

## INSIDE

### Mozzies and maggots

Learn how these surprisingly valuable commodities support healthcare — **PAGE 4**

### Helping visually impaired patients

Collection centre staff get specialised training to support visually impaired patients — **PAGE 5**

### New class of trainees

Our SEALS network partners with TAFE to pilot traineeship for phlebotomists — **PAGE 6**

### Banking on new approaches

NSW Health Pathology leads new approach to biobanking — **PAGE 6**

### Hunter lab first to test for new cancer gene

Pathology North at forefront of diagnostic screening — **PAGE 7**



Joanna Bunford, Head of Section for Trace Evidence

## \$5M labs help solve crimes

Three new forensic laboratories in Lidcombe are helping solve crimes and keep NSW communities safer.

They include a new chemical criminalistics unit, a DNA research laboratory and a refurbished automated DNA laboratory.

The automated DNA laboratory is the most advanced forensic DNA processing facility in Australasia.

Designed by scientists from our Forensic & Analytical Science Service (FASS), the lab is the only one of its kind in Australia to use end-to-end robotic analysis.

Kevin Forward, FASS Network Director, said the advances in DNA analysis have brought the science of crime solving to the forefront and the use of robotics improves that even further.

“Twenty years ago scientists needed a blood spatter the size of a 20 cent piece to extract the DNA required for analysis,” Kevin said.

“The latest technology means we only need twenty cells — and roughly 100,000 cells fit on the head of a pin.”

The use of robotics also improves the efficiency and quality of results.

Police officers take a sample from a crime scene and seal it in a test tube that is only opened by the robotic arm once it's on the machine for analysis.

This greatly reduces the risk of contamination and improves turnaround times.

[\[continued on page 3\]](#)

## FLU FIGHTERS

Winter has only just blown in and NSW Health has already recorded double the influenza notifications than normal in the first four months of 2015.

Influenza A/H3N2 is the strain most commonly identified, followed by influenza B and influenza A/H1N1.

During the Northern Hemisphere winter, moderate to severe influenza activity was reported with influenza A/H3N2 viruses dominating in most countries.

The 2015 influenza vaccine for Australia has been updated to match the strains that circulated during the Northern Hemisphere winter.

To reduce your risk of influenza this winter, speak to your GP about an influenza vaccination today.

To help prevent the spread of influenza remember:

- Germs spread easily. Always catch your cough or sneeze with a tissue, or cough into your elbow if you don't have a tissue.
- Germs can live on tissues for up to 12 hours. So, throw away used tissues immediately.
- Your hands spread germs to every surface you touch. Clean your hands every time you cough, sneeze or blow your nose.
- If you are sick, be extra vigilant to avoid infecting others. If you have a fever, stay home and wait 24 hours after your fever resolves before returning to work.

For more information and resources to help prevent influenza in your workplace, visit the NSW Health website and go to the Healthy Living section.

To help track influenza near you, join FluTracking at [www.flutracking.net](http://www.flutracking.net) to receive a weekly report and map of influenza activity.



## INFOCUS

### Neil Catlett

Director of Operations,  
Pathology West

Pathology West extends a warm welcome to the newly appointed Director of Operations, Neil Catlett. Neil will help create greater alignment between the work happening at the laboratory bench and the strategic directions of Pathology West and NSW Health Pathology.

#### **What's the best thing about your job?**

I guess it's the fast-paced and varied nature of the work that appeals to me most, and the fact that I'm able to do this in a biology/medical based industry which has always been a passion of mine. I never wanted a 'desk job,' doing the same things day in day out. There are so many projects in progress across the network. It makes life very interesting and challenging.

#### **What does a typical day at work involve?**

Much of my time is spent at our Westmead Hospital laboratories. However, I will be visiting laboratories across the network on a regular basis. My role is to oversee the service we are providing across the Pathology West network and ensure that it happens in a coordinated fashion – giving us the best outcomes in terms of efficiencies, patient care and laboratory standards.

#### **What are you working on to strengthen the services Pathology West provides?**

I've just started with the organisation but it's already evident there is an immense amount of development going on within the service. I'll be working on the redesign of the pathology building at Westmead to give the public a state-of-the-art laboratory service that will take pathology beyond the current boundaries to new technologies, new working practices and even new sciences. I also want to help ensure our services are well known and well respected in the community.

#### **What was the last thing that made you really laugh?**

My mischievous daughter. She's at that age of exploring everything. Last week she established that sand is not a nutritional food source and that socks don't fit on your head!

#### **Change or status quo – which do you prefer and why?**

I've trained in biomedical science but worked with everything from body scanners and bioluminescence to hovercrafts and helicopters. I've also lived on both sides of the world – so change I think.



Dr Jodie Ward works in the mitochondrial DNA Lab where advances in technology mean hundreds of unidentified bones will no longer have to go interstate or overseas for analysis

[ Cover story continued ]

Another key feature of the lab is its mitochondrial DNA testing, which is used to identify the deceased when traditional DNA testing is not possible.

With more than 100 unidentified bones within FASS awaiting forensic testing, the mitochondrial technology means those bones no longer have to go interstate or overseas for analysis.

The new chemical criminalistics laboratory provides a full suite of technology for scientists to analyse a range of evidence including gunshot residue, explosives, and riot and chemical warfare agents.

Analysis can be used to investigate drive-by shootings, potential cases of arson, terror threats and much more.

The new DNA research laboratory is fast-tracking implementation of the latest technologies to support criminal investigations and ensure NSW Police are at the forefront of crime solving.

The lab is currently investigating the use of rapid DNA technology using an instrument that has the capability to generate a DNA profile in just 90 minutes. (The current process can take up to 24 hours.)

All three new facilities are fully operational and already assisting NSW Police with their investigations.

“The new technology has already helped us provide vital intelligence about crimes that have been or will go before the courts,” Kevin explained.

“The work our staff are doing is world-leading and helping us take customer service to a whole new level.

“But the results are also making a difference to people who have had to deal with crime and its associated trauma.”

Long investigations or protracted court cases can add to a victim’s distress.

Advances in the FASS laboratories

mean forensic results are being processed more quickly and shedding greater light on particular incidents.

This can result in evidence being provided faster and suspected perpetrators brought before the court sooner so victims of crime and their loved ones can move on with their lives.

“The forensic work being undertaken by our staff is incredible,” Kevin said.

“Their efforts are frequently recognised by the officers and investigators we work with.

“I’m really proud of the commitment our teams display and the sense of partnership they have with our customers.

“FASS is committed to giving police the analysis and intelligence they need, and we’re very proud of what the \$5 million investment in these new labs is already producing.”

# Maggots and mozzies earning their keep



Merilyn Geary with adult egg-laying green bottle flies, used to breed maggots sold for wound debridement (medical removal of dead, damaged, or infected tissue)

A pot of 200 maggots will set you back \$90, and 100 mozzies will cost \$156.

That's the market for the public health arthropods produced by the insectaries at Pathology West's Department of Medical Entomology, Westmead.

The two insectaries are run on a cost recovery basis and boast the widest range of medical insects of any entomology department in Australia. They are managed by the department's Merilyn Geary with the assistance of Karen Willems.

One insectary is humidified for the comfort of five mosquito species known to carry such debilitating diseases as Dengue Fever and Ross River virus, as well as 46 different strains of tropical and common bedbugs.

A second smellier insectary houses the common house fly and two species of blowfly, including *Lucilla sericata* (the green bottle fly) from which maggots are bred and sold for clinical wound debridement.

Mercifully, there are few escapees. Cases, cages and air curtains contain the inhabitants, who on occasion have been wiped out by over-zealous cockroach control in the facility where the insectaries are located.

Bedbugs, which are making a world-wide resurgence and have been known to bite our scientists during testing, are used in insecticide resistance studies. Mosquitoes are used for vector competence research (their ability to carry and transmit disease to humans), as well as ecology studies and insect repellent trials.

Mosquitoes are also sold for insecticide testing. House flies were previously sold to Federal quarantine authorities to determine if aircraft had been properly sprayed with insecticide to prevent exotic mosquitoes entering Australia and spreading disease.

Specially bred maggots are sold to hospitals, GPs and veterinarians for wound debridement.

The eggs are laid on mince and liver in stench-resistant tanks and are collected and surface sterilised with bleach before being transplanted into sterile egg yolk media.

Once hatched, the larvae undergo quality assurance testing for bacteria before being covered with sterile gauze and transported on ice to their place of work.

Pathology West's Senior Hospital Scientist Stephen Doggett said demand for maggots fluctuates.

"There was a bit of a downturn recently, but it's up again now with a lot of orders from veterinarians who are using them to treat pets and expensive race horses," Stephen said.

"When you think of the cost to treat human patients with wounds that won't heal, \$90 for a pot of 200 maggots is a minimal cost really compared to surgery."

# Refocusing service

## SSWPS staff trained to see things differently

Many people don't want to look while they're having blood drawn but what if you didn't have the choice?

Collection centre and administrative staff at Sydney South West Pathology Service (SSWPS) have received specialised training by Vision Australia to provide better customer service to people with vision impairment.

"Over the years we've had a few people who were vision impaired visit our collection rooms," said Kathy Beard, Acting Nurse Unit Manager at the SSWPS Medical Centre Pathology, Royal Prince Alfred Hospital.

"We wanted to be better prepared for these customers.

"After liaising with the Human Rights Commission and Vision Australia we organised some training for our staff so they would know what to do in the future.

"Fourteen of our collection and administration staff attended training in April.

"It was really practical. As part of the training we were asked to put on glasses which allowed us to experience various levels of vision impairment and how difficult it can be.

"Straight away you're in the dark and in a strange environment. You really need the healthcare worker to assist you in a way that is not condescending," Kathy explained.

The training also involved guidelines, principles and role plays on how to guide a vision impaired person in a way that's respectful.

"It was a really positive experience, and the day after our training we actually had a blind customer visit the collection service so it allowed us to put the new training to work straight away," Kathy said.

Vision Australia provides guidelines on caring for people who are blind or have low vision. Visit their website at [www.visionaustralia.org](http://www.visionaustralia.org).

# Privacy matters

## Capturing clinical images on personal mobile devices

The *Sydney Morning Herald* recently cited a 2013 study that found 80 percent of medical staff at a hospital used personal electronic devices to capture medical images.

It went on to discuss the implications of public access to such images when they are shared by clinicians on social networking applications such as *Figure 1*.



A screen shot of *Figure 1*, an app used by clinicians to share medical images

Privacy rules apply to information where a person's identity is reasonably ascertainable.

Where possible, don't use personal mobile devices to take clinical images. If you don't transfer images to a patient's medical record as required, or do so and then fail to delete them from your private phone, you risk breaching patient privacy and significant penalties apply.

While patient consent is not required where the capturing of images is necessary for diagnosis or clinical care or treatment, the patient should still be made aware (where practical) that this is to occur or has occurred and why.

The Australian Medical Association (AMA) and the Medical Indemnity Industry Association of Australia have both published advice in their *Clinical Images and the Use of Personal Mobile Devices*, which is available on the AMA website. The Ministry of Health also provides information in section 9 of its *Privacy Manual for Health Information*.

## SEALS Trainees

A new class of hand-picked phlebotomists is on the way.

Fourteen students selected from a TAFE Certificate III Pathology course will undertake a year-long pilot traineeship program in the new financial year that is jointly funded by SEALS and NSW Health Pathology.

SEALS' Patient and Client Service Manager, Dieter Schultejobann, said professional development of blood collectors has been largely driven by the private sector until now.

"We are taking a lead role in the training of phlebotomists and engaging more with the profession," Dieter said.

"We want to impart the high standards of quality, safety and customer service our patients deserve.

"It's also about giving back to the community and creating a pathology career entry point for school leavers."

The trainees will be multi-skilled from inpatient collections to in-the-home and outpatient collections.

TAFE will teach the theory while on-the-job training will be provided at the SEALS Randwick, St George and Wollongong collection services.

Mr Schultejobann said the program will be evaluated based on the number of trainees who complete the program and secure employment. It is hoped that further traineeship programs may be conducted at other sites in future.

## Time to invest in biobanking

Imagine a bank that could save your life instead of your money.

That's exactly the purpose of a biobank – a facility that holds a collection of blood and tissue samples which are available for research into disease.

The State Government has asked NSW Health Pathology to lead the development of a state-wide biobanking framework that will streamline biobanking services across NSW and provide greater integration with diagnostic services and care.

Jane Carpenter is leading NSW Health Pathology's efforts and will work closely with NSW Health's Office of Health and Medical Research and the Cancer Institute NSW.

Her experience with the Australian Breast Cancer Tissue Bank puts her in a strong position to navigate the challenges and relationships with various stakeholders across the biobanking field.

"This is a relatively new speciality and there's not a lot of background to draw from," said Jane.

"There are many biobanks operating in isolation across the State with no regulated, controlled register of them so there's a lot to be done to better understand the current landscape and opportunities."

Funding for biobanks in Australia comes largely from research grants with some federal, state and territory government support as well as the private sector and philanthropic sources.

According to Jane, the demand for biobanking services has increased significantly over the last 10 years.

She believes it will continue to grow as biospecimen research grows and as technology further advances.

The opportunity to be involved in such a dynamic field is one motivation for Jane's work.

Another comes from knowing that the work will help a broad base of people, not just cancer patients.

"This is a once-in-a-lifetime opportunity and I'm excited to dive in and make the most of it," Jane said.

Jane said she would like to be in a position to pilot a model before the end of next year and have a fully comprehensive framework established within the next three years.

But she acknowledges she has a lot of work to do before then.

"Since starting on the project earlier this year I've started to scope a strategy to integrate biobanking into healthcare and meet the demands of research programs in a sustainable and affordable way," Jane explained.

"I'd also like us to deliver an integrated consent process for patients who are admitted to NSW Health facilities.

"This would allow us to streamline the collection of samples while ensuring we are respecting the rights of patients.

"We also need to assess the potential for collection services as well as an agreed set of standards for endorsed biobanking facilities.

"I could go on and on, as there are so many facets to tackle.

"It's going to be a big job but the time to move is now and it's great to have NSW Health Pathology leading the way."

# Hunter lab first to test for new cancer gene



Susan Dooley (Unit Supervisor Molecular Medicine), Dr Cliff Meldrum (Genomics Project Manager) and Michael Hipwell (Senior Scientist) with the new testing equipment

Determining a person's risk of cancer is like trying to piece together a jigsaw.

A worldwide study carried out last year discovered another piece of the puzzle – the PALB2 gene.

Women who inherit a faulty version of the gene have an increased risk of breast or ovarian cancer. In men it means a higher risk of prostate cancer.

Pathology North's Newcastle laboratory was Australia's first to receive national accreditation for diagnostic testing of mutations in BRCA1 and BRCA2 genes.

It is now the first in the country to offer diagnostic screening for mutations in the PALB2 gene.

"About 12 percent of the general population is at risk of developing breast cancer," said Dr Cliff Meldrum, NSW Health Pathology's Genomics Project Manager.

"That risk rises to around 35 percent for those with a family history of cancer and a mutation in the PALB2 gene."

By using the Next Generation Sequencing instrumentation, Pathology North has drastically increased the number of samples it can test, analyse and process.

"Since we started screening for PALB2 in October last year, the turnaround times have really improved," said Dr Meldrum.

"Using the older equipment we could test two patients per day.

"This new technology allows us to test six patients in the same time – an increase of 200 percent," he said.

Not only is the new instrumentation increasing capacity, it's also reducing the number of manual steps involved

and significantly lowering the cost of testing by almost 40 percent.

That means more affordable testing at a faster rate which leads to more information for people to have when working with their GPs and clinical teams to make decisions about their personal healthcare.

"Having a mutated gene doesn't mean a person will develop cancer – it just means their risk is greater than the general population," said Dr Meldrum.

Genetic screening for BRCA1, BRCA2 and PALB2 mutations is provided for people who meet a specific criteria. Those interested should see their GP for a referral to a cancer genetics clinic or counsellor and undergo a risk assessment.

## Pathology labs open 24/7

Pathology North laboratories at Lismore, Tweed Heads and Coffs Harbour are now providing services 24 hours a day, seven days a week.

The laboratory at Grafton Hospital also recently extended its hours and is now open until 9pm every day of the week.

The 24/7 services started at Lismore in early January, at Tweed in February and at Coffs Harbour in March.

“The Lismore laboratory was built during last year’s \$80 million redevelopment of Lismore Hospital, and the extended hours are a value-add to the hospital’s clinical staff who requested the expanded service,” said Darren Croese, Pathology North Operations Director.

Michelle McPherson, Acting Operations Manager at the Lismore laboratory, said the team has received positive feedback from the Hospital’s Women’s Care Unit, the Emergency Department and the Intensive Care Unit.

“Those units have told us our services and our staff are there when they need us, which is greatly appreciated,” she explained.

Ruth Rowan, Senior Scientist at the Tweed Heads laboratory, said the change happened smoothly and continuous operation had seen two more technical officers appointed.

According to Darren, the expanded hours across all four sites means Pathology North is providing a more consistent workflow and helping hospitals meet NEST and NEAT targets.

“We worked very closely with the staff and the Health Services Union to implement the changes,” Darren said.

“The results are clear. We have satisfied customers with expanded access to quality pathology services.”



Some of the staff at the Tweed Hospital lab now open 24/7

## Critical results flagged

Professor Andrea (Rita) Horvath of SEALS has been instrumental in developing a new national pathology guideline to greatly improve patient safety.

It ensures clinicians are better notified when patients have critical or abnormal test results so they can remain in hospital and under care.

The guideline was developed after Prof Horvath requested the Australasian Association of Clinical Biochemists (AACB) establish a working party made up of public and private pathology providers that agreed on the guideline. This has now been approved by the AACB and the Royal College of Pathologists of Australasia (RCPA) for use in labs across Australia.

“We looked at our own procedures and saw room for improvement,” said Prof Horvath.

“We also examined the Clinical Excellence Commission’s reviews of critical incidents and found that sometimes patients are discharged with abnormal results that have not been reviewed. We felt the lab could do something more for them and be more proactive to help clinicians following up high-risk laboratory results.”

Prof Horvath and SEALS IT Manager Simon Winter are now working on new IT solutions to better communicate critical results to clinicians.

These might include electronic messages being sent to clinicians’ pagers or phones via a closed loop system that requires confirmation once information is received.

## Comment on *Compass*

Have a story you want to share? Contributions are welcome but may be edited for length and publication style. To submit a suggestion contact:

**Editor:** Carina Bates NSW Health Pathology

**Phone:** (02) 4920-4041

**Email:** [carina.bates@health.nsw.gov.au](mailto:carina.bates@health.nsw.gov.au)



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