



PathWay

THE ROYAL COLLEGE OF PATHOLOGISTS OF AUSTRALASIA



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Issue #055

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Interesting Facts

1947 and 1948

The respective years the Zika virus was first isolated from a rhesus monkey and in mosquitoes (*Aedes africanus*) in Zika forest, Uganda.

1954

The year the Zika virus was first isolated in humans, and this occurred in Nigeria.

Welcome to the February edition of ePathWay

[Pathology Update](#) kicks off this Friday (February 26) for three days of formal and informal information sharing. Social media will play a major role in this year's event and we will be ensuring that the important messages of pathology are heard, but we need your help too. Please like our [Facebook](#) page (if you haven't already) and follow us on [Twitter](#), then share your thoughts and experiences from the event. Highlighting the important role of pathology has never been more vital so don't forget to use the hashtags [#PathUpdate](#) [#Pathology](#) [#RCPA](#) to keep the conversation going.

The Pathology Update 2016 Mobile App can be downloaded at <http://eventmobi.com/pathupdate/>.

New information shared at Pathology Update illustrates the fact that medicine is a dynamic profession. While this is a positive attribute, adapting established skill sets to new medical frontiers can be challenging – but achievable. We've looked at how cytopathology is rising to this challenge and future proofing itself in a time of rapid change.

The Zika virus is a hot topic at present, but is the hype justified? We've asked RCPA Fellow Professor Lyn Gilbert, Infectious Diseases Physician at the Marie Bashir Institute for Infectious Diseases & Biosecurity at the University of Sydney, for her assessment of the situation.

February is not only Pathology Update time. It's also the month when countries around the world acknowledge heart health. Heart disease is still a major global killer, and we've focussed on a lesser-known condition that sets hearts on fire.

This summer is also delivering some surprises including a spike in cryptosporidiosis cases in NSW linked to public swimming pools. We've braved these waters and delved into reasons why there is a link between these two.

The times are a-changin' for cytopathology

Between 2 and 7 days

The typical incubation period for Zika virus.

Source: World Health Organization

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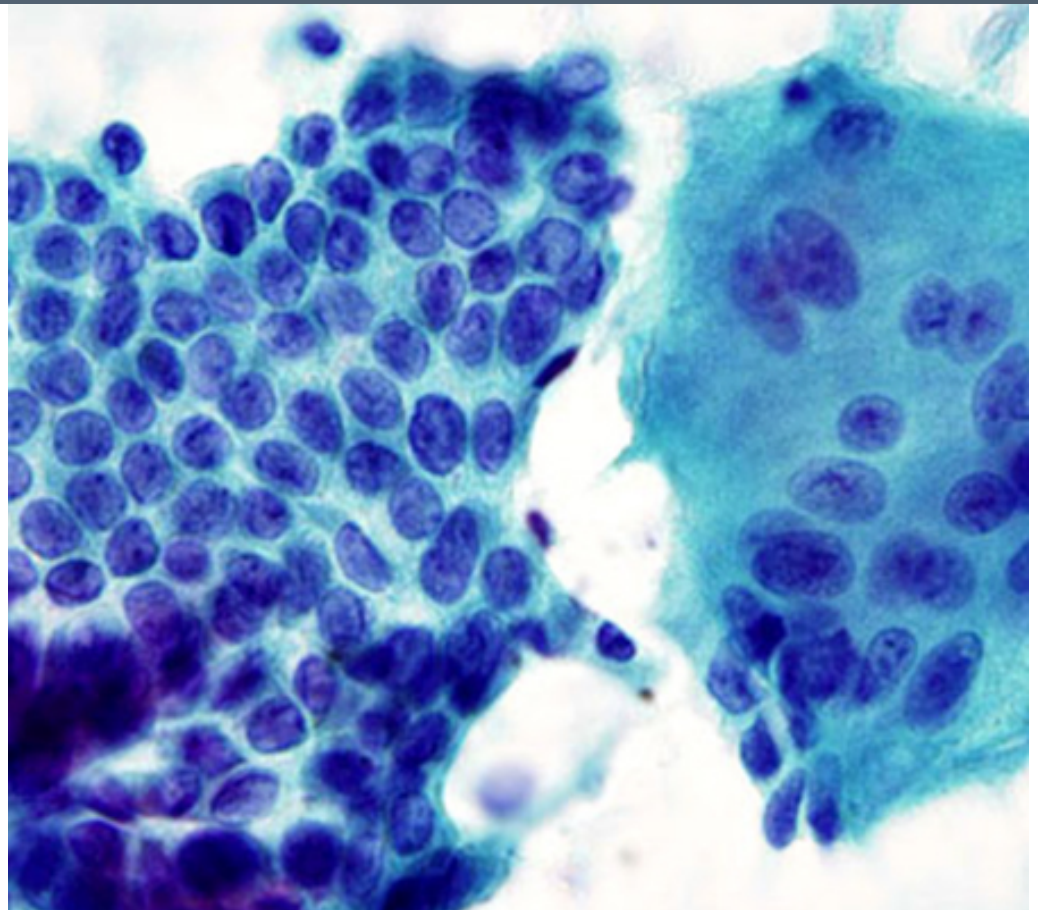
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Medicine has evolved so rapidly over the past 50 years that Bob Dylan's 60's hit song *The Times They are A-Changin'* should still be on every doctor's playlist. Adapting established skill sets to new medical frontiers is a consequence of rapid change. It's also a challenge – just ask a cytopathologist or cytology scientist.

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Zika virus outbreaks warrant extra precautions for pregnant women

Zika virus is a hot topic, mostly because of its suspected – but so far unproven - association with an apparent rise in detected cases of microcephaly and other neurological disorders in newborn babies in Brazil. Similar birth defects were reported in French Polynesia in 2014, and the World Health Organization has now declared these as extraordinary events that constitute a Public Health Emergency of International Concern.



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It takes more than love to set hearts on fire

Countries around the world acknowledge heart health



during February – with good reason. Heart disease is still a major global killer and the leading cause of death in Australia and New Zealand, but did you know the heart muscle itself can become inflamed? This is known as myocarditis.



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Cryptosporidiosis spike could keep the sizzle in summer

A spike in cryptosporidiosis cases in NSW linked to public swimming pools may have dampened some people's enthusiasm for a dip this summer. But as the mercury keeps hovering around 30°C or more, running through the sprinkler might wear a bit thin.



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- Pathology Update provides ongoing benefits for the wider community
- Drink driving could knock Santa off his sleigh tonight
- Organ donation gives young husband and father a second chance
- Alopecia has some hairy

Welcome to the December/January edition of ePathWay

It's the time of year when we reflect on achievements from the year just gone, and contemplate what we might accomplish in 2016. We have started this with a combined retrospective/prospective look at Pathology Update 2015 and [2016](#).

We've also placed ourselves on a certain person's naughty list for the foreseeable future. We intoxicated Santa to see what happens to his driving skills at different blood alcohol concentrations, and the outcome wasn't good for him or Christmas.

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The times are a-changin' for cytopathology



Medicine has evolved so rapidly over the past 50 years that Bob Dylan's 60's hit song *The Times They are A-Changin'* should still be on every doctor's playlist. Adapting established skill sets to new medical frontiers is a consequence of rapid change. It's also a challenge – just ask a cytopathologist or cytology scientist.

Cytopathology is a branch of anatomical pathology. It is the study of individual cells where fluid or tissue samples are smeared onto a slide, stained, and examined under a microscope for abnormal cellular changes. A common cytopathology test is the cervical (Pap) smear.

While the ability to examine cells and interpret cellular changes to diagnose disease will always be a valued skill, Associate Professor Elizabeth Salisbury, Clinical Director of Anatomical Pathology at South Eastern Area Laboratory Service (SEALS), says modern technologies are challenging some long held beliefs and reinforcing others.

"There is an enormous challenge to gynaecological cytology services and workforces with the upcoming changes to the cervical screening program^[1]. At the same time, the diagnostic uses of non-gynaecological cytopathology tests, particularly in oncology and molecular diagnostics, are expanding and becoming more sophisticated," she explains.

Changes to the cervical screening program, with Human Papillomavirus (HPV) testing as the primary screening tool, combined with HPV vaccination, will inevitably reduce the number of Pap smears. But A/Prof Salisbury says there will still be a large number of high-risk women with persisting cervical abnormalities to monitor. The goal is to maintain the skilled workforce through the transition period.

"Cytopathologists and cytology scientists are a highly specialised group with high level skills. The challenge to the pathology profession is to ensure these skills are retained and developed in such a way as to facilitate the expansion of other areas of tissue and cellular based testing."

The profession has remained relevant for breast cancer diagnosis despite the move away from fine needle aspirates to core biopsies. But there is a shift, and the profession is finding ways to move with it.

“One of the great strengths of cytology laboratories is their highly skilled morphologists who are trained to process and diagnose cellular samples. Those same skill sets can potentially be utilised in other emerging areas such as molecular testing of cancers,” explains A/Prof Salisbury.

Repositioning and future proofing a profession in times of rapid change is challenging, but achievable. So if we could use some poetic license and add a new line to Dylan’s anthem about times a-changin’ with respect to cytopathology, it would read ‘and we’re a-changin’ with them’.

[1]The National Cervical Screening Program Renewal is covered in the [June 2014](#) edition of ePathWay.

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Zika virus outbreaks warrant extra precautions for pregnant women



Zika virus is a hot topic, mostly because of its suspected – but so far unproven - association with an apparent rise in detected cases of microcephaly and other neurological disorders in newborn babies in Brazil. Similar birth defects were reported in French Polynesia in 2014, and the World Health Organization has now declared these as extraordinary events that constitute a Public Health Emergency of International Concern.

Zika virus isn't new. Professor Lyn Gilbert, Infectious Diseases Physician at the Marie Bashir Institute for Infectious Diseases & Biosecurity at the University of Sydney, says it has been around for about 50 years with little impact on health.

"Zika virus infections mostly cause a self-limiting mild illness and no one dies from them. The reason it has hit the headlines is because of the explosive outbreak in Brazil and the subsequent apparent rise in microcephaly in newborn babies in that country," she explains.

"However, it has been suggested that the increase in reported cases of microcephaly has been exaggerated by increased awareness and reporting following previous significant underreporting."

Microcephaly is a rare condition where a baby is born with a small head, or the head stops growing after it is born. These babies can suffer convulsions and may develop physical and learning disabilities when they are older.

Prof Gilbert says there have been sporadic cases of Zika viral infections in Australia and New Zealand over the years, all from travellers returning from countries where the virus is circulating. She says there have been no cases of Zika virus transmission in Australia, but the current situation warrants extra precautions.

"Pregnant women, or women wanting to become pregnant, should refrain from travelling to Zika affected countries. The link between the virus and birth defects isn't yet proven, but there is very strong circumstantial evidence that there may be a

relationship. There are also concerns Zika infection can lead to a rare immune system disorder called Guillain-Barré syndrome.”

How do you become infected with the Zika virus?

Infection is transmitted to people through the bite of an infected mosquito from the *Aedes* genus. The main culprit is *Aedes aegypti* which lives in tropical regions, including North Queensland. This is the same mosquito that transmits dengue and yellow fever. (*Aedes aegypti* is not present in New Zealand.)

While this sounds alarming, Prof Gilbert says the chance of anyone becoming infected with Zika virus in Australia is quite low.

“It can happen of course, but you need an infected person to be bitten by the relevant infected mosquito, and then that mosquito needs to bite another person. These mosquitoes can and do hitch rides on planes, so they are occasionally found outside of tropical regions, but surveillance and preventive measures are in place including spraying aircraft with [insecticides](#).”

Most people infected with Zika virus don't have any symptoms of infection, but if they do appear they are typical of a viral infection such as a low-grade fever, joint and muscle pain, rash, headache and fatigue.

How is Zika virus diagnosed?

“Diagnosis is via a blood test, usually through reverse transcriptase (RT-) [PCR](#) (polymerase chain reaction). Serology tests can be used, but antibodies can be difficult to distinguish from dengue antibodies and antibodies induced by yellow fever vaccine with which they cross-react. Specialised confirmatory tests, which are not widely available, are needed to do this,” explains Prof Gilbert.

She says a doctor who suspects a patient has the Zika virus should contact their relevant public health unit for advice about the appropriate pathology test and testing laboratory.

The [New Zealand](#) and [Australian](#) governments have posted information online about living and travelling overseas with respect to Zika virus.

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It takes more than love to set hearts on fire



Countries around the world acknowledge heart health during February – with good reason. Heart disease is still a major global killer and the leading cause of death in Australia and New Zealand, but did you know the heart muscle itself can become inflamed? This is known as myocarditis.

Myocarditis literally means inflammation of the heart muscle (myocardium). Its causes range from viral, bacterial, fungal and parasitic infections, to allergic reactions to medicines or toxins such as alcohol, insect stings and snake bites. Conditions that cause general inflammation throughout the body such as autoimmune diseases and rheumatoid arthritis are also implicated.

“The causes of myocarditis depend on what part of the world you are in. In Australia and New Zealand the most common cause is viral infection. A Brazilian colleague has told me that most cases of myocarditis in her country are due to Chagas disease, an infestation by a parasite that we haven't got in our part of the world,” explains Dr Andrew Detrick, Anatomical Pathologist and Director of Pathology Queensland Nambour Laboratory.

He says myocarditis is usually diagnosed from clinical signs and symptoms, and pathology tests may be requested to check for evidence of infection and for antibodies to the causative organism. Most patients recover from myocarditis, but it can persist in some patients potentially causing severe and life-threatening damage to their heart muscle. These patients may progress to an endomyocardial biopsy and possible heart transplant.

“An endomyocardial biopsy is when the clinician takes a sample of tissue from the patient’s heart. The sample is then sent to a pathologist who will look at the inflammatory pattern of the tissue, the type of cells involved, and how badly the tissue is damaged from the infection. This information forms the basis of the patient’s diagnosis and prognosis.”

Dr Detrick says the next step for these often gravely ill patients depends heavily on the pathology report, including whether they should be placed on the waiting list for a heart transplant.

“I’ve been standing in an intensive care unit discussing the prognosis and treatment options with a patient’s medical team,

and the patient in question was so ill they were attached to an artificial heart. Their next step relied very heavily on my biopsy report.”

Myocarditis isn't a common disease, and a minority of patients progress to the stage where they need a biopsy or heart transplant. Data from the [Australia and New Zealand Cardiothoracic Organ Transplant Registry](#) shows that viral cardiomyopathy/myocarditis accounted for just three percent of pre transplant diagnoses between 1984 and 2014. But if you're in the three percent whose heart stayed on fire, it's good to know diagnostic expertise is available when it's needed most.

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A spike in cryptosporidiosis cases in NSW linked to public swimming pools may have dampened some people's enthusiasm for a dip this summer. But as the mercury keeps hovering around 30°C or more, running through the sprinkler might wear a bit thin.

Dr Matthew Watts, Clinical Microbiologist and Infectious Diseases Physician at Westmead Hospital in Sydney, describes cryptosporidia as a group of microscopic parasites that live in the intestinal mucosal cells of humans and in animals such as cattle, sheep and goats.

"The cysts are very small, so you can't see them without a microscope. When they come into contact with the host intestine the organism reproduces by producing more cysts. These then pass into the environment through the gut when the host passes a stool," he explains.

So how did they find their way into public swimming pools? We're pretty sure stray livestock haven't been enjoying these facilities, so that leaves humans as the prime suspects.

"If a person infected with *Cryptosporidium* has diarrhoea, or has had diarrhoea recently, their stool contains cysts. If the stool comes in contact with the pool water, for example if a child isn't wearing a waterproof nappy, other people can become infected. Studies have shown that you only need to swallow 100 to 200 cysts for a previously uninfected person to become infected," says Dr Watts.

Common symptoms of infection with *Cryptosporidium* include diarrhoea, stomach cramps, and sometimes fever, nausea and vomiting. Diagnosis is via a pathology test.

"Usually a sample of stool from the person with diarrhoea is sent to the microbiology lab where it can be concentrated and stained to look for organisms. There are also immunological tests that use antibodies which can attach to the cysts, and there are tests that detect the organism's DNA."

“If the pathology test is positive, the laboratory staff will inform the person’s doctor and the public health unit that monitors for outbreaks, because Cryptosporidiosis is a notifiable disease.”

Dr Watts says people with a healthy immune system usually have diarrhoea for about two weeks and get better without specific treatment. The illness can last longer and be more severe in people with impaired immune systems.

“Once a person has recovered from infection, they are usually less susceptible to further infections. One reason an infant or young child exposed to *Cryptosporidium* may be more likely to become ill is that they haven’t been exposed before.”

Public health officials advise people not to use a pool if they have had diarrhoea in the past two weeks. It’s good advice. When it comes to infections size doesn’t matter. The tiniest organism can make entire communities sick. Prevention is the key to staying healthy, so knowing more about these parasites, including how they are spread, can help everyone keep cool and carry on swimming for the rest of summer.

How common is Cryptosporidiosis?

Dr Watts says European and North American studies have reported a past exposure rate of 25 to 30 per cent, and that percentage can be higher in developing countries. The cysts are also very hardy, and normal pool chlorine levels don’t kill them. They can even survive in soil for weeks before being washed into watercourses.

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