ACT Government
Health

ACT Population Health Bulletin

Volume 5 Issue 2 May 2016

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Introduction

A message from the Chief Health Officer, Dr Paul Kelly

There is a view that population health work is routine, protocol driven and somewhat boring. Of course, that is a view which is not shared by those of us who are privileged enough to work in this field. I give a lecture to 1st year medical students to try to convince them that population health is in fact the opposite of boring and is full of possibilities, variety and intellectual challenges. In the talk, I have a slide describing the role of a Chief Health Officer (CHO) entitled "whatever is on my desk at the time". Over the past five years, I have kept a list of the major or unexpected matters which have come across my desk, some of which are always there, others which come and go and others which are one-offs. Currently, there are 40 issues on the slide, but these are just the highlights because something unusual comes onto the desk several times a week. This should not be viewed as a lack of strategic thinking or forward planning, as the CHO role has a lot of that. Rather it does point to the wide breadth of responsibility which the Population Health Division continues to take on as a service organisation for the ACT public. It also points to the extraordinary capacity that our technical experts have in providing timely and effective advice and/or responses to this wide range of subjects.

In this Issue of the Bulletin, some of the more unusual issues that have been on the CHO's desk in recent times are highlighted. Whilst some of these issues (eg. windfarms) are not present or are not actually occurring (eg. pill-testing at music festivals) in the ACT at this time, there has been a need to consider these issues due to public or media interest and/or national policy debates. Of those which have directly affected the ACT, articles in this Issue range from macro-environmental hazards such as climate change to much more local ones such as those posed by livestock living in close proximity to residential areas, natural burials and infection control risks in nail salons. The seemingly increasing frequency and diversity of novel food products which raise concern of toxic or microbiological hazards are another recurring topic.

The public health responses outlined in this Issue also represent some common themes. These include: staff flexibility in dealing with often unfamiliar topics; the importance of systematic approaches when dealing with issues as they arise; the role of legislation and regulation in controlling health hazards, and ways in which these can be on the one hand useful but on the other hand not always fit for specific purposes; the role of data collection and analysis upon which decisions must be based; and finally, the importance of possessing a keen awareness for alternate viewpoints on perceived hazards and on any proposed actions to address them.

Thanks goes to the guest editor, Victoria Wansink who had the difficult task of crafting such a diverse range of topics into a consistent story, to the editorial committee for their timely review and advice and to the authors for providing such a wide range of interesting and thought-provoking articles.

Dr Paul Kelly
ACT Chief Health Officer
May 2016

Breaking News

Choose Healthier pilot project

ACT Health has been working with businesses on the Choose Healthier pilot project. The pilot is being delivered under the Healthy Weight Initiative in partnership with the Canberra Business Chamber and is supported by Nutrition Australia ACT.

Five Canberra businesses are participating in the pilot project: Hellenic Club (Woden), Limelight Cinema (Tuggeranong), Tommy and Me Cafe (Macgregor) and IGA Supermarkets (Nicholls and Drakeford).

Over a three month period, these businesses are trialling actions to increase the promotion and availability of healthier food and drinks, and reduce the marketing of unhealthy choices, particularly where targeted to children.

The ACT Nutrition Support Service worked with each participating business to identify healthier options in store, using criteria to categorise foods according to their nutritional value and levels of saturated fat, sugar, salt and fibre.

All five businesses have launched their trial actions – each with their own unique strategies developed in partnership with the business owners themselves. The businesses worked with the Canberra Business Chamber to develop in-store marketing materials to promote selected Choose Healthier items.

The Hellenic Club has introduced three new children's meals to their kid's menu. So far the spaghetti bolognese is proving popular with the chicken souvlaki and mini roast with vegetables following close behind. The new meals come in a serving size suitable for children under the age of 12 and are nutritionally balanced. The spaghetti bolognese sauce recipe is rich with vegetables and the other two meals come with a serve of vegetables on the side. The new children's meals are a similar price to the existing kid's menu items and come with a free colour-in placemat.

The Tommy and Me Café in Macgregor has made changes to a number of standard menu items and also introduced a new refillable snack pack for toddlers. The snack packs can be filled with a wide range of easy to hold, nutritious choices. Customers can keep their snack pack boxes and bring them in to be washed and refilled on their next visit to the cafe. Parents can relax and enjoy their morning coffee, lunch or afternoon tea while their little ones busily explore a variety of healthy food.

The two IGA supermarkets participiating in the Choose Healthier trial are highlighting and promoting healthier food and drink choices across the stores, including fruit and vegetables, wholegrain cereals and lean meat and dairy foods. Customers are also being directed to healthier choices within their processed food range and at the point of sale.

The Limelight Cinema in Tuggeranong has introduced a new frozen yoghurt product to their range of snack bar items as a low kilojoule alternative to a choc top. The Twisted Frozen Yoghurt product has been teamed with a bottle of water and sold at a competitive price so that cinema goers now have a healthier option to choose from.

At the end of the pilot period, the ACT Government and the Canberra Business Chamber will review the actions trialled in each pilot business. A case study on each participating business will be prepared that highlights outcomes and lessons learnt. Where pilot strategies show positive change, they will be promoted to Canberra businesses through Canberra Business Chamber networks.

The aim of the pilot project is to identify actions that support healthier purchasing decisions, while protecting or increasing business revenue.

For more information visit http://www.canberrabusiness.com/business-support-programs/choose-healthier-pilot-program/

Breaking News

The Sugar Swap Challenge

With sugar hidden in so many modern foods and drinks, many of us do not realise just how much sugar we are really consuming.

The Sugar Swap Challenge, which is part of the ACT Government's Good Habits for Life campaign, was launched by Assistant Health Minister Meegan Fitzharris. The Challenge encouraged Canberra families with children aged eight and under to swap sugary snacks, cereals and drinks for healthier alternatives over the course of a month.

Families signed up to the challenge at www.act.gov.au/sugarswap-challenge and had the option to receive a Sugar Swap Challenge Starter Kit in the post. The kit included a number of resources such as a sugar cube tracker to enable families to track how much sugar they had saved throughout the Challenge and a free cookbook.

The Challenge was promoted through Her Canberra and the Canberra Raiders via their websites and social media channels including Facebook, Twitter and Instagram.

An evaluation of the Sugar Swap Challenge and its impact on Canberra families is currently underway.

For more information visit www.act.gov.au/goodhabitsforlife

Image: Campaign image about sugary snacks

Acronyms and Resources

Acronyms

ACMA	Australian Communications and Media Authority
ACTGAL	ACT Government Analytical Laboratory
AHPRA	Australian Health Practitioner Regulation Agency
AIDS	Acquired immunodeficiency syndrome
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
CHO	Chief Health Officer
CJD	Creutzfeldt-Jakob disease
CNG	Core Notification Group
DPP	Director of Public Prosecutions
ELF	Extremely low-frequency
EME	Electromagnetic Energy
FASS	Forensic and Analytical Science Service
FSANZ	Food Standards Australia and New Zealand
GC-MS	Gas chromatograph and mass spectrometer
HCl	Hydrogen chloride
HIV	Human immunodeficiency virus
HPS	Health Protection Service
HRA	*Human Rights Act 2004*
IARC	International Agency for Research on Cancer
IPCC	Intergovernmental Panel on Climate Change
IWT	Industrial wind turbines
MDMA	3,4-methylenedioxymethylamphetamine
MHz	Megahertz
MPTGA	*Medicines, Poisons and Therapeutic Goods Act 2008*
NHMRC	National Health and Medical Research Council
NPS	Novel psychoactive substance
PMA	Para-methoxyampetamine
PRP	Platelet rich plasma
QIV	Quadrivalent influenza vaccine
RF	Radiofrequency
RFID	Radio Frequency Identification Device
ROI	Record of Interview
SAR	Specific Absorption Rate
TAMSD	Territory and Municipal Services Directorate
TGA	Therapeutic Goods Administration
TIV	Trivalent influenza vaccine
UPLC-PDA	Ultra Performance Liquid Chromatography with Photodiode Array
WHO	World Health Organization
WTN	Wind turbine noise

Resources

- ACT Legislation register - http://www.legislation.act.gov.au/
- Australian Radiation Protection and Nuclear Safety Agency - http://www.arpansa.gov.au/
- Climate Change in the ACT - http://www.environment.act.gov.au/cc
- Choose Healthier pilot program - http://www.canberrabusiness.com/business-support-programs/choose-healthier-pilot-program/
- Food Standards Australia and New Zealand - www.foodstandards.gov.au/
- Influenza Vaccination - http://www.health.act.gov.au/our-services/immunisation
- Natural Burials - http://www.tams.act.gov.au/city-services/cemeteries or http://www.canberracemeteries.com.au/
- National Health and Medical Research Council - https://www.nhmrc.gov.au/
- Infection control in the ACT - http://www.canberrabusiness.com/business-support-programs/choose-healthier-pilot-program/
- Sugar Swap Challage - www.act.gov.au/goodhabitsforlife
- Therapeutic Goods Administration - Recalls - https://www.tga.gov.au/product-recalls

Addressing public health harms not captured by legislation

Brett Purdue, Legal Policy Office, Population Health Division

Occasionally new or emerging health issues arise which may not be adequately addressed, or addressed at all, by existing ACT public health legislation.

In some instances the piece of ACT legislation that might seem most relevant may not have application, but another piece of ACT legislation might. In other instances it may be a Commonwealth Act or agency is best placed to address the issue.

There will be times where ACT public health legislation does not adequately address a particular issue, but the harm can still be addressed through education, engagement, or persuasion.

Legislation can always be enacted to address a new or emerging issue, but legislation amendments are not achieved quickly. The enactment or amendment of legislation is not always the most appropriate response to a new or emerging public health issue.

Every jurisdiction in Australia has legislation covering a range of public health related subjects, and it is through such legislation that public health authorities are empowered to regulate, applying mechanisms such as licensing schemes and offence provisions. Nevertheless, a challenge that occasionally arises for government public health agencies is how to address a particular public health harm that may not be adequately addressed by public health legislation, or not covered by it at all. Several of the articles within this edition of the ACT Population Health Bulletin discuss such challenging public health risks.

In some instances the harms to be addressed are not new, but are instead becoming a greater challenge because of increased frequency. The use of 'natural' burials and the consumption of 'raw' milk being good examples, both of which are explored in articles within this edition.

Legislation may also not address the potential public health issues that arise because of emerging practices, such as tattooing of the eyeball. These challenges can arise because of emerging technologies and devices; a good example is personal vaporisers, or 'e-cigarettes' as they are more colloquially referenced. These devices have been the subject of articles in previous editions of this Bulletin in August 2015 and November 2014.

An additional challenge with emerging technologies can be the absence of adequate and compelling scientific evidence that either supports or refutes the possibility of public health harms associated with their use, as the article within this edition on mobile phones reflects.

Where to start?

When encountering new or unusual public health harms, the obvious starting point is to assess whether there is indeed a public health harm, and whether that harm requires addressing. This is in itself a potentially complex question and not one that this article will seek to address. Rather, the focus of this article is on how these challenging issues can be addressed.

In assessing potential public health harms, ACT Health needs to determine if the harm is capable of being addressed by any existing legislative provisions. This will sometimes require broad 'outside the box' thinking as the most logical body of legislation might not actually offer the tools required to adequately address the harm, but another piece of legislation might.

A good example is 'raw' milk, which is addressed in detail later in this edition in the article "When food is not food". 'Raw' milk cannot legally be sold as a food, but can be sold as a bath product ('bath milk'). Marketing 'raw milk' in this manner excludes it from the operation of the *Food Act 2001*, but given the potential public health risks that can remain it may be possible to use the *Public Health Act 1997* to restrict or regulate its availability.

False or misleading claims about the health benefits of a product can also give rise to public health harms. In such circumstances it is possible to find that although public health legislation might have application, the most appropriate or adequate means of addressing such claims is through consumer law. In the ACT, Access Canberra is the regulator for consumer law issues. This means that public health problems can sometimes be better addressed by other laws and other agencies. This does not necessarily suggest deficiencies with public health legislation, as sometimes it is more a matter of utilising whichever law is most fit for purpose, or most likely to be effective.

There can also be circumstances where the public health harm to be addressed is covered by a Commonwealth agency or legislation outside of the ACT. For example, in the ACT the prescribing, supply and administration of medicines is governed by the *Medicines, Poisons and Therapeutic Goods Act 2008* (MPTGA). Under the MPTGA, ACT Health has a limited ability to take action against registered health professionals for misconduct or unsatisfactory professional practices. In these particular circumstances, such harms may be better managed by referral to the Australian Health Practitioner Regulation Agency (AHPRA) as the Commonwealth regulator.

How to respond?

It should also be recognised that weaknesses in statutory powers, or even an absence of applicable powers, does not prevent a regulator from being able to take steps to address harms. ACT Health applies its enforcement powers and sanctions according to Ayres and Braithwaite's Regulatory Pyramid Model[1], as depicted below.

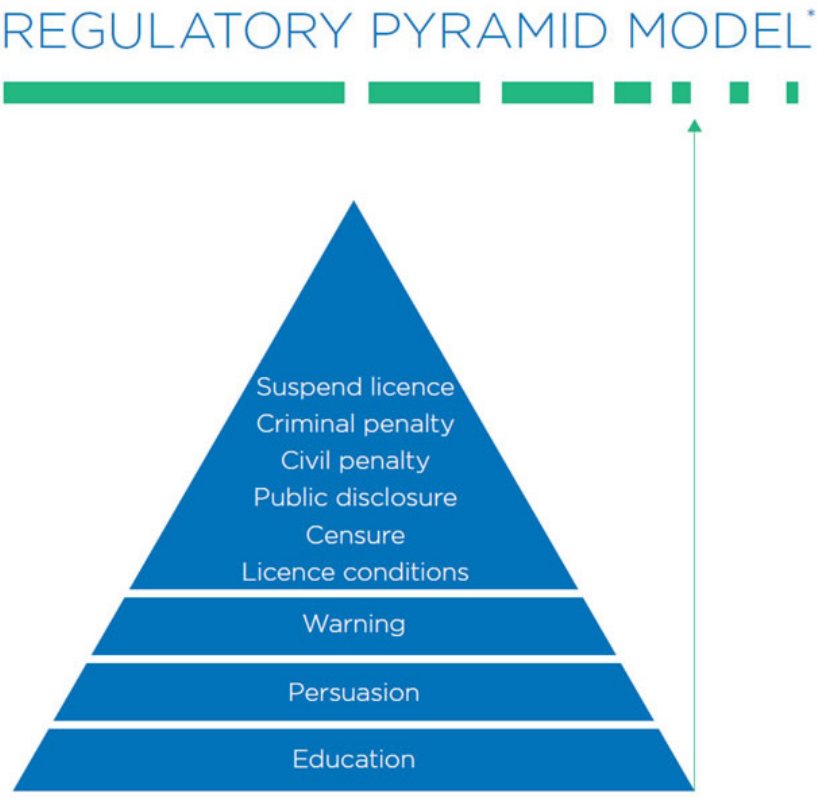

Image: Based on Ayres and Braithwaite's Sanctions Pyramid 1982[2]

Addressing public health harms not captured by legislation *(continued)*

The Regulatory Pyramid Model associates the base of the pyramid with the majority of enforcement action or steps taken to address harms; being education and awareness raising. The 'levels' of the pyramid reflect escalations in the powers and sanctions employed, whilst the tapering of the pyramid walls is symbolic of the decreasing frequency in which such actions and sanctions should be needed.

In the way that this model is usually depicted, the base of the pyramid, or the foundation of regulatory action as it could also be described, should be knowledge building. This works on the principle that for most regulated persons, businesses and industries education and awareness raising is usually sufficient to promote regulatory compliance. Thereafter a smaller number of those regulated will require a greater degree of intervention in order to achieve full compliance. This could involve persuasion or warnings.

Even less common should be situations in which legislative tools are needed. However when legislative tools are required, there is also an ascending scale of severity and as such are generally employed less frequently.

Applying this model of thinking reflects that a regulator can address a particular harm without having to rely upon more serious legal mechanisms in the upper levels of the regulatory pyramid, such as criminal penalties. This is also sometimes necessary as those more serious legal mechanisms may not exist, or they may exist but lack robustness or reliability.

Similarly, the approach to risk-based regulation advanced by Professor Malcolm Sparrow contemplates that regulators focus their efforts "around carefully selected and important pieces of risk – rather than around traditional programmatic or functional tasks".[3] This approach encourages action by regulators to address harms, irrespective of whether the more serious legal mechanisms reflected in the upper levels of the regulatory pyramid can be applied to the harm or not.

In circumstances in which statutory powers are weak or absent ACT Health can still engage with the source or sources of the perceived public health risk with a view towards achieving a cooperative approach. It is possible that a person or business may consider taking steps to eliminate or mitigate the risk if they gain a better appreciation of the risk, and their potential legal liability.

There will be occasions in which a person or business consciously choose to engage in conduct, or to deal with a product associated with a particular source of harm, aware that it is either unregulated or inadequately addressed by regulation. In these circumstances it can be effective to draw to their attention the potential liability that can still attach irrespective of the lawfulness of the conduct or product. Whether prohibited or not, the risk of civil litigation or significant insurance outcomes are likely to arise should the relevant public health harm result. It is for these reasons that labelling 'raw' milk as "not for human consumption" will not offer a supplier much legal protection from civil claims when it is known, or should be known, that consumption by choice or by accident may still occur.

As the Regulatory pyramid model reflects, there may also be situations in which potential public health risks can be addressed by a regulator through persuasion, warnings or even coercion. For example, it is fair and reasonable for a regulator to seek to discourage behaviours that give rise to a harm by warning of the application of the legislation, even though the legislation may have weaknesses. However, care must be exercised as it would be improper and unethical to seek to discourage behaviours that give rise to a harm by claiming the behaviour is unlawful when it is not.

If nothing else is effective, legislate?

There will occasionally be new or unusual public health risks that are of such seriousness, or that have become sufficiently common place, that in order to achieve appropriate regulatory intervention and oversight they warrant the development of specific legislation, or amendments to existing legislation. Appreciation is needed however for the fact that enacting or amending laws is not achieved quickly, or always effective. The processes involved in developing or amending legislation can be protracted, and can require significant consultation and assessment of potential regulatory impacts.

It must also be recognised that the imposition of a regulatory structure through legislation is not a 'magic pill'. Not all public harms can be legislated away, and the presence of legislation does not guarantee public health harms will not eventuate or that prevent persons from engaging in unsafe practices. This limitation of legislation was well understood by Thomas Brackett Reed, Speaker of the United Stated House of Representatives from 1889 to 1891 and from 1895 to 1899. He is attributed as having said *"[o]ne of the greatest delusions in the world is the hope that the evils in this world are to be cured by legislation"*.[4]

Image: Thomas Brackett Reed. WikiCommons

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The public health risk of keeping livestock in residential areas

Gemma Parker and Andrew Stedman, Environmental Health, Population Health Division

Keeping of livestock in residential areas is becoming popular. Some of us choose to have a chicken coup in the back yard to provide a steady supply of eggs; other a sheep or goat to keep the grass short. Some people also enjoy having traditional farm animals such as pigs as companion pets due to their intelligence and individual personalities. Increased contact with livestock comes with an increased risk to public health through disease, pest harbourage and nuisance issues, such as noise and odour. Where concerns are raised by the public, Public Health Officers from the Health Protection Service (HPS) investigate and assesses potential health risks posed to the community. The HPS is often contacted with complaints from members of the public regarding the keeping of livestock on residential properties. Public Health Officers of the Environmental Health team take these opportunities to investigate the possible risk to public health in the Australian Capital Territory.

What is livestock?

The term "livestock" is used broadly to describe any breed or population of animal kept by humans, usually on a farm, for a useful, commercial purpose. This can mean domestic animals, semi-domestic animals, or captive wild animals.[1] Livestock generally includes sheep, pigs, horses, cattle, goat, deer, alpaca, and chickens.[1]

Image: Lambs. Freedigitalphotos.net

Risks to human health

The keeping of livestock within residential areas can expose the property owner and surrounding residents to a variety of health risks. These are generally exacerbated by the smaller size of residential blocks and the increased risk of contact with the livestock due to increased living density. The trend of keeping livestock as family pets also increases the risk of close contact with the livestock.

Some health risks associated with close animal contact include infection by diseases which originate from animals but can affect people. These diseases are collectively known as zoonoses and can be bacterial (leptospirosis and brucelliosis), protozoal (giardia and cryptosporidiosis) or viral (swine flu) in origin.[2] These diseases can be spread to humans through close contact with infected livestock's saliva, blood, urine or faeces, contact with water or soil contaminated by infected animals or from being bitten by an infected tick, mosquito or other insect.[2] Disease does not always result from infection with a zoonosis; this depends on the infectious agent, the susceptibility of the host and the way it is spread. People who have a higher risk of being affected are those with frequent animal contact; such as farmers, abattoir workers, pig hunters and pet owners. Other high risk populations are those with developing or compromised immune systems including children, the elderly, pregnant women and people with impaired immunity.[2]

Animals such as pigs can also become infected with the seasonal human virus influenza. In 2009, New South Wales was the first Australian jurisdiction to diagnose Influenza A (H1N1) in pigs, although they did not show the classical signs of Swine Influenza, which is exotic to Australia.[2]

Pathogens such as *Escherichia coli*, are also linked with cattle, sheep and goats as a source of human infection. Transmission may occur when a person pets, touches or is licked by an animal.[3] The pathogen is transmitted via the faecal-oral route, noting that animal fur, hair skin and saliva can become contaminated with faecal matter. The risk of illness is increased with inadequate hand washing, hand-to-mouth activities in proximity to animals and a lack of awareness of the risks. Whilst an animal may show no signs of illness, the immediate environment can be contaminated and pathogens may persist for months or years.[3]

Whilst it is not possible to eliminate the risks associated with zoonotic diseases and pathogens, appropriate personal hygiene measures, management of animal health and a reduced exposure help prevent the likelihood of infection.

Aside from the risk of disease, there are a number of issues with the keeping of livestock in smaller residential blocks. The volume of animal feed and waste can cause odours and attract nuisance insects, such as flies. In addition, rodents and other pest animals can be attracted by excessive feed as well as stable sources of food, drink and shelter. The behaviour of some livestock may exacerbate the potential health risk, for example pigs have a natural behaviour to dig with their snouts, churning up surrounding areas.[4]

What are people allowed to do?

Currently the ACT has no specific prohibition on the keeping of livestock within residential areas; however, the *Public Health Act 1997* requires a person who keeps livestock to not cause a condition, state or activity that the person has reasonable grounds for believing it to be an insanitary condition. An 'insanitary condition' can include whether the keeping of an animal is liable to become a public health risk, damaging to public health or offensive to community health standards.[5]

In addition to the general requirements of the *Public Health Act 1997*, the Public Health Regulation 2000 specifically states that animals must be kept in a way that will not cause an insanitary condition. Also, animals must not be kept in a place that is in an insanitary condition. The Public Health Regulation also allows the Chief Health Officer, in extreme circumstances, to direct a keeper of an animal to destroy the animal if it has a condition that may be injurious to humans or presents a serious risk to public health.[6]

Other legislation referring to the keeping of animals within the ACT includes the *Domestic Animals Act 2000* and *Animal Welfare Act 1992*. Whilst the *Domestic Animals Act 2000* regulates the registration and keeping of domestic animals, such as dogs and cats, the legislation also refers to the keeping of animals (which could include livestock) which could become a danger to the health of a person (other than the animal keeper). This legislation requires the animal keeper to take reasonable action to minimise adverse effects or nuisance to other people. However this legislation does not apply to the keeping of animals on land which is granted for agricultural or grazing purposes, or animal facilities. The *Animal Welfare Act 1992* refers to livestock when detailing the appropriate accommodation for keeping pigs and the agistment of horses. This legislation requires pigs to be kept in a clean and adequately drained place, whilst the agistment of horses is further outlined in the code of practice.

The public health risk of keeping livestock in residential areas *(continued)*

In addition to keeping livestock, poultry are also permitted in residential areas. The *Public Health Act 1997* requires poultry to be kept in hygienic and sanitary condition and a fact sheet published by HPS details how poultry keepers can prevent their yard or enclosure from becoming insanitary.[7]

Regulatory response

Although not common, the HPS receives a number of complaints each year from members of the public regarding the keeping of livestock in residential areas. Complaints have included the keeping of chickens, sheep, pigs, horses and cattle on private residential properties. These complaints have centred on issues such as offensive odours, presence of vermin and flies, and alleged insanitary conditions caused by the animals.

Complaints are investigated by Public Health Officers, who determine if the conditions are insanitary and present a risk to public health. Where a public health risk exists and the matter cannot be resolved privately, Public Health Officers can enforce the requirements of the *Public Health Act 1997* by issuing abatement notices to the responsible person to remedy the insanitary condition.

Abatement notices can include a range of measures such as a direction to the owner to clean up the living area of livestock, remove excess food meal and drink, remove harbourage for pests and even the removal of the animal. The ordered removal of an animal may be necessary where the animal is being kept in an unsuitable area and the keeping of the animal would be liable to become insanitary (whether it is currently insanitary or not).

Once an authorised officer is satisfied that the Abatement Notice has been complied with and adequate measures have been taken to prevent the issue reoccurring, the notice can be revoked. Failure to comply with an abatement notice may result in enforcement action being taken, including the issuing of an abatement order or prosecution for creating an insanitary condition.

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Case Study

One example of a livestock complaint received by the HPS related to the keeping of a pig in a residential yard. The complainant alleged that offensive odours were caused by the pig and that rodents were being attracted to the area, due to the keeping of the pig. An authorised officer investigated and attempted to make contact with the property owner; however this was unsuccessful. As the property bordered a public access way, the officer was able to view into the property and identify that a large sow was being housed in the rear yard. Housing and feed containers were sighted in the area housing the sow. The weather conditions at the time of the inspection were warm, dry and relatively calm and only light odours were observed. An inspection of the area housing the pig was arranged with the property owner which allowed the authorised officer to thoroughly investigate. The weather was warmer at the follow up inspection and offensive odours were detected. The investigation did not sight rodents, but found easily available food and shelter were likely to harbour pests. There were collections of odorous materials including old bedding, faeces and urine. The findings of the inspection were discussed with the manager of Environmental Health and a decision was made that the keeping of the pig in the residential backyard was likely to become a public health risk, become damaging to public health and be offensive to community health standards. If the pig was not removed, it would be likely an insanitary condition would be created. The occupants of the premises were directed through the issuing of an Abatement Notice to remove the pig along with associated waste products and manure from the property within 21 days of the notice being issued. The occupants removed the pig from the property and rehoused it on a nearby farm. With the pig removed, the area was deemed to be sanitary and the Abatement Notice was revoked.

Image: FreeDigitalPhotos.net

Are our mobile phones harming us?

Chris Nickel, Radiation Safety Section, Population Health Division

A large number of studies have been undertaken to investigate whether mobile phones pose a health risk. It is the assessment of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and other national and international health authorities, including the World Health Organization (WHO), that there is no established scientific evidence that the use of mobile phones causes any adverse health effects. However, the possibility of harm cannot be completely ruled out.

The current debate is centred on whether long-term low level exposure can evoke biological responses and influence people's well being. This article covers some recent research into the possible health effects which have been attributed to mobile phones.

With approximately 21 million subscriptions in Australia[1], mobile phones have become an integral part of our lives. The use of mobile phones has been linked to a wide range of health effects, and studies with varying levels of scientific rigour, have been performed to explore this hypotheseis. This article explores a number of proposed health effects, and recent scientific evidence for these.

Image: Mobile phone use. FreeDigitalPhotos.net

Type of radiation emitted by mobile phones

Radiation in the electromagnetic spectrum includes radiowaves, microwaves, infrared light, visible light, ultra violet light, X-rays and gamma rays. These types of radiation vary in energy from low (radio waves) to high (gamma rays).

Mobile phones in Australia operate between 850 and 2100 Megahertz (MHz)[2] which is classed as Radiofrequency (RF) Electromagnetic Energy (EME). RF EME is classed as nonionising radiation as it is not capable of freeing an electron from an atom, which is referred to as ionisation. This means non-ionising radiation does not have enough energy to cause chemical changes by breaking chemical bonds.

Thermal effects

In addition to the energy of the radiation it is important to consider the strength of the field, which represents the amount of radiation emitted. Strong electromagnetic fields, including radiowaves, above certain levels can trigger harmful biological effects, such as burns.[3] Regulation and national guidelines exist to protect people from exposure to these higher levels that could potentially be harmful.

Regulation

Ionising radiation is regulated by state regulatory bodies and by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). In the ACT the Health Protection Service administers the *Radiation Protection Act 2006*. However, non-ionising radiation including mobile phone EME, is not covered under the *Radiation Protection Act 2006*.

The Australian Communications and Media Authority (ACMA) regulates telecommunication facilities, including mobile base stations (towers), and RF EME consumer devices, including mobile phones, Wi-Fi and smart meters.[4]

All mobile phones in Australia must comply with the requirements set by the ACMA. These requirements include complying with the exposure limits in the ARPANSA Standard, Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz (2002). The ARPANSA Standard is designed to protect people against all known adverse health effects from exposure to RF EME.

At the frequencies used by mobile phones, most of the RF EME is absorbed by the skin and other superficial tissues, resulting in negligible temperature rise in the brain or any other organs of the body.[5]

The ARPANSA Standard specifies exposure limits to RF EME for mobile phone handsets in terms of the rate at which a mobile phone user absorbs energy from the handset, the Specific Absorption Rate (SAR). The SAR limit for mobile phone handsets is 2 watts per kilogram of tissue. This limit was set to be well below the levels at which harmful effects have been shown to occur.[3]

The ACMA also licences and regulates telecommunication providers which install mobile phone towers. The location and installation of new mobile phone towers is subject to state, territory and local government planning laws, and must not exceed the EME safety exposure limits set by ARPANSA. To demonstrate this, the carrier must produce an Environmental EME Report that shows the predicted levels of EME around each new or upgraded facility. ARPANSA has conducted surveys of EME around towers and in homes, to ensure that requirements of the RF standard have been met.

Image: Phone tower. FreeDigitalPhotos.net

Are our mobile phones harming us? *(continued)*

Classification	Description of category	Number of agents	Examples
1	Carcinogenic to humans	118	Benzene, asbestos, alcoholic beverages, ionising radiation, coal smoke (indoor), mineral oils, tobacco, wood dust
2A	Probably carcinogenic to humans	79	Wood smoke (indoor), red meat, DDT, hydrazine, glyphosate weed killer (Roundup®)
2B	Possibly carcinogenic to humans	290	Coffee, ginko extract, carbon nanotubes, radiofrequency electromagnetic fields, kava
3	Not classifiable as to its carcinogenicity to humans	501	Fluorides (inorganic, used in drinking-water), vitamin K substances, ethylene, melamine, toluene, mercury and inorganic mercury compounds, sulfur dioxide
4	Probably not carcinogenic to humans	1	Caprolactam

Table 1 - International Agency for Research on Cancer Carcinogenic Risk Classification

Cancer Risk

It has been proposed that exposure to RF EME from mobile phones might cause cancer, particularly glioma, a malignant type of brain cancer.

The World Health Organization (WHO) International Agency for Research on Cancer (IARC) coordinated the largest retrospective case-control study to date, the Interphone study.[6] The study was designed to determine whether there are links between use of mobile phones and head and neck cancers in adults.

The study gathered data from 13 participating countries. Analysis found no increased risk of glioma or meningioma with mobile phone use of more than 10 years. The study found some indications of an increased risk of glioma for those who reported the highest 10% of cumulative hours of cell phone use, although there was no consistent trend of increasing risk with greater duration of use. The researchers concluded that biases and errors limit the strength of these conclusions and prevent a causal interpretation.

The IARC is responsible for classifying potentially carcinogenic agents. A summary of this classification system is provided in Table 1.[7] In 2011, IARC classified mobile phone radiation as Group 2B[8] "possibly carcinogenic", primarily based on the interphone study. This means that there "could be some risk" of mobile phone radiation causing cancer, so additional research into the long-term, heavy use of mobile phones needs to be conducted.

There is currently no established link between mobile phone use and increased risks of brain tumors. A large population based study of mobile phone subscribers in Denmark[9] also gives substantial evidence against there being any short term increases in cancer with typical levels of phone use experienced by residential subscribers.

As mobile phones only became widespread in the 1990s, there is a lack of data for mobile phone use over time periods longer than 15 years. Due to this lack of data, and the increasing use of mobile phones, the IARC considers that further research of mobile phone use and brain cancer risk should be carried out.

Sleep

Studies investigating the effects of RF exposure on sleep quality have so far given inconsistent results.[10]

A recent human provocation study by Danker-Hopfe et al.[11] looked into the effects of radiofrequency (RF) exposure on sleep quality. In the study 30 healthy adults were subjected to three nights of each of the following exposure conditions: sham (no exposure), GSM (900 MHz), and WCDMA/UMTS (2,000 MHz). The exposure was for the whole night (8 hours), with the SAR set to reach but not exceed the general exposure limit of 2 watts per kilogram.

In 90 percent of the subjects, one or more sleep parameters were significantly different during GSM or WCDMA/UMTS exposure periods when compared to the sham exposure. However, there was no consistent pattern in sleep parameter changes among the subjects. The authors found that in about 30 percent of the subjects there was a prolonged period of one of the sleep stages (rapid eye movement sleep) during the RF exposure, although this result does not indicate a sleep disturbance.

Danker-Hopfe et al. also reviewed the main findings of many other studies done in this area. The majority of the studies did not find any effects, while some studies found conflicting results. For example, two studies reported reduced sleep latency (the amount of time it takes from lying down at night to falling asleep) but one study reported prolonged sleep latency. A previous study by Danker-Hopfe et al. in 2010 also did not find any effects on sleep quality.

Image: Sleeping with mobile phone. FreeDigitalPhotos.net

Cognitive impairment

A recent meta-analysis study conducted by Barth et al.[12] looked at 17 studies performed on humans in the laboratory investigating whether using a mobile phone affects cognitive performance. The studies found cognitive abilities were not significantly affected (either impaired or assisted) by RF EME emitted by mobile phones. The authors conclude that substantial short-term impacts on cognitive performance by RF EME emitted by mobile phones can essentially be ruled out.

Are our mobile phones harming us? *(continued)*

Reproductive outcomes

A recent cohort study by Baste et al.[13] looked into the possibility of any association between pregnancy outcomes and parental RF EME exposure to mobile phones. More than 100,000 pregnancies from all over Norway were included in the cohort. Expectant mothers were asked to complete sets of questionnaires during gestational weeks 15 and 30, mainly asking about mobile phone use. Expectant fathers were also given a questionnaire during gestational week 15. The responses were then assessed against the pregnancy outcomes identified from the birth registry. The authors found no association between any of the studied pregnancy outcomes and parental mobile phone exposure.

Image: Pregnant woman. FreeDigitalPhotos.net

Conclusion

To date, research does not suggest any consistent evidence of adverse health effects from exposure to radiofrequency fields at levels below regulatory limits.[14]

While there is no established scientific evidence that the use of mobile phones causes any health effect, the possibility of a small risk cannot be ruled out. A large number of studies continue to investigate possible health effects of radiofrequency EME. ARPANSA monitors and reviews new EME literature, such as peer-reviewed journals, scientific-body reports and fact sheets.[10] ARPANSA provides online monthly updates on new literature, and summaries of literature which may be of interest to the public.

ARPANSA also provides EME fact sheets and information on their website. For those concerned about health effects of mobile phone RF EME, ARPANSA provides advice on how to minimise exposure at: http://www.arpansa.gov.au/mobilephones.

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Climate change health impacts

Cathy Watson, Office of the Chief Health Officer, Population Health Division

Climate Change in March 2016

Climate warming is evident from observations of increased global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.[1] January and February 2016 were the warmest seasonally adjusted months in recorded history, averaging 1.14°C and 1.35°C above the global average respectively.[2] The Paris Agreement, signed in December 2015, pledged to hold the increase in global average temperature to below 2 °C above preindustrial levels[3] however this February the surface of the Earth north of the equator was already 2°C warmer than pre-industrial temperatures.[2]

Projections

The projections of the Fifth Intergovernmental Panel on Climate Change (IPCC) Report reflect a lack of global progress toward substantial reduction in emissions. Some IPCC scenarios now predict average warming of 4–7°C by the end of the 21st century. This scenario increases the number of people living in conditions where maintaining heat balance during physical activity is compromised for parts of the year and unprotected outdoor labour is no longer possible.[4]

Warming is bringing more frequent and longer lasting heat waves, more frequent extreme rainfall events, continued warming and acidification of the ocean, and a rise in global mean sea level.[1]

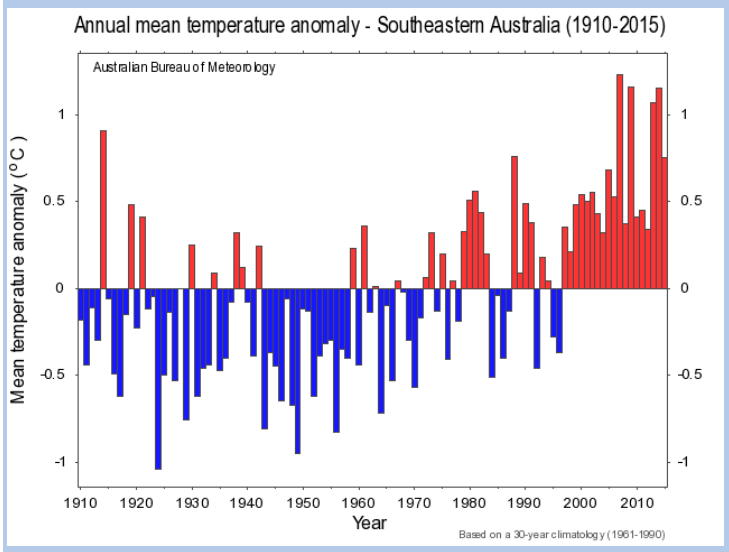

Figure 1: Australian Bureau of Meteorology 2016[16]

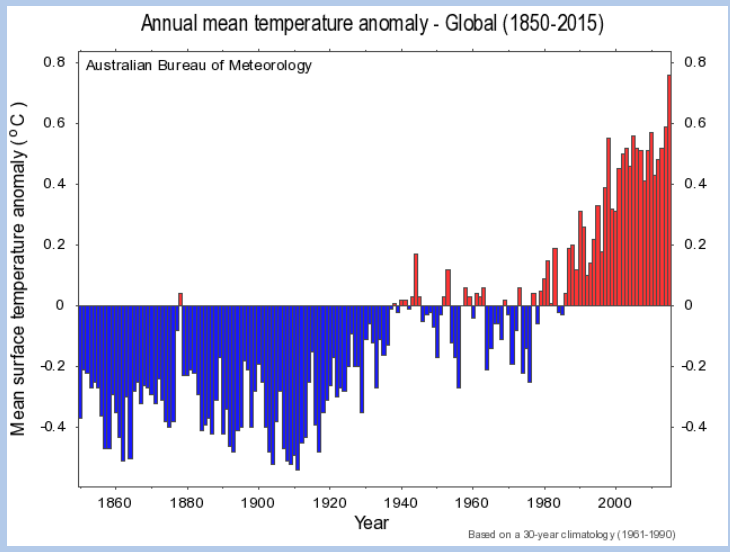

Figure 2: Australian Bureau of Meteorology 2016[17]

Expected impact of climate change in the ACT region

Inland areas, like the ACT, will warm faster than coastal areas.[5] Mean warming is projected to be 0.6 to 1.3°C above the 1986–2005 rates by 2030. The water supply will be threatened as, compared to 1990, annual rainfall could decline by up to 10 percent by 2030, and 25 percent by 2070. Snowfall is projected to continue to decline[6] with annual runoff reducing by up to 20 percent by 2030 and up to 50 percent by 2070.[7]

By 2090 warming could be between 1.3 and 4.5°C and cool season rainfall will continue to decline. Rainfall is expected to remain unchanged in the warm seasons.[6] The number of high or extreme fire danger days is likely to increase from 23 days to up to 29 days by 2030 and as many as 38 days by 2070.

Health Impacts of Climate Change

Changing climate observations indicate that it is now too late to prevent the climate from warming. Health services need to focus on mitigating the effects of global warming on human health until sufficient action has been taken to reduce global warming. Mitigation action may be required for a century or more.

Milder winters may potentially reduce deaths from influenza or cardiovascular disease but there will generally be negative impacts on health in the ACT, including increased episodes of heat cramps, heat stroke and dehydration leading to increased hospital presentations and emergency call-outs.[8]

The number of illnesses and heat-related deaths in the ACT could more than double as the number of days above 35°C increase, potentially rising from 14 to between 37 and 41 deaths a year by 2020, and 62 to 92 deaths by 2050.[7] People most at risk include the elderly; people with pre-existing illnesses such as heart and kidney conditions, children, the disabled, homeless people and outdoor workers.[8]

Climate change health impacts *(continued)*

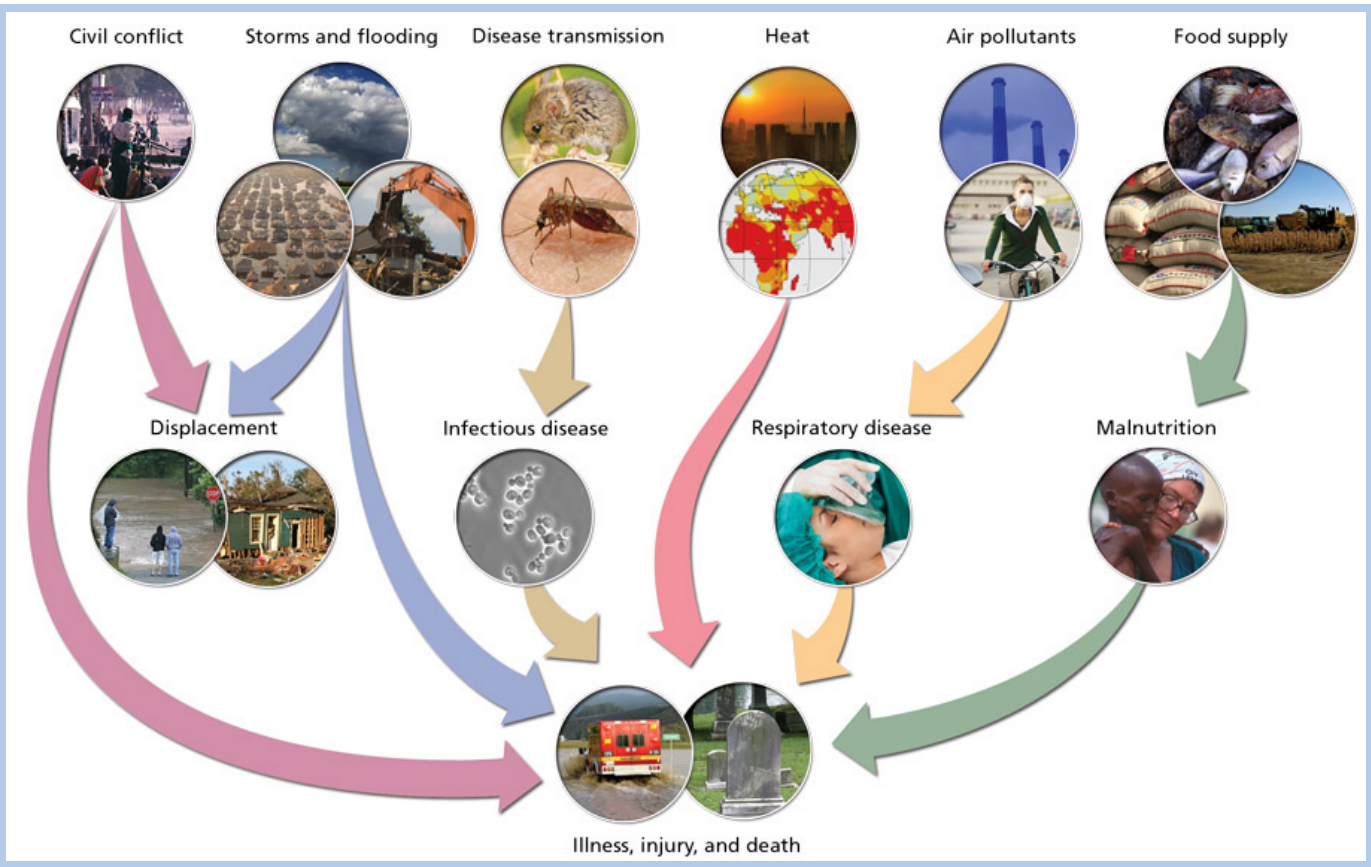

Image: 2016, Climate Communication (adapted from Borowski, 2008)[18]

Greater sunlight and higher temperatures will increase ozone formation causing a rise in asthma, allergies, and other respiratory diseases. Breathing ozone can cause lung inflammation, short-term, reversible decreases in lung function, increased risk of asthma-related hospital visits and premature mortality. Respiratory diseases may also be affected by an increase in air pollution from bush fires, earlier onset of pollen seasons, higher pollen loads due to longer growing seasons and migration of new plant species into warmer areas exposing people to novel pollens.[9]

Challenges to nutrition and food security may occur as drought increases evaporation rates and heat disrupts food yields and quality. The cost of food may rise due to reduced availability including reduced productivity of fisheries and other ecosystem services.[6,11] Bacterial growth rates may also increase impacting on food safety and storage times.[11]

There will potentially be increasing incidence of Dengue virus, Zika virus, Murray Valley Encephalitis and Ross River Virus in some areas related to changes in the range and activity of mosquitoes that act as vectors for these viruses. Some of these mosquitoes are currently restricted to northern Australia but may move south with warmer weather.[10]

Mental health consequences will undoubtedly occur relating to rural to urban displacement, droughts in failing rural communities, environmental refugee flows[11] and increased frequency of disasters such as bush fires leading to post-traumatic stress disorder, adjustment disorder, and depression.[12]

Excessive heat may affect population fitness by reducing participation in active outdoor recreation and active transport. There may be increased reliance on lit outdoor sporting venues for evening events and air-conditioned indoor facilities for daytime activities and these may be unaffordable for some people. Irrigation of dedicated sports grounds and public open space may have to be reduced, affecting playing surface quality and suitability. Some water activities may be limited by an increase in potentially harmful algal blooms.[13]

Adaptation

Public Health action is needed to prepare for, respond to and provide education about the health effects of climate change. Preparation needs to include: activating early warning mechanisms to alert residents to impending weather extremes, enhancing infectious disease surveillance[11] and identifying and planning for public buildings to be used as cooling centres for people without access to air conditioning in extreme heat conditions.[14]

A whole of government response is required[15], including: acknowledgement of heatwaves as a hazard, release of real time impact data and forecasts during and immediately following a heatwave (including data on the correlation between heatwaves and mortality/morbidity), implementing a scaled response to heatwaves (similar to the scaled bushfire response), improving understanding of the impacts of heatwaves on human health in the ACT, now and into the future and assessing current and future response capacity to heatwaves.

Climate change health impacts *(continued)*

Education is needed on the health effects of climate change to build awareness about heatwave risks and develop effective warnings for the public, health and community services, and the workforce[15] in the ACT. This should include: supporting education with evidence-based advice and analysis of heatwaves and health impacts, preventing and reducing heat stress through behavioural and cultural change, educating workforces about heat stress and how it affects them and improving support and education of groups most vulnerable to heat stress.[8]

Image: Anett Richter/UFZ Helmholtz Center for Environmental Research[19]

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Placenta Products

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The practice of consuming a placenta or products derived from a placenta has been described anecdotally and throughout the literature for many years. Advocates for 'placentophagy' as it is known, claim several health benefits for both mother and child and it is a practice slowly becoming more popular amongst a minority of women in Western culture. However, there is little evidence to support the claimed health benefits nor to support concerns from medical professionals regarding adverse health effects. Consequently, the lack of evidence-base to inform regulation of placenta preparation or consumption makes it a complex issue to manage for public health professionals.

History of Placentophagy

Placentophagy or the consumption of the placenta postpartum is a practice undertaken by most mammalian species.[1] The first documented cases of postpartum women practicing placentophagy were in North America in the 1970s.[2] While the practice has not been common in humans there is evidence to suggest that an increasing minority of women are partaking in placentophgagy in Australia, Europe and North America.[2]

An increase in awareness of the consumption of placenta products due to documented cases of celebrity placentophagy may contribute to an increase of the practice in Western culture.[3,4] In 2015, Kim Kardashian-West reported consuming her placenta, in encapsulated form, after the birth of her second child.[3] In 2013, actress January Jones became an advocate for placenta consumption after consuming her own placenta following the birth of her son.[4] It could be argued that these recently documented cases of celebrity placentophagy have contributed to the increase in the practice in Western culture.

Advocates of placentophagy have claimed several health benefits, including improved mood, prevention of postpartum depression, increased energy, improved milk supply, decreased postnatal bleeding and decreased sleep disorders.[5] The placenta is also believed to hold medicinal benefits, according to traditional Chinese medicine.[6]

Placenta Products

The placenta can be ingested in many different ways, including raw, cooked, dehydrated, encapsulated into pills for use over time. The placenta can also be made into a homeopathic tincture or balm for topical application.[2,7]

Studies have shown that the majority of women who consume their placenta after giving birth choose the encapsulated form.[8] Approximately 80 percent of the women surveyed by Selander et al indicated they would prefer to ingest encapsulated placenta with less than 15 percent choosing to consume it raw.[8]

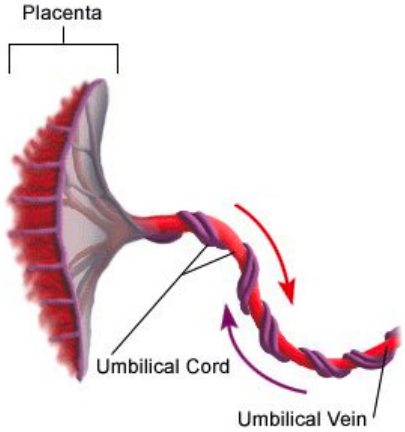

Image: Placenta. WikiCommons

Several placenta service providers outline the process to encapsulate a placenta on their websites. The placenta is washed to remove blood clots and excess tissue, the umbilical cord is removed and the membranes trimmed, the placenta is steamed in an electric steamer, sliced thinly and placed in a dehydrator. The dehydrated placenta is then ground into a fine powder and divided into capsules.[7]

Image: Pills. FreeDigitalPhotos.net

Advocates claim that hormones and nutrients, including oestrogen, progesterone, lactogen, iron, β-endorphins, and oxytocin, are retained through preparation and consumption.[2] Despite the proclaimed health benefits of placentophagy, there is little available evidence to support the claimed health benefits.[5]

Some women choose to consume their placenta immediately after birth; this is usually done by consuming small pieces of raw or frozen placenta. Conversely, some women choose to consume the placenta as traditional food such as in soups, stews, teas or blending it into a drink mixed with fruits and juice.[6]

Public Health Risks Associated with Placenta Products?

There are several health concerns associated with consumption of the placenta but whether these fall in to the public health risk sphere is of some debate.

The placenta is not sterile and one function of the placenta is to protect the unborn child from exposure to harmful substances. Subsequently, potentially damaging elements including selenium, cadmium, mercury, lead, as well as bacteria have been identified in postpartum placental tissues.[9]

Additionally, there are several concerns regarding viral or bacterial contamination. For example if a woman contracted a bloodborne disease prior to or during pregnancy, there is a risk that anyone handling the raw placenta could become infected.[6]

Some research has suggested that consumption of the placenta could place women at risk of experiencing a thromboembolic event. It is widely accepted that exogenous oestrogen in the postpartum period is a risk factor for such an event.[6] The placenta is a known source of oestrogen during pregnancy. Consequently, it is hypothesised that consumption of the placenta could increase oestrogen levels thus resulting in a thromboembolic event.[6]

It is difficult to be precise about any potential benefits or harm that might come from ingesting the various elements said to be present in the placenta, as there have been no conclusive scientific evidence to determine the adverse effects.[6]

Placenta Products *(continued)*

A Regulatory Approach?

As there is no evidence base to support the health benefits or risks, the practice of placentophagy poses a complex regulatory issue that spans across several regulatory fields (e.g. public health, therapeutic goods, food, infection control, communicable disease, human tissue etc). It is for this reason that the regulation of such practices, whether it be the preparation of the placenta or the consumption itself, has not been standardised and is dealt with on a case-to-case basis.

There is an argument that a woman consuming her own placenta poses no risk to public health and should not be forced to comply with any regulatory standard. Conversely, in the scenario of a business responsible for placenta preparation that is not observing appropriate infection control and food safety standards, it is arguable that regulatory intervention is necessary. This is an interesting debate that will be further explored if the practice becomes more widspread in the community.

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Developing a pill testing program for music festivals

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Ed: A pill testing regime is not currently being considered by the ACT Government. The complex philosophical, ethical and legal aspects of a pill testing program are beyond the scope of this article.

Recent media attention to a number of 'ecstasy' related deaths in Australia has put the potential of pill testing at music festivals as a harm reduction method into the spotlight. However, pill testing is not as simple as making a machine available for the music festival attendees to use. Developing a service that would provide fast and accurate results would require careful consideration in terms of instrument selection and method development, transportation, staffing, and reporting capabilities. The logistics of creating a laboratory capable of working to the required standard in a transient environment would also need to be addressed. This article looks at the three main challenges to developing a pill testing service: having a service that is reliable, fast, and transportable.

Introduction

Ecstasy is the colloquial name for the illicit drug 3,4-methylenedioxymethylamphetamine (MDMA) and is frequently associated with 'raves' and music festivals. It is the second most commonly used illicit drug in Australia with 2.1 million (10.9 percent) of people aged 14 and older reporting having ever used the drug.[1] MDMA can be found in the form of tablets, capsules, crystalline materials, and powders. However, many different substances are also sold to the unknowing consumer under the guise of ecstasy. Tablets seized as 'ecstasy' and subsequently analysed by the ACT Government Analytical Laboratory (ACTGAL) within the Health Protection Service have shown that many tablets do not contain MDMA. Tablets seized in the ACT have been found to contain a wide variety of drugs. Some examples include those chemically related to MDMA such as MDA and methylone; those unrelated to MDMA such as ketamine, dextromethorphan, and 2C-B; non-psychoactive drugs such as caffeine and paracetamol; and novel psychoactive substances (NPS) such as 25I-NBOMe (Fig 1). Such variability makes it impossible to determine what and how much of a drug is in a tablet based on appearance alone. With the increased detection of novel psychoactive substances (NPS) by forensic laboratories worldwide[2,3] combined with the inability of consumers to be certain of what they are consuming, there is a heightened risk of adverse reactions for those consuming these drugs.

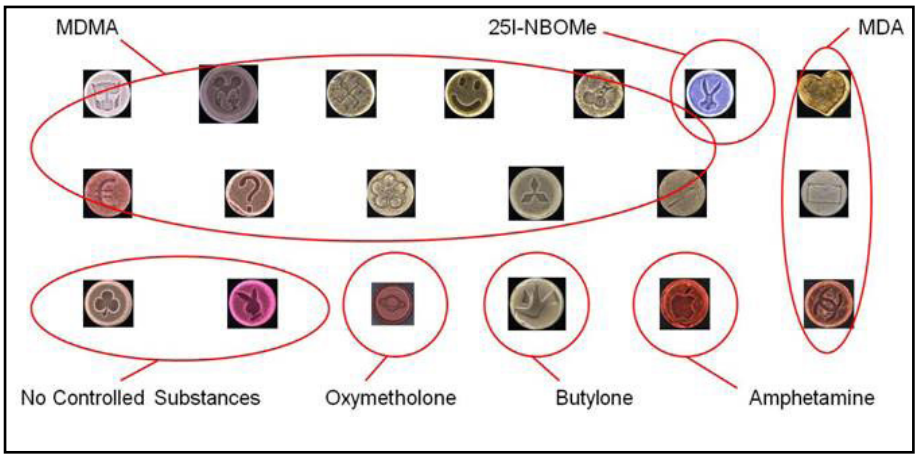

Figure 1: Examples of tablets seized in the ACT, with a range of analytes detected.

In 2007, two fatalities resulted from consumers ingesting tablets that they thought contained MDMA.[4,5,6] During the subsequent investigation, it was found that the tablets contained the substance *para*-methoxyamphetamine (PMA), also known as 'Dr. Death' or 'Death'. PMA has vastly different effects on the body to MDMA, and as such users are at a higher risk of overdose if symptoms are not recognised. In 2015 the media reported several more deaths of music festival attendees that were suspected to be related to illicit drug consumption.[7,8,9] These fatalities have reignited the debate surrounding the proposal of 'pill testing' at these events, led by harm minimisation groups and concerned individuals.[10,11]

The philosophical, ethical and legal aspects of a pill testing program are beyond the scope of this article. However, in order to consider the provision of a pill testing service, numerous technical challenges need to be addressed to translate laboratory test methods and instrumentation to a mobile laboratory at a music festival. This article examines some of these challenges.

Image: Music festival. WikiCommons

What is it, and how much is there? Drug Identification versus Quantification

When analysing unknown substances, forensic laboratories are concerned with two main questions: composition (what is the drug in the substance?), and quantity (what percentage of the substance consumed is actually drug?). Composition is routinely addressed in the forensic space using a combination of presumptive and confirmatory testing. Purity determination (quantification) is done following the drug identification phase, and is often done using methods specific to the drug found.

Presumptive testing is often limited in its ability to identify individual drugs. For example a common presumptive colour test, the Marquis test[12] is unable to distinguish between chemically similar drugs such as MDMA, MDA and MDEA, as they all produce an identical black colour (Fig. 2). However the same test can discriminate between different classes of drugs, for example, methylamphetamine and amphetamine produce an orange colour whilst opiates such as heroin and codeine produce a purple colour.[13] It cannot, however, determine if there is more than one drug present, nor the quantity. Examples have been encountered by ACTGAL, where substances submitted for analysis produce a positive colour test for MDA/MDMA, whilst confirmatory testing showed a mixture of different compounds present. This test is an important initial screening tool for further confirmatory tests, but is highly unreliable by itself.

Developing a pill testing program for music festivals *(continued)*

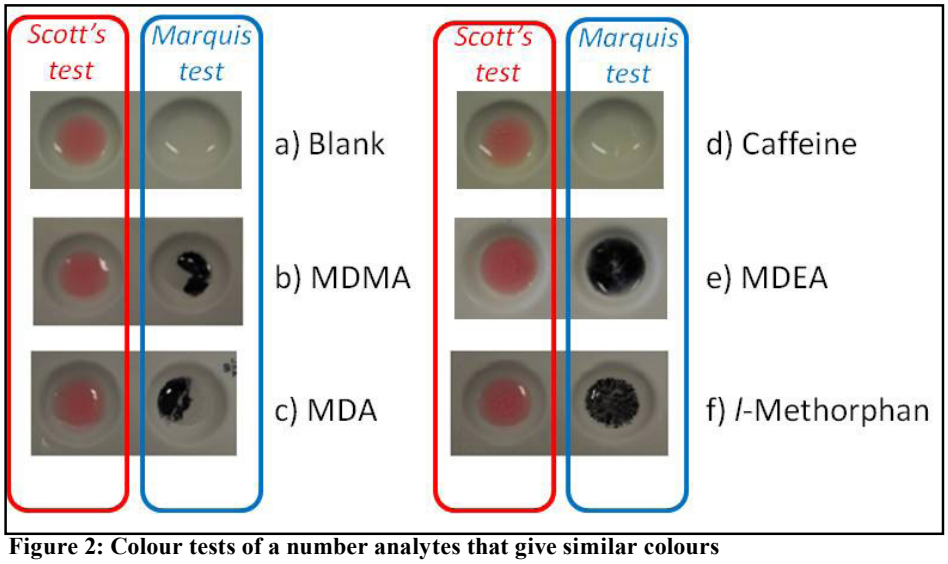

Figure 2: Colour tests of a number analytes that give similar colours with the Marquis test. Scott's test is a colour test that indicates the presence of cocaine and is included as a standard test performed on an unknown substance at ACTGAL.

Confirmatory tests are generally capable of determining individual drugs in a substance. One of the most commonly employed confirmatory tests uses the combined gas chromatograph and mass spectrometer (GC-MS).[14] It is considered one of the most robust techniques as it combines a separatory technique (gas chromatography) with structural information about individual components (mass spectrometry). As each drug has different chemical properties, the GC-MS can separate and identify multiple components found in a substance. Comparison to appropriate reference standards provides identification certainty.

Once a drug has been identified, quantification can be performed. The technique used by ACTGAL for the measurement of MDMA, for example, is Ultra Performance Liquid Chromatography with Photodiode Array (UPLC-PDA).[14] This method isolates the drug of interest and measures the instrument's response to the drug. Comparing this response to responses of known concentrations provides the data to accurately calculate the purity of the sample.

Whilst other techniques exist, the above techniques represent the accepted international standard for drug identification and quantification. These methods and instruments have however been designed to work in a controlled laboratory environment and do not easily translate to field testing.

Challenges associated with pill testing in a mobile environment

There are three major challenges with delivering a pill testing program in a mobile environment. The program must be reliable, fast, and easily transportable. This can be seen as a 'triple constraint' where it may not be possible to optimise all three characteristics.

Reliable

The first consideration in setting up testing in a mobile environment is that the results obtained from any analysis performed must be absolutely reliable. The techniques used for identification of drugs in unknown samples must be able to consistently detect and identify a wide range of compounds of interest with a high degree of certainty. For example, if a sample contains MDMA, the methods of analysis used must always identify MDMA and not confuse the identification with a chemically similar drug.

Fast

The second consideration is being able to deliver results in a useable timeframe. This may be the biggest challenge in designing a pill testing program. It not only requires very fast and reliable instrumental techniques, but consideration must also be given to the operations of the program as a whole. This includes issues such as expected demand, sample management, staffing levels, number and type of instruments, the physical layout of the mobile laboratory and security.

Transportable

The final consideration involves the transport and set up of the instrumentation required. Fast and easily transportable techniques, such as colour tests and IR spectroscopy, all suffer from a lack of discriminating power. They either cannot determine the absolute identity of a drug in a mixture or are unable to identify beyond a class of drugs. These are not considered suitable for a pill testing program. The instrumentation that can provide the required level of certainty however are predominantly not considered transportable. The challenge involves finding a reliable way to make these instruments and techniques work in a transient environment. For example, GC-MS's are highly sensitive and fragile instruments, which are not designed for disassembly and transport. These instruments operate under temperatures in excess of 200 °C and run under high vacuum. They require constant access to ultra pure gases such as hydrogen or helium and have specific power requirements; as interference in power supply can cause permanent damage. In addition, instruments such as these traditionally have extensive start up and shut down procedures and cannot simply be switched on and off as required.

Meeting these challenges

A viable solution to the transport challenge is to house all the required instrumentation in a trailer or vehicle that is custom built to suit their specific requirements. Once installed and secured, the instruments would not require disassembly and may only require minimal fine tuning onsite. This would reduce the preparation time for the instruments down to a day or less. Such mobile laboratories already exist; the Australian Federal Police developed the MobiLab,[15] which has the capacity to not only identify drugs but can also be used to assist other forensic investigations such as biological and chemical warfare agents. The NSW Forensic and Analytical Science Service (FASS) have a similar mobile laboratory at their disposal for the analysis of clandestine laboratories.[16] Such mobile laboratories also have integrated the appropriate safety facilities, such as emergency eye wash/showers and gas bottle storage. These mobile laboratories come at significant cost however and due to size restrictions are not designed for high throughput of samples.

Creating a method for an instrument (i.e. programming what the instrument does) that is both highly discriminating and fast poses a challenge. Methods currently utilised by ACTGAL for the detection of illicit drugs, utilising GC-MS technology, generally take up to an hour per sample and require a small scraping of a tablet. These highly discriminating methods can accurately identify most common illicit drugs and detect (with partial identification) most known drugs. Quantitative analysis utilising UPLC-PDA requires an additional half an hour and would require a larger quantity of sample, for example, half a tablet. This time frame for identification and quantification does not suit a field pill testing program as users are unlikely to accept a one and a half hour wait for results. The time taken for current analysis would also significantly reduce the capacity to analyse large numbers of samples. Additionally users may object to providing a significant quantity of their drugs for quantitative analysis. Time and resources would need to be allocated to design and validate methodology that is significantly fast-

Developing a pill testing program for music festivals *(continued)*

er whilst still maintaining an acceptable amount of discriminating power with a sample volume that is acceptable to the end user.

Additional challenges

A robust sample management plan requires time and resources to develop. Significant resources are allocated to sample management within the controlled laboratory environment of ACTGAL to ensure probity and the reliability of results. These include aspects such as duplicate testing and peer review. Such management plans would need adaptation to work in a fast and transient environment whilst maintaining the reliability and quality expected from the service.

The logistics of setting up a mobile laboratory at a music festival would require careful consideration. Where the laboratory is set up could be expected to have significant impact on the demand for the service. For example, placing it too close to a police presence may decrease the patronage, whilst situating too far from appropriate security presence may have security implications for staff. A mobile laboratory of sufficient size to undertake high throughput pill testing could reasonably be expected to be very heavy and would require appropriate vehicular access, in addition to a set up site located on solid ground in order to ensure appropriately stable conditions within. Agreements would need to be reached with festival organisers for prior access to the site, reliable power supply, and security prior to, during and following the event.

Additionally the techniques discussed above are not capable of detecting inorganic substances and harmful contaminants that can be byproducts of the manufacture process, such as mercury and aluminium. Techniques for detecting these compounds are significantly different to drug testing, often requiring targeted analysis. The rapidly increasing development of NPS also makes it increasingly likely that a drug will be detected that cannot be conclusively identified. It is also reasonable to expect that any pill testing capacity will only be able to provide purity determinations on a limited number of drug types.

However, possibly the greatest limitation, is that a pill testing facility can provide information only on the actual sample tested. It cannot make inferences about the purity of other tablets, even those that appear identical, as it is assumed that there is no quality control in their manufacture. Any pill testing program would be unable to say that there is nothing of potential harm (apart from the detected drugs) in a tablet. The limitations of the pill testing program would need to be explicit and understandable to the consumer.

Conclusion

To develop the technical aspects of a successful pill testing program, consideration would have to be given to a number of issues relating to adapting laboratory techniques to a mobile high throughput environment. Ideally, time and resources would need to be allocated to develop a custom-designed mobile laboratory, with instruments and methods selected specifically for efficiency and reliability. In addition, the technical limitations of mobile pill testing would also need to be fully understood by members of the public using the service.

Glossary

25I-NBOMe - *N*-(2-methoxybenzyl)-2,5-dimethoxy-4-iodo-phenethylamine
2C-B – 2,5-dimethyoxy-4-bromophenthylamine
MDA – 3,4-methylenedioxyamphetamine
MDEA – 3,4-methylenedioxy-*N*-ethylamphetamine
MDMA – 3,4-methylenedioxymethylamphetamine
PMA – *para*-methoxyamphetamine

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Natural burials in the ACT

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Natural burials have become an increasingly popular method to manage human remains since the early 1990s; however, they have only recently become available in Australia. The first natural burial ground opened in Australia in 2008 in New South Wales. In December 2015, the ACT opened its natural burial grounds. Natural burial aims to minimise environmental impacts associated with the management of human remains. This article explores what is involved in natural burial and why it has come to prominence in recent years. It will also detail the guidelines and regulations for natural burial in the ACT.

Introduction

Death is a natural and universal reality. The management of human remains after death has become an increasingly important government policy and public health issue in recent decades due to a growing global population. In Australia, an expanding and aging population coupled with housing shortages and lucrative land development, particularly near cities, has put pressure on governments to find suitable arrangements for the management of human remains.

Cremation (to dispose of a corpse by burning it to ashes) began to surge in popularity in the mid-1950s[1] and currently outnumbers burials in Australia.[2] Although cremation addresses the lack of burial space, the incinerators in crematoria and combustion of human remains release harmful emissions and have a negative environmental impact. The release of heavy metals (especially mercury), hydrogen chloride (HCl) and various other toxic gasses resulting from combustion of human remains contribute to increasing air pollution. Additionally, large quantities of fossil fuels (gas, oil or electricity) are required to power the incineration chambers.[3]

There is growing concern about the impact that humans are having on the environment, and there has consequently been a concerted effort to reduce harmful emissions. As a result, the recent global trend towards 'natural' or 'green' burials has emerged. Advocates hope that this solution will address limited land availability using an environmentally conscious approach.

What is a natural burial?

Natural burial is not a modern concept and is simply the return of 200 year old postcolonial interment practices in Australia.[4] Natural burial is a process by which the body of a deceased person is interred in the soil in a manner that does not inhibit decomposition and allows the body to decay naturally. Natural burials are promoted by proponents as environmentally responsible.

As the concept of natural burials is based on minimising environment impact, embalming is not to be performed prior to burial due to the potential of formaldehyde and other chemicals seeping into the surrounding soil. Additionally, the body must be wrapped or encased in biodegradable materials.[4]

The rise of natural burials

The natural death movement has gradually increased in popularity since the early 1990s. Numerous books, websites and even an annual magazine have been published, supporting a growing community in favour of natural burials. The first 'modern day' official natural burial ground was established in Carlisle, England in 1993.[1] The number of green cemeteries has grown substantially since 1993, with over 270 natural burial sites now available in the United Kingdom.[6] Acceptance of the natural death movement in Australia has been substantially slower, with the first natural burial ground opening in New South Wales (NSW) in July 2008. By 2010 the number of natural burial sites in Australia had risen to seven and the number continues to increase,[1] with the first site opening in the ACT in December 2015.

Natural burials in the ACT

The ACT Government introduced the Cemeteries and Crematoria (Burial Conditions) Approval 2015 (no1) under the Cemeteries and Crematoria Regulation 2003 to allow interment by natural burial in the ACT in 2015. Following this change in legislation, the first natural burial ground in the ACT opened at Gungahlin Cemetery in December 2015. To date, there have been two natural burials in the ACT and an additional site has been reserved.

Territory and Municipal Services Directorate (TAMSD) and Canberra Cemeteries have developed natural burial guidelines for the ACT. These guidelines amalgamate natural burial regulations passed in the ACT and recommendations from international organisations such as the Natural Burial Association.

In the ACT, all natural burials are to be single depth (only one burial per allotment), to a maximum of 1.2 meters. There is the possibility for a second burial to occur in an occupied site after a significant length of time has passed, for example 30 years. Dual burial would be at the discretion of the cemetery management. The allotment next to a burial site can be reserved for companion burials.[7]

The guidelines dictate that all materials buried with the body must be both biodegradable and non-toxic for natural burials. This includes clothing, caskets, coffins, shrouds and chemicals used in the preparation of the remains for burial.

Image: Natural burial cemetery, Canberra Cemeteries (Gungahlin)

Natural burials in the ACT *(continued)*

Natural burials in the ACT *(continued)*

No physical markers record the location of graves. Tokens of remembrance may be placed upon the site at the time of burial; however, these are removed after two weeks. The exclusive rights holder may elect to have an approved native tree or shrub planted on the site which is undertaken by Canberra Cemeteries. This cost is included in the fee paid for the plot. A communal memorial is available at the entrance of the natural burial grounds to place tokens of remembrance.[7]

Details of each grave are recorded within the Canberra Cemeteries' management system on a digital map. Sites can be located by GPS. A Radio Frequency Identification Device (RFID) is buried in each grave to assist in locating sites.[7]

Public health requirements

The Cemeteries and Crematoria Regulation 2003 requires human remains to be encased in a material and in a manner that does not permit offensive or noxious emissions. Additionally, body matter must not be able to escape the encasing prior to burial. The remains must be transported in a closed container that prevents any distortion or collapse of the body during the normal events leading up to burial. If the body is to be removed from the container for burial (e.g. if the deceased is to be interred in a shroud), safe removal must be ensured. In these cases, if the container is to be reused it must be able to be thoroughly cleaned to prevent transmission of diseases.

In cases where the deceased was diagnosed or was suspected to be affected by an infectious disease, the remains must be contained in a sealed coffin. Diseases that would require containment include: acquired immunodeficiency syndrome (AIDS), human immunodeficiency virus (HIV), acute viral hepatitis B, C, D, meningococcal disease, rabies, active tuberculosis, anthrax, diphtheria, Creutzfeldt-Jakob disease (CJD), plague, small pox, yellow fever or any viral haemorrhagic fever (e.g. Ebola).[8]

The management of natural burial grounds is undertaken by Canberra Cemeteries. The Health Protection Service (HPS) would only become directly involved in a natural burial in the case of an exhumation. Exhumations may be court directed; however, this has not previously occurred in the ACT. Exhumations are typically requested by the rights holder of the grave to move the body to another cemetery. This requires HPS approval and oversight to manage potential risks to public health.

The management of human remains is an evolving issue with complex cultural and public health requirements. As the practice of natural burial expands in Australia, health officials continue to monitor for emerging public health risks.

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Emerging trends in infection control activity (skin penetration) in licensed businesses.

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Public Health Officers from the Infection Control Unit sometimes receive unusual requests for licensing or approval of activities or new treatments that may pose a threat to public health. The Unit provides infection control advice on compliance with infection control standards. The primary purpose of the work conducted by the Infection Control Unit is to limit the transmission of blood borne viruses during the performance of skin penetration activities. The unit is not responsible for assessing operator training or experience; however, requests for assessment and licensing of some beauty treatments are becoming more complex as the line between what is a beauty treatment and a medical procedure becomes increasingly blurred. Some examples of recent requests relating to skin penetration procedures are outlined below.

1. Factor 4 -Platelet Rich Plasma treatment

Beauty therapy treatments are expanding well beyond the traditional waxing and facial treatments. A request was recently received from a beauty therapy business for approval to perform Factor 4 - Platelet Rich Plasma (PRP) treatment. This treatment requires the collection of blood from the client which is then centrifuged to separate the red blood cells from the plasma. The plasma is then treated in a way which is claimed to make it rich in platelets, stem cells and other growth factors. The treated plasma is injected back into the client's skin at the site of wrinkles or other signs of ageing, allegedly plumping the skin and erasing lines and wrinkles. It is claimed the treatment accelerates collagen production and stimulates the natural processes of repair.

Image: Needle. FreeDigitalPhotos.net

Plasma is classed as a therapeutic product and is regulated by the Therapeutic Goods Administration (TGA). In order for PRP treatments to be performed the operator must obtain a licence under the *Therapeutic Goods Act 1989* unless they are exempt. Exempt clinics/businesses are medical clinics and those under the professional supervision of a medical practitioner. Under TGA[1] requirements where storage of the blood products occurs and supervision of that storage by the same medical practitioner cannot be guaranteed, exemption from TGA regulation may not be applicable.

The difficulty in assessing such requests is that medical procedures are not clearly defined in Health Practitioner regulation or national law.

In this case the business was required to attain the appropriate TGA licence prior to seeking ACT Health approval.

2. Requests for infection control assessments of tattooing – Bondage/Discipline/Sadism/Masochism events at local venues.

Requests are occasionally received for approval to conduct tattooing or hold bondage/discipline/sadism/masochism (BDSM) events at public venues. While these events do pose some risk of blood borne virus transmission, the risk is low . Strategies have been employed by the organisers to mitigate risk. Provided that these strategies are employed, the public health risks associated with these events are minimal.

Activities at BDSM events include needle play, bondage, spanking and flogging, which potentially may produce blood and/or body fluids. Organisers of these events are required to provide the Health Protection Service with a list of activities that may occur at the event. The organisers of BDSM events are required to have policies in place for needle play, needle stick injury, equipment cleaning and general (environmental) cleaning both during and after the event.

Image: Tattooing. FreeDigitalPhotos

The organisers of tattooing events are required to hold an Infection Control Activity Licence and have the appropriate equipment and policies in place to comply with infection control requirements.

The Infection Control Unit staff also meet with event premises and visit the event premises to ensure appropriate infection control procedures and practices are in place.

3. Eyeball tattooing

The Infection Control Unit was recently asked to provide information on eyeball tattooing. Eyeball tattooing involves injecting the whites of the eyes (the sclera) with coloured dye. It is a permanent procedure.

At the time of writing, eyeball tattooing is not performed in the ACT. Despite recent media attention it is not understood to be a growing trend across Australia.

ACT legislation does not stipulate which parts of the body can or cannot be tattooed. However all businesses engaged in tattooing are required to hold an Infection Control Activity (ICA) license.

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When food is not food

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The ability to determine what can be sold, labelled and marketed as a food product is an important public health function to ensure safety and confidence in Australia's food supply. In recent years, changes to the Australia New Zealand Food Standards Code have expressly prohibited several products from being sold or marketed as food on public health grounds.

On rare occasions, products with a history of being eaten or recognised as foods in Australia have been prohibited from continued sale or marketing as a food for health reasons. This can lead to public confusion about what products can be eaten as food, and what can be sold as food.

The term 'food' is colloquially used to include all products that are intended to be consumed by people for pleasure or nutritional value.[1,2] However, what an individual might reasonably view to be food might be highly varied and is often influenced by personal preference, culture and age.

When the social and legal interpretations of what is 'food' come into conflict, it can create confusion for both consumers and industry about whether a product can be sold or marketed as food. In reality, the legal definition of food in Australia is exceptionally broad. In accordance with the *Food Standards Australia New Zealand Act 1991*, food can include alive or deceased animals (at any stage of processing), plants and organic material, synthetic additives (flavour enhancers, colours etc) or any other thing that is declared to be a food.[3]

Image: Food. FreeDigitalPhotos.net

The only items that are excluded from being considered potential foods in Australia are items that are specifically labelled or marketed as 'not a food' and items that are prohibited from being sold, labelled or marketed as food under legislation such as the Australia New Zealand Food Standards Code (Food Standards Code). Products that are listed or registered as a therapeutic good under the Australian Register of Therapeutic Goods or *Therapeutic Goods Act 1989* are also not considered food.

The Food Regulation System and the Food Standards Code

All States and Territory Governments, the Commonwealth Government and the New Zealand Government have a role in supporting the Australia and New Zealand food regulation system. To ensure the safety and integrity of Australia and New Zealand's food supply, all jurisdictions routinely meet to discuss and set food policy through the Australia and New Zealand Ministerial Forum of Food Regulation (Forum) and its subcommittees. The Forum is supported by expert advice provided by Food Standards Australia New Zealand (FSANZ) and relies on the Australia New Zealand Food Standards Code (Food Standards Code) to implement domestic food policy.[4]

The Food Standards Code is a compilation of food standards produced by FSANZ that are adopted under State and Territory legislation for regulatory purposes. Each individual standard under the Food Standards Code may set out national requirements relating to the safety, production, marketing or labelling of food. The ACT adopts the *Food Standards Code under the Food Act 2001*.

If a product is expressly prohibited from being sold, marketed or labelled as a food under the Food Standards Code, it is not regulated as food in the ACT. In recent years, the Forum has approved changes to the Food Standards Code to expressly reject some products from being considered foods for public safety reasons such as untreated milk and raw apricot kernels.

Raw cow's milk

Raw cow's milk is milk that has not been subject to a pathogen reduction process (i.e. pasteurisation) to kill bacteria that could be harmful to humans, such as *E.coli*.[5]

While raw milk is available in other countries as a legitimate food product, and is preferred by some people to pasteurised milk as being more natural or healthy,[6] all milk for sale in Australia must either be pasteurised or undergone an approved pathogen reduction process.[7] This means that the commercial sale and marketing of raw cow's milk as food is not permitted in Australia.

Image: Hand milking a cow. Wiki Commons

As raw milk cannot legally be marketed as a food in Australia, suppliers have previously advertised it as 'bath milk' or 'cosmetic milk' and labelled it as 'not for human consumption'. This approach excludes the product from being considered a food and allows its sale as a consumer product.

In late 2014, the consumption of raw milk was linked to the death of a three year old child and the hospitalisation of another four young children in Victoria.[8] This led to Victoria introducing a requirement that producers of raw milk include a strong bitter flavour to deter the drinking of raw milk.[9] Despite these precautions and clear public health messaging about the potential dangers of drinking raw milk, there continues to be a growing following for the consumption of raw milk as a food.[10,11]

When food is not food *(continued)*

Raw apricot kernels

Raw apricot kernels are another product that is not permitted to be sold or marketed as a food under the Food Standards Code due to public health concerns. Raw apricot kernels contain cyanogenic glycosides that can convert to a form of cyanide when eaten.[12] Cyanide is highly toxic to humans.[13]

Raw apricot kernels have been promoted as an alternative therapy for cancer, which in part has led to their consumption in unsafe quantities.[13,14] However, there is no evidence to support the consumption of raw apricot kernels as a cancer treatment.[15] Many scientific resources, governments and expert organisations such as the Cancer Council of Australia have stated that they are not only ineffective as a cancer treatment, but can also be very dangerous.[13,16]

Image: Aprioct Kernals. Wiki Commons

In 2000, a man in Canada died after consuming 20 - 40 gelatine capsules containing crushed raw apricot kernels each day for three months as an alternative to cancer treatment.[17]

There have been several cases of people falling seriously ill as a result of consuming raw apricot kernels in Hong Kong, the United States of America, Canada and the United Kingdom.[17] At least two people in Australia also required admission to hospital between 2011 and 2014 for mild cyanide poisoning as a result of consuming raw apricot kernels.[13,17]

In 2014, the FSANZ reported that the consumption of raw apricot kernels pose an acute public health and safety risk and should not be consumed.[13,17] The sale of raw apricot kernels was later banned under the Food Standards Code in December 2015 in the interest of public health.[17,18]

The future of food

With the ongoing development of food science and technology, innovative methods to produce or develop food are being used in Australia (e.g. genetically modified foods, synthetic additives and new processing agents). In light of emerging food technology developments it is critically important that FSANZ and jurisdictional food regulators continually assess the public safety elements of new and existing food products.

If any public health concerns arise about our food products, the Forum may approve FSANZ to change the Food Standards Code to prohibit the product from being sold or marketed as a food e.g. raw apricot kernels, betel nuts or deadly nightshade (a plant).[19] This means that as we further develop our understanding of food science and public health, our view of what constitutes 'food' may change to further exclude or regulate products on public health grounds.

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Potential public health risks of imported foods: Hepatitis A associated with frozen berries

Laura Ford, Communicable Disease Control, Population Health Division

Food imported into Australia must comply with the Imported Food Control Regulations 1993 and the Imported Food Control Act 1992, which also subjects imported food to the Food Standards Code.[1] This legislation aims to reduce the risk of unsafe food product entering Australia. Risk-based border inspection and general monitoring of the food supply is also undertaken by the Department of Agriculture, Food Standards Australia New Zealand, and other government agencies.[1]

Despite these measures, unsafe imported food product has occasionally entered the Australian food supply. The Communicable Disease Network of Australia and OzFoodNet monitor foodborne disease outbreaks to help detect any unsafe food products.

In February 2015, cases of locally acquired hepatitis A virus were identified by OzFoodNet epidemiologists in multiple Australian States and Territories. The cases reported consuming the same brand of frozen mixed berries, which were packed in China.[2] Frozen berries were the only common exposure for the cases. Frozen berries have been associated with multiple outbreaks of foodborne illness overseas, including outbreaks of hepatitis A virus.[3,4]

Subsequently, there was a nationwide voluntary recall of this frozen berry product, as well as a precautionary recall of three other frozen berry products which shared the same production line.[2] In addition, a multi-jurisdictional outbreak investigation was declared, monitoring national case numbers and initiating a number of different types of investigations to test the hypothesis that the hepatitis A cases were associated with the frozen berry product.

Image: Berries. FreeDigitalPhotos.net

The recall of these products resulted in a significant amount of media attention and commentary on the safety of imported foods. In response, the Department of Agriculture enacted new regulations that require frozen berry importers to prove that they are sourcing product from farms and factories with strict sanitation standards.[5] In addition, all frozen berry consignments from the facilities in China linked to this outbreak are screened for Escherichia coli and hepatitis A virus, and the Department of Agriculture has introduced random testing of berries from factories that were not associated with the outbreak for E. coli.[2,5] The detection of E. coli may indicate poor hygiene during processing.

This outbreak also raised concerns that country of origin labelling on food products is currently not clear to consumers. Industry and lawmakers continue to discuss proposed changes to food labelling laws, including using symbols and larger print on packaging to show the proportion of ingredients that are made in Australia.[6] The Australian Country of Origin Food Labelling Bill was introduced into Parliament in February 2015.[7]

OzFoodNet epidemiologists in all States and Territories continue to follow up cases of hepatitis A virus and other potentially foodborne diseases to monitor outbreaks and identify sources of illness.

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ACT response to drug and therapeutic good recalls and shortages

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The Health Protection Service (HPS) is responsible for distributing information across the ACT community about therapeutic goods (including recalls, product corrections and safety alerts) and medicine shortages. This information may be received from the Therapeutic Goods Administration (TGA), the national regulatory authority for therapeutic goods or the company primarily responsible for supply or manufacture of the therapeutic good or medicine in Australia (referred to as the "sponsor").

The Chief Pharmacist within the HPS is the nominated ACT Recall Coordinator. The Chief Pharmacist closely liaises with the ACT Core Notification Group (CNG) so that there is a coordinated approach to the distribution of therapeutic good recalls or medicines shortages within ACT Health and Calvary Public Hospital. The CNG is comprised of Executive representatives within each of the ACT Health facilities who forwards on the notifications within their divisions as appropriate.

When ACT Health receives advice about a recall or shortage, the Chief Pharmacist undertakes a risk assessment that can include:

- Liaison with the Chief Health Officer;
- Liaison with other health professionals;
- Coordination of the response with the CNG;
- Sharing of information with other Directorates.

The Liaison with the Chief Health Officer and other groups informs the level of alert status and action that is coordinated by HPS.

The Chief Pharmacist also maintains a distribution system to directly notify external organisations, such as community pharmacies, dental practices and medical practices to distribute therapeutic good recalls or medicines shortages when required. Ongoing liaison with the CNG and this distribution system ensures that the public is protected for any harm from the use of sub-standard, poor quality or unsafe products or shortage of medicines in the ACT.

Local management in action

On 11 March 2016, the sponsor for an adrenaline auto injector, in consultation with the TGA, advised users of their therapeutic good to check its expiry date and compare it against the information on the carton. The HPS locally managed this alert by distributing this information to:

- the CNG;
- dental practices;
- medical practices;
- first aid licence kit holders;
- community pharmacies;
- Education and Training Directorate for distribution to child care centres and schools; and
- other potentially affect organisations.

In addition, the CHO tweeted on this alert on social media, with media dot points and a Question Time Brief was also provided to the Assistant Minister for Health in relation to this alert.

Future direction

To support improvements to medicines shortages local management, the Chief Pharmacist is a member of the national Medicines Shortage Working Party. This Working Party will provide further strategies to manage medicines shortages across the ACT community.

For further information about therapeutic goods recall and medicines shortages, please contact the Chief Pharmacist by emailing hps@act.gov.au.

Infection control regulation of nail salons in the ACT

Sam Kelly and Irene Passaris, Communicable Disease Control, Population Health Division

The popularity of quick and inexpensive manicures and pedicures has resulted in growth of the nail salon industry, with salons opening in almost every shopping centre across Australia. In recent years the number of nail salons in the ACT has increased dramatically from three in 2005 to 34 licensed nail salons in April 2016.

Nail technicians may carry out procedures that involve skin penetration such as cuticle cutting, exfoliation or razor scraping. Procedures that involve skin penetration carry a risk of spreading disease because microorganisms can enter the body when the skin barrier is broken. Microorganisms that are present on dirty instruments can penetrate the skin and transmit bacterial and fungal infections, as well as diseases such as hepatitis B and C, and HIV.

The Infection Control Unit at the Health Protection Service (HPS) is responsible for regulating all businesses in the ACT that perform skin penetration procedures, including nail salons. These businesses are required to be licensed and comply with the relevant code of practice.

In the ACT, inspections are undertaken by public health officers to assess the cleanliness of equipment, the environment and the infection control practices of nail salon operators. Salons are routinely inspected at least twice annually, including during times of peak trade (e.g. pre-Christmas and summer holidays). In addition, salons are inspected as a result of complaints directed to the HPS from consumers. Most customer complaints involve allegations of unclean premises or unclean equipment.

The HPS Infection Control Unit have developed printed information outlining infection control procedures to assist salons to meet regulatory requirements. To assist business owners from non-English speaking backgrounds, translated copies of this information are being-provided to each salon.

Images: Nail treatment. FreeDigitalPhotos.net

Evidence on wind farms and human health

Chris Kelly, Environmental Health Policy and Projects, Population Health Division

Power generation via industrial wind turbines (IWT) is a relatively new technology in Australia. As of late 2014, 71 wind farms were in operation across the country. These wind farms produced over 30 per cent of Australia's clean energy and supplied 4.2 percent of the country's overall electricity in 2014.

Whilst the technology promises cost effective, renewable, non-polluting power generation, when compared to traditional fossil fuel generation methods, IWTs are not completely emission free. Emissions given off into the surrounding environment by IWTs include electromagnetic frequencies, light, and audible and sub-audible noise and vibration.

Opponents of IWT technology cite a number of impacts on human health, either directly or indirectly related to these emissions. Some suggest adverse health impacts related to habitation in proximity to IWTs that can be categorised into clinical syndromes.

The peak Australian body providing health advice to the community and governments, the National Health and Medical Research Council (NHMRC), has undertaken a number of reviews to examine the possible human health effects of IWTs. In 2015 following an extensive literature review by a specially commissioned expert reference group, the NHMRC concluded that there is no "consistent evidence" that wind farms damage human health. These findings add to the growing international body of literature on the safety of IWTs. The residual issue of 'annoyance' in relation to habitation in proximity to IWTs remains the focus of ongoing research.

Background

Wind power generation involves converting wind energy into electricity through Industrial Wind Turbines (IWTs). The atmospheric determinates of wind include changes in air temperature and pressure causing air masses to move around the surface of the earth. A wind turbine harnesses the wind to produce electrical energy. The kinetic energy of the wind turbine turning is converted into electricity. The wind makes the turbine rotor spin. As the rotor spins, the movement of the blades spinning gives power to a generator which makes energy.

IWTs are generally large in scale with turbine blade spans of over 100 meters, operating at heights greater than 150 meters from the ground, depending on the wind speed environment it is placed in. Currently individual IWTs are capable of generating electricity capacities between one and six megawatts per turbine. One megawatt of electricity can power approximately 1000 homes.

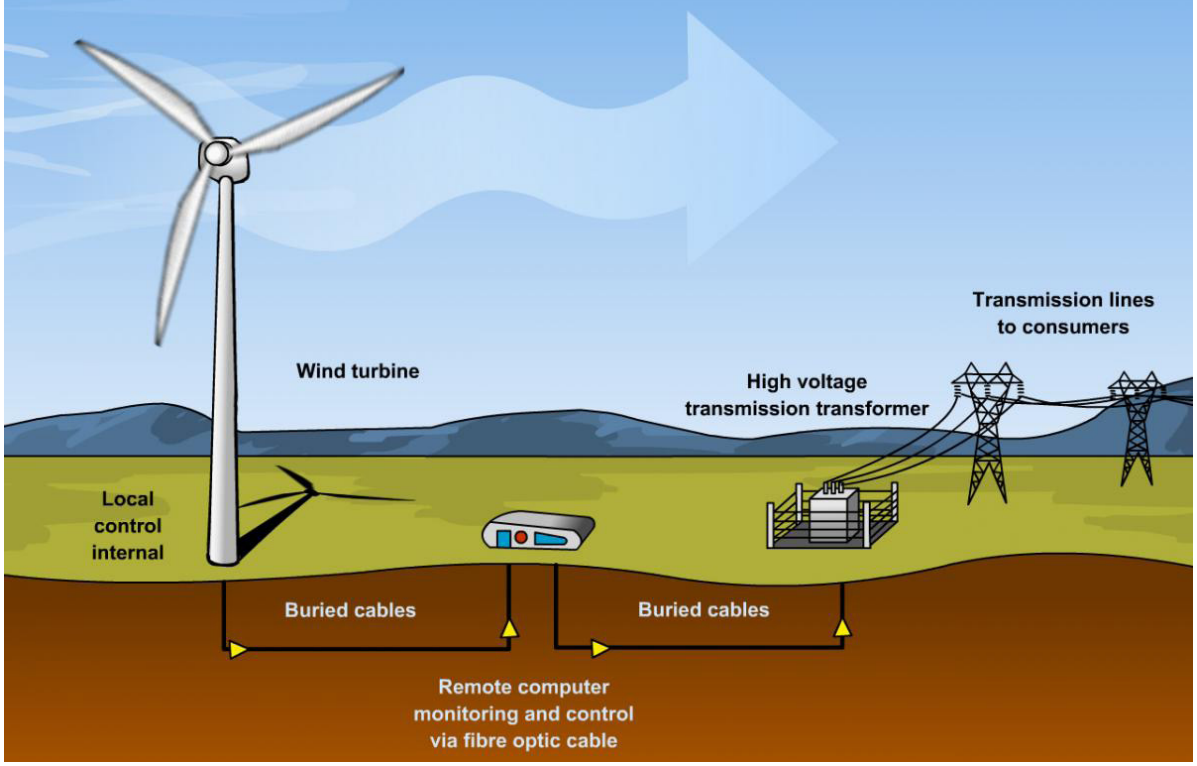
IWTs grouped together are referred to as wind farms. Wind farms may be located on land or offshore. Wind farms have been promoted as a viable and sustainable alternative to traditional, non-renewable forms of energy production such a coal fired power stations. The environmental impacts of coal fired power generation include, land use, waste management, water and air pollution.[1]

There were approximately 250,000 IWTs operating globally as of 2015. In Australia, since the introduction of the Renewable Energy Act 2000, the number of domestic wind farms has grown substantially. In 2014, there were 1866 IWTs across 71 operational wind farms located around the country with more being constructed or planned. (Table 1)

State	Number of projects
South Australia	21
Victoria	14
Western Australia	21
New South Wales	10
Tasmania	7
Queensland	2
Total	**71**

Table 1: Installed wind energy projects in Australia by state (as at end of 2014) Source: Clean Energy Council

Figure 1: Electricity Generation via Wind Turbine Source: Hydro Tasmania. Available at http://www.hydro.com.au/energy/about-wind-power



Evidence on wind farms and human health *(continued)*

Although wind power has been harnessed as a source of electricity generation for several decades globally, its use as a source of renewable energy in Australia is relatively recent. Wind power supplied 4.2 percent of Australia's overall electricity in 2014.[2] Under the ACT's 90 percent renewable energy target, wind energy is expected to meet 50 percent of the ACTs electricity needs by 2020.[3] However, this energy is sourced from interstate, with no wind farms currently planned for the ACT.

Image: Wind Frams at Lake George, NSW. WikiCommons

As is the case with the introduction of much new technology, concerns have been raised that wind power projects could lead to adverse impacts on human health.

In Australia, for planning purposes, the various states have a variety of minimum "set-back" distances that must be observed between wind turbines and residential homes. These set-back distances vary between 500 and 2000 metres across jurisdictions.[4] The justifications for these set-back distances include public safety and mitigation against the risk of IWT catastrophic failures, including blade throwing and fire, as well as mitigation of the noise generated by IWTs. Whilst infrequent, catastrophic failures of IWTs have been documented.[5]

Not including catastrophic failures, the health concerns most frequently associated with IWTs relate to the emissions of by-products of IWTs. These emissions include electromagnetic frequencies from transmission lines, shadow flicker created by rotor blades, and wind turbine noise including inaudible low frequency noise called infrasound. There have also been claims of various psychological impacts related to living in proximity to IWTs including: annoyance, anxiety, heighted awareness of the turbines and sleep disturbance.[6]

Critics of wind farms have expressed concerns that lIWT emissions could lead to potential negative health impacts on people living in proximity to wind farms including: death, cancer, congenital abnormality and various syndromes.

Electromagnetic frequencies, also referred to as electromagnetic radiation, broadly refer to combinations of electric and magnetic waves. Electromagnetic radiation is emitted by a range of common domestic and commercial applications and these devises are engineered to minimise exposure. Extremely low-frequency (ELF) electromagnetic radiation is the only potentially important electromagnetic emission from wind farms that is relevant to health.[7] ELF waves can also penetrate significant distances into earth or rock. The frequency of alternating current flowing in electric power grids, 50 or 60 Hz, also falls within the ELF band, making power grids an unintentional source of ELF radiation.

Concerns regarding the safety of exposure to electromagnetic radiation have been raised in the literature linking childhood leukaemia and extremely low-frequency magnetic radiation exposure from electricity transmission lines.[8] Concerns have been raised about possible links between occupational exposure to ELF radiation and cancer and cardiovascular, neurological, psychological or reproductive conditions in adults. This association between the health effects of ELF and wind farms has also been proposed.

Wind energy opponents often cite possible health effects from shadow flicker as a reason to oppose wind development. Shadow flicker, as it relates to IWTs is defined as the flickering effect caused when rotating wind turbine blades intermittently cast moving shadows on the ground, resulting in alternating changes in light intensity. Shadow flicker has been proposed as a trigger to people who have of photosensitive epilepsy.

In terms of noise, high sound pressure levels (loudness) of audible noise and infrasound* has been associated with learning, sleep and cognitive disruptions as well as stress and anxiety. Since the appearance of wind farms in Australia, concerns have been raised that people living in proximity to wind farms suffer an array of sleep disturbance and other health effects from low-frequency noise and infrasound, with illnesses alternately labelled as 'wind turbine syndrome'', 'vibro-acoustic disease' and 'visceral vibratory vestibular disturbance'.

National Health and Medical Research Council (NHMRC) Reviews

The National Health and Medical Research Council (NHMRC) Strategic Plan 2013-15 includes a particular focus on investigating new and emerging health issues, particularly through environmental hazards and changes in the human environment. The health impacts of IWTs were first investigated by the NHMRC in 2010. At that time a rapid review of the evidence by the Council found "renewable energy generation is associated with few adverse health effects compared with the well-documented health burdens of polluting forms of electricity generation".[9]

In 2012 the NHMRC commissioned a comprehensive assessment of the scientific evidence to examine the possible human health effects of wind farms. The NHMRC Wind Farms and Human Health Reference Group were convened to oversee the review of evidence. The reference group comprised experts in environmental epidemiology, sleep, social psychology, acoustics, sound engineering and consumer issues. The Reference Group studied published research from 1981 up to May 2014, including two previous NHMRC reviews.

The findings of this comprehensive review informed the development of the NHMRC Statement: Evidence on Wind Farms and Human Health and the NHMRC Information Paper: Evidence on Wind Farms and Human Health, both released in February 2015.

These reports considered the proposed health impacts and concluded that there is no consistent evidence that wind farms damage human health. The Council also concluded there is no direct evidence that exposure to wind farm noise affects physical or mental health. Despite this conclusion, the Council made a targeted call for more high quality research to be undertaken particularly for impacts within 1500 metres of a wind farm. The Council further noted that

Evidence on wind farms and human health *(continued)*

while exposure to environmental noise is associated with health effects that the effects occur at much higher levels of noise than are likely to be perceived by people living in close proximity to wind farms in Australia.

The Council wanted new research to focus on improving measurement of noise, particularly low-frequency noise. It would also include expanding beyond self-reported symptoms to more objective indicators, and look at social circumstances and how that might influence perceived impacts. The reason given for the call for additional research is that some residents report annoyance from wind farms, with disturbed sleep and poorer quality of life.

The NHMRC also ruled out suggestions that wind farm noise impacts would differ from effects from other noise sources at similar levels. The Council concluded wind farms would be unlikely to cause health effects at distances of more than 500 metres, where noise levels are generally less than 45 decibels. By comparison, wind farms beyond 1500 metres would have an approximate 30-35 decibel range, while most household devices have 35-70 and city traffic has a 70-85 decibel range.

The NHMRC findings align with a Health Canada comprehensive epidemiological study on Wind Turbine Noise and Health[10] released in November 2014. The study examined 17 different models of IWTs and collected data in 1,238 homes in two provinces. The study considered physical health measures that assessed stress levels using hair cortisol, blood pressure and resting heart rate, as well as measures of sleep quality.

The Health Canada study found no evidence linking turbines and any of the self-reported conditions including dizziness or migraines, stress and sleep quality. The study did however find an association between increased levels of wind turbine noise and individuals reporting to be annoyed. Annoyance was defined as a long-term response (approximately 12 months) of being "very or extremely annoyed" as determined by population surveys. Reference to the last 12 months or so was intended to distinguish a long term response from one's annoyance on any given day.

The relationship between noise and community annoyance was stronger than any other self-reported measure, including complaints and reported sleep disturbance. The study found statistically significant exposure-response relationships between increasing wind turbine noise (WTN) levels and the prevalence of reporting high annoyance. These associations were found with annoyance due to noise, vibrations, blinking lights, shadow and visual impacts from wind turbines. In all cases, annoyance increased with increasing exposure to WTN levels.

Future directions

As of March 2016, the NHMRC has awarded two grants totalling $3.3million to contribute to the evidence-based understanding of the effects of wind farms on human health. The NHMRC is funding research by the Flinders University of South Australia that will explore relationships between noise from wind farms and effects such as annoyances and reduced sleep and quality of life. This project proposes to directly evaluate the sleep and physiological disturbances associate characteristics of wind farm noise compared to traffic noise reproduced in a specialised and carefully controlled laboratory environment.

Research by the University of New South Wales will investigate the broader social and environmental circumstances that may influence the health of people living near wind farms. This project involves a short term and longer term study to investigate whether exposure to infrasound causes health problems. The short term study will be laboratory-based and run for three one-week periods. The longer term study will be community-based and run for six months measuring sleep quality, balance, mood, and cardiovascular health. The outcomes of these research activities will further assist in developing policy and public health recommendations regarding future wind turbine development and operations in Australia.

*** Sound that is lower in frequency than the normal limit of human hearing usually of a frequency less than 20 Hz (hertz) or cycles per second.**

Conclusion

The wind power industry is generally associated with significant economic and environmental benefits including large offset of greenhouse gases emission and economic benefits, when compared to traditional fossil fuel industries. However, as more IWTs and wind farm projects come online in Australia the number of people living in proximity to IWT infrastructure also grows. Public concerns regarding the health impacts of IWTs have been growing in parallel with the developing wind power industry. Other renewable power generation industries have not attracted the same level of public health concern.

Despite the persistent perception of adverse health concerns, the vast majority of suspected health impacts proposed to relate to residing in proximity to IWTs appears to have been comprehensively addressed by the growing body of domestic and international literature. The residual issues related to annoyance through proximity to IWTS are the focus of ongoing research.

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Preparing for, and initiating a prosecution

Brett Purdue, Legal Policy Office, Population Health Division

As a regulator ACT Health will begin to gather evidence of alleged offences while conducting routine inspections, or during a public health response.

Early identification of possible contraventions of any laws is critical, as is a determination of the evidence needed to prove any offences, and evidence which might reflect the culpability of the offending.

Depending on the severity of the offence and the nature of the accused person, some prosecutions must be initiated within twelve months.

To initiate a prosecution ACT Health submits a prosecution brief to the Director of Public Prosecutions containing all evidence collected.

Like any regulator, ACT Health has a range of enforcement tools it can apply when public health issues or contraventions of legislation are identified. These tools can vary from legislation to legislation, but every Act administered by ACT Health contains offences for the most serious contraventions.

Occasionally ACT Health will identify possible offences during routine inspections, when conducting inspections in response to complaints from the public, or during a public health response to a disease outbreak or other public health problem. Where a possible offence has been identified there are a range of factors that ACT Health must consider and address when preparing for and initiating a prosecution.

Assessment as to the seriousness of the offences, and the public interest in proceeding to prosecution

Preparation for a prosecution often commences while a contravention of legislation is still being addressed. This is because in many instances it is often immediately apparent that the contravention being addressed is of such seriousness that a prosecution will definitely be warranted. However, in some instances the inspector(s) and senior officers will need to make an administrative decision as to whether to consider pursuing a prosecution. Such assessments will consider a range of factors including the potential seriousness of the offence or offences, the compliance history of the person involved, and the public interest in proceeding to a prosecution.

Image: Law. FreeDigitalPhotos

Investigation and evidence collection

As soon as possible after identifying that an offence may have been committed a focus on evidence collection is needed. This requires careful consideration of the elements of any applicable offences, and what evidence may be needed to establish the various elements of the offences. Consideration must also be given to the identification of evidence that will reflect the degree of culpability involved or which may be indicative of the severity of the offence.

For example, the *Medicines, Poisons and Therapeutic Goods Act 2008* (MPTGA) contains an offence for supplying a declared substance to another person when the supplier is not authorised to supply the substance. This offence carries a maximum penalty of five years imprisonment, a fine of 500 penalty units, or both. At the time of writing, 500 penalty units equates in the ACT to a fine of $75,000 for an individual, and $375,000 for a corporate entity.

What constitutes a declared substance is established in the MPTGA, as is the categories of persons and professions that are authorised to supply. The meaning of 'supply' within the MPTGA is also specifically explained, and captures selling the substance, as well as offering or exposing the substance for sale.

Proving that a person was not authorised will generally involve establishing whether or not the person is a registered health professional that is authorised by the MPTGA, or whether the person held a licence issued by ACT Health that authorised dealing with the substance.

Determining if a person does or does not hold a licence is a straight forward process as ACT Health, being the regulator, is also the licensing authority. Accordingly, this merely involves a check of ACT Health's own records.

The Australian Health Practitioner Regulation Agency (AHPRA) maintains a register of all registered health professionals within Australia, and this register is publically accessible and searchable through the AHPRA website. As such, establishing if a person is a registered health professional will generally just involve a simple online search of the AHPRA register.

Whilst establishing a person's authority to supply a declared substance is relatively straight forward, evidence must also be produced confirming that the substance in question was indeed a declared substance to which the offence relates. In many instances an investigating officer will have formed a reasonable suspicion of the offence based on information such as labelling on the packaging. Nevertheless, proving the offence to the requisite standard of beyond reasonable doubt will require analytical testing of the substances to conclusively determine the nature and composition of the substance.

The collation of evidence of supply is not only essential in order to prove the offence, but it can also be important information for the court to consider when determining the extent and severity of the offending behaviour. As such it is important for investigating officers to have regard for the need to gather evidence that will not only prove the offence, but which will inform sentencing should a finding of guilt be recorded.

As the definition of 'supply' for the offence includes both the sale of the substance and offering the substance for sale, evidence of the substances on display to the public with a price tag affixed or near the substance would generally be sufficient to prove that element of the offence. Nevertheless, if evidence of past sales can be found, including quantities and dates, this will be important information

Preparing for, and initiating a prosecution *(continued)*

for the court to consider when determining what penalty would be appropriate to impose. Understandably the culpability of a person that only recently displayed substances for sale, and had made few if any actual sales, will be significantly less than that of a person that had sold large quantities and/or had being selling the substances for a significant period of time.

This same information may also be relevant to determining the number of charges to be proposed. Every sale of a declared substance by an unauthorised person could be regarded as a specific, individual offence having been committed, although in practice in order for a prosecution to be fair and proportionate to the offending behaviour a single offence spanning a date range is often laid.

Development of a prosecution brief

In the ACT prosecutions for regulatory matters are handled by the office of the Director of Public Prosecutions (the DPP). In order to have a prosecution initiated, ACT Health must submit to the DPP a prosecution brief containing all necessary materials for charges to be laid. This will include information about what offences ACT Health alleges, information identifying the accused person(s), a statement of facts, and the evidence collected that supports the alleged offences.

In any prosecution the evidence of alleged offences will include witness statements from the public health officers involved in the investigation. This will be a sworn written account by the public health officer that will outline their position, experience and authorisations. Their statement will also document their observations, actions and decisions involved in the investigation, and the date, time and location in which such matters took place. A common example of an action taken by a public health officer is the taking of photographs to document the scene and contraventions identified. These photographs will also constitute evidence to be included in the prosecution brief.

Depending on the nature of the investigation and offences proposed a prosecution brief may also include witness statements beyond those of the investigation officer(s). This can include statements from members of the public that observed or were affected by the contravention. It might also include statements from analysts that performed the scientific analysis to confirm the nature of a substance for offences involving medicines, or the presence of a contaminant or bacteria for offences relating to food or public health.

A standard action taken by ACT Health as part of an investigation will be to invite the person(s) allegedly responsible for the offence, and possibly any employees or agents that may have acted on their behalf, to attend for a recorded interview. Attending an interview is not compulsory, but it is the alleged offender's opportunity to deny or explain offending conduct, or to correct or contradict the investigation's understanding of the facts. Any interview conducted as part of an investigation, regardless of duration or evidentiary value, is recorded with the interviewee's knowledge, and a copy of the recorded interview provided to them. At a later stage the recorded interview is professionally transcribed by an independent provider, and a written record of interview (an ROI) provided. Where an interview, or interviews, are conducted as part of an investigation the prosecution brief will include a copy of the recorded interview and the associated ROI.

Timeframes

In preparing a prosecution brief ACT Health must have regard to the fact that in certain instances there are strict timeframes in which a prosecution must be commenced. Generally in the ACT where the entity to be prosecuted is an ordinary individual the timeframe will depend on whether or not the offence can be punishable by an imprisonment term of greater than six months.

Where the offence can be punishable by imprisonment for a period six months or less, section 192 of the *Legislation Act 2001* (the Legislation Act) establishes that a prosecution must be commenced within one year of the date of the offence.

The gravity and seriousness of offences carrying imprisonment terms of six months or less is proportionally lower than other offences. Furthermore, the investigation of such offences should usually involve limited complexity and be able to be initiated very quickly. For these reasons it is reasonable to interpret from the operation of section 192 of the Legislation Act that the legislature clearly anticipated that prosecutions for such offences be initiated quickly, that is within a year, or else not be pursued.

In contrast, where the offence can be punishable for a period longer than six months, the same section of the Legislation Act establishes that a prosecution may be begun at any time. This should not be interpreted though as indicative of an intention by the legislature to give an indefinite period in which a prosecution might be initiated. Regard should always be afforded to the long established and accepted legal maxim of "justice delayed is justice denied". Furthermore, since the commencement of the *Human Rights Act 2004* (the HRA) in 2004 section 192 of the Legislation Act must be read in conjunction with the provisions of the HRA, particularly section 22(2).

Section 22(2) of the HRA provides that all human beings are entitled to be "told promptly and in detail ... about the nature and reason for the charge" and are to be "tried without unreasonable delay".

Section 22(2) of the HRA is more than a mere codification of the 'justice delayed' maxim. Part 5A of the HRA imposes a duty upon any public authority to act consistently with human rights. As such, any ACT regulator must have regard to section 22 of the HRA when investigating an alleged breach, and also when developing a prosecution brief for the DPP about any identified breaches. Furthermore, the DPP itself will also be subject to the same duty.

Where a significant delay in initiating a prosecution has occurred, a defendant will have the right to apply to the court for a permanent stay of prosecution – essentially permanently barring any further pursuit of the alleged offences.

Submission to the DPP

Once a prosecution brief is prepared it must be submitted at the earliest opportunity to the DPP in order to give the DPP sufficient time in which to review the brief. In the ACT the decision whether or not to proceed with a prosecution, or which charges to prefer, is a matter for the DPP. Accordingly, upon reviewing a prosecution brief the DPP can request further evidence be provided from ACT Health, or it may elect not to pursue some or all of the charges. If the DPP does elect to proceed with a prosecution, charges are filed with the Court thereby initiating a prosecution.

Case Study

Prosecution of a Belconnen grocery store

Michael Fitzsimons and Renae Beardmore, Pharmaceutical Services, Population Health Division

The *Medicines, Poisons and Therapeutic Goods Act 2008* regulates all medicines and poison dealings within the ACT. The main objective of this Act is to promote and protect public health and safety by minimising:

- accidental and deliberate poisonings by regulated substances;
- medicinal misadventures related to regulated substances;
- the diversion of regulated substances for abuse;
- the manufacture of regulated substances that are subject to abuse; and
- harm from regulated therapeutic goods.

The *Medicines Poisons and Therapeutic Goods Act 2008* other objectives include ensuring that consumers of prescription medicines have adequate information and the understanding necessary to allow them to use the medicines safely and effectively; and consumers of non-prescription medicines have adequate information and the understanding to allow them to select the most appropriate medicines for their condition and to use the medicines safely and effectively, taking into account the conditions of their health.

The Health Protection Service within ACT Health received a call on the 30 June 2014 from a member of the public alerting them of the sale of prescription only medicines from a grocery store in Belconnen. Medicines and poisons inspectors from the Health Protection Service inspected the store shortly after the alert. While inspecting the premises, the inspectors found and seized over 1000 tablets, capsules and powders allegedly for sale and labelled to contain the following scheduled medicines:

- amoxycillin - a schedule 4 substance (Prescription Only Medicine);
- neomycin - a schedule 4 substance (Prescription Only Medicine);
- sulfanilamide - a schedule 4 substance (Prescription Only Medicine);
- chlorpheniramine 4mg - a schedule 3 substance (Pharmacist Only Medicine);
- chlorpheniramine 2mg - a schedule 2 substance (Pharmacy Medicine).
- Amoxycillin, neomycin and sulfanilamide are antibiotics used for the treatment of susceptible infections. Chlorpheniramine is a sedating antihistamine used for the treatment of allergies, motion sickness, and cold and flu symptoms.

The Health Protection Service confirmed via testing that the products contained the labelled medicines. These medicines are all schedule medicines in the Poisons Standard, which is made under section 52D(2)(b) of the Commonwealth's T*herapeutic Goods Act 1989*. The ACT adopts the Poison Standard by reference in the *Medicines, Poisons and Therapeutic Goods Act 2008*. Under the Poisons Standard, a substance listed in:

- schedule 2 (Pharmacy Medicine), is a substance that the safe use may require professional advice and should be available from only a pharmacy, or where there is no pharmacy, a licensed person;
- schedule 3 substance (Pharmacist Only Medicine), is a substance that the safe use requires professional advice from a pharmacist but can be supplied without prescription; and
- schedule 4 (Prescription Only Medicine), is a substance that should be prescribed by an authorised person, such as a doctor, and supplied on prescription from a pharmacist.

The supply of scheduled substances by non-authorised persons can be a serious public health risk. For the medicines seized, the risks are as follows:

1. amoxycillin:
- ineffective treatment of infection;
- increased antibiotic resistance within the community; and
- severe anaphylaxis and death in susceptible people;
2. neomycin:
- ineffective treatment of infection;
- increased antibiotic resistance within the community; and
- ear and kidney damage, even at recommended doses;
3. sulfanilamide:
- ineffective treatment of infection;
- increased antibiotic resistance within the community; and
- blood discrasias (agranolocytotis, aplastic anaemia), severe skin and liver reactions, which could seriously injure or lead to death of a patient;
4. chlorpheniramine:
- increased drowsiness, sedation, and decreased a person's reaction time, which if patient is unaware, they could cause an accident that leads to permanent injury or death to themselves or another person.

On 3 March 2016, the ACT Magistrates Court convicted the director of Capital Groceries Pty Ltd in Belconnen, after they pleaded guilty, to seven charges of supplying a declared substance without authorisation under section 26(1) of the *Medicines, Poisons and Therapeutic Goods Act 2008*. The ACT Magistrates Court fined the owner a total of $7405. The seizure of medicines from and prosecution of, an unauthorised person illustrates that the provisions under the *Medicines, Poisons and Therapeutic Goods Act 2008* have met its objectives to protect public health and safety.

Section Highlight

Legal Policy Office

The Health Protection Service manages risks and implements strategies for the prevention of, and timely response to, public health incidents. This is achieved through a range of policy activities and the exercise of regulatory powers under ACT public health-related legislation, including the *Public Health Act 1997*, the *Food Act 2001*, the *Medicines, Poisons and Therapeutic Goods Act 2008*, and the *Radiation Protection Act 2006*. The Health Protection Service also has policy responsibility for ACT tobacco and smoking related legislation, and conducts analytical services for a range of ACT legislation and some Commonwealth legislation.

The Legal Policy Officer for the Health Protection Service provides specialist advice and guidance on:

- development of new legislation and amendments to existing legislation,
- implementation of legislative reforms and programs; and
- the exercise of the regulatory powers and functions of the Health Protection Service, including:
  - the usage of inspection and enforcement powers,
  - licensing and registration considerations and processes,
  - construction of legal instruments; and
  - statutory interpretation.

Photograph: Brett Purdue

To contact the Legal Policy Office, Health Protection Service - (02) 6205 1700 or hps@act.gov.au

Notifiable Disease Report

	1st QTR 2016	YTD Average 2011-2015	Ratio YTD:YTD average	Annual Total 2015	Annual Average 2011-2015
VACCINE PREVENTABLE CONDITIONS					
INFLUENZA	**60**	40.0	**1.5**	1205	791.0
PERTUSSIS*	**71**	123.6	**0.6**	486	442.0
GASTROINTESTINAL DISEASES					
CAMPYLOBACTERIOSIS	**154**	136.0	**1.1**	608	492.6
CRYPTOSPORIDIOSIS	**11**	12.6	**0.9**	26	25.4
GIARDIA	**47**	39.2	**1.2**	140	121.6
HEPATITIS A *	**1**	1.0	**1.0**	3	3.2
HEPATITIS E	**1**	0.4	**2.5**	0	1.0
LISTERIOSIS	**0**	0.2	**0.0**	1	0.8
SALMONELLOSIS	**81**	74.4	**1.1**	236	226.8
SHIGELLOSIS	**3**	2.8	**1.1**	7	7.8
STEC/VTEC	**0**	0.4	**0.0**	0	2.8
TYPHOID	**0**	0.6	**0.0**	2	2.2
YERSINIOSIS	**7**	2.0	**3.5**	22	9.8
SEXUALLY TRANSMITTED INFECTIONS					
CHLAMYDIA	**389**	332.6	**1.2**	1266	1255.2
GONOCOCCAL INFECTION	**49**	37.6	**1.3**	141	118.8
VECTORBORNE & ARBOVIRUS					
BARMAH FOREST VIRUS INFECTION	**0**	1.6	**0.0**	2	2.6
CHIKUNGUNYA^	**0**	0.2	**0.0**	3	0.6
DENGUE FEVER*	**13**	5.2	**2.5**	19	16.8
LEPTOSPIROSIS	**0**	0.2	**0.0**	1	0.4
MALARIA	**5**	3.4	**1.5**	7	9.8
Q FEVER	**0**	0.0	**N/A**	0	0.6
ROSS RIVER VIRUS INFECTION	**4**	3.2	**1.3**	10	7.6
RESPIRATORY CONDITIONS					
TUBERCULOSIS #	**9**	5.4	**1.7**	15	20.0

All Diseases except Tuberculosis are reported by onset date or closest known test date. Tuberculosis is reported by notification date.

* This condition includes cases that meet the probable and confirmed case definitions. Both probable and confirmed cases are nationally notifiable.

^ Chikungunya infection is received as a notification of an arbovirus not otherwise specified, as it is not currently notifiable. As a result, it is possible that reporting may be incomplete.

For the relevant year, Q1 refers to 1 January to 31 March, Q2 refers to 1 April to 30 June, Q3 refers to 1 July to 30 September, Q4 refers to 1 October to 31 December.

YTD refers to 1 January to 31 March.

N.B. Data reported are the number of notifications received by ACT Health. Data are provisional and subject to change.

The number of notifications received for all notifiable diseases in the ACT is available at http://www9.health.gov.au/cda/source/cda-index.cfm

HIV data are reported annually by the Kirby Institute: http://www.kirby.unsw.edu.au/surveillance/Annual-Surveillance-Reports

Notifiable Disease Report

Number of notifications of selected notifiable diseases received in the Australian Capital Territory between 1 January to 31 March 2016

Overview

There were no cases of measles, mumps, rubella or invasive meningococcal disease notified in the first quarter of 2016.

Gastrointestinal Diseases

ACT Health was notified of one case of Hepatitis A and one case of Hepatitis E in the first quarter of 2016. Hepatitis A and E viruses infect the liver and the resulting illnesses follow a similar clinical course. Symptoms usually include fever, generalised aches and pains, nausea, lack of appetite and abdominal discomfort followed by dark urine, pale stools and jaundice. Both pathogens are typically transmitted by the faecal-oral route. People who live in, or travel to, countries with poor sanitation are at most risk. Both cases this quarter acquired their infections through recent travel to Asia.

The incidence of foodborne disease usually increases in the warmer months. In the first quarter of 2016, notifications of pathogens typically responsible for foodborne disease were similar to the five year first quarter average.

There were eight outbreaks investigated during the first quarter of 2016 that were determined to be of probable foodborne origin. Five of these outbreaks were notified through complaints from the public and were subsequently investigated. Of these, two outbreaks were likely toxin-mediated, one was suspected norovirus, and two had an unknown cause. Three outbreaks were identified through routine interviewing of notified *Salmonella* cases.

There were 12 laboratory confirmed cases of Salmonella identified across three outbreaks this quarter, including two hospitalised cases. Two of the outbreaks, linked to two separate food premises, were caused by a relatively new and uncommon strain of *S. typhimurium* with the same sub-type. Eggs sourced from a common production facility were identified as the probable source in these two outbreaks, accounting for eight cases. However, it is not clear how the bacteria were transmitted within the food premises. The third outbreak, affecting four people, was caused by a different strain of *S. typhimurium*. The source of this outbreak remains unknown.

Vectorborne and Arbovirus

There were thirteen notifications of dengue virus infection notified in the first quarter of 2016, which is more than twice the five year first quarter average (n=5.2). Dengue is a viral illness spread by the *Aedes aegypti* mosquito. The virus itself is not endemic in Australia, but there is potential for transmission locally due to the presence of *Aedes aegypti* in parts of northern Australia. Symptoms typically include sudden fever, chills, severe headache with pain behind the eyes, swollen glands, muscle and joint pain and extreme fatigue. All thirteen adults diagnosed with dengue infection this quarter acquired their infections overseas, primarily in countries in south and south-eastern Asia (n=9).

The ACT received five notifications of malaria this quarter, which is slightly more than that expected for the period. Malaria is a serious and sometimes life-threatening infection of the liver and red blood cells caused by microscopic parasites. Malaria parasites are spread through the bite of certain mosquitoes. Mainland Australia is free of malaria, therefore local transmission of the illness is not expected. Almost all cases of malaria diagnosed in Australia are in people who have travelled to malaria-affected countries. The five cases notified this period were in adults who acquired their infections overseas, mostly in Africa (n=3).

Ross River virus infections are the most common mosquito-borne infection in Australia. The symptoms usually include fever with joint pain and swelling, which may then be followed by a raised red rash affecting mainly the trunk and limbs. ACT Health was notified of four cases in the first quarter of 2016, which is not unexpected. All four cases acquired their infection interstate.

The best way that travellers can reduce the risk of becoming infected with a mosquito-borne virus is to take measures to prevent being bitten. This includes using appropriate repellents, mosquito nets and covering up with long sleeved shirts and trousers. Preventative medication can also be used for malaria.

For more information see see http://www.health.nsw.gov.au/Infectious/factsheets/Pages/mosquito.aspx

Have a Healthy Winter

Influenza is a respiratory illness caused by the influenza virus and affects people of all ages. Each year influenza, commonly known as the "flu", causes significant illness in the community, which can lead to serious complications, hospitalisation and even death. Flu vaccination is the single most effective action in preventing influenza. Vaccination with seasonal flu vaccine is recommended each year, because the composition of the vaccine changes annually to match the circulating virus and immunity from flu vaccination only lasts about 12 months.

There are two types of influenza vaccine registered for use in Australia:

- Trivalent influenza vaccine (TIV), which contains three strains of influenza viruses (two A subtypes and one B lineage), and
- Quadrivalent influenza vaccine (QIV), which contains four strains of influenza viruses (the same A subtypes and the B lineage in TIV, plus a second influenza B virus from another B lineage).

There are certain groups who are more at risk of severe complications and are eligible to receive a free seasonal flu vaccine. QIV is funded for these people through the National Immunisation Program. These groups are;

- people aged 65 years and over,
- pregnant women,
- Aboriginal and Torres Strait Islander peoples aged 6 months to 5 years,
- Aboriginal and Torres Strait Islander peoples aged 15 years and over, and
- individuals aged 6 months and over with existing medical conditions.

Influenza vaccine is also recommended, but not nationally funded for Health Care Workers, household contacts of people in high risk groups and anyone who wants to avoid being sick with the flu. For more information see http://www.health.act.gov.au/our-services/immunisation