus: As of 29 April Kosrae state, FSM reported 4 confirmed cases and 67 suspected cases as of since 10 February 2016. None of the confirmed cases had a prior travel history nor were any of the cases pregnant. Enhance surveillance for zika is ongoing in all health clinics as well as surveillance for congenital zika syndrome. Source: Kosrae EpiNet team.

Dengue: French Polynesia: there were 30 confirmed cases, including 2 hospitalisation for week ending 24 April 2016. Dengue serotype 1 is in circulation. The weekly number of cases is decreasing. Source: French Polynesia Ministry of Health.

Yellow Fever: As of 26 April, a total of 2023 suspected cases and 258 deaths were reported in Angola, of which 653 were laboratory confirmed cases. In the week to 24 April, 115 new suspect cases, eight new deaths and 36 new confirmed Yellow Fever cases were reported.

The outbreak in Angola remains of high concern due to persistent local transmission in Luanda despite that fact that almost six million people have been vaccinated and there is high risk of spread to neighbouring countries. Confirmed cases have already travelled from Angola to China, DRC and Kenya.



MONTHLY NOTIFIABLE DISEASE SURVEILLANCE REPORT - Feb 2016

Zika virus: 11 cases (7 confirmed, 3 probable and 1 under investigation) were notified in March 2016. After further investigation, one case has since been found not to meet the case criteria. The highest number of cases was reported in the 20–29 years and 50–59 years age groups (3 cases each). 70.0% of the cases were confirmed by PCR. All cases travelled during the incubation period for the disease, and countries visited included Tonga (6 cases), Samoa (3 cases), and Papua New Guinea (1 case, who had also been in transit in Australia).



ZIKA

USA

Zika fears fuel demand for bug spray as mosquito season looms

By Tom Howell Jr. - The Washington Times - Thursday, May 5, 2016

Factories are churning out bug spray around the clock as fears of the mosquito-borne Zika



virus take hold. Demand has tripled in Brazil, where the virus is already entrenched, and has doubled in the U.S., even though no mosquito-transmitted cases have been recorded in the country. The mere anticipation of a Zika epidemic has sparked a boom in the bug-repellent industry.

Mosquito Joe franchises report an increase in business of 50 percent.

Mosquito inspector Giraldo Carratala responds to a complaint in a Miami neighborhood. Health officials are concerned about the Zika virus and the mosquitoes that spread it. (Associated Press)

“Clearly, part of it is Zika,” said company CEO Kevin Wilson

The Centers for Disease Control and Prevention has recorded 426 travel-related Zika cases in U.S. states and the District of Columbia, including a handful through sexual transmission.

The virus is expected to puncture the mainland once temperatures rise, allowing mosquito populations to flourish.

Pregnant women are being warned against travel to Latin America, and people returning are being urged to use birth control.

It is unclear whether and when Zika will start circulating in the U.S. through mosquitoes, as it does south of the border, but companies that make bugs their business say they won't be caught off guard.

“Nobody likes to benefit from a crisis, but the other way of looking at it is we're here to help with this crisis,” Mr. Wilson said.

S.C. Johnson, the company that makes Off insect repellent, decided in February to hire additional staff and boost its production to maximum capacity, “working 24/7,” to meet anticipated demand.

The Wisconsin Pharmacal Co. is dispatching its Coleman brand insect repellent at a rate that matches or even exceeds the fervor around West Nile virus in recent years.

“I'd say it's the single largest demand uptick we've seen in years. We are too early in the season to gauge whether or not it'll prove to be unprecedented,” said Andrew Wundrock, the company's senior vice president for sales and marketing.

Spectrum Brands, the maker of Cutter and Repel insect repellents, told investors last week that Zika factored into record quarterly earnings for its home and garden division, while Terminix's parent company reported a surge of interest in the mosquito-control services it introduced 18 months ago.

“We can't say whether the Zika conversation will directly impact sales, but we do believe our education and awareness efforts around the potential dangers will encourage our customers to protect their homes and families with mosquito treatments,” ServiceMaster



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Global Holdings CEO Rob Gillette told investors Wednesday on an earnings call. Like yellow fever and dengue, the Zika virus is carried primarily by the *Aedes aegypti* mosquito, a nasty day biter that will feast on multiple people in a single bloodmeal. Mosquito Joe tries to stamp out the bugs before they get inside the home by surveying property for standing water where mosquitoes breed and spraying leaves and other mosquito rest stops with a synthetic version of pyrethrin, a compound that chrysanthemums use as a natural defense against insects.

The company has 172 locations in 26 states, including 30 franchises in Texas and 20 in Florida. When Southeast franchises speak to clients, “Zika is one of the first things that come up,” Mr. Wilson said.

Southeastern states are most vulnerable to the *aegypti*, though researchers in Mexico have found the Zika virus in another species, *Aedes albopictus*. That breed has an even larger footprint in the U.S., raising the stakes for mosquito-control forces in places as far north as New York City.

“I know [Donald] Trump wants to build a wall, but I’m not sure it’s going to keep the mosquitoes from coming across,” Mr. Wilson said of the presumptive Republican presidential nominee.

Consumers and scientists alike are getting acquainted with the latest global health scare. Though the facts are daunting, he said, his direct-mail advertising won’t change. He vows to stick with his lighthearted tag lines — “Tired of donating blood on your way to the mailbox?” — instead of spooking potential clients.

“We take what we do very seriously,” he said, “but our goal is not to use scare tactics to get people to use our services.”

Florida Gov. Rick Scott, a Republican, is urging Congress to brush aside partisanship and treat the looming Zika virus “like a hurricane.” He said his state is depending on resources and specific planning to gird for an outbreak.

Florida has recorded more than 100 travel-related cases of Zika, and health officials warn that the disease could puncture the states further once temperatures climb and mosquito populations flourish.

President Obama has asked Congress to approve his \$1.9 billion request for emergency spending to combat Zika and backfill \$510 million in Ebola funding that he has shifted to the burgeoning threat.

Yet Republican leaders say the Ebola funding should cover immediate costs and that additional money could be disbursed through this year’s appropriations process.

Last week, Senate Majority Whip John Cornyn, Texas Republican, said he doesn’t want to give the administration a “blank check” to fight Zika, while House conservatives have demanded that any additional spending be offset by budget cuts elsewhere.

Mr. Scott didn’t suggest a dollar amount in his statement Thursday, though he is adding his voice to those of other Florida Republicans who want Congress to act before Zika hits. The Sunshine State is relatively warm and has significant populations of the *Aedes aegypti mosquito*.

Sen. Marco Rubio, Florida Republican, has urged fellow lawmakers to approve Mr. Obama’s funding request as long as it’s used solely to combat Zika.

DENGUE

India

PM Modi to talk about preventing dengue

Mail Today by Astha Saxena May 8, 2016

New Delhi Prime Minister Narendra Modi will talk about the need to take preventive



measures, like keeping surroundings clean, to get rid of dengue in his next edition of Mann ki Baat scheduled for May 15.

Dengue, a viral disease transmitted by the bite of aedes aegypti mosquito, generally develops after five to six days of being bitten by the mosquito.

The Union as well as state health ministry are putting together the data and information that the PM would need.

"We are coordinating with all the important departments like Municipal Corporation of Delhi (MCD), state dengue department as well as the central health department. The PM has been very keen in discussing about dengue as it is a major health hazard for citizens of the country," a senior health ministry official told Mail Today.

Mann ki Baat is a monthly radio programme where Modi directly communicates with the people of this country. Each month, some selected calls become a part of the broadcast.

Through this initiative, Modi informs, educates, inspires, shares, urges and extols on just about everything that can contribute to nation-building.

According to the sources, Modi will be specifically focusing on how the locality should be kept clean and larvae should not be found in anywhere near the residents.

"He will be suggesting ways to keep the surroundings clean. Water should not get collected anywhere, and he will be insisting on this issue majorly," added the official.

India will be celebrating dengue day on May 16, a day after this month's edition on Mann ki Baat. The Delhi health department, this year, will focus on the specific areas where the cases have been found.

"The intervention programme will be area-based this year. The areas that has been prone to the disease will be closely monitored," a senior Delhi health department official said.

Delhi has reported five cases of dengue in the month of April this year. Recently, a mobile application 'India fight dengue' was also be launched by the Union Health Minister JP Nadda to ensure that all the information and measures are easily available to the general public.

Worldwide

Doctors are wondering when the dengue vaccine is coming

Star2 MAY 8, 2016 BY DR MILTON LUM

Is the world finally ready to fight dengue?

Despite public health measures, the incidence of dengue has increased markedly in the last two years, with a daily average of 331 cases and just under one death in 2015.

The data for 2016 is still gloomy, with a daily average of 378 cases and just under one death.

Dengue vaccine development:

The clinical trials of new medicines and treatment undergo three phases before they can be licensed for human use.

Phase I involves the testing in a small group of people to evaluate its safety, determine a safe dose, and identify its side effects.

Phase II involves testing in a larger group of people to evaluate its effectiveness and its safety.

Phase III involves large groups of people to confirm its effectiveness and side effects; compare it to existing treatments, if any; and collect more information about its safety.

After the new medicine or treatment has been licensed and marketed,

Phase IV studies involve the collection of information of the effect of the medicine or treatment in various populations and side effects with long-term use.

Three of the dengue vaccine formulations are live recombinant vaccines (by Sanofi Pasteur, Takeda and the United States National Institutes of Health); one is a purified



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inactivated vaccine (GlaxoSmithKline/Fiocruz/Walter Reed); one is a recombinant subunit protein vaccine (Merck & Co); and the other is a plasmid DNA vaccine (US Naval Medical Research Center).

Since last December, the Sanofi Pasteur CYD-TDV vaccine has been licensed for use in Mexico, Brazil, El Salvador and the Philippines in the nine-to-45 years or nine-to-60 years age groups.

There are other candidate vaccines at various phases of development, of which the one from the Butantan institute/US National Institutes of Health is in Phase III of clinical trials, with the rest in Phases II and I. (Source: www.denguevaccines.org/winter-newsletter-2016. Accessed Apr 28.)

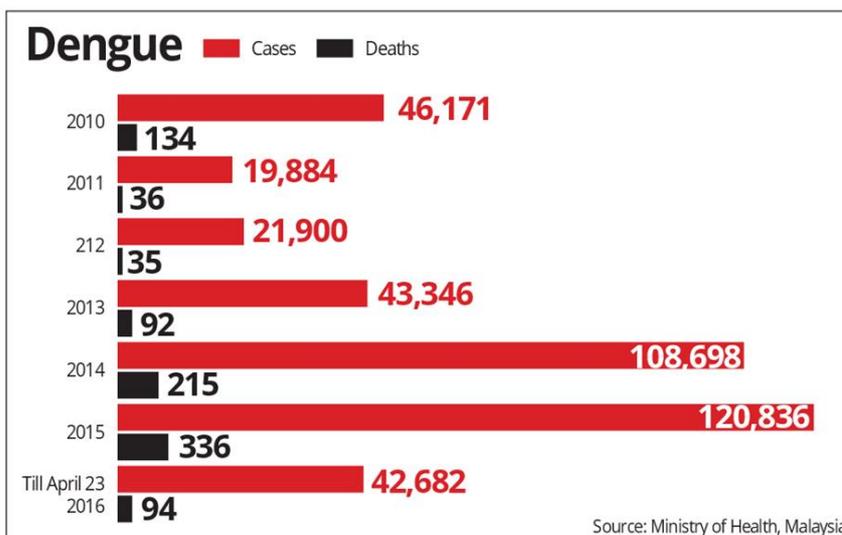
The time from Phase III to licensing is about three to five years. In other words, the next dengue vaccine licensed for use will be available in about three to five years.

WHO SAGE statement

The World Health Organization (WHO) has a Strategic Advisory Group of Experts (SAGE), which comprises experts who advise WHO on the optimal use of vaccines through an evidence-based review process.

SAGE reviewed the data from two large Phase III trials in Asia and Latin America, the former in nine- to 14-year-olds in five Asian countries, including Malaysia, and the latter in nine- to 16-year-olds in five Latin American countries.

They issued a statement on Apr 15: "Vaccine efficacy over 25 months from the first vaccine dose among nine- to 16-year-olds, using data pooled from both trials, was 65.6%. The sub-group benefit profile is complex: vaccine efficacy varied by infecting virus (higher protection against DENV 3 and 4 than DENV 1 and 2); age (higher



protection in older children) and disease severity (higher protection against hospitalised and severe dengue) and serostatus at the time of vaccination (higher protection in participants who had already been exposed to dengue virus)." The statement went on: "SAGE considered the results of a comparative mathematical modelling evaluation of the potential public health impact of CYD-TDV introduction done by seven different groups. There was agreement across the different models that in high transmission settings, the introduction of routine CYD-TDV vaccination in early adolescence could reduce dengue hospitalisations by 10-30% over a period of 30 years, representing a substantial public health benefit."

SAGE recommended that countries consider introduction of CYD-TDV only in geographic settings (national or subnational) where dengue is highly prevalent, which is the case with Malaysia.

The safety profile of CYD-TDV to-date has been benign. In the Asian study, 1% of vaccine



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recipients and 1% in the control group had serious adverse events that happened within 28 days of vaccination.

These events were mainly infections and injuries.

The dengue vaccine will not do away with the need for mosquito control as it is not a magic bullet.

What are the benefits of the vaccine? Phase III trials reported a marked reduction in hospitalisations for dengue and severe dengue, as well as dengue infections.

The Health Ministry has been studying the dengue vaccine for more than a year, surpassing considerably its KPI (key performance indicator) for time taken for decision-making.

What the studies are is not known to the medical community.

Clinicians who have to manage the marked increase in disease burden wonder if, and when, the dengue vaccine, which is a potential game changer, will be available for use, or whether the public have to wait for the perfect vaccine.

Whether the next vaccine in the pipeline, which will be in three to five years' time, will be the perfect vaccine is still unknown.

It is pertinent to note that less than perfect vaccines are licensed for use, e.g. typhoid vaccine, which has a protective efficacy of 70% 1.5 years after vaccination and 50% after three years.

The Philippines licensed the dengue vaccine last December and launched the world's first public dengue vaccination programme on Apr 4.

YELLOW FEVER

Uganda

Yellow fever – Uganda

Disease Outbreak News, 2 May 2016

On 8 April 2016, the National IHR Focal Point of Uganda notified WHO of an outbreak of Yellow Fever (YF) in Masaka district, south of Kampala. An alert concerning a suspected outbreak of viral haemorrhagic fever in Kaloddo village, Masaka district was initially sent on 26 March. A cluster of three cases from a single family was reported after patients presented with high-grade fever, were non-responsive to anti-malarial treatment with haemorrhaging signs and acute neurological signs (convulsions and unconsciousness). From 28 March to 1 April, a rapid response team (RRT) was deployed to carry out investigation and response activities. The RRT confirmed the deaths, activated the district task force, set up a treatment facility in Masaka, and collected and referred samples to the Uganda Virus Research Institute (UVRI) for laboratory testing. In addition, the team used a case definition for haemorrhagic fevers and proceeded to carry out active case search to identify additional suspected cases. On 29 and 30 March, 6 samples were sent to the UVRI. On 8 April, Yellow Fever was confirmed on three samples by PCR, two blood samples tested positive for salmonella non-typhi and one tested positive for malaria. On 21 April, at least four samples were re-confirmed positive by PCR at CDC Fort Collins (WHO Collaborative Center for Yellow Fever). From 26 March to 18 April, 30 cumulative suspected cases, including 7 deaths, were reported from Masaka, Rukungiri, Ntungamo, Bukumansimbi, Kalungu, Lyantonde, and Rakai. Of these, 6 cases and 2 deaths were confirmed in Masaka district (5 cases), and Rukungiri district (1 case). The mean age of the cases is 23 years old. The majority of cases are male. The cases do not have any history of travel outside of Uganda.

Public health response

The Ministry of Health of Uganda, with the support of WHO, Centers for Disease Control, Médecins Sans Frontières and other partners are supporting the response to the outbreak. WHO AFRO shared relevant guiding documents with the country for conducting risk assessment, vector control and outbreak management. The district task force which coordinates the response at district level developed a response plan and meets regularly. A multidisciplinary investigation team (physicians, laboratory experts, communication specialists, an epidemiologist and an entomologist) was sent to the affected district to conduct in-depth investigations and provide technical support to the District Task Force. Active surveillance has been enhanced through the activation of the alert desk and provision of alert free lines to the public. Case management, social mobilization, reactive vaccination and a rapid YF risk assessment are ongoing. A YF management centre was established in Masaka and Yellow Fever vaccine has already been requested from the International Coordinating Group on Vaccine Provision for reactive vaccination.

WHO risk assessment

The current outbreak in Uganda is occurring in the context of international export of YF cases from Angola to China, the Democratic Republic of the Congo, and Kenya. Uganda is situated in the “Yellow Fever belt” of Africa and is considered a country at risk of Yellow Fever virus transmission. Last outbreak of Yellow Fever was reported in December 2011. The affected districts are in south-western Uganda close to Democratic Republic of Congo, Rwanda and Tanzania. As the borders are porous with substantial cross border social and economic activities, further transmission cannot be excluded. WHO continues to monitor the epidemiological situation and conduct risk assessment based on the latest available information.

Angola

Yellow fever outbreak in DRC and Angola could spread: WHO warns

Africanews 9.5.2016

The World Health Organisation (WHO) has raised concerns over the likelihood of the Yellow fever outbreak in Angola that has killed nearly 300 people spreading to neighbouring countries.





Congo

Yellow fever spreads to DR Congo, kills 21

12 April 2016 From the section *Africa* BBC News

An outbreak of yellow fever has killed 21 people in the Democratic Republic of Congo, the World Health Organization (WHO) says, linking some cases to an outbreak in neighbouring Angola.

In a statement, the WHO said the deaths had occurred in January to March, with 151 suspected cases recorded.

There was, it said, a "serious risk of further spread of the disease" in DRC.

The acute, mosquito-borne viral disease has killed 225 people in Angola and infected about 1,600 there.

The WHO said the DRC health authorities had set up a national committee to respond to the outbreak, including "screening and sanitary controls" on the country's borders.

It is thought that *Aedes aegypti* mosquitoes are key yellow fever carriers

People travelling to Angola will now be vaccinated against the disease, it added.

The WHO statement says that the DRC's health ministry has in addition activated a contingency plan which includes more community engagement to fight the disease and better training of health workers.

Yellow fever is a virus that can cause bleeding, jaundice and kidney failure, It is spread by mosquitoes, usually the *Aedes aegypti* mosquito, the same species that spreads the Zika virus.

It is endemic in tropical regions of Africa and South America.

A vaccine can prevent infection but there is no specific drug treatment for people who are infected.

Worldwide

What is Behind the Global Shortage in Yellow Fever Vaccine?

Voice of America May 05, 2016 by Jennifer Lazuta



DAKAR - Angola is battling a yellow fever outbreak amid a global shortage of the vaccine. Cases have also been reported in the Democratic Republic of Congo, Kenya, Uganda and China.

Health experts worry about further spread. There is no treatment.

Mass immunization is the only way to stop yellow fever, but producing more of the vaccine is not easy.

FILE - Staff members of the Teaching Hospital receive the first vaccination treatment for yellow fever in El Geneina, West Darfur in this Nov. 14, 2012 handout.

Making of a vaccine

The Institut Pasteur de Dakar is one of four places in the world that make the yellow fever vaccine.

Recording is prohibited inside the institute, but there is nothing to hear. The halls are quiet. Two walls of windows separate us from the sterile labs where technicians work in



head-to-toe protective gear.

Each week, a carton of special, pathogen-free chicken eggs arrives from Germany.



Technicians inject the embryos, one by one, with the live virus. That's a first step. What follows is weeks of extraction, mixing, incubation and safety checks.

It can take up to six months to produce a batch of usable vaccine.

Globally, around 80 million doses of yellow fever vaccine are made each year. The Institut Pasteur can produce up to 10 million doses.

A technician at the Institut Pasteur in Dakar, Senegal, sterilizes one of the labs where the yellow fever vaccine is made. (VOA / J. Lazuta)

Meeting global needs

Antoine Marie Diatta is the quality control manager for yellow fever vaccine production at the institute. He said unfortunately our production capacity can't always meet the global needs. It's the same for other manufacturers, he said. This can be a problem when there is an epidemic, he said, because then there is an immediate need to vaccinate a large number of people.

It can be hard to predict how much vaccine will be needed.

Yellow fever vaccines can be stored for up to three years, but manufacturers can't afford to over produce, as Diatta explained. He said money is invested to make each batch of vaccine and you must wait for your return. It's not easy. He said while you wait to sell, you still need to pay salaries and update equipment, but your money is tied up.

Yellow fever is endemic to 34 countries in Africa. It is spread through the bite of an infected mosquito. A single dose of the vaccine can protect you for life.

UNICEF's chief of child survival and development in Angola, Samson Agbo, said 80 percent of people living in high-risk areas need to be vaccinated to prevent an epidemic. In many parts of Africa, immunization rates are below 60 percent.

"The high-risk countries are known. Ideally, those high-risk countries should have a very strong immunization programs, which means you are reaching every child,"

said Agbo. "We need to invest more if we want to prevent occurrences like this, this kind of outbreak."

Nearly 2,000 cases have been reported in Angola since the outbreak began in October 2015.

A mass vaccination campaign was launched in February, using 6 million doses from emergency stockpiles.



FILE - A health worker administers a yellow fever vaccine to a woman on August 27, 2008 on a roadside in Koumassi, a poor quartier of Abidjan after a case was discovered of yellow fever.



Averting an outbreak

An additional 10 million doses were made available by the International Coordinating Group on Vaccine Provision and UNICEF in late March.

While this has slowed the spread of the virus, the World Health Organization (WHO) warns that if the outbreak spreads to other countries, the now-depleted stockpiles could impact routine Uvaccination campaigns, putting millions more at risk.

"What we really need to do is make sure there are enough funds and that we work with manufacturers to see how production can be increased," stated Tarik Jasarevic, spokesperson for the WHO. "We already heard from some manufacturers they can increase production. We've replenished now our stockpiles and just hope we can contain this outbreak in Angola, so there would be no need for additional doses that we may not have."

Three other labs in the world produce yellow fever vaccine. They are in Russia, France and Brazil.

The Institut Pasteur said plans are under way to open a new facility on the outskirts of Dakar by 2020 to increase production here.

MALARIA

Colombia's Illegal Mining Linked to Malaria Outbreak

Telesur 30.4.2016

Areas of illegal mining activity in Colombia have shown drastically higher cases of malaria.



Colombia's widespread illegal mining is blamed for causing environmental damage and holding workers in slave-like conditions, and now it is also being blamed for a malaria outbreak.

Critics point to stagnant water buildups at the clandestine sites and poor sanitary conditions at the workers' camps for an increase in mosquitos spreading

the disease, which has quadrupled in jungle regions of the hard-hit and impoverished western department of Choco.

"The country had more or less controlled its malaria problem ... the death rate had dropped significantly," Health Minister Alejandro Gaviria said this week.

"But because of illegal mining ... we've had hotspots since last year and especially this year," Gaviria added.

Speaking on RCN radio, Gaviria said that malaria was especially on the rise in Choco — which is located on the border with Panama along a stretch of Colombia's Pacific coastline — as well as the Bajo Cauca area to the east.

The National Health Institute counted 18,524 malaria cases and about 300 cases of the disease's more severe strain.

A year earlier, only 4,740 cases of malaria were recorded.



Outbreaks of malaria due to clandestine mining however is not new. "Population displacement linked to the exploitation of gold mines — and resulting deforestation — has previously created isolated epidemics of malaria" in Latin America, the Health Institute said.

Mining is a major source of revenue for Colombia.

In 2012, the last year for which official figures are available, legal mining accounted for 2.3 percent of GDP, or US\$8.5 billion but authorities say that more than half of Colombia's mining sites are in fact illegal.

In these illegal mines, "excavators dig huge holes where water accumulates, perfect breeding groups for malaria-carrying mosquitoes," said University of Antioquia researcher Ivan Dario Velez.

And the sites where the miners set up camp "usually lack public utilities and have very poor hygiene conditions, which encourages the spread of mosquito and thus the disease," he added.

Malaria symptoms include feverish headaches, chills, fatigue, nausea and vomiting.

The outbreak in Choco is also linked to a shortage of medicine to fight the disease, according to the health minister.

Gaviria said about 7,000 doses of needed medicine are being sent to the department, the poorest in the country.

From 2015 to 2016, about 30 people died of malaria, most in isolated communities far from urban centers, according to the Office of the Ombudsman, which that warned this week of a "worrisome increase" in cases.

Malaria Control among neglected populations along the China-Myanmar Border

Infectious Diseases of Poverty has published an article investigating the risk of malaria on the China-Myanmar border and how this has changed over the years.

Jian-wei Xu 25 Apr 2016 for BiomedCentral



A camp for refugees from Myanmar on China side along the China-Myanmar border
Jian-wei Xu

In November 2003, more than 100 deaths occurred in Kokang, Shan Special Region in Myanmar. At the time, local people and the authorities didn't know the cause of these deaths. Chinese investigators suspected Acute Respiratory Syndrome (SARS) or plague to be the main cause of these deaths.



Eventually, experts from Yunnan Institute of Parasitic Diseases (YIPD) confirmed it was malaria. For 13 days, between November 7 and November 19, 1392 new cases of malaria and 125 deaths were detected across 30 villages in Kokang, Myanmar.

Intensive efforts with international and domestic financial support to control malaria have dramatically reduced malaria burden on China-Myanmar border over the past decade.

Intensive efforts with international and domestic financial support to control malaria have dramatically reduced malaria burden on China-Myanmar border over the past decade.

In the Shan Special Region II (locally called Wa State) of Myanmar, our annual indicator survey for evaluation did not detect any malaria parasites in November 2013.

On June 19, 2014, HPA reported a *P. falciparum* malaria outbreak in a private Rubber Plantation, located close to the border. At the time when the outbreak was reported, there were 122 inhabitants, in 24 households of which 14 families were of the Lahu ethnic minority who emigrated from Lancang County, China in 2004.

There were ten families of the Wa ethnic minority who emigrated from other villages of the Shan Special region of Myanmar in 2005. We realized that our GFATM projects did not cover the special community when we arrived at the outbreak site. Our investigation results show that imported *P. falciparum* from Salween River Valley caused the outbreak and that children were at higher risk of malaria infection during the outbreak.

Seeking inappropriate treatment from a private healer who just administered a single artemether injection for treatment of malaria and lack of protection of bed nets were the causes of the outbreak.

The majority of the China-Myanmar border is just a political border where immigration control is only available at those important border crossing points. Illegal immigrants, internally displaced people, refugees and ethnic minorities exist along the mountainous and forested border. However they have limited access to the public health service. Inappropriate diagnoses and treatments with sub-therapeutic-dosage and/or mono-therapies still exist in the private sector along the international border.

We cannot deny that inappropriate treatments in the private sector have helped to save lives, however, they contribute to maintain malaria transmission and are thus harmful to patient prognosis, public health and also a cause of drug resistance.

In this situation, our malaria control and elimination programs should give special attention to these neglected populations. In order to increase coverage and service of public health facilities, and to strengthen cooperation with private sectors for proper malaria case management, malaria control along China-Myanmar border needs further multilateral collaboration.

WORLD OF MOSQUITO SCIENCE

MAY 4, 2016 by Judy Stone for FORBES

Smart Science Confirms Wolbachia's Value In Fighting Zika As Well As Dengue

There's a bit of good news from Brazil today in the fight against Zika. A new report further confirms the ability of *Wolbachia* bacteria to reduce Zika virus transmission from the *Aedes aegypti* mosquito, the main vector at this time. *Wolbachia* is a bacteria that has been used for some time, especially in Australia, to control dengue.

Today's report is the first time *Wolbachia* was shown to reduce Zika as well. The study is from Brazil's Oswaldo Cruz Foundation (Fiocruz), part of the international research collaboration Eliminate Dengue, which is centered at Monash University in Australia.



“Zika and dengue belong in the same family of viruses so with the Zika outbreak in Brazil, the logical idea was to test the mosquitoes carrying *Wolbachia* by challenging them with the Zika virus,” explains Dr. Luciano Moreira, senior author of the report and head of the Brazilian Eliminate Dengue team.

Drs. Scott O’Neill, right, and Luciano Moreira attending to mosquitoes in their lab – Credit Eliminate Dengue

The researchers compared wild Brazilian field mosquitoes and *Wolbachia*-infected mosquitoes by feeding them on blood infected with strains of the Zika virus currently circulating in Brazil.

The *Wolbachia*-infected mosquitoes showed much lower levels of virus in their saliva. Importantly, the saliva from these *Wolbachia*-carrying mosquitoes did not contain infectious virus. This inhibition further suggests that this strategy may be very helpful in controlling the Zika epidemic, likely blocking Zika transmission in the field as well.

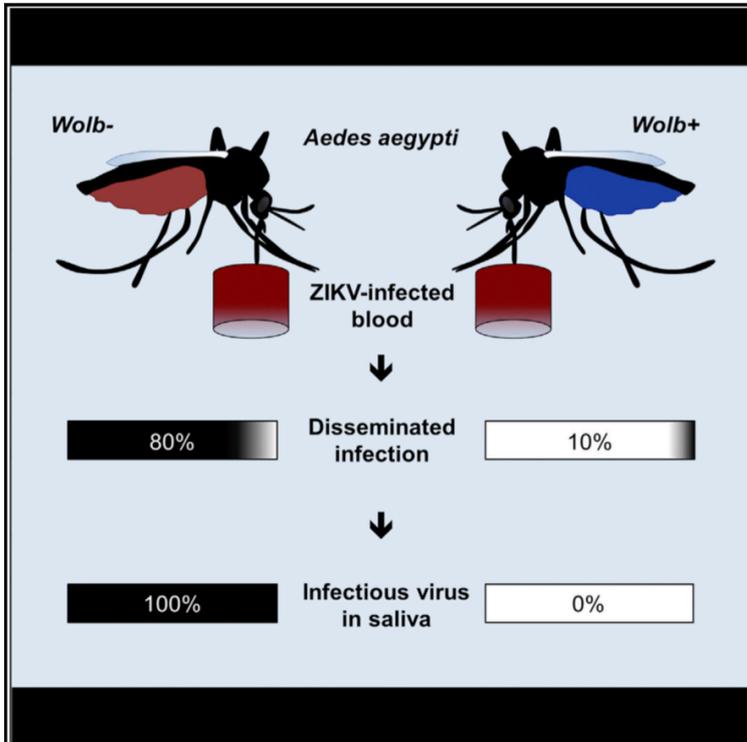
How does *Wolbachia* work?

Wolbachia works by preventing RNA arboviruses, like dengue, Chikungunya, and Zika, from replicating in the mosquito. In effect, the *Wolbachia* “immunizes” the mosquito against the viruses they eat with their blood meal. It’s transmitted from one generation of mosquito to the next inside the female’s egg. If a *Wolbachia*-infected male mates with an uninfected female, those eggs won’t hatch. If mating occurs with an infected female, normal offspring will be produced and the *Wolbachia* “infection” will be passed on to future generations, gradually increasing the numbers of *Wolbachia*-infected mosquitoes in the population. Once *Wolbachia* is introduced into the mosquito population, it will thus remain and be self-sustaining, so in the long term it will also be less labor-intensive than some of the other new technologies being explored.

Use of *Wolbachia* for a type of biological warfare is not entirely new. Using this technique, the Eliminate Dengue program has been conducting field trials to target transmission of dengue since 2011 in Brazil, Colombia, Vietnam and Indonesia, as well as the successful trials in Australia.

While I am supportive of Oxitec’s GMO mosquito technique to control mosquitoes as well, the *Wolbachia* have certain advantages -particularly regarding public opinion and acceptance. Many have a reflexive aversion to anything “GMO,” although the Oxitec technology appears quite safe and far safer to people and the environment than widespread pesticides.

Another advantage of *Wolbachia* is that it could follow any changes in the mosquito distribution; we are already seeing this with climate change and globalization having introduced the *Aedes aegypti* mosquito to the Americas (currently the main strain transmitting Zika).



Finally, the Eliminate Dengue program is an international, nonprofit research collaboration “supported by national governments and philanthropic donors including the Foundation for the National Institutes of Health as part of the Bill & Melinda Gates Foundation’s ‘Grand Challenges in Global Health,’ the Wellcome Trust, the Tahija Foundation and the Gillespie Family Foundation.” Professor Scott O’Neill from Monash University, the lead scientist for Eliminate Dengue, explains “*Wolbachia* is sustaining itself at high levels in the majority of these sites up to five years after application.

Wolbachia Blocks Currently Circulating Zika Virus Isolates – Credit Cell Host & Microbe (2016)

In areas where mosquito populations have high levels of *Wolbachia*, we haven’t seen any significant local transmission of dengue.” He adds, “The method we’re using is safe for humans and the environment, and has received widespread international support from governments, regulators and community members.”

A city-wide trial of *Wolbachia* in Townsville, Queensland, Australia is also reporting excellent news this week, with 80% of the mosquitoes showing *Wolbachia* 18 months after they were first introduced into the population there.

An earlier trial in Cairns show sustained populations of *Wolbachia* after four years.

One benefit of the *Wolbachia* project there is how it involves residents to participate in citizen science projects. Students study the mosquito life cycle and help maintain “Mozzie Boxes,” raising *Wolbachia* infected eggs until they mature into adult mosquitoes that then go out and breed with others, furthering the spread of the *Wolbachia*-infected mozzies. It’s great to see the community engagement and support of projects like the “*Wolbachia* Warriors program.”

This type of innovative technology will be increasingly important to the U.S. as well as Latin America because of the rapid spread of *Aedes aegypti*, a.k.a. the yellow fever mosquito, that is transmitting disease. As Zika spreads throughout the Western hemisphere, and we learn more about its devastating neurologic damage with microcephaly and paralysis from Guillain-Barré, we must have a greater urgency in stopping the infection.



It's not just Zika we should prepare for. The *aegypti* mosquitoes can transmit dengue, Chikungunya, and deadly yellow fever, and all of these are likely to occur in the U.S. The *Wolbachia* technology has also been shown to reduce transmission of each of these viruses.



Students undertake mosquito release experiments as part of an applied science project (credit: Thom Cookes/Eliminate Dengue)

There is worrisome news this week as well—that Zika can infect the *Aedes albopictus* mosquito as well as the recent invader *A. aegypti*. This is important for several reasons. *Aegypti* is an urban dweller and can lay eggs in tiny amounts of water (even a bottle cap) in houses as well as

outdoors. They are sneaky biters and attack people inside their homes. In contrast, *A. albopictus* can adapt to colder temperatures and survive the winters, so its range in the U.S. is much more extensive. It's more a garden or outdoors mozzie.

Now there is some additional worry that the hardier *Culex* mosquito, widespread throughout the U.S. and as far north as Canada, might be able to adapt and transmit Zika. *Culex* already transmits West Nile, equine, and St. Louis encephalitis viruses.

Dr. Peter Hotez, dean of the National School of Tropical Medicine at Baylor College of Medicine, put it aptly: "If that turns out to be the case, then we're all totally screwed."

We're already halfway there, given that Congress won't even bother to provide emergency Zika funding, and recessed without addressing those needs. The lack of support for public health that I addressed in my recent post is a critical mistake likely to come back and haunt us as well.

One other vitally important message from Australia is the need for extensive public education and engagement, critical to the program's success there. O'Neill explains the elegance of the *Wolbachia* approach, which doesn't involve putting toxins into the environment, as being a more natural and more targeted approach. "We're not even trying to kill the mosquito. We're just trying to remove its ability to transmit human pathogens." That's something we should have universal agreement on.

Surveillance, insecticide resistance and control of an invasive *Aedes aegypti* (Diptera: Culicidae) population in California

F1000Research

Anthony J. Cornel, Jodi Holeman, Catelyn C. Nieman, Yoosook Lee, Charles Smith, Mark Amorino, Katherine K. Brisco, Roberto Barrera, Gregory C. Lanzar, F. Stephen Mulligan III

The invasion and subsequent establishment in California of *Aedes aegypti* in 2013 has created new challenges for local mosquito abatement and vector control districts. Studies were undertaken to identify effective and economical strategies to monitor the abundance and spread of this mosquito species as well as for its control. Overall, BG Sentinel (BGS) traps were found to be the most sensitive trap type to measure abundance and spread into new locations. Autocidal-Gravid-Ovitrap (AGO-B), when placed at a site for a week, performed equally to BGS in detecting the presence of female *Ae. aegypti*. Considering



operational cost and our findings, we recommend use of BGS traps for surveillance in response to service requests especially in locations outside the known infestation area. We recommend AGO-Bs be placed at fixed sites, cleared and processed once a week to monitor mosquito abundance within a known infestation area. Long-term high density placements of AGO-Bs were found to show promise as an environmentally friendly trap-kill control strategy. California *Ae. aegypti* were found to be homozygous for the V1016I mutation in the voltage gated sodium channel gene, which is implicated to be involved in insecticide resistance. This strain originating from Clovis, California was resistant to some pyrethroids but not to deltamethrin in bottle bio-assays. Sentinel cage ultra-low-volume (ULV) trials using a new formulation of deltamethrin (DeltaGard®) demonstrated that it provided some control (average of 56% death in sentinel cages in a 91.4 m spray swath) after a single truck mounted aerial ULV application in residential areas.

WORLD OF MOSQUITO Technology

New Type of Mosquito Trap Invented In So. Utah Used to Monitor Mosquitos Carrying West Nile, Zika Virus

By Hailey Higgins Good4Utah 5.4.2016

WASHINGTON CITY, Utah (ABC4 Utah) With the threat of Zika and West Nile Viruses in the US, monitoring the mosquito population is more important than ever.

A Washington County abatement's unique trap is making it easier and more effective.

Over the last three years, Southwest Mosquito Abatement developed a new mosquito trap to keep an eye on the bugs known to carry West Nile and Zika Viruses.

It's self-contained inside a bucket, holding a canister releasing the same amount of CO2 a human breathes every minute.

"It sends out a plume out into the air, and a mosquito will follow that with their sensors, they'll follow that all the way in and once they get close enough, then we use light and heat to attract them," Sean Amodt said, general manager of Southwest Mosquito Abatement and Control District.

The old traps used dry ice that would melt quickly in the St. George heat. Oftentimes wouldn't make it through the night.

Since they've moved to tanks, they're saving 80 percent on CO2. They're also catching more daytime mosquitos. Now, other states, like Nevada and California, are showing interest.

"We've had a few mosquito districts say, 'hey, we've heard about the new Bucket Trap you have. Can you tell us about it?' So we've been sending out email and pictures and telling them how to build them," Amodt said.

An invention helping track mosquitos carrying dangerous viruses, developed right here in Utah.

The district plans on sharing everything they've learned from their bucket trap at an annual mosquito conference later this year.

Materials for each trap cost around \$100 and can be found online.



UPCOMING EVENTS

NATIONAL MOSQUITO CONTROL

AWARENESS WEEK 2016

JUNE 26–JULY 2, 2016

Each year the week of June 26 is declared National Mosquito Control Awareness Week by the American Mosquito Control Association. AMCA’s “Mosquito Week” educates the general public about the significance of mosquitoes in their daily lives and the important service provided by mosquito control workers throughout the United States and worldwide.

Here are a few ideas on how you can get the word out:

- Contact your local radio station and offer to be a guest expert.
- Contact your local elementary school and offer to talk about mosquitoes.
- Contact your local girl scouts or boy scouts troop and offer to teach about mosquitoes.
- Set up an informational display in your community.
- Hold an open house at your district.
- Set up a tire drive.
- Distribute repellent packets in your community.

We want to hear from you after your event(s). Don’t forget to take pictures and report back to AMCA at amca@mosquito.org.



AMCA WEBINAR
"OPERATIONAL USE OF ADULT MOSQUITO TRAPS FOR
TEMPORARY REMOVAL OF DENGUE/CHIK VIZIKA VECTO
DATE: THURSDAY, APRIL 28, 2016 | 1:00 PM – 2:00 PM EAS

REGISTER NOW!