

Healthy Pacific ENVIRONMENTS

Issue 4 / May 2019

Keeping New Zealand informed of ESR's science and research in the Pacific region

Inside this issue

- Introducing ESR's Healthy Pacific Environments team 1
- Healthy Tonga Environments Update 2
- Managing antimicrobial resistance in New Zealand and its Pacific neighbours 2
- Arbovirus testing at ESR 3
- ESR's Partner Profile – HEW Consultants Limited 3
- Developing a Health National Adaptation Plan (HNAP) for New Zealand 4



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Wendy Gunn is a Principal Technician based in the Human and Ecological Health unit at Wallaceville Upper Hutt. She has worked at ESR for 10 years in the clinical virology lab specialising in arbovirus serology. During the past 10 years Wendy has seen an increase in arbovirus infections throughout the Pacific and the spread of viruses new to the region. Wendy's interest is in climate change, the spread of arboviral disease and the long term disease burden implications for the Asia-Pacific region.

From ESR's Healthy Pacific Environments team

In this issue we introduce a number of Health Sciences staff based at the Kenepuru Science Centre (KSC) in Wellington, several of whom have contributed on their respective specialist subject areas.



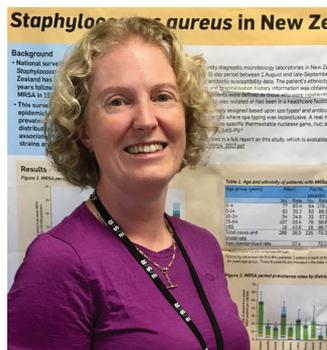
Angela Brounts
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Angela Brounts is the Health Science Manager at ESR. She has operational responsibility for all of ESR's public health laboratories in Wellington and Christchurch. She is a registered Medical Laboratory scientist with more than 30 years' experience and a Master's degree in Business Administration. Angela receives requests for laboratory testing from the Pacific region and facilitates contracts and funding applications. She is also a Director on the Board of the Pacific Paramedical Training Centre (PPTC), a not-for-profit organisation that provides medical laboratory science training in the Pacific region.



Virginia Hope
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Virginia Hope is the Medical Director for the Health and Environment Business Group. A former medical officer of health for Auckland, Virginia has a background in public health medicine, medical administration, health systems governance and management. She is a key ESR contact for the Pacific Community (SPC), the Pacific Public Health Surveillance Network (PPHSN) and for the Global Outbreak Alert Response Network (GOARN). Virginia has also led or supported outbreak investigation and response and climate change research in New Zealand and in the Pacific.



Shevaun Paine
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Shevaun is an epidemiologist in the Intelligence for Action group and works across two ESR locations in Wellington (Kenepuru Science Centre, Porirua and the National Centre for Biosecurity and Infectious Disease, Wallaceville). Shevaun has worked for ESR for 12 years; three years as a microbiologist and nine years as an epidemiologist. Shevaun prepares the weekly Public Health Aberrant Infectious Disease Event report which covers emerging local and international disease threats. She also contributes to surveillance reports which are circulated to our Pacific partners to inform their own reporting.



Kristin Dyet
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Dr Kristin Dyet is a microbiologist in the Health Science group based at the Kenepuru Science Centre in Wellington. She is a Senior Scientist who has been working at ESR's Antibiotic Reference and Nosocomial Infections Laboratories since 2011. The main functions of these laboratories are the surveillance of antibiotic resistance among medically important bacteria in New Zealand and the typing of hospital-acquired pathogens. In recent years her laboratory has established methods to identify new and emerging mechanisms of antimicrobial resistance, including the use of next generation sequencing technologies, with the support of ESR's sequencing facility.

Healthy Tonga Environments Update

We have an exciting update from the Healthy Tonga Environments project where ESR is progressing the building of the Environmental Public Health (EPH) laboratory. The laboratory is designed to provide robustness to the existing capability of the Ministry of Health and is being custom designed to ensure its mobility if required. Its construction has started and is expected to be complete in late May. The ground work will then commence at Vaiola hospital ready to receive the prefabricated lab.

Once completed, the Tonga Environmental Health staff from the Ministry of Health will be equipped to provide an analytical service in support of water quality and food safety analyses (for outbreak investigation support) to meet regulatory requirements later this year. The laboratory will also provide a new home for the vector-borne disease team to carry out identification and susceptibility testing. We will provide training to the new laboratory technical officers; starting with some basic training from the Quality and Training Manager of the Hospital Clinical laboratory. The training will provide the skills and knowledge to carry out routine EPH and commercial contract work. The Healthy Tonga Environments team and the Ministry of Health will work through the remainder of the project to create an economically viable, self-sustaining environmental health laboratory. This will be achieved through providing services to other Ministries, commercial and industrial food and beverage producers, and NGO's working in Tonga.



The laboratory will be established as an annex to the existing Environmental Health offices within the estate of the hospital at Vaiola. An environmental impact assessment (EIA) and impact management plan has been carried out as part of finalising the location and laboratory design.

The laboratory is being constructed by Intracor Commodity Exports. Intracor have a wealth of experience providing fit-for-purpose design and building projects in the Pacific region, with a well-resourced and responsive team in Tonga at Oregon Pacific.

Matt Ashworth (matthew.ashworth@esr.cri.nz)

Managing antimicrobial resistance in New Zealand and its Pacific neighbours

Antimicrobial resistance has been flagged by the World Health Organization (WHO) as one of the top ten global threats to health. New Zealand and its Pacific neighbours are not immune to threats from emerging antibiotic resistant organisms.

The rise in antibiotic resistance now means we have bacteria that can grow in the presence of an antibiotic that historically could have treated it. Multi-drug resistant bacteria have multiple resistance genes and these bacteria can grow in the presence of multiple classes of antibiotics. Patients with an infection caused by antibiotic resistant bacteria generally have an increased risk of worse clinical outcomes.

In 2014, countries in the Western Pacific region agreed to strengthen their ability to respond to antimicrobial resistance. ESR's Antibiotic Reference Laboratory is responsible for national surveillance of antimicrobial resistance among human pathogens, on behalf of New Zealand's Ministry of Health.

In 2017, New Zealand published its Antimicrobial Action Plan which is available online: <https://www.health.govt.nz/publication/new-zealand-antimicrobial-resistance-action-plan>. The five key objectives of this plan are improved awareness, understanding, surveillance, stewardship, as well as prevention and control measures. These efforts aim to reduce resistance, and keep antimicrobials available and effective to manage diseases when needed in the future.

Data from the 2014 World Health Organization global antimicrobial resistance report shows that New Zealand has relatively low rates of antibiotic resistance. However, our monitoring shows the rates of resistance in New Zealand are increasing. The increasing incidence of antibiotic resistance in human pathogens means that medical procedures that we view as relatively simple today, may be too risky to perform due to the risk of acquiring a bacterial infection that cannot be treated, since there are now resistant genes for all classes of antibiotics.



ESR obtains test results from hospital and diagnostic laboratories and also undertakes its own testing to put together facts and figures on antimicrobial resistance. Laboratories are asked to send all isolates (samples) of particular emerging resistant organisms to ESR which looks at the growth of the organism in the presence of an antibiotic to determine if it is susceptible or resistant.

This is followed by some molecular-based testing, looking at the genes that are actually present – either just the antimicrobial resistant gene or the entire genome - in a technique called whole genome sequencing. Data from this surveillance is routinely published on ESR's website (https://surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php).

The threat posed by antimicrobial resistance is a global issue and requires coordinated national and international responses. Multiple sectors need to be involved in these responses including human health, animal health and the agricultural sectors.

International travel means that the introduction of a bacterium into any country is only a flight away. This is highlighted by the observation that the most likely place of acquisition of some of New Zealand's serious antibiotic resistant bacteria is overseas.

Kristin Dyet (kristin.dyet@esr.cri.nz)

Arbovirus testing at ESR

The Clinical Virology Department of ESR has a collaborative relationship with the World Health Organization regional office in Suva, Fiji as well as with the Pacific Community (SPC). ESR has been assisting the Pacific region with the testing for arbovirus (transmitted by mosquito infection for a number of years).

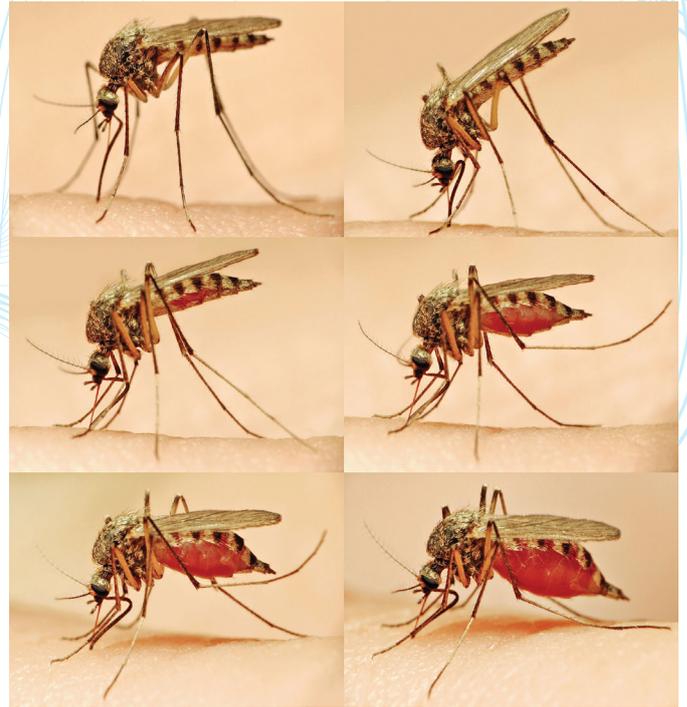
Our accredited laboratory provides services such as confirmation of suspected cases of dengue, Chikungunya, Zika virus infection and typing of Dengue virus. ESR provides disease surveillance support by determining what type of arbovirus is currently impacting the Pacific islands which in turn determines and helps the national government to design the required public health response.

Wendy Gunn, featured in this newsletter is our Principal Technician and is the main arbovirus analyst who performs the serological testing for dengue and Zika as well as an indirect fluorescent antibody test for Chikungunya virus. Serological testing can give an indication if the infection is current or recent, or a past infection or vaccination.

Judy Bocacao, is our scientist who performs the molecular testing for arbovirus. Our main screening test is the Centers for Disease Control and Prevention (CDC), Trioplex assay, which is a multiplex polymerase chain reaction (PCR) that detects Dengue, Zika and Chikungunya.

ESR's Clinical Virology laboratory also has capability in Influenza and Polio confirmation and typing.

Lauren Jelley (lauren.jelley@esr.cri.nz)



ESR's Partner Profile – HEW Consultants Limited

HEW Consultants provide a broad range of services to governments, organisations and communities including environmental investigations, surveys, health impact assessments, drinking water safety plans and public health regulatory work. The company has long-term experience working for central and local government in New Zealand and in the Pacific Islands, as well as in humanitarian and disaster response.

HEW Consultants have been working with ESR in the Healthy Tonga Environments project since its launch in 2016. The company brings a set of practical and applied environmental health skills, which complement well with the science support provided by ESR. HEW's expertise in drinking water, environmental and public health is a key input for the project, providing ongoing mentoring support to Tongan Health Inspectors in areas such as:

- Water supply risk management and management of sanitary facilities
- Emergency management
- Communicable disease control and vector-borne disease control
- International Health Regulations and associated tasks
- Professional practice including investigation and surveys
- Managing nuisance and community sanitation and safety
- Climate change
- Public health regulation including food safety and alcohol



Photo: Courtesy of HEW Consultants Limited

Building the capability of the Environmental Health Inspectors (EHI's) is a fundamental component of the project and the HEW team, being from the same professional background, provides the practical support which is central to its success.

The project term, of 5 years is fundamental to its success as it ensures time has been given to the development of relationships and trust needed to ensure its success. Remote ongoing support between visits

is provided directly and through a closed Facebook group.

The production of the Operational Manual with the Tongan EHI's, has been an important output of this project. Working together on the manual ensures ownership is held by the local EHI's and that they embrace the change of practice it requires, into their everyday work.

Malcom Walker
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Developing a Health National Adaptation Plan (HNAP) for New Zealand



Before we can adapt to climate-associated health risks, we first need to understand what those health risks might be. Two recent reports highlighted the systematic impacts on public and environmental health in New Zealand (The Royal Society of New Zealand 2017; Ministry of Health 2018). The health risks are wide-ranging and many are already present; they all encompass future risks but also opportunities that allow us to prepare in order to reduce those risks.

Appropriate and well planned adaptation for environmental health can benefit all New Zealanders. This includes mitigation of heat-trapping (greenhouse) gases, but also acknowledges direct and indirect changes via the climate system are inevitable, and therefore adaptation mechanisms will be essential.

National Adaptation Plans (NAPs) are plans that identify the medium and long-term climate related adaptation needs and actions to address those needs. Sectors, including health, can develop their own adaptation plans that compliment or align with NAPs in more detail.

ESR has begun the process of reviewing the essential requirements of a health national adaptation plan (HNAP) for the New Zealand Ministry of Health. This process will consider how the plan fits into other strategies and frameworks, in particular disaster-risk resilience. The overall aim is to develop an adaptive, evidence-based health national adaptation plan.

The general strategy to develop a HNAP focuses on the information required to create a plan, including reviewing a number of existing international plans. An analysis framework will be used to assess other countries HNAPs, NAPs or equivalents including for example how health systems fit within a NAP or HNAP framework, legislative

and policy requirements and identifying current management or adaptation practices in relation to health adaptation to climate change. We will capture the key steps and processes that need to be followed when developing a country's HNAP. In the future, the current work may focus on how climate change may impact health systems.

There are also a number of areas that need to be explored in order to refine the scope and boundaries of a HNAP. For example, how does disaster risk resilience (such as to flood or tropical cyclones) fit into climate change adaptation, given that there is some clear cross over. Some countries in the Pacific and Asia have overcome this by combining their separate climate change and disaster management plans in to what are called Joint National Action Plans for climate change adaptation and disaster risk management (or JNAPs). They have essentially mainstreamed climate and disaster risks together.

The development of a New Zealand HNAP complements existing work in the Pacific (Tonga), which has included a health and health determining sector-wide vulnerability and adaptation assessment on behalf of the Tonga Ministry of Health. The assessment was used to understand the climate related risks to health, and to co-develop adaptation options and prioritise them based on risk. This information can be used to inform Tonga's JNAP and it's hoped will form the basis of a health adaptation action plan for Tonga Ministry of Health.

The work developing in both New Zealand and the Pacific is complementary to each other, and knowledge gained can be shared across the regions and countries.

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ESR is well-placed to assist the Pacific region with scientific expertise, information and tools to strengthen policy, programmes and practice to achieve healthy, safe and resilient communities.

ESR's focus in the Pacific is aligned with the New Zealand Aid Programme's strategic plan and sector priorities, particularly providing scientific support to two of the enablers of sustainable economic development (health, water supply and sanitation) and to the environment cross-cutting issue.

We work in partnership with regional organisations such as The Pacific Community (SPC), the World Health Organization (WHO), UNICEF, Pacific governments, not-for-profit organisations, and New Zealand CRIs and universities.

