NEW ZEALAND BIOSECURE

BORDER HEALTH NEWSLETTER - June 2016

WELCOME!

Hi everyone! As winter is upon here in New Zealand our numbers have dropped but with Dengue and Malaria in India, Chikungunya and Yellow Fever in Africa,
Zika threatening Americas, it is no wonder we are looking into defeating strategies such as bloated mosquitoes.

SAMPLES

During June 529 samples were collected by staff from 12 DHBs with only 85 positive. Not many adults have been found (16 times less than last year) with only 22 *Aedes notoscriptus* compared to 200 more at the same month last year. A similar amount of *Culex quinquefasciatus* compared to June 2015 but much less than last month and 5 times less larvae of the same species. A nice surprise were Ae. subalbirostris larvae and an adult of Culiseta tonnori.

Species	Adults		Larvae	
New Zealand Mozzies	**June 16**	**June 15**	**June 16**	**June 15**
Aedes antipodeus (winter mosquito)	3	1	Nil	Nil
Ae. australis (saltwater mosquito)	Nil	Nil	Nil	1
Ae. notoscriptus (striped mosquito)	22	227	1527	865
Ae. subalbirostris	Nil	Nil	13	Nil
Culex astilae	Nil	Nil	2	Nil
Cx pervigilans (vigilant mosquito)	1	1	71	81
Cx. quinquefasciatus (southern house	23	17	339	335
Culiseta tonnori	1	Nil	Nil	Nil
Opifex fuscus (rockpool mosquito)	Nil	Nil	20	26
Total	**(891) 50**	**246**	**1972**	**1309**

INCURSIONS/INTERCEPTIONS

During June four suspected interceptions were detected and responded to including another *Aedes aegypti* at Auckland airport
Please note that the interceptions of live unwanted mosquitoes are highlighted in red. Exotic species in general are highlighted in light blue.

6.6.2016 One live female *Aedes aegypti* was found flying around in the risk assessment area at the ITB AIAL.

10.6.2016 One live female Chironomid was found in a container with (fumigated) furniture from Malaysia.

14.6.2016 One live male *Cx. quinquefasciatus* was found in the MPI inspection room – likely to be a local one.

15.6.2016 *A live female cranefly Elephantomyiia sp.* and one dead female *Culex sp.* damaged beyond recognition were found in boxes of pineapples at Freshmax AKL.

Phone 021 522 476 Email Taxonomy@nzbiosecure.net.nz or Enquiries@smsl.co.nz Website www.smsl.co.nz
BIOSECURITY SPECIALISTS

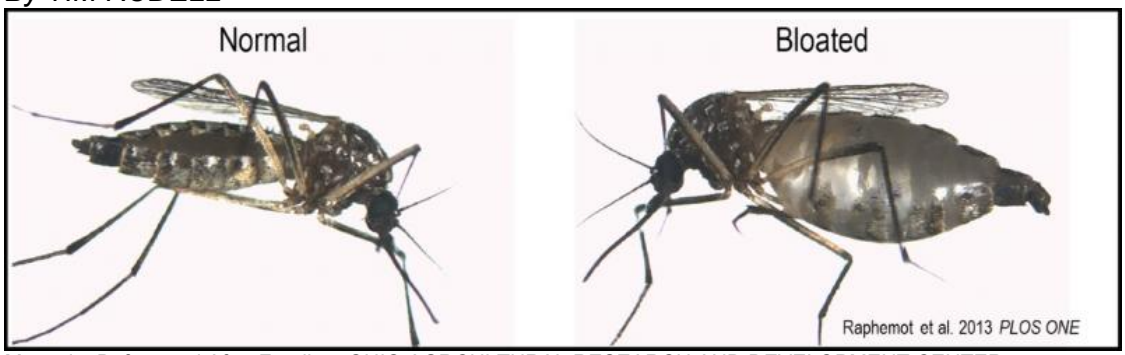
PICTURES OF THE MONTH

© Pius Utomi Ekpei/Getty Images

STORYOF THE MONTH

When it comes to controlling the threat of Zika, one Long Island town is stepping up to bat.

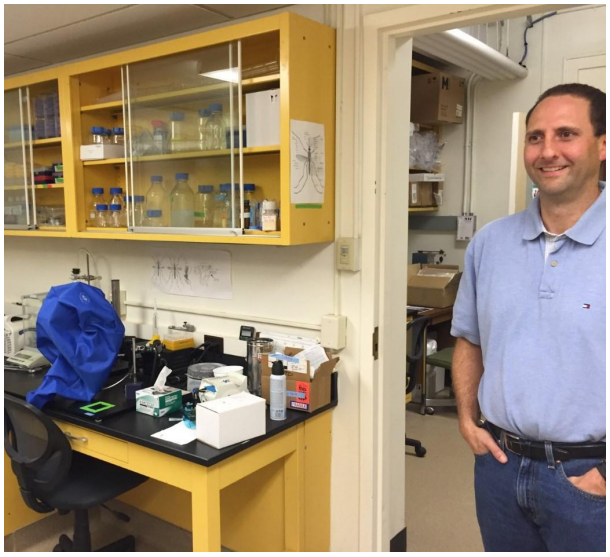
By TIM RUDELL



Mosquito Before and After Feeding OHIO AGRCULTURAL RESEARCH AND DEVELOPMENT CENTER

Scientists at the Ohio Agricultural Research and Development Center in Wooster are exploring a different strategy for controlling disease-carrying mosquitos. Forget pesticides. Increasingly, mosquitos are adapting to survive those. Another idea is to block their kidney function.

Peter Piermarini of the research center says when adult female mosquitos feed — they're the only ones that can — they bloat to three times normal size. Until they process nutrients from the blood and pass the liquid, they've vulnerable



"So we're trying to target that, to make them more susceptible to the physiological stress of engorging and to make them more susceptible to predators. When they're all loaded up with blood they have a harder time maneuvering."

Piermarini says research has found molecules that keep mosquitoes from urinating and don't affect other insects. But he says, several more years of study are needed before the technique can be rolled out.

Peter Piermarini says keeping mosquitoes from urinating could make them vulnerable.
CREDIT TIM RUDELL / WKSU

VECTOR-BORNE DISEASES - OUTBREAK NEWS

South Pacific

World Health Organization Western Pacific Region

Pacific syndromic surveillance report – Week 25, ending 26 June 2016

Zika virus: American Samoa: As of 23 June 2016 there have been a total of 706 suspected cases and 29 laboratory confirmed cases since 1 January 2016 . Fourteen of the confirmed cases were pregnant women. Fifty-four percent of suspected cases were female and most affected age group was 10 years old or younger. For further details please refer to Fesili Niumata-Foifua's PacNet post on 25 June 2016.

FSM (Kosrae State): As of 27 June there have been 94 suspected cases since 10 February 2016. Of these twelve were confirmed by PCR and eleven cases were Zika IgM positive. The attack rates within Kosrae's municipalities ranges from 9.16 to 21.17 per 1,000 population. For further details please refer to Afeke Kambui'

Yellow Fever: As of 17 June 2016, Angola has reported 3294 suspected cases of yellow fever with 347 deaths. Among those cases, 861 have been laboratory confirmed. Despite extensive vaccination campaigns in several provinces, circulation of the virus persists.

As of 20 June, the Democratic Republic of Congo has reported 1106 suspected cases, including 68 confirmed cases and 75 deaths, Of the 68 confirmed cases, 59 were imported from Angola.

Public Health Surveillance
Information for New Zealand Public Health Action

MONTHLY NOTIFIABLE DISEASE SURVEILLANCE REPORT - May 2016

Chikungunya fever: Five confirmed cases of chikungunya fever were notified in May 2016 compared to one confirmed case notified during the same month of the previous year. Fourteen cases have been notified in the year to date compared to 40 at the same time in the previous year. All cases travelled during the incubation period for the disease, and

countries visited were Fiji (3 cases), Brazil, India and United States of America (1 case each). One case travelled to more than one country.

Dengue fever: 19 confirmed cases of dengue fever were notified in May 2016 compared to four cases notified during the same month of the previous year. All cases had been overseas during the incubation period, with a number of cases visiting more than one country. The countries visited included Indonesia (12 cases), Papua New Guinea (3 cases), Solomon Islands (2 cases), and Chile, Cook Islands, Fiji, India, Brazil, Thailand and Vanuatu (1 case each). One finalised dengue fever outbreak (4 cases) was created in May.

Ross River virus infection: Two confirmed cases of Ross River virus infection were notified in May 2016. One case was a male in the 40–49 years age group from Waitemata DHB. The other case was a male in the 60–69 years age group from Nelson Marlborough DHB. Both cases had travelled during the incubation period to Fiji and Australia, respectively.

Zika virus infection: Seven cases of zika virus infection (6 confirmed and 1 under investigation) were notified in May 2016. Cases were reported in the 30–39 years (5 cases), 20–29 years and 50–59 years (1 case each) age groups. All cases except one were confirmed by PCR. All cases travelled during the incubation period for the disease, and countries visited were Fiji (6 cases) and Indonesia (1 case).

ZIKA

USA

Air Force Reserve units ready to spray pesticide for Zika-carrying mosquitoes

Oriana Pawlyk. Daniel Woolfolk

Air Force Times July 3, 2016

JOINT BASE ANDREWS, Md. — Scorching, humid temperatures have a way of killing summer fun. But this year, the sticky air could bring an ugly visitor — Zika.

The virus poses a threat to service members across 190 Defense Department installations in areas where Zika-carrying mosquitoes could migrate.

Luckily, the 910th Airlift Wing is already in the business of killing insects. Members of the wing out of the Youngstown Air Reserve Station, Ohio, said they're already up and running about the country spraying for their busy mosquito season.

"It's not just for the nuisance of them, but they're also capable of spreading diseases as well," said Capt. Jonathan Blackann, 757th Airlift Squadron pilot."We're trying to keep our brothers and sisters in arms out of harm's way by getting rid of the disease carrying vectors."

The 910th's 757th Airlift Squadron has six C-130H Hercules aircraft complete with a modular aerial spray system, or MASS — the Defense Department's only aerial spray maintenance flight. The products they carry in their aerial spray tanks vary depending on mission, said maintenance chief Senior Master Sgt. Phil Aliberti.

(Photo: MSgt. Bob Barko Jr./Air Force)

The Zika scare has cast a cloud over the Summer Olympics in Brazil, and although squadron members say they haven't gotten a call for help, they're ready.
"We are prepared to go overseas ... we train for all sorts of situations, and if the government says to go take care of that mission, we'll be ready," Blackann said.
According to a Pentagon memo released in March, senior defense officials have instructed installation managers to increase surveillance for certain mosquito species and to eradicate them in housing areas, near child development and youth centers, around barracks and elsewhere.
The reserve flight often sprays near or over DoD sites in states like Louisiana, Florida, Georgia, South Carolina and North Dakota.
"On a pesticide mission, you're trying to float a cloud of chemical where the mosquitoes are flying so you can eradicate them," Aliberti said. "It depends on the chemical we're spraying and the dispersion rate we're spraying for but we can go anywhere from two large nozzles just dumping chemical to 35 or 40 nozzles."
Flying low at 100 to 150 feet, at 230 mph, the crew has very detailed topographical maps to ensure they get through the areas they need to spray, and avoid a collision. On board are pilots, navigators, flight engineers, spray operators, loadmasters and entomologists, ranging from six to nine crew members depending on a day or night mission, Blackann said.
"The entomologist is either on board or in the spray area itself," he said. "Once we enter the spray area, the navigator will let the sprayers know when to spray once we enter the block. … And we'll do another pass depending on how much of the area needs to be sprayed."
Blackann said most flights are done in one to two hours, but insecticide spray, a lighter mist, can make for an all-day mission.
"We're likely to run out of fuel before we run out of [bug] spray," he said.

As Zika funds stall in Congress, Florida is attacking mosquitoes
NATIONAL JULY 1, 2016 BY TONY PUGH
WASHINGTON - Mosquito control isn't a profession that requires much politicking. Killing tiny insects doesn't take a lot of arm twisting.
But in May, Chris Lesser, assistant director of the Manatee County Mosquito Control Division, went to Washington to ask Congress for more money to fight the mosquito-borne Zika virus.
A board member of the American Mosquito Control Association, Lesser and his colleagues found that securing help on Capitol Hill can be like chasing mosquitoes with a fishnet.
"It's frustrating talking to Congress," Lesser said. "When you go to their offices, you get a lot of handshaking. But then the vote goes right down party lines."
And nothing gets resolved.
"When people say that D.C. is broken, this a perfect example why," Lesser said of the four-month Zika funding standoff. "We have an issue at the federal level that can impact many, many people. It impacts children. It impacts women's health.

Samples of *Aedes aegypti* mosquitoes, responsible for transmitting dengue and Zika. Felipe Dana AP

And we can't, we just simply can't, get Congress' act together. It's very frustrating."
Seventy-two percent of Americans – including majorities of Democrats, independents and Republicans — support allocating more federal funds to study the Zika virus and prevent its spread, according to a new poll this week by the Kaiser Family Foundation.
Nearly two-thirds of the public – 65 percent – also supports helping U.S. women with reproductive health services in areas affected by the virus, which can be transmitted through intercourse and cause birth defects. Majorities of Democrats and independents back that proposal along with 46 percent of Republicans, the Kaiser poll found.
But in crafting a legislative response, common ground is elusive.
More than four months ago, President Barack Obama asked Congress for $1.9 billion in emergency funds to address the Zika threat through vaccine development, mosquito abatement, contraception and maternal care. Congressman Vern Buchanan, R-Fla., of Sarasota supports funding the full amount.
But Senate Democrats recently rejected a $1.1 billion Zika bill from Republicans in the House of Representatives. Democrats didn't like its funding level, nor that it would bar private family-planning organizations, including Planned Parenthood, from getting federal funds to provide Zika-related reproductive health services.
While no local mosquito-borne cases have been reported in the U.S., 934 U.S. travelers have acquired the virus in other countries, including 13 cases that were sexually transmitted, according to the U.S. Centers for Disease Control and Prevention.
U.S. territories, however, have reported 2,020 locally acquired cases, including 1,970 in Puerto Rico alone.

Cases among pregnant women include 287 in the U.S. and 250 in U.S. territories.
In the absence of federal emergency funding, Florida Gov. Rick Scott has made $26.2 million in state funds available for mosquito surveillance and spraying, training for mosquito control personnel and other Zika preparedness services. With a $3 million budget, Lesser's department is fully funded and ready for mosquito season, he said.
So far, no Zika-carrying Aedes aegypti mosquitoes, which thrive in urban areas, have been caught in Bradenton, Palmetto or the swampy area north of Palmetto.
But if the notorious ankle biters gain a foothold in a neighboring county or city that's short on mosquito-control resources, the insects could easily breed their way into the Bradenton area, Lesser said. That's why extra funding from Congress is so important.

"It's beyond time for Congress to come together to address this," said a statement this week from Georges C. Benjamin, executive director of the American Public Health Association. "We've seen this coming from a mile away. There are nearly 1,000 cases in the U.S. already, and it could get much more severe if we don't get serious about slowing the outbreak immediately."
Helicopter and truck-mounted spraying in downtown Bradenton and Palmetto several weeks ago has cut the numbers of aegypti mosquitoes locally, Lesser said.

"It's only in people's backyard where this mosquito would originate," Lesser said.
The other Zika-bearing mosquito, Aedes albopictus, is more prevalent in northern Florida and mid-Atlantic states from the District of Columbia to New York, Lesser said.Unlike mosquitoes that are more deliberate in their feeding habits, aegypti are known to be nervous, serial snackers.
"They will sneak a small bite from your ankle. And if you twitch your ankle, not in even response to the mosquito bite, the mosquito will quickly fly away from you and then go land on somebody else," Lesser said. "And if that person twitches or moves, it'll fly away

from them. That's why this mosquito is so effective at transmitting Zika, because it can bite many people in a very short period of time."

"It's only in people's backyard where this mosquito would originate," Lesser said.

The other Zika-bearing mosquito, Aedes albopictus, is more prevalent in northern Florida and mid-Atlantic states from the District of Columbia to New York, Lesser said.

Unlike mosquitoes that are more deliberate in their feeding habits, aegypti are known to be nervous, serial snackers.

"They will sneak a small bite from your ankle. And if you twitch your ankle, not in even response to the mosquito bite, the mosquito will quickly fly away from you and then go land on somebody else," Lesser said. "And if that person twitches or moves, it'll fly away from them. That's why this mosquito is so effective at transmitting Zika, because it can bite many people in a very short period of time."

CHIKUNGUNYA

Africa

Coast and North Eastern regions soft spots for Chikungunya viral disease

By Ally Jamah Updated Tue, June 7th 2016

Coast region and northern Kenya are most vulnerable to the Chikungunya virus that is currently ravaging parts of Mandera County. The Kenya Medical Research Institute (KEMRI) indicated that the virus, which is transmitted by *Aedes* mosquito, is unlikely to spread to other parts of the country. Acting Director for Kemri's Centre for Virus Research Rosemary Sang said should persons who are infected with Chikungunya travel to the Coast or other parts of northern Kenya, they could trigger further spread of the virus to the two regions. "The *Aedes* mosquito that carries the virus is found in all parts of the country. But the virus itself multiplies fast in high temperature areas. So if it is introduced to those regions by travellers, it could cause a problem," she said. She added: "There was an outbreak of Chikungunya in the Coast region in 2004 and 2005, specifically in Lamu, Mombasa and Kilifi. So the risk of the virus spreading there is justified based on historical facts and the environment."

Kenya: Mandera Governor Ali Roba Falls Victim to Chikungunya

Daily Nation By Manase Otsialo

Mandera Governor Ali Roba has also become a victim of Chikungunya, a mosquito-borne viral disease.

Speaking during Madaraka Day celebrations in Mandera Town Wednesday, Mr Roba appealed for more medical support to curb the spread of the disease that has affected over 500 people.

"Chikungunya does not discriminate. In Somali language we call it Adala, meaning justice. It has affected most of us and we need to go and rest," said Mr Roba, who did not say if he is undergoing treatment.

The governor fell sick on Monday, and on Tuesday he was seen supporting himself on a walking stick as he reported to work.

"Luckily, Chikungunya does not kill but its effects are not a good experience," he added.

Mr Roba spoke even as a majority of leaders skipped the celebrations.

Senator Billow Kerrow and seven MPs shunned the event while there were four Members of the County Assembly out of the 38 legislators present.

Brazil

Chikungunya mother-to-baby transmission reported in Brazil

Outbreak News Today by Robert Herriman, June 27, 2016

Brazilian officials are reporting a confirmed case of Chikungunya that was transmitted from mother to baby (vertical transmission) in Paraiba state in northeast Brazil.

The 12-day old baby showed strong convulsions and is now hospitalized in an intensive care unit in the city of Campina Grande.

Municipal Children's Hospital obstetrician Adriana

Image/DigitalMarketingAgency

Melo said they are unaware of any similar precedent in the country, although cases have been reported in the literature. Melo's team was also responsible for identifying the Zika virus in the amniotic fluid of two fetuses with microcephaly in 2015.

Researchers note that vertical transmission cases have been reported in an epidemic on Réunion Island in the Indian Ocean during the years 2005 and 2006.

This case strengthens the alert for pregnant women, who should take protective measures against *Aedes aegypti*, the mosquito vector Zika, dengue and chikungunya, throughout the period of pregnancy. "While the increased risk of transmission of Zika occurs in the first three months of pregnancy in the case of chikungunya is the opposite. The transmission to the fetus usually happens when the mother already ill at the end of pregnancy," says Oswaldo Cruz Foundation researcher Rivaldo Cunha.

DENGUE

India

Overcharging' for dengue test: Gurgaon health team raids Fortis Hospital lab

Written by Sakshi Dayal | Gurgaon | Published:July 2, 2016 4:24 am

District health authorities conducted a raid on the laboratory of Fortis Hospital in Gurgaon Thursday night after getting information that the hospital was overcharging patients for dengue tests.

"We received a tip-off that the hospital was charging more than Rs 600 for these tests, despite the ceiling for the test being set at that price. We conducted a raid on the hospital's laboratory based on that information," Dr Ramesh Dhankar, Chief Medical Officer, Gurgaon, said Friday. "We found that instead of the mandated Rs 600, the hospital was charging patients Rs 1,777 for these tests," he added.

Gurgaon, India – July 1: Health department raid on Fortis hospital, in Gurgaon, India, on Friday. (Express Photo/ Manoj Kumar)

Earlier this month, the Gurgaon district health department had made it mandatory for private hospitals to charge not more than Rs 600 for dengue tests, adding they could only conduct the NS1 rapid antigen test, which picks up infection at an earlier stage and is cheaper than the NS1 Elisa test.

A spokesperson at Fortis Memorial Research Institute said the reason for overcharging

was unawareness of the advisory mandating the use of only the rapid antigen test. “The rapid card test, an abbreviated test for dengue, was recently mandated by the government. This advisory was not updated with us. We ran the Elisa test, which is conclusive for dengue, accounting for the difference in the cost of the two. As this was on account of an information gap, we have offered an immediate refund. We would like to emphasise that our action to conduct the Elisa test was in the best interest of the patient,” the spokesperson added.

Dhankar, however, said action would be taken against the hospital since it was violating norms. “We will give them a notice and carry on investigations.”

YELLOW FEVER

Africa

WHO Launches Emergency Yellow Fever Vaccination

by MAGGIE FOX

The World Health Organization said Thursday it will launch emergency yellow fever vaccination campaigns along the border between Angola and Democratic Republic of Congo and in the Congolese capital Kinshasa to try to stop a growing epidemic of the virus.

The worst yellow fever outbreak in decades has killed 345 people in Angola and another 75 in the Democratic Republic of Congo, WHO says.

WHO has been vaccinating people in Kinshasha against yellow fever E. Kabambe / WHO

Officials have been trying to vaccinate people against the mosquito-borne virus but the vaccine's run out.

Related: Yellow Fever Death Toll Passes 400 in Africa

The 6 million dose global stockpile of yellow fever vaccine has been drained twice this year already. Yellow fever's circulating in Angola, Uganda, Congo, Brazil, Chad, Colombia, Ethiopia, Ghana and Peru.

"While WHO is working with partners and vaccine manufacturers to increase vaccine production and replenish the emergency stockpile currently being used for this outbreak, it is vital to interrupt transmission, especially in cross-border areas to rapidly bring this outbreak under control and halt further international spread," said Dr. Matshidiso Moeti, WHO's regional director for Africa.

The agency has also agreed in principle to dilute the vaccine if necessary.

WHO has not decided to declare an international emergency yet but Kinshasha, a muggy city with 12 million people and little health infrastructure, is a worry. The *Aedes* mosquitoes that carry yellow fever, Zika, dengue and related viruses thrive in densely populated areas.

Reuters contributed to this story

MALARIA

India

ANMs given medical kits, phones to prevent malaria epidemic

TELANGANA INDERVELLI 3, 2016 July

With the last of the malaria kits and cell phone SIM cards handed over to Auxiliary Nurse and Midwives (ANM) and Male Health Assistants at Indervelli Primary Health Centre (PHC), the special measures to prevent epidemic outbreak in tribal areas of Adilabad district was totally in place on Saturday.

Additional District Medical and Health Officer T. Prabhakar handed over the kits to field staff and explained to them the salient features of field-level treatment procedure of malaria.

AVOIDING PROBLEMS: Additional District Medical and Health Officer T. Prabhakar Reddy handing over malaria kit to an ANM at Indervelli PHC in Adilabad district on Saturday.- Photo: S. Harpal Singh

The malarial kit which has ample medicine to treat malaria helps the ANMs diagnose the disease at the house of the suspected patient. “The ANM concerned will hand over medicines for three days to the patients diagnosed of falciparum malaria so that the poor tribals are saved of the trouble of reaching the PHCs or other hospitals,” the Additional DHMO pointed out.

The cell phone SIM cards as part of a closed user group (CUG) were given to the ANMs so that they can keep in touch with their counterparts from neighbouring PHCs.

“It will help them in identifying patients of respective PHCs so that proper attention is given," he added.

Mr. Reddy told The Hindu on Saturday that the Integrated Tribal Development Agency, Utnoor, had launched the disease control measures even before the start of monsoon season. The drive was designed by ITDA Project Officer R.V. Karnan to take treatment at the door steps of poor Adivasis and other tribal people in the far flung villages.

The drive is a joint operation of Medical and Health, Rural Water Supply and Panchayat Raj departments. Every mandal has been allocated a vehicle for transport of 10 sanitation workers.

These workers have identified water stagnation areas in their respective places of operation. They continue to undertake bleaching of the stagnant water.

Africa

Uganda: 5,000 Malaria Cases a Week Leave Kitgum Hospital Ailing

The Observer (Kampala) by Jonathan Kamoga

A surge in the number of malaria cases has left Kitgum hospital in dire straits, with authorities reporting up to six deaths a week from a fever both preventable and treatable.

Kitgum district health officer Thomas Ojok said last week that until recently, the hospital was averaging 1,000 malaria cases a week, but this can now go up to 5,000 patients a week. The epidemic, he said, has strained financial and human resources.

"We are in a state of crisis. Staff is overloaded with work and there is a stockout of anti-malarial drugs," Dr Ojok told The Observer on Friday. "We register an average of two to

six deaths a week."
The 78-year-old hospital was designed to accommodate 100 patients, but health workers say up to 300 patients are admitted daily. Since last year, the Acholi sub-region has been battling a malaria epidemic, and there was hope it was being contained. But according to Ojok, the crisis seems to be spiraling out of control.
Although a district hospital, Kitgum also serves several neighboring districts such as Pader, Lamwo, Agago and parts of South Sudan.
"The money given to the hospital is just for the district, but it works on the whole region, especially with this malaria outbreak," Dr Ojok said.
Each quarter, the hospital receives Shs 64 million, for maintenance and logistical operations, excluding medical drugs and medical staff salaries. To decongest the hospital, authorities want to conduct treatment outreaches to areas heavily hit by malaria, but they have no money to finance this.
Many patients have camped in the hospital compound due to lack of space in the wards. Others patients were found sleeping on the floor in the wards and corridors.
The children's ward, meant for 44 patients, had at least 150 patients, most of them lying with their mothers on the floor.
The ward has only one day-time doctor assisted by three nurses. But the nurses are often sent out to handle critical situations at nearby health centres. The hospital currently has five doctors out of the eight required.
When this reporter visited, the hospital had run out of antimalarial and other drugs, although someone had reportedly been sent to Kampala to pick up some drugs. Hospital sources said that in May, five child-patients at the hospital died due to failed blood transfusions.
The Kitgum district LC-V chairperson, Jackson Omona, said he was trying to engage district leaders to come together and address the issue and create community awareness.
"We set up a malaria task force that is supposed to help us and we want all local leaders and area members of parliament brought on board," Omona said.

MOSQUITO DISCUSSION

'Invisible' Zika Virus Epidemic Frustrates Health Officials

by MAGGIE FOX

Tom Frieden is frustrated. For half a year now, he and colleagues have been trying to get Americans worried about Zika virus.
From the moment Frieden's Centers for Disease Control and Prevention realized that Zika was probably causing horrendous birth defects in Brazil, the agency has been advising pregnant women to stay away from Zika-affected zones and warning that the virus would inevitably end up in the U.S.

Environmental Services, examines mosquitoes collected in a trap in Houston at the Harris County Mosquito Control lab. Zika has been sweeping through Latin America and the Caribbean in recent months, and the fear is that it will get worse there and arrive in the U.S. with the onset of mosquito season this summer. John Mone / AP

Yet Congress has failed for five full months to appropriate money the agency said was urgently needed back in February, and polls show Americans were more worried about Ebola — which never threatened the U.S. — than they are about Zika.

States need to start killing mosquitoes now if they are to prevent outbreaks of Zika, and experiments underway to develop new vaccines may have to end if the cash doesn't start flowing. Puerto Rico, an American territory, has a full-blown epidemic with thousands of verified cases and probably many thousands more that haven't been reported.

Related: Few Americans Fear Zika

"The president calls the situation in Puerto Rico a crisis and it is," Frieden told NBC News. "But it's an invisible crisis. In Puerto Rico, people are used to seeing dengue, which can kill you, or chikungunya, which can give you terrible joint pain for months."

But Zika doesn't cause symptoms in many if not most people who get infected and even when it does they are mild — a fever, a rash, an eye infection. "I have heard over and over again 'I don't know anyone with Zika'," Frieden complained.

"Well, they don't know anyone who knows they had Zika because four out of five people don't have symptoms."

“"IT'S AN INVISIBLE CRISIS."”

Zika does its real damage in developing babies, quietly and invisibly as they grow in their mothers' wombs. A woman may not suspect she's been infected, only to find out in the worst possible way when her child is born with severe birth defects, or when she miscarries.

Even when Zika is suspected, the real damage cannot be seen until a pregnancy is advanced. And doctors are now starting to report babies with Zika-linked brain damage that's not immediately visible at birth. While the tiny, misshapen heads of microcephaly were the most obvious first sign of Zika's arrival in Brazil, doctors have documented less obvious brain damage, too.

"I am just worried we are going to look back in four or five months and say, 'Why didn't we do more, then'," Frieden said.

Related: Obama Says He Expects Congress to Move on Zika

Dr. Peter Hotez, dean of the National School of Tropical Medicine at Baylor College of Medicine, has been warning that the first real sign that Zika has come to the U.S. could be an epidemic of birth defects — which is what happened in Brazil a year ago.

"Zika could already be here," he said. "There could be transmission under way and we would be in no position to detect it."

State and local authorities have the responsibility to watch for outbreaks of new disease, but their funding has been cut year after year and there are not many good ways to watch for Zika.

They can test mosquitoes but Zika's hard to detect in the insects even when it's spreading as an epidemic. They can test blood donations — CDC did so in Puerto Rico to gauge the epidemic there — but Hotez notes only a small percentage of the population donates blood so it won't show up until many people have been infected already.

Related: Puerto Rico Struggles to Deliver Contraceptives as Zika Spreads

"The best way to do this is to undertake programs of active surveillance, where you are going into community health centers and clinics and in everybody who has a fever and a rash you are taking a blood sample and testing it for Zika," Hotez said.

"That's why you need congressional funds."

Ebola was dramatic. Zika is more subtle.

"It's not like Ebola, where people will be dying in the streets," Hotez said. "It's what I call a delayed epidemic. The nightmare scenario is we miss it and seven, eight, nine months from now we see microcephaly cases showing up in the obstetric wards."

“THE WAY CONGRESS IS BEHAVING, IT'S ALMOST AS IF THEY THINK IT'S NOT REAL.”"

Plus the victims are likely to be people who don't have a voice, Hotez said. "Who is going to pay the price? Pregnant women in urban centers on the Gulf Coast — the poor and disenfranchised," he said.

And Americans saw that despite their fears about Ebola, it never caused an epidemic in the U.S. even as it killed more than 11,000 people in Sierra Leone, Guinea and Liberia. Two people caught the virus on U.S. soil — both nurses who treated a man who'd brought the virus from Liberia and who died from his infection. The nurses, given quick treatment, both recovered.

"I can say that it is different from Ebola, where we saw horrible deaths," Frieden said. "Zika is much more theoretical. If I am not a woman of reproductive age or if I am not pregnant, then my risks are very different. There is a long time horizon there."

Even in Puerto Rico, Frieden said, it's difficult to get action. His current battle is trying to get residents to accept the idea of aerial spraying for mosquitoes.

Related: Baby Born in New Jersey With Zika-Linked Defect

"They are suspicious about it," he said. That's in part because Agent Orange — notorious for its use in Vietnam and now known to cause a range of diseases because of its dioxin content — was tested in Puerto Rico in the 1950s and 1960s.

But spraying for mosquitoes is accepted in most of the U.S. and it's routine in southern states, especially when West Nile virus, another mosquito-borne infection, pops up.

"There is no doubt in my mind that if any other part of the U.S. had this much Zika, they would be spraying aerially," Frieden said.

Related: Full Coverage of the Zika Epidemic

Mosquito season gets into full swing right about now and yet Congress is off for a three-day July 4 break, and there's no sign of any agreement on appropriating money for Zika.

"The way Congress is behaving, it's almost as if they think it's not real," Hotez said. "There does not seem to be any urgency. For something like Zika, we shouldn't have to provide adult supervision over Congress."

WORLD OF MOSQUITO SCIENCE

Scientists discover maleness gene in malaria mosquitoes, opening the way for genetic control of the disease

THE PIRBRIGHT INSTITUTE 30-JUN-2016

Krzywinski, Head of the Vector Molecular Biology group at The Pirbright Institute have isolated a gene, which determines maleness in the species of mosquito that is responsible for transmitting malaria. The research, published in the journal Science, describes identification and characterisation of a gene, named Yob by the authors, which is the master regulator of the sex determination process in the African malaria mosquito, *Anopheles gambiae,* and determines the male sex.

In insects, sex is commonly determined by a primary genetic signal that during the first hours of life activates a short cascade of genes, whose sex-specific products ultimately control whether an individual will develop as male or female. The molecular mechanisms underlying these developmental processes are surprisingly extremely variable, and in particular the primary sex-determining genes drastically differ in their nature between different groups of insects. Similar to humans, many insects possess a pair of sex chromosomes, with females carrying identical XX chromosomes and males XY chromosomes, the Y chromosome harbouring a dominant male-determining gene. The molecular identity of such maleness genes has remained enigmatic. Yob represents only the second known case in insects.

To identify Yob, researchers from Pirbright, with support from colleagues from the

Liverpool School of Tropical Medicine, used high-throughput sequencing to sample all transcripts (genetic messages) produced in the *Anopheles gambiae* male and female embryos. After comparison of the sequencing data, they found, exclusively in males, fragments of transcripts corresponding to Yob. Further research showed that Yob is encoded on the Y chromosome, and that activity of Yob was limited to males and was necessary to generate male-specific products of the sex determination pathway genes. Unexpectedly, Yob transcripts are highly detrimental to females. When injected into mixed-sex early embryos of *Anopheles gambiae*, or another African mosquito species, *Anopheles arabiensis,* Yob kills females before they hatch from eggs, but leaves male development unaffected. Conversely, silencing normal embryonic Yob activity is lethal to males. These results indicate that, apart from determining maleness, Yob is pivotal for the control of another fundamental developmental process, called dosage compensation, which balances levels of transcripts from genes located on the single X chromosome in males and on two X chromosomes in females.

"Our research may have far-reaching implications for the control of malaria. This preventable disease is the major cause of human suffering and an immense barrier to socioeconomic development, mainly in poor countries of sub-Saharan Africa, where nearly 200 million clinical cases and half a million deaths are reported every year. Malaria in that region is transmitted primarily by females of *Anopheles gambiae* and *Anopheles arabiensis*. Currently, application of insecticides to control mosquitoes remains the most efficient way of combating the disease, but with a rampant spread of resistance to chemicals in mosquito populations, the insecticides may soon become ineffective. Clearly, we urgently need alternative more sustainable mosquito control methods. Genetic strategies, such as those successfully used to control agricultural pests, have great potential. However, they require releases of male mosquitoes only, which represents an insurmountable obstacle to extending genetic control to malaria vectors, because no efficient methods to separate sexes in Anopheles currently exist. Now, the female-killing property of Yob gives us an invaluable tool for the engineering of male-only Anopheles strains suitable for malaria control in the future", said Dr Krzywinski.

WORLD OF MOSQUITO TECHNOLOGY

Microsoft designs smart mosquito trap to track Zika

Euronews SCI- TECHscience 27/06

Researchers are testing a smart mosquito trap they hope will help better track the spread of the Zika virus.

The device is designed to trap specific types of mosquitoes, and collects data on the time and weather at the moment they're captured.

It's part of Microsoft's "Project Premonition", which aims to detect infectious diseases earlier, before they reach densely populated urban regions, to better prevent outbreaks

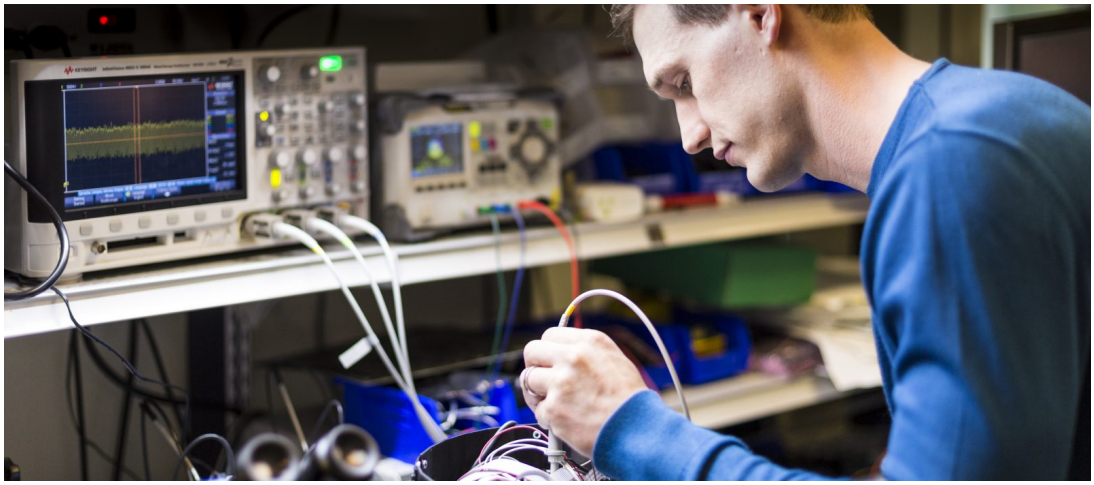
"The idea of Premonition is to use a mosquito as a device that can go out and sample blood and then from that mosquito, we can try to understand what pathogens it might have encountered," said Ethan Jackson, who leads the project.

"So the technologies we needed to build go all the way to how do you catch a mosquito to how do you get it back to a lab, to how do you analyze it."

Ethan Jackson is using machine learning to help mitigate disease before an outbreak ever occurs.

The device uses an algorithm to identify which kinds of mosquitoes to trap based on the way they flap their wings. Microsoft also plans to use drones to place the traps in remote

areas, which would save both time and money.
“Project Premonition started from the observation that emerging infectious diseases are very difficult to predict, dangerous to societies and expensive. So the vision is can we make them more predictable? If we get it right, I hope the answer to that is yes,” said Jackson.



“I hope that we can predict emerging infectious diseases before they surprise us, as we saw in the past with something like Ebola, as we see now with something like Zika.”
The current Zika virus outbreak in Brazil has been linked to severe birth defects in hundreds of babies and has spread across the Americas to more than 50 countries.
The virus is expected to reach the US mainland and parts of Europe in the coming weeks as the weather warms.

Haier Mobile Provides 10k Smartphones to Monitor Anti-Dengue Campaign
By Onsa Mustafa - Jul 4, 2016

Haier Mobile recently provided more than 10,000 customized smartphones to Punjab Information Technology Board (PITB). Haier Mobile Provides 10k Smartphones to Monitor Anti-Dengue Campaign. These smartphones will help to monitor the anti-polio and anti-dengue campaigns in Punjab.
Haier Mobile Provides 10k Smartphones to Monitor Anti-Dengue Campaign

These phones have pre-installed applications with various options for maintaining the healthcare. Most of the Apps focus on preventing the dengue virus. Here are the details of a few features:
Grass cutting: An officer needs to capture the image of the grass while cutting it, to inform the health department about the condition of the lawn.
Dry the Water: Water increases the chance of spreading the dengue virus. If a health officer sees a significant amount of water somewhere, he can select this option in the app. The app will capture the image of the area and send it to the relevant department along with the GPS location information. The consultant team will then arrive at the area to dry

the water.
Dengue Larvae: If dengue larvae are found in any area, the health officer can tap this option to inform the department about it.
Polio: Polio is a very sensitive issue in Pakistan. That is why PITB has designed an app for the information related to this disease. The app is also available in phone.
The device starts and shuts down by displaying the logo of PITB. There is a logo of the Punjab Health Department on the back of the smartphone. Underneath, the phone carries "Powered by PITB" sticker.
The PITB-powered version of the Haier Esteem i40 is not available for sale. As it is designed only for the health officers of the PITB. All of the data shared using the apps of this phone is stored on the servers of PITB.

DID YOU KNOW?

Mosquito spit helps viruses make us sick

Health by Kai Kupferschmidt Jun. 21, 2016

When a mosquito infects you with a viral disease such as Zika or dengue, it does more than just deliver a few virus particles under your skin. The saliva it injects also causes an inflammation that helps the virus multiply and quickly spread to other parts of your body, according to a new study. The research suggests that there might be a surprisingly easy way to prevent infections in people who have just been bitten: applying an anti-inflammatory cream to the bite site.
When mosquitoes bite, they inject a tiny amount of their saliva (less than a microliter), which contains a specialized, potent cocktail of molecules that numb the pain of the bite and stop the blood from clotting. Many pathogens hitch a ride in the saliva, and they, too, seem to benefit: Mice develop more severe infections when a virus is injected by a mosquito than by a researcher using a needle. But, until now, it had been unclear why.
Clive McKimmie, an immunologist at the University of Leeds in the United Kingdom, and his colleagues set out to find the answer. They infected mice with a relatively harmless variety of the Semliki Forest virus (SFV), a relative of chikungunya. When the strain was injected into the skin, none of the mice got very sick, and all of them survived. But when injected into a mosquito bite on the skin, the virus spread faster and more easily to the rest of the body. Four of 11 mice died from the infection.
Apparently, the virus needed mosquito saliva to get going in its new host. But why? One theory has been that compounds in the saliva suppress the immune system. But the researchers found that that is not the case. Instead, saliva triggers an inflammation, essentially a warning that the body's defenses have been breached. A class of cells known as neutrophils, which act as the body's first responders, rush to the bite site. These in turn recruit macrophages, cells whose job it is to gobble up microbes or anything else that does not belong in the body.
Using SFV labeled with a fluorescent dye, the researchers discovered that the macrophages are themselves infected by the virus and start spreading the disease further, like policemen joining a mob they are meant to control. When the researchers infected a strain of mice lacking macrophages with SFV, the mice fared similarly well whether they had been infected at a bite site or not. This shows that the virus actually uses the macrophages to replicate and disseminate quickly in the body, the authors write in Immunity today.
The paper is exciting because "it is the first example I know of where the virus is using the host response to increase the success of transmission to a new host," says David Schneider, a microbiologist at Stanford University in Palo Alto, California, who was not

involved in the study. Mosquito-borne viruses face a particular challenge, he says, because they need to establish an infection from the few virus particles transmitted by a mosquito bite, and then become abundant enough to be taken up again when the next mosquito bites. “It just goes to show you that for every host defense mechanism, you can be sure some pathogen will be trying to exploit it,” says Andrew Read, an evolutionary biologist at Pennsylvania State University, University Park, who was not involved in the study.

McKimmie hopes that dampening the immune response after a bite, for instance by applying an anti-inflammatory cream, could make severe infections of mosquito-borne viruses less likely. "Obviously this needs a lot more work before we start recommending any form of public health advice,“ he says.

Schneider warns that suppressing an immune reaction may have drawbacks: “The risk there is always that there is a hidden secondary infection that will now be able to grow out of control and hurt the patient,“ he says. And widespread use of such a therapy could even lead to the evolution of more virulent pathogens that make do without the immune system’s help, he argues.

But McKimmie says there's no evidence that the strategy would drive virus evolution in any way. And there is no need to suppress the immune system as a whole, he says—just local inflammation. And even if it should prove to work one day, the treatment would only be a plan B, he says: "The best way to not be infected is not to be bitten.”

Researchers in Brazil have captured thousands of mosquitoes to test them for Zika and other viruses.