NEW ZEALAND BIOSECURE

BORDER HEALTH NEWSLETTER – December 2016

Happy New Year!

2017 introduces itself with a range of obscure **Malaria-News:**

Nigeria, for example, will raise import taxes for antimalarial drugs terming them as “luxury goods”. In most countries buying and owning a yacht is considered a luxury and so far Africa’s largest economy has been import duties on yachts and sports cars. The health minister has denied the tariff hike, but a ministry of finance document suggests the additional taxes of 20 % on antimalarial drugs have been approved by the president since last October. This could inadvertently provide a bigger market for local manufacturers of fake drugs.

At another end of the world the Malaria Elimination Group, an independent international advisory group convened by the Global Health Group at UC San Francisco, is meeting this week in Chennai, India, to discuss strategies to eliminating malaria in India by 2030.

A Seattle lab’s unconventional approach to a malaria vaccine, once dismissed as crazy, worked well in early tests but faces a long road to reality. In an experimental trial, 10 local volunteers were bitten by infected mosquitoes and no one got sick. After the bites, the volunteers’ bodies produced antibodies that could be potent enough to confer immunity to future infections. The model mosquito carries a weakened form of the parasite, which would stimulate immunity but pose no risk of infection, and use it as the basis for a vaccine.

In Mumbai the National Consumer Disputes Redressal Commission has held that a malaria death caused by mosquito bite is an accident, and directed the insurer to honour its policy to a widow. The husband had availed of a policy of the National Insurance Company to cover death by accidents. But when his widow filed a claim, the insurance company rejected it saying a mosquito bite was not an accident under the policy, and that malaria was a disease. The national commission observed that the insurer had included snake bites, dog bites and frost bites under the `accident' category. The commission also cited Black's Law dictionary that describes an accident as "an unanticipated and untoward event that causes harm".

And there is more news about the outbreak in Perak, Volunteers with Malaria Consortium’s pilot program leading a community dialogue and a 2000 year old skull diagnosed with malaria.

If you still want to learn more about the risk of mosquitoes visit the 2017 America Mosquito Control Association Conference; Early Registration Ends on January 21st!

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

SAMPLES

During December amazing 1033 samples were collected by staff from the 12 DHBs with only 174 positives. This is the time when we normally have more Culex pervigilans larvae than Cx. quinquefascautus larvae. This year Cx. quinquefasciatus is already on the rise and the numbers are much higher than the previous years at the same time. It was nice to see so many Coquillettidea iracunda which is mainly thanks to the BG trap trial in Northland. The number of Aedes notoscriptus larvae was quite low this month; but their adults have been flying a lot.

Species	Adults		Larvae	
New Zealand Mozzies	**Dec 16**	**Dec 15**	**Dec 16**	**Dec 15**
Aedes antipodeus (winter mosquito)	20	8	Nil	Nil
Ae. australis (saltwater mosquito)	1	Nil	Nil	Nil
Ae. notoscriptus (striped mosquito)	634	192	733	1715
Coquilletidea iracunda	81	26	Nil	Nil
Cqt.tennuipalpis	Nil	1	Nil	Nil
Culex astilae	Nil	Nil	Nil	9
Cx pervigilans (vigilant mosquito)	19	45	2412	2899
Cx. quinquefasciatus (southern house mosquito)	510	90	1814	657
Opifex fuscus (rockpool mosquito)	1	Nil	50	65
Total	**1266**	**362**	**5009**	**5345**

INCURSIONS/INTERCEPTIONS

During November 2 suspected interceptions were detected.

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

16.12.2016 – Interception of dead mosquitoes found in a container of paper from the USA. Several individuals were found belonging to the following species 1 *Anopheles crucians*, 1 female *Aedes infirmatus*, 2 female and 1 male *Aedes vexans,* 1 female *Culex nigripalpus* and 1 Culex sp.

VECTOR-BORNE DISEASES - OUTBREAK NEWS

South Pacific

RADIO NEW ZEALAND
TE REO IRIRANGI O AOTEAROA

Heavy rain hastens mosquito eradication efforts in Cook Is

From Dateline Pacific, 22 December 2016

Recent heavy rainfall in the Cook Islands is adding urgency to efforts to eradicate potential mosquito breeding sites.

Health officials say the country is free of mosquito-borne diseases such as dengue and zika which are present in some neighbouring countries.

But a six-monthly programme is underway to identify sites where mosquitos could breed.

Jo O'Brien talked to Tutaka programme co-ordinator Charlie Ave.

CHARLIE AVE: The problems so far we have identified are people are keeping junk,

motor parts, whiteware waste, E-waste, and all general waste around their properties. Also we have anticipated there will be problems with our septic tanks, water will be seeping through some septic tanks and we have so far identified around three of them, that is our first priority to make sure it is desludged. Also pigs, keeping of animals within residential areas. Animals causes smell, offensive odour and it sometimes brings in flies so therefore we have asked people to move their pigs away, at least fifty metres from any dwelling.

Because we've been through heavy rainfall we are anticipating there will be increasing mosquito population but it doesn't mean that we will be having dengue, chikungunya or zika outbreak. It's a high population of mosquitoes and our boys, our health protection officers are scheduled to do a larvicide programme and survey properties where all the possible mosquito breeding sites can be identified and at the same time apply a larvicide, we call it a Vectobac, we apply in all stagnant waters or anything that holds water. That is our first line of defence. And secondly we have a paid service to spray individual properties with a minimum cost of $35 to spray the outside. This is to get rid of adult mosquitoes.

Most of the viruses that cause these mosquito-borne diseases has to be imported from somewhere. We are sitting in the middle of the Pacific, where the Cook Islands is surrounded by countries, like American Samoa, Samoa, New Caledonia, French Polynesia, Wallis and Futuna, they have this mosquito-borne disease on their islands since the beginning of this year. But because we have preventative and control measures at our port of entry, or even our media campaign, or our actual larvicide programme, cleaning campaign, so we are hoping nobody will escape through the roots here.

Zika infection confirmed in Palau

Pacific Daily News Sue Lee, sjlee@guampdn.com Published 1:09 p.m. ChT Nov. 8, 2016 | Updated 10:23 p.m. ChT Nov. 8, 2016

According to a Bureau of Public Health in Palau press release, there has been a U.S. Centres for Disease Control and Prevention confirmation of a Zika-infected patient.

This patient had no recent travel history, indicating that the infection most likely occurred on the island. The bureau has initiated activities to control and prevent further spread of the Zika virus. They are urging others to seek medical advice if they think they have been infected.

The CDC also recommends continuing to prevent mosquito bites three weeks after your travels, to prevent local mosquito spread if you have been infected.

Minimize breeding grounds by emptying, cleaning and covering containers that can hold water where mosquitos like to lay eggs, the bureau advises.

People coming back from travels to Zika-affected areas should avoid sex or practice safe sex including the use of condoms and dental dams, CDC recommends.

It's undetermined how long the virus stays in the system. The current recommendation is to take precautions for eight weeks if female and 6 months if male, according to CDC.

Pacific syndromic surveillance report – Week 50, ending 18 December 2016

Dengue: Vanuatu - As of 22 December there have been 264 suspected cases since 11 November 2016. Dengue serotype-2 was confirmed in two samples by the Institute of

Environmental Science and Research Limited (ESR), New Zealand. As of December 9th, the Dengue Task Force of the MOH decided that not all suspected cases would be tested. Testing will be only for cases from new sites, severe dengue cases and about 2 case per day will be tested to detect potential introduction of new dengue virus serotypes and/or Zika virus and/or Chikungunya virus. Source: Vanuatu Ministry of Health.
Solomon Islands: As of 11 December 2016, there have been 6,294 cases of dengue since 15 August. Recent samples sent to ESR, NZ for confirmation identified Dengue serotype-2 in 60% of samples sent. In the week ending 11 December 2016 there were 36 hospitalised cases, with no deaths reported.

Public Health Surveillance
Information for New Zealand Public Health Action

MONTHLY NOTIFIABLE DISEASE SURVEILLANCE REPORT - Nov 2016

Chikungunya fever: Two cases of chikungunya fever (1 confirmed and 1 probable) were notified in November. Twenty-seven cases have been notified in the year to date compared to 48 at the same time in the previous year. Cases were in the 30–39 years and 70 years and over age groups and were from Auckland and Counties Manukau DHBs, respectively. Both cases reported overseas travel to India during the incubation period for the disease.
Ross River virus infection: One case of Ross River virus infection was notified in November 2016. After further investigation, the case has since been found not to meet the case criteria.

ZIKA

Puerto Rico Zika tally nears 36,000

Outbreak News Today by ROBERT HERRIMAN December 20, 2016

Puerto Rican health officials reported an additional 512 confirmed Zika virus cases the week ending Dec. 3, bringing the island total to 35,648 since the first local case was reported in late in 2015. The number of cases in pregnant women infected with the mosquito borne virus now stands at 2,864, while more than 300 people required hospitalization for their illness to date.

MALARIA

Malaria outbreak at Pos Kemar is over

The Star online BY IVAN LOH 3.1.2017

IPOH: The malaria outbreak at Pos Kemar, Gerik is over.
Perak Health Committee chairman Datuk Dr Mah Hang Soon said the outbreak, which started in mid-November, ended on Dec 28 last year.
He said the last case was detected on Dec 21 and health officers were now monitoring the condition of patients who had recovered.
"We have tested some 67% of the villagers through mass blood survey and found no new cases.

"Health officers will continue to visit the respective villages and to check for symptoms and those with continuous fever would have their blood sample taken," he told reporters after chairing a State Environmental Health Action Plan meeting at the state secretariat building here on Tuesday.
He said some 137 villagers, including 79 children aged 14 and below, had tested positive for malaria during the outbreak.
"All contracted the Plasmodium vivas strain except for one villager, who tested positive for Plasmodium falciparum," he said.
Following the end of the outbreak, Dr Mah said some 724 homes at the villages at Pos Kemar have been sprayed with mosquito killing chemicals and provided with medicated concoction to control the breeding of mosquitoes.
"We have also conducted larvaciding activities to prevent breeding.

DENGUE

Oriental

Malaysia dengue cases top 100,000 in 2016, Dengue vaccine still not approved
Outbreak News Today by ROBERT HERRIMAN January 4, 2017
In 2015, the Southeast Asian country of Malaysia reported in excess of 120,000 dengue fever cases, including 322 dengue related fatalities. As 2016 came to a close, Malaysian health officials say the case tally has just eclipsed the 100,000 mark and the death toll is also down.
Through the 51st week of 2016, Malaysia has reported 100,028 cases and 231 deaths. Like in 2015, Selangor state accounted for about half of the country's dengue cases with approximately 50,000 reported.
While the case total dropped a little in 2016, Malaysia still reports a significant number of dengue cases and is one of the hardest hit dengue endemic countries, and as one author critiques, Malaysia continues to rely on outmoded mosquito control techniques such as fogging.
Philip Stevens, Senior Fellow at the Institute for Democracy and Economic Affairs (IDEAS) wrote in an Op-Ed in the Star Online promoting the use of the dengue vaccine, "Why is it that 13 dengue-endemic countries in Asia and Latin America have so far approved the new vaccine (Dengvaxia) and Malaysia lags behind, despite its high burden of disease?"
In another piece in Malay Mail Online, Stevens questions the logic of the government– Deputy Health Minister Datuk Seri Dr Hilmi Yahya stated earlier this month that the government is "still doubtful of the vaccine's effectiveness, as such there is no need to register the vaccine in the country for the time being".
What is clear is that current approaches to mosquito control are both ineffective and costly. In light of tighter budget lines and the availability of more cost effective methods, perhaps it is time for the Ministry of Health to take on a fresh approach to fighting dengue.
Related: Dengue vaccine gains approval in nearly a dozen countries
In the past 50 years, the incidence of dengue worldwide has increased 30-fold, largely as a consequence of the growth of cities and increased travel.
The World Health Organization (WHO) estimates there may be 50 - 100 million dengue infections worldwide every year. However, new research from the University of Oxford and the Wellcome Trust, using cartographic approaches, estimate there to be 390 million dengue infections per year worldwide.

CHIKUNGUNYA

Americas

Mexico chikungunya, dengue fever and Zika virus update

by ROBERT HERRIMAN
December 26, 2015
Outbreak News Today

Despite a campaign and attempts by the Mexican government to prevent mosquito borne viruses this year, the numbers have climbed in respect to chikungunya, dengue fever and now the introduction of autochthonous, or locally acquired cases of Zika virus.

Since the first local transmission of chikungunya in Chiapas, Mexico 13 months ago, the cumulative total has reached 11,199 autochthonous cases as of mid-December 2015, according to the Pan American Health Organization (PAHO).

Now, the Mexican Department of Epidemiology says the mosquito borne viral infection has spread to 28 states, with Veracruz, Michoacan, Guerrero, Oaxaca and Chiapas being hit the hardest.

The number of dengue fever cases in Mexico topped the 200,000 mark in November, according to the PAHO. In addition, 31 dengue-related fatalities have been reported year-to-date. All four dengue serotypes have been reported in Mexico this year.

Finally, one month ago, national health authorities in Mexico notified PAHO/WHO of 3 cases of Zika virus infection, including two autochthonous cases (residents of Nuevo León and Chiapas) and one imported case (with history of travel to Colombia).

Elephantiasis

Elephantiasis Potential Concern in Post-Hurricane Haiti

WOMEN'S ENEWS By: Alexandra MuckDecember 16, 2016

UN Photo/Logan Abassi
Les Cayes, Haiti, in the aftermath of Hurricane Matthew.

NOTRE DAME, Ind. (WOMENSENEWS)–For 60-year-old Velouse Casseus, September's Hurricane Matthew brought fears for the future in addition to death and damage to her community in Leogane, Haiti. She is now concerned about getting another disease, especially since she already has lymphatic filariasis.

"I feel so vulnerable to any disease because of the conditions I am living in," she said through a translator using WhatsApp messaging. "I am seriously affected by the disastrous cyclone on the country. My conditions were already complicated, so I am in extreme need."

Aid organizations, including CRUDEM Foundation, were also concerned that there could be an increased risk for lymphatic filariasis after Hurricane Matthew. The disease is caused by a parasite transmitted by mosquitos and the standing water in post-hurricane Haiti leaves more places for mosquitoes to lay their eggs.

Lymphatic filariasis, more commonly known as elephantiasis, is one of the seven neglected tropical diseases (NTDs), named as such because they tend to impact

populations in poverty and are usually easily treatable. Affecting over 2 million Haitians, lymphatic filariasis damages the lymphatic system and causes areas of the body to swell.
Antionette Saint Fabre, who lives in Haiti and also suffers from the disease, said she has seen "so many negative impacts on the area affecting people with lymphatic filariasis," including increased lesions for people already suffering from symptoms.
Despite the concerns, Thomas Streit, a professor at the University of Notre Dame who founded the school's Haiti Program, which focuses on treatment and research, is hopeful that the impact this time around will be minimal overall. He has published several papers evaluating how to eradicate the disease and said that while mosquito populations could go up in the area, the disease should not restart since it was locally wiped out.
"The area where the hurricane hit the most, which is the southwest of Haiti, we had pretty much already licked – we were done with filariasis," he said.
Even though an increase in lymphatic filariasis cases may not be a concern, this disease and other NTDs, such as onchocerciasis (river blindness) and schistosomiasis ("snail fever" that leads to internal bleeding), are far from being eradicated globally.
NTDs are easily preventable in the more than one billion people around the world who have one of these diseases, according to the World Health Organization. It costs about 50 cents to treat one person for a year from the most common NTDs, and companies such as Eisai, GlaxoSmithKline and Merck & Co. are willing to donate drugs. The difficulty lies in getting the treatments to people. Since many of the countries where lymphatic filariasis and the other NTDs are endemic are poor, they lack infrastructure to effectively deliver and educate the population about the diseases.
Streit said the diseases impact women particularly as caregivers. "Women are the health care providers in the world," he said, "so they are the ones who get the extra burden of work whenever anyone in the family has one of these NTDs."
Saint Fabre, also from Leogane, has had symptoms of lymphatic filariasis for 26 years.
"Stigmatization is a factor of my relationship with my neighborhood, which makes me sad," she said. After being diagnosed, she "was so ashamed to take part in social activities like walking in the street, the public market and even church."
She noted that her life changed dramatically, however, with the Filariasis Program staff at a local health clinic. She now works for the clinic and can play a role in "encouraging those living with lymphatic filariasis and advising them to visit the clinic." This treatment includes taking medicine and learning to care for the inflamed areas.
For Casseus and others living in post-hurricane Haiti, caring for themselves is a top priority. Casseus said now that she knows basic cleanliness principles, she practices them daily to avoid more diseases.

VACCINATION NEWS

Zika vaccine produces promising results in human trial

by PRESS RELEASE
December 21, 2016
Outbreak News above post

Inovio Pharmaceuticals, Inc. today announced its DNA-based Zika vaccine (GLS-5700) generated robust antigen-specific antibody responses in a first-in-man, multi-centre phase I trial. In initial testing, Zika-naïve subjects in both low dose and high dose vaccine groups demonstrated Zika antigen-specific antibody responses after one or two vaccinations. In addition, the vaccine was well tolerated and no significant safety concerns were noted in any of the 40 subjects out to 14 weeks from initiation of dosing, the latest available data from the study.

This phase I, open-label, dose-ranging study of GLS-5700 in healthy adult volunteers is evaluating the safety, tolerability and induction and persistence of Zika specific antibody and T cell responses out to 60 weeks. In preclinical testing Inovio's Zika vaccine protected animals that had been exposed to the virus from infection, brain damage and death.

Dr. J. Joseph Kim, Inovio's President & CEO, said, "These early clinical results show that Inovio is on track to rapidly develop Zika countermeasures for this disease that has no currently existing vaccine or treatment. Our synthetic vaccine technology allows rapid development of new products, leading Inovio to be the first to create a Zika vaccine, the first to generate preclinical data, the first to initiate human testing, and now first to report positive clinical data."

"We also look forward to completing our second phase I study of 160 subjects in Puerto Rico, where the CDC estimates 25% of the population could be infected with Zika virus by year end. We expect results next year which may provide exploratory signals of vaccine efficacy. Based on these two studies, we plan to meet with regulators to map out the most efficient path forward to bring our Zika vaccine to patients and help mitigate this widespread Zika outbreak that has expanded into the continental United States."

Inovio is developing its Zika vaccine, GLS-5700, with GeneOne Life Science, Inc. (KSE:011000) and academic collaborators from the U.S. and Canada who are also collaborating to advance clinical development of Inovio's Ebola and MERS vaccines.

In addition to the vaccine development, earlier this month, Inovio and The Wistar Institute received an $8.8 million grant from the Bill & Melinda Gates Foundation to develop a DNA-based monoclonal antibody designed to provide fast-acting protection against Zika infection and its debilitating effects. Unlike vaccines, monoclonal antibody-based therapies could provide more immediate protection but do not develop long-term immune memory. An ideal approach would therefore include the co-administration of a dMAb™ product for immediate protection and a DNA vaccine to train the immune system for longer-term, persistent protection against Zika infection.

Chikungunya vaccine developed by UTMB researchers, Made from an insect-specific virus

by PRESS RELEASE
December 19, 2016
Outbreak News Today

Researchers from The University of Texas Medical Branch at Galveston have developed the first vaccine for chikungunya fever made from an insect-specific virus that doesn't have any effect on people, making the vaccine safe and effective. The newly developed vaccine quickly produces a strong immune defense and completely protects mice and nonhuman primates from disease when exposed to the chikungunya virus. The findings are detailed in Nature Medicine.

"This vaccine offers efficient, safe and affordable protection against chikungunya and builds the foundation for using viruses that only infect insects to develop vaccines against other insect-borne diseases," said UTMB professor Scott Weaver, senior author of this paper. Traditionally, vaccine development involves tradeoffs between how quickly the vaccine works and safety. Live-attenuated vaccines that are made from weakened versions of a live pathogen typically offer rapid and durable immunity but reduced safety. On the other hand, the inability of inactivated vaccines to replicate enhances safety at the expense of effectiveness, often requiring several doses and boosters to work properly. There may be a risk of disease with both of these vaccine types, either from incomplete inactivation of the virus or from incomplete or unstable weakening of the live virus that is only recognized when rare vulnerable individuals develop disease.

To overcome these tradeoffs, the researchers used the Eilat virus as a vaccine platform since it only infects insects and has no impact on people. The UTMB researchers used an Eilat virus clone to design a hybrid virus-based vaccine containing chikungunya structural proteins.

MOSQUITO AND LAW

What step have you taken to eradicate mosquitoes, Madras HC asks TN govt

L Saravanan | Jan 3, 2017, 08.45 PM IST

MADURAI: The Madurai bench of the Madras high court on Tuesday directed Tamil Nadu chief secretary and health secretary to file a report on the action taken to eradicate mosquitoes.

K Ramesh of Madurai filed a petition stating that the government failed to obey the court order directing it to take action to prevent mosquito menace in the state.

The petition came up for hearing before the division bench headed by Justice A Selvam. The petitioner said he had already filed a petition in the high court seeking a direction to the government to eradicate mosquitoes and accordingly the court issued an order in 2014. But there was no action on it. Due to this, it is in a position that the mosquito breeding could not be stopped. The government failed to clean drainage channels and sewers. Several people, including children, have died of diseases like dengue and chikungunya in Ramanathapuram, Paramakudi, Madurai and Vaniyambaid. There was no separate bed facility in the government hospitals to treat the patients suffered by those diseases. Hence, to ensure safety every family should be provided mosquito nets and separate wards should be set up in government hospitals, the petitioner said.

The government side claimed that it had taken steps to eradicate mosquitoes.

The bench told the government side that mosquito menace is very bad even on the high court bench campus which is in the city limit. No need to tell the situation in villages, it said. "The court passed order in that effect in 2014. What steps have you taken? The chief secretary and health secretary should file report before the court on January 9," the court said. The court adjourned the matter to January 9.

PUBLIC IMPACT

Association spends Rs 85,000 on mosquito menace

The Times of India Komal Gautham | TNN | Updated: Jan 3, 2017, 11.15 AM IST

COIMBATORE: A residential welfare association in Podanur has spent nearly 85,000 to fight the mosquito menace in their area in the past one year. Civic apathy forced the residents to take this step as the officials did not respond to their grievances. They purchased a fogging machine worth 25,000 and also spend 5000 every month for on medicines and kerosene.

"We had no other choice, but to buy the machine as the officials failed to respond. We tried talking to sanitary officers and junior engineers. Every time they assure us of taking action, but not a single step was taken to resolve the issue. So the association members pooled in money and decided to purchase the fogging machine," said S Sreekala, secretary of Sai Nagar residents' welfare association in Podanur. "But otherwise, no action is being taken to curb the mosquito menace," she said. There are more than 500 families located in this area. Sreekala said that since the Noyyal river is mixed with sewage and passes through their area, the mosquito menace is a major issue to the residents. "For several years, we followed up on the complaint and kept calling the officials. So, last year, we decided to buy the fogging machine on our own. We even discussed it with some of the sanitary officials. It cost us nearly 25,000," said Sreekala. In addition, monthly twice, the residents bought medicines, kerosene and other necessities on their own. "It costs us nearly 2500 for one fogging operation. The men in our locality do it on Sundays," she said.

The residents said official apathy did not stop just there. Nasser, the president of the association said, "Be it street light repair work, cleaning of garbage, or even switching on the street lights in the evening, we have to do it all on our own."

"Since our area was added to the civic body later, we do not get proper response from officials. While they always listen to our complaints, they hardly take any steps. Since the members of the association are very active and are willing to contribute funds for development activities in the area, we manage ourselves," he added.

Meanwhile, the sanitary officer of the area, M V Andiappan said, "We conduct the fogging operation every day in the area. We have records to prove it. We mix half a litre of the medicine with nine litres of diesel and two litres of petrol. It can be used for 40 minutes. We conduct door-to-door collection regularly and maintain the area well," he said. He added that even a few weeks back, they conducted an operation in the area for dengue awareness. City's health officer, K Santhosh Kumar said, "Whenever we get complaints, we immediately take action. They must be doing it on personal interest," When contacted, the corporation commissioner, K Vijaya Karthikeyan was unavailable for comment.

Volunteers With No Medical Training Are Fighting Diseases The World Ignores

They help in areas far from health centers where up to 80 percent of people may be infected with a neglected tropical disease.

This article is part of HuffPost's Project Zero campaign, a yearlong series on neglected tropical diseases and efforts to fight them.

For people suffering from painful diseases in remote parts of the world, neighbors volunteering as health educators can be their best shot at getting help.

Ordinary people, without any formal medical training, have stepped up to teach others about common illnesses in the province of Nampula, Mozambique, which has one of the highest rates of neglected tropical diseases in the country — but where many people live in remote, rural communities, far from any health centers.

As part of a pilot program from the nonprofit Malaria Consortium and the ministry of health, about 150 volunteers have been trained since 2014 to hold monthly "community dialogues" in villages, gathering large groups of people to talk about neglected diseases. They discuss how to recognize symptoms and when and where to seek treatment, often handing out pamphlets with illustrations depicting the diseases, since not all people in the area are literate.

"These diseases are affecting rural, removed communities with low education levels and where poverty is huge," Sandrine Martin of Malaria Consortium told The Huffington Post. "In some provinces, you can have up to 80 percent of people who have these diseases, and people are usually infected with several at once."

These are illnesses such as schistosomiasis, which can lead to blood in the urine or stool and, in severe cases, kidney failure or bladder cancer, killing 20,000 people worldwide each year. Elephantiasis is also common in the area, and can cause swelling in the legs and genitals, leading to pain, disability and social stigma.

"These diseases affect more than half of people who live here," volunteer Anivel Adriano Haueque, from the Mogovolas district in Nampula, told HuffPost. "I know a man who has

swelling in his arm and scrotum from elephantiasis — he has a lot of trouble doing normal tasks in his everyday life."

Volunteers with Malaria Consortium's pilot program leading a community dialogue in Nampula.

Both schistosomiasis and elephantiasis are part of a larger group of 18 illnesses dubbed neglected tropical diseases, which don't receive wide global attention or resources, largely because they affect the poorest populations of the world.

Schistosomiasis, for instance, is transmitted by parasites in water, so it largely affects poor, rural communities that lack access to safe drinking water and sanitation.

"They get it as kids bathing in water," Martin said. "The symptoms, like blood in the urine, only develop later, so people tend to hide it because it's in the genital area."

Because for some of these diseases, symptoms develop years after the initial infection, it is common for folklore to develop around the original cause.

"For schistosomiasis, some believe that it can come from your mother having sex while she was breastfeeding," Martin said. "For elephantiasis, some think it's some kind of spirit, that someone put a spell on their family."

Elephantiasis can cause severe swelling in the scrotum, leading some to believe it is a sexually transmitted disease, when actually it is spread by mosquitoes.

"They're trying to make sense of things they don't understand," Martin added, "which is understandable."

Part of what volunteers do is dispel myths of how these diseases are developed and discuss the real causes, so people can avoid getting them.

"If you think what you have has nothing to do with health, but is from a spell, you go to a traditional healer," Martin said. "But with these community dialogues, people realize they have a disease that can be treated, and it generates a shift from healers to health centers."

An image from the pamphlets volunteers use in Nampula to educate people on neglected tropical diseases, in this case lymphatic filariasis — commonly known as elephantiasis.

Other similar "village health teams" — organized, trained and at times paid by local governments — exist in countries throughout Africa. In Mozambique, these groups have existed since 2010, Martin told HuffPost, but they have focused on educating and treating people affected by more deadly diseases, such as pneumonia, malaria and diarrhea —

illnesses that aren't considered to be neglected.

This means that Mozambicans battling less deadly, but often debilitating neglected tropical diseases were being left behind. The program in Nampula was created to change that. However, a lack of funding for neglected diseases has meant that these volunteers — unlike those fighting malaria or diarrhea — don't have easy tools to diagnose or treat patients on-site, away from medical centers. This means their role is limited to simply informing people, and directing them to get professional help.

"What we do with community dialogue, is to say: This disease can be treated, it can be prevented," Martin said. "That motivates people to seek care at health facilities."

An image from the pamphlets volunteers use in Nampula.

The Malaria Consortium pilot program for elephantiasis is still being evaluated, but the one for schistosomiasis seems to be working so far: After a year and a half, an evaluation of 700 households found that it increased knowledge of symptoms by 12 percent and of how the disease is acquired by 10 percent.

The successes of the program also appear in more visible ways: After people in one area realized schistosomiasis was transmitted by infected water, they made sure each house in the community had a latrine, Martin said.

But volunteers still need far more resources to better help their communities.

"The people here need boots to be able to go into the river to clean and collect water without catching diseases," volunteer Haueque said. "There aren't any other sources of water here."

After a few education sessions in his community, Haueque says, some people have stopped swimming and having fun in the river altogether, to avoid diseases.

More needs to be done at all levels, according to Martin: Donors need to commit more funds to fighting neglected tropical diseases; pharmaceutical companies need to invest in easy-to-use diagnostic tools and drugs for remote settings; and governments need to prioritize strategies to tackle these diseases, including investing in safe water and sanitation in poor communities.

"These are diseases of poverty," Martin said. "When you don't have latrines or safe water, you have to go to a river, and that's when you get these diseases."

Most important of all, according to Martin, is that the communities that are affected be involved in any new programs.

NEW MOSQUITO SCIENCE

Cerebral malaria: NIH video reveals cause of death in mice brains

Outbreak News Today by PRESS RELEASE December 11, 2016

Using state-of-the-art brain imaging technology, scientists at the National Institutes of Health filmed what happens in the brains of mice that developed cerebral malaria (CM). The results, published in PLOS Pathogens, reveal the processes that lead to fatal outcomes of the disease and suggest an antibody therapy that may treat it.

"By looking into the living brain, we were able to watch the chain of events that cause cerebral malaria to kill thousands of people every year," said Dorian McGavern, Ph.D., scientist at the NIH's National Institute of Neurological Disorders and Stroke (NINDS). "Our study also suggests there may be a simple treatment available to stop this deadly disease."

Malaria is a parasitic infection that is spread by mosquitoes, primarily in the developing world. According to the Centers for Disease Control and Prevention, in 2015, there were more than 200 million cases of malaria worldwide and 400,000 deaths from the disease, mainly in children under five years old. Although many people experience mild symptoms, in some individuals the parasite affects the brain and causes cerebral malaria, which kills

15 to 30 percent of patients with that form of the disease. Individuals who survive cerebral malaria often experience long-term neurological symptoms including cognitive impairment and limb paralysis. The cause of death from cerebral malaria is often due to brain swelling and bleeding, but the mechanisms leading to these outcomes are not completely understood.

Previous studies in the rodent model of this disease indicated CD8+T cells played a key role in the development of CM so Dr. McGavern's team focused its cameras on those cells. Dr. McGavern and his colleagues peered inside the brains of mice infected with a parasite that causes CM, using an imaging technology known as intravital microscopy, which allowed them to watch cells in action.

The findings of this study showed that as red blood cells containing the parasite adhere to cerebral blood vessels (a hallmark of CM), the immune system attempts to clean them off. Despite these efforts, endothelial cells making up the walls of cerebral blood vessels shed bits of the parasite, which CD8+ T cells recognize, causing those immune cells to attach to and attack the vessels. Once the CD8+T cells amassed on the surface of brain blood vessels, the vessels began to leak. The subsequent leaking led to swelling and increased pressure in the brain, which was fatal. Results also showed that the CD8+ T cells preferentially interacted with blood vessels in the brain and not in other parts of the body. To determine which parts of the brain were affected by these events, the researchers injected mice with dyes that marked dead cells and blood vessel leakage. The results indicated that the brain regions with the most damaged vessels and cell death were the olfactory bulb (the area involved in sensing smell) and crucially, the brainstem, an area that controls such vital functions as breathing and heart rate.

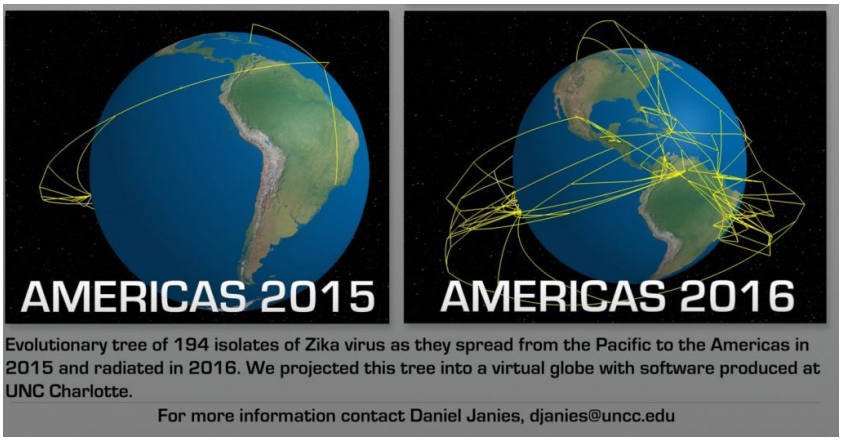
"These movies show us a terrible side effect sometimes associated with malaria — the parasite can fool the body's immune system into attacking the blood vessels within its own brain," said Dr. McGavern.

In future studies, Dr. McGavern and his colleagues will examine how the interaction between CD8+T cells and cerebral vessels causes blood leakage and ways in which the brain recovers from CM infection. In addition, the live-action imaging technology from in this study may be used to watch ways in which other mosquito-borne illnesses, such as Zika and dengue, affect the brain.

Mutations acquired trans-Pacific may be key to changes in Zika severity

Outbreak News Today by PRESS RELEASE December 14, 2016

The Zika virus remains a mystery. Isolated from macaque monkeys in the Ziika Forest in Uganda in 1947, the virus was shown to infect humans not long after, but it was identified as a benign disease, with mild symptoms.



Maps showing travel and evolution of Zika virus in transit to South America, and after South American spread. Image/Daniel Janies

For this reason, it was not heavily studied until almost 70 years later when it appeared to

be associated with an unusual cluster of cases of microcephalic birth defects and Guillain-Barré Syndrome (GBS) paralysis in Brazil in 2015 and 2016.

If the at-least-70-year-old virus is responsible for the recently reported neurological diseases, why were the first serious effects not noticed until recently? And, why were these effects first in Brazil, very distant from its continent of apparent origin, Africa? The mysterious history of the virus matters because its details might tell us the backstory of how it came to be what it is where it is and from that, why it is doing so much damage.

But, how do you know the history of an invisible virus, which leaves no physical record? It is especially hard to know the history of Zika because the seemingly benign disease has been under-the-radar for most of its known time in human hosts.

This is where genetics can help, since single-strand RNA viruses like Zika tend to change rapidly over time and, with bioinformatics, researchers can deduce what the ancestral relationships are between different viruses collected at different places in different times from different hosts. While the first noted occurrence of the virus was in Africa, it was detected only a few years later in Asia, and separate lineages of the disease are known from both areas – a clue that the history hidden in the genes may be complicated.

“But sequence data on Zika is limited,” notes University of North Carolina at Charlotte Bioinformatics and Genomics Professor Daniel Janies. “People have made the assumption that it came out of Africa because that’s where it was discovered. However, it has not been easy to reconstruct the history of Zika with the data we have,” he said.

Janies heads a team of researchers who have recently completed a phylogenetic and geographic analysis of the available collection of Zika’s genetic sequences. The analysis provides the most complete study of the virus’s history to date and reveals specific genetic changes that occurred as the virus crossed the Pacific Ocean on its way to the Americas. An analysis of the genes involved also suggests new hypotheses to explain the virus’s association with microcephaly and GBS.

A report by Janies, Adriano de Bernardi Schneider, Jun-tao Guo, Gregorio Linchangco, Zachary Witter, Dylan Vinesett and Lambodhar Damodaran from the department of Bioinformatics and Genomics at UNC Charlotte, Robert Malone from Atheric Pharmaceutical, and Jane Homan from IoGenetics LLC appears in the current issue of Cladistics.

“Our results indicate that Zika may have deep ancestry in Asia that has been under-recorded,” Janies said. “For example, not all the recent global outbreaks of Zika appear to result from a simple linear chronology of travel from the most recent past outbreak.”

“Recently there has been an outbreak of Zika in Singapore in parallel to the one in the Americas. We have updated our analyses and the Singapore Zika virus is distantly related to the viral lineage in the Americas. This lends support for the hypothesis that there are yet-to-be discovered reservoirs of Zika virus in Asia,” Janies said.

The Cladistics report traces Zika’s phylogenetic tree through analysis of genetic sequences, combining it with the chronology and geographic information from the samples, and allows the researchers to detail the virus’ probable historical path as well as specific genetic and structural changes in the virus as it traveled to the Americas.

The researchers noted in particular some new mutations that began appearing in the virus as it travelled from island to island across the Pacific. Not long after these mutations appear, there are records in French Polynesia of an increase in both microcephaly and GBS. The specific nature of the new mutations in the virus also suggest to the team some possible relationships between viral infection and the severe symptoms associated with the virus in the Americas.

“We looked at the viral changes that correspond to the first reports of microcephaly and we saw the origins of these changes in the Pacific lineages,” Janies noted. “There are

mutations that occurred in the part of the viral genome that codes the viral envelope protein and the ends of the viral genome that are called 'untranslated regions.' We focused on the envelope protein because that's the part responsible for the entry of the virus to host's cells. We studied the untranslated regions since they mediate the types of tissues the virus attacks and viral replication."

Both sets of mutations suggested potential relationships to the virus's new association with neurological and developmental problems in adults and infants.

"Members of our team found that Zika has recently started making its envelope proteins with features, called epitopes, that are similar to human proteins, which could cause a human host immune response to the virus to be diluted," Janies said. "The theory underlying this idea is called 'epitope mimicry.' The similarity is advantageous to the virus because it confuses the host's immune system and blunts the immune reaction to the virus."

However, the researchers suspect that the human proteins being mimicked may be significant for reasons besides providing immune system "cover" for the attacking virus.

An important element of the envelope protein mutation, Janies points out, is not only in the mimicry itself, but also, in the specific genes being mimicked: "Our team members found that two of the human proteins that Zika is mimicking are involved in the signaling that goes on when the sensory organs are being formed in the fetus. These genes are called 'Neuron Navigator Protein 2' and 'Human Neurogenic Differentiation Factor 4′, " he said. "Because these are the proteins are being mimicked, a hypothesis is that the developmental pathways that rely on the proteins may be being disrupted by the immune system," Janies said. The other mutations, on the untranslated regions, suggest other possible effects that might change where Zika virus infects in the body.

"Although epitope mimicry hypothesis helps clarify the protein-immune interaction, the mutations in the untranslated regions may explain the types of tissues Zika attacks" UNC Charlotte Bioinformatics and Genomics graduate student Adriano de Bernardi Schneider said. "The presence of specific binding regions on untranslated regions of the Zika viral genome, called "Musashi Binding Elements" provides bases for the study of changes in tissue preference of the virus."

In this part of the study, the authors evaluated the changes in the virus' Musashi Binding Elements and found that they increased the efficiency of the Zika virus that is circulating in the Americas in hijacking human cells.

Musashi is a family of RNA-binding proteins in the host cells that control gene expression and the development of stem cells. The finding that Zika has mutated to be better at binding to human Musashi proteins, leads to the hypothesis that Zika is adapting to be more efficient at attacking human cells. Moreover, the role of Musashi proteins in stem cells provides another possible target for the study of developmental defects in the fetus associated with Zika infection in pregnancy.

Both the autoimmune effect and changes in the virus' tissue specificity are working hypotheses suggested by computational models and will require further study to verify.

In contrast, the information gained from studying Zika's phylogenetic history is of immediate importance to medicine and public health response, as this work puts the mutations in specific time and place context, at a time when the virus has nearly circled the planet, changing from place to place in its travels and leaving different variants. Many versions of the virus currently exist globally and these variants have different capabilities and effects.

"We're tracing the lineages and the geographic links in a very rigorous way and pulling it all together, pin-pointing Zika's molecular changes in time and space – showing what actually is going on in different places," Janies said.

"Why does it matter? Well, when Zika arrives someplace is it going to be benign or dangerous? It has been both — it depends on where it is coming from."

MOSQUITO ECONOMY

Zion Market Research Home Technology & Media Global Expression Vectors Market Press Release

Global Expression Vectors Market Set for Moderate Growth to Reach USD 330.3 Million by 2021

Expression Vectors Market (Bacterial, Yeast, Insect, and Mammalian) by Application (Therapeutic, Research, and Industrial) for Biotechnology & Pharmaceutical Companies, CROs & CMOs, and Academic Research End-user: Global Industry Perspective, Comprehensive Analysis and Forecast, 2015 - 2021

21-Dec-2016 | Number of pages: 110 | Report Code: ZMR-579 |

The report covers detailed analysis and forecast for the expression vectors market on a global and regional level from 2015 to 2021. The study offers historic data of 2015 along with a forecast from 2016 to 2021 based on revenue (USD Million). The study comprises a comprehensive view of the market with the review of market drivers, restraints, and opportunities. It also provides the level of impact of drivers and restraints on the expression vectors market between 2015 and 2021.

The study included a detailed competitive scenario and host portfolio of key vendors. The report evaluates Porter's Five Forces model to analyze the different factors affecting the growth of the expression vectors market. Moreover, the study encompasses a market attractiveness analysis, which provides the most attractive and least attractive market segments information by the host, application, and region.

The report includes detailed segmentation of expression vectors market based on host, application, end-user and region. Bacterial, yeast, insect and mammalian are the key host in the expression vectors market. On the basis of application segment, the market can be classified into therapeutic, industrial, and research applications. The expression vectors market is segmented on the basis of different end-user such as pharmaceutical & biotechnology companies, contract research organizations (CROs) & contract manufacturing organizations (CMOs), and academic research institutes. Major regional segment analyzed in this report include North America, Europe, Asia-Pacific, Latin America and the Middle East & Africa with its further bifurcation into major countries including U.S. Germany, France, UK, China, Japan, India, and Brazil.

The report provides detailed competitive outlook including market share and company profiles of the key players operating in the global market. Some of the key participants in the report include Promega Corporation, Agilent Technologies, New England Biolabs, Sigma-Aldrich Corporation, Thermo Fisher Scientific, Inc., Bio-Rad Laboratories, Merck Millipore, QIAGEN, Clontech Laboratories, Inc., and GenScript USA Inc.

This report segments the global expression vectors market as follows:

Global Expression Vectors Market: Host Analysis

Bacterial, Yeast, Insect, Mammalian

Global Expression Vectors Market: Application Analysis

Therapeutic, Industrial, Research

Global Expression Vectors Market: End-user Segment Analysis

Biotechnology & Pharmaceutical Companies, Contract Research Organizations (CROs) & Contract Manufacturing Organizations (CMOs), Academic Research Institutes

Global Expression vectors Market: Regional Segment Analysis

U.S., Germany, France, UK, China, Japan, India, Brazil, Middle East and Africa

NOT ONLY MOSQUITOES

Chagas outbreak in northern Brazil possibly linked to food served at party

by ROBERT HERRIMAN
December 26, 2016
Outbreak News Today

The Health Surveillance Coordination (CVS) of Amapá and the Municipal Health Secretariat (Semsa) are investigating a Chagas disease outbreak that has affected at least ten people in the Rural Zone of Macapá, according to a G1 Globo report (computer translated).

Kissing bug next to penny Image/Rachel Curtis-Hamer Labs

The report notes that 10 people have been confirmed with Chagas' disease since Dec 5 and another nine had symptoms and are awaiting results. Among those infected are men, women and children, according to the state coordinator of Health Surveillance, Clóvis Miranda. The patients are being treated.

The outbreak considered isolated happened after a family party in October and health officials suspect foodborne transmission of the parasitic infection. "All the food that was consumed, the açaí, the rice, the meat, everything there was to be investigated, will be investigated for us to detect. On Monday we will be sending a team of our surveillance to make a site screening and an investigation of food that may have been consumed with traps to find out where this contamination came from, "said Macapá Health Secretary, Silvana Vedovelli.

According to CVS, in 2016, the Amapá accounts for 247 reported cases, with 7 confirmations, apart from the recent cases recorded in December. The last recorded outbreak was in 2010, with 20 cases in Macapá.

According to the World Health Organization(WHO), Chagas disease, also known as American trypanosomiasis, is a potentially life-threatening illness caused by the protozoan parasite, Trypanosoma cruzi (T. cruzi). It is found mainly in endemic areas of 21 Latin American countries.

About 7 million to 8 million people worldwide are estimated to be infected with the parasite.

T. cruzi parasites are mainly transmitted by the infected feces of blood-sucking triatomine bugs, or kissing bugs. In addition, the parasite can be transmitted via food contaminated with T. cruzi through for example the contact with triatomine bug feces, blood transfusions using blood from infected donors, passage from an infected mother to her newborn during pregnancy or childbirth, organ transplants using organs from infected donors and laboratory accidents.