ENVIRONMENTAL HEALTH DIRECTORATE

YEARBOOK 2017-18

Government of **Western Australia**
Department of **Health**

This yearbook outlines the work of the Environmental Health Directorate, in the Public and Aboriginal Health Division of the Department of Health, Western Australia, for the 2017-18 financial year.

From the Executive Director

The Environmental Health Directorate (EHD), in partnership with Western Australian local governments, plays a critical role in maintaining a safe environment for people living and travelling in Western Australia (WA). This yearbook showcases a selection of the many roles and responsibilities of officers of the EHD, who are both passionate and dedicated to promoting good health, managing risks and preventing disease associated with various environmental impacts.

The EHD celebrated a number of significant achievements during 2017-18. We played a pivotal role in the investigation into the lead in Perth Children's Hospital's potable water supply and scoping of remedial works required to ensure the water supply met all necessary standards. Following the success of this work, the staged opening of the hospital began in May 2018. Our officers continued to review all relevant regulations adopted under the *Health (Miscellaneous Provisions) Act 1911*, as well as a number of provisions within that Act that will be repealed at stage 5. The WA Aboriginal Environmental Health Program's profile was elevated following recognition of the services provided by Aboriginal environmental health practitioners by external agencies in both WA and other jurisdictions. The EHD also led the country in the development of guidance on risk management addressing the growing public health issues arising from residual contamination following the use of methylamphetamine. This is by no means an exhaustive list of achievements, so I encourage you to take the time to peruse this Yearbook in order to appreciate the significance, depth and variety of work undertaken by the EHD.

I also thank EHD staff and our stakeholders for their ongoing commitment to managing and minimising environmental risks to health in WA, which in turn plays a significant role in safeguarding the wellbeing of all individuals visiting and living in this great State.

Executive Director
Environmental Health Directorate
Public and Aboriginal Health Division
Department of Health, Western Australia

Contents

Values and Behaviours

ARCTIC

Accountability

- We act responsibly in everything we do.
- We will hold ourselves and others to account.

Respect

- We look after our people - they are our most valued asset.
- We listen and treat others with respect and seek to understand their needs.

Critical Thinking

- We review and assess current practices to make sure we manage risk in the best possible way.
- We are curious and not afraid to question, review and assess evidence to address emerging risks.

Integrity

- We will always act with integrity and impartiality.
- We use fairness and equity when interacting with people and dealing with issues.

Collaboration

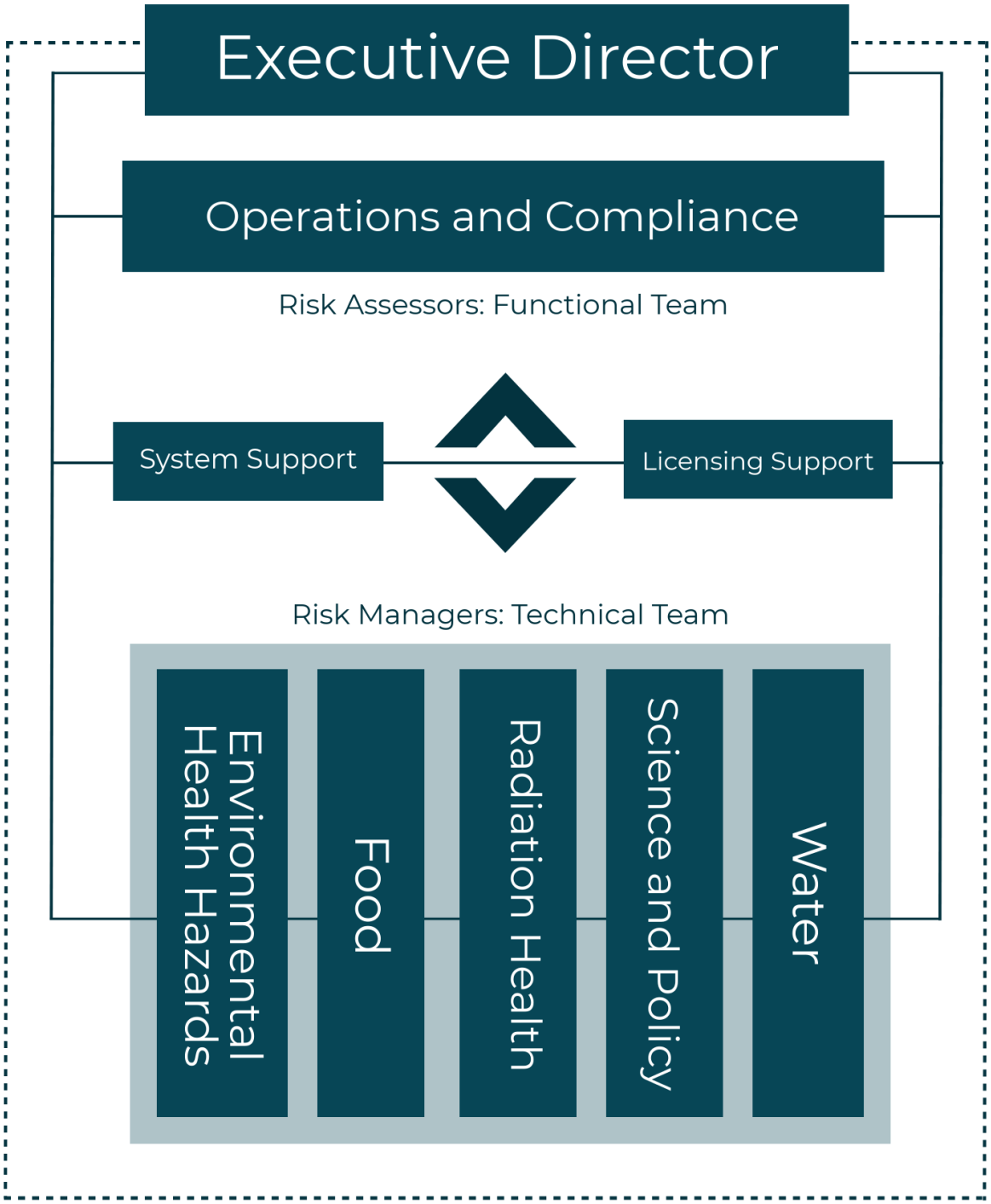
- We will work together across disciplines, maximising each other's strengths to achieve positive outcomes.
- We encourage our people and organisation to grow in knowledge and capacity to share.

Glossary

ACNF	Advisory Committee on Novel Foods
CBA	Cost benefit analysis
CLAG	Contiguous Local Authorities Group
DAP	Development Assessment Panel
DAWR	Department of Agriculture and Water Resources
DPIRD	Department of Primary Industries & Regional Development
EHA	Environmental Health Australia
EHD	Environmental Health Directorate
Food Act	*Food Act 2008*
FSANZ	Food Standards Australia and New Zealand
ISFR	Implementation Subcommittee for Food Regulation
PCH	Perth Children's Hospital
PFAS	Poly-fluoroalkyl substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
Public Health Act	*Public Health Act 2016*
SAFE	Surgery, antibiotics, facial cleanliness, environmental health
SCK	Squeaky Clean Kids
TMV	Thermostatic mixing valve
WA	Western Australia
TRAP	Traffic-related air pollutants
WACHS	Western Australia Country Health Service
WALGA	Western Australian Local Government Association

Operating structure

The Environmental Health Directorate (EHD), led by Executive Director Jim Dodds, was one of seven Directorates within the Public and Aboriginal Health Division of the WA Department of Health, in 2017-18. During this time, the EHD continued to undergo a significant structural change to reflect the Department of Health's transition to the role of system manager and a shift in human resources.



Enabling Legislation

The EHD administers a wide range of Acts and regulations, including those listed below, as well as relevant Codes of Practice:

Public Health Act 2016
Health (Miscellaneous Provisions) Act 1911

Environmental Health Hazards

Construction Camp Regulations
Fly Eradication Regulations
Health (Air-handling and Water Systems) Regulations 1994
Health (Asbestos) Regulations 1992
Health (Cloth Materials) Regulation 1985
Health Act (Carbon Monoxide) Regulations 1975
Health (Garden Soil) Regulations 1998
Hairdressing Establishment Regulations 1972
Health (Skin Penetration Procedure) Regulations 1998
Health (Offensive Trades Fees) Regulations 1976
Health (Construction Work) Regulations 1973
Health Act (Laundries and Bathrooms) Regulations
Health (Public Buildings) Regulations 1992
Health (Rottnest Island) By-laws 1989
Health (Pesticides) Regulations 2011
Health (Prescribed Insect Pests) Regulations 1991
Health (Notification of Lead Poisoning) Regulations 1985
Health (Section 112(2) Prohibition) Regulations 2006
Piggeries Regulations 1952
Registration, Enforcement and Discharge of Local Authority Charges on Land Regulations
Sewerage (Lighting, Ventilation and Construction) Regulations 1971

Food

Food Act 2008
Food Regulations 2009

Water

Fluoridation of Public Water Supplies Act 1966
Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974
Health (Temporary Sanitary Conveniences) Regulations 1997
Health Act (Underground Water Supply) Regulations 1959
Health (Aquatic Facilities) Regulations 2007

Radiation Health

Nuclear Waste Storage and Transportation (Prohibition) Act 1999

Radiation Health as secretariat to the Radiological Council

Radiation Safety Act 1975
Radiation Safety (General) Regulations 1983
Radiation Safety (Qualifications) Regulations 1980
Radiation Safety (Transport of Radioactive Substances) Regulations 2002

Science and Policy

Tobacco Products Control Act 2006
Tobacco Products Control Regulations 2006

Major achievements

Perth Children's Hospital lead contamination investigation	Investigation over 12 months, analysis of 7,500+ results, identification of cause and advice on solutions, assuring satisfactory outcome to facilitate hospital opening.
Supporting Stage 5 *Public Health Act 2016*	Release of two regulatory review discussion papers and a local government public health planning guide to support Stage 5 of the *Public Health Act 2016.*
WA Foodborne Illness Reduction Strategy 2018-2021+	A new collaborative approach between government and industry has been created to drive down the rate of foodborne illness in Western Australia.
Illicit drug residue guidance	Development of an interim protocol and guidance package on managing health risks from illicit drug residues in residential housing.
Aboriginal environmental health workforce development	Partnered in the delivery of Certificate II Indigenous Environmental Health courses, bringing the total number of WA Aboriginal environmental health practitioners with the qualification (or higher) to 47.

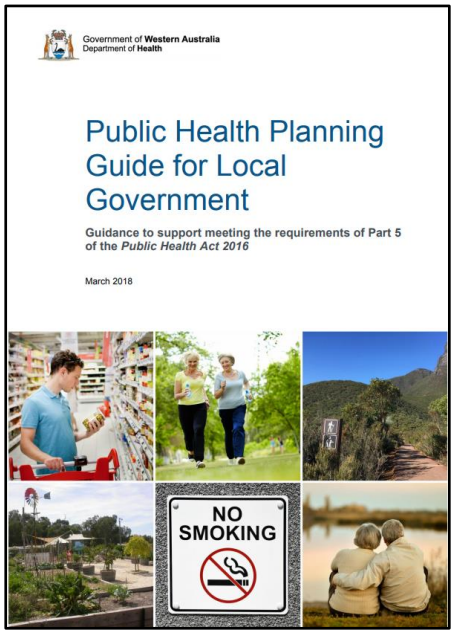
Public Health Act 2016: 2016-17 reporting

On 1 July 2017, local governments were asked to participate in the Department of Health mandatory reporting survey required under the *Public Health Act 2016* (Public Health Act), as well as respond to a number of optional reporting questions. The outcomes of both surveys were released via the following documents:

- 2016-17 *Public Health Act 2016* Enforcement Agency Reporting
- 2016-17 Results of Local Government Optional Reporting Survey
- 2016-17 Local Government Optional Reporting Snapshot infographic

Public Health Planning Guide for Local Government

The EHD published the Public Health Planning Guide for Local Government to support enforcement agencies to prepare a local public health plan that meets the requirements of stage 5 of the Public Health Act. The document aims to provide practical advice and links to further tools to support people who are responsible for preparing a local public health plan.



Funding to broaden skills in public health intervention course

The EHD organised funding for 16 local government environmental health officers, valued at over $1000 per person, to participate in Curtin University's School of Public Health course, to broaden their skills in planning, implementing and evaluating public and environmental health programmes at a local community level. The 12-week course involves a series of online courses and interactive seminars, providing a great opportunity for individuals wanting to broaden their skills in public health planning.

Submissions for the Interim State Public Health Plan

The EHD, in partnership with the Department of Health's Epidemiology Branch, coordinated the drafting of and six-month consultation process for the First Interim State Public Health Plan on behalf of the Chief Health Officer. A total of 63 responses were received from various stakeholder groups. Local government represented 33 per cent of responses received. The Chief Health Officer is in the process of reviewing the plan based on feedback and will aim to release a revised version mid-2019.

Regulatory review program

In the lead up to stage 5 of implementation of the Public Health Act, the EHD has continued to play a key role in the review of all relevant regulations adopted under the *Health (Miscellaneous Provisions) Act 1911*, as well as a number of provisions within that Act that will be repealed at stage 5. The aim is to determine whether these public health risks must continue to be regulated under the new regulatory framework provided by the Public Health Act or can be managed in other ways such as a local law, other legislation or a guideline.

All regulatory proposals are subject to the Regulatory Impact Assessment process, administered by the Better Regulation Unit (Department of Treasury). The first stage of this two-tiered process involves undertaking a Preliminary Impact Assessment to determine any potential impacts that a regulatory proposal may have on business, (including Government businesses), consumers or the economy. In the event that the Preliminary Impact Assessment identifies a significant impact, a Regulatory Impact Statement must then be undertaken to ensure the costs of regulatory instruments are properly considered and broad consultation is undertaken beyond the interest group directly affected by the change. This process formalises and provides evidence of the analysis undertaken, supporting good policy development processes. Further information on the regulatory review program can be accessed on the Department's website.

Cost benefit analysis training

As part of the EHD's commitment to developing quality legislation, officers from the Directorate have been working closely with the Better Regulation Unit to educate our staff on their requirements. In February 2018, the EHD took part in Cost Benefit Analysis (CBA) training provided by the Better Regulation Unit. CBA is a systematic approach to calculating and comparing the benefits and costs of legislation or policy, with the aim of comparing potential courses of action or evaluating the desirability of a single decision, project, or policy. EHD officers in attendance will use the skills and knowledge acquired from this opportunity to support the development of future management options under the Public Health Act.

Red tape reduction and Rapid Assessment Tool workshop

EHD officers have been working closely with the Department of Treasury's Red Tape Reduction Team and Better Regulation Unit to educate staff on State government processes that aim to reduce red tape.

EHD officers and members of the Public Buildings Working Group took part in a Rapid Assessment Tool (RAT) workshop, applying the public buildings approvals process as an example. The session was useful in highlighting the many points of frustration to not only customers but local government in the public buildings approval process. The information will be used to support the review of the *Health (Public Buildings) Regulations 1992*.

EHD officers attending the RAT workshop

Events working group

Research on public health risks at events is underway as part of the review of the *Health (Public Buildings) Regulations 1992.* A discussion paper will propose future management strategies for these risks, and the Events Working Group was formed to represent the views of stakeholders in their development. The group is made up of representatives from metropolitan and regional local government authorities and the event industry.

Public buildings discussion paper

The maintenance and safety of public assembly buildings is currently managed by authorised officers under the *Health (Public Buildings) Regulations 1992*. In consultation with the Public Buildings Working Group, a discussion paper, Managing public health risks in public buildings in Western Australia has been developed to examine current risks and outline options and proposals for their ongoing management. The paper is open for consultation until 17 January, 2019.

The EHD has also been working closely with the Building Commission to reduce duplication between the Public Buildings Regulations and the Building Codes of Australia and has released an industry bulletin.

Pesticide safety discussion paper

Research on pesticide safety regulation is being conducted as part of the review of the *Health (Pesticides) Regulations 2011.* A discussion paper will propose future management strategies for pesticide safety risks for WA. This is an interesting area that has stakeholder interests across many different areas including the pesticide industry, primary producers, local government, Department of Water and Environmental Regulation, Department of Primary Industries and Regional Development (DPIRD), Department of Mines, Industry Regulation and Safety, as well as an ongoing public interest in chemical safety.

Temporary sanitation provision

As part of the regulatory review program, the EHD released a discussion paper which reviews the requirement to provide a temporary toilet at a construction site under the existing *Health (Temporary Sanitary Conveniences) Regulations 1997* and the *Health (Construction Work) Regulations 1973*. The paper explores how the management of sanitation provision and maintenance on construction sites and mobile, temporary or remote worksites in WA should occur in the future. The consultation period is now closed.

Offensive trades workshop

The EHD and Western Australian Local Government Association (WALGA) coordinated a workshop (February 2018) on the review of the Offensive Trade provisions in the *Health (Miscellaneous Provisions) Act 1911* and associated regulations. The workshop was well received by the 31 attendees who represented 19 local governments and 2 State departments. Eight local governments also participated via webinar and were able to provide their feedback electronically as the workshop progressed. The outcomes of this workshop and input from local government will assist the EHD in developing options that could be pursued within the review.

Aquatic facilities working group and discussion paper

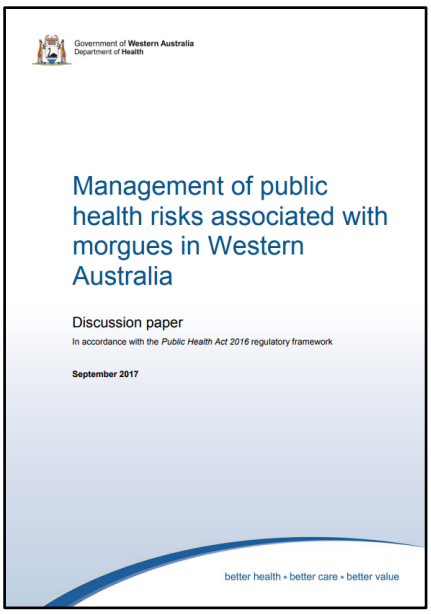
The EHD released a discussion paper, Management of public health risks associated with aquatic facilities in WA, summarising the current and future management options for aquatic facilities. In preparing the paper, members of the Public Health Act Regulation Group were invited to join an aquatic facilities working group with 11 representatives from local government and WALGA. The discussion paper is open for consultation until 30 November, 2018.

Public buildings bulletin for industry

In late 2017, the Public Buildings Working Group, established by the Department of Health, raised concerns about the lack of consideration given to the Public Buildings Regulations by building professionals during the building design and certification process. To combat this issue, the Working Group, in partnership with the Building Commission (Department of Mines, Industry Regulation and Safety), composed and released the Industry Bulletin 99, which was circulated to building professionals. This is an important interim measure while the regulations are under review.

Morgues discussion paper released

The Management of public health risks associated with morgues in WA discussion paper was released in September 2017, focussing on determining the best option for managing the public health risks associated with the temporary storage of human remains (morgues) in a manner which maintains public health. A total of 23 submissions were received. Responses will be used to support future risk management options for WA.



ABORIGINAL ENVIRONMENTAL HEALTH

$8.27 million in Aboriginal environmental health expenditure

22

Aboriginal environmental health service providers

71

FTE staff employed by service providers to deliver program

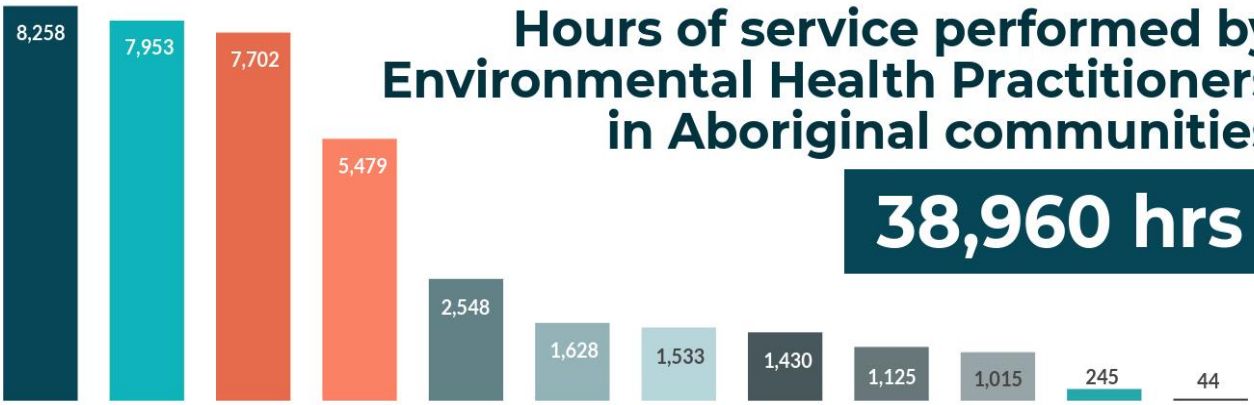
72% Staff employed by service providers with Certificate II Indigenous Environmental Health qualification or higher

EHD Aboriginal Environmental Health Program team members in Derby with members of the Shire of Derby West Kimberley's Aboriginal Environmental Health team

Milpa the Strong Eyes goanna mascot and Robert Mullane, Manager of the Aboriginal environmental health program, packing towels for distribution to remote communities

Hours of service performed by Environmental Health Practitioners in Aboriginal communities

38,960 hrs



Aboriginal Environmental Health Program

2017-18 was a busy period for the WA Aboriginal Environmental Health Program. The services provided by Aboriginal environmental health practitioners were acknowledged by other agencies in both WA and other jurisdictions, elevating the program's profile. New activities were incorporated into the suite of services the program provides and the best of these consolidated as part of the program's core business and service delivery model. They include:

- Partnership with WA Country Health Service (WACHS) in the roll-out of the *Squeaky Clean Kids* program;
- The provision of *Safe Bathroom* assessments in community households, where trachoma has been or continues to be an issue;
- Support for the facial cleanliness (F) and environmental health (E) components of the SAFE strategy to eliminate trachoma in WA;
- Closer working relationships with WA's Housing Authority (Department of Communities) and its regionally based housing management and tenancy support agencies to support the healthy homes and healthy people;
- Referrals from community clinics to service providers for environmental health assessment and interventions in the homes of people with preventable contagious conditions;
- Revising Community Environmental Health Action Plans; and
- Presentation at and participation in a series of workshops in regional (3) and metropolitan (1) areas about prevention and treatment of acute rheumatic fever and rheumatic heart disease.

Aboriginal environmental health workforce development

The EHD partnered with two Registered Training Organisations to deliver four Certificate II Indigenous Environmental Health courses in the Kimberley, Pilbara, Midwest and Goldfields regions. A total of 47 Aboriginal environmental health practitioners employed by agencies contracted to the Department of Health completed Certificate II, bringing the total number of staff employed in the program with a qualification equivalent to Certificate II or higher to 72 per cent. This is a significant achievement and ensures that practitioners have the appropriate skills to improve environmental health conditions in remote communities.

Under the State's plumbing regulations, the completion of Certificate II ensures an Aboriginal environmental health practitioner is permitted to provide timely basic and emergency plumbing repairs in remote Aboriginal communities. This valued assistance supports the *Safe Bathroom* program, to reduce the negative impact that poorly functioning plumbing can have on an individual's health and living conditions.

Health practitioners undertaking Certificate II Indigenous Environmental Health training in Kalgoorlie

Reducing trachoma in Aboriginal communities

The EHD continued to support the WA Country Health Service's *Squeaky Clean Kids* program, aimed at eliminating trachoma. This debilitating eye disease is found only in remote Aboriginal populations, so there is a concerted national push to eliminate the condition by 2020. Australia has adopted the SAFE approach to reducing disease incidence which considers surgery, antibiotics, facial cleanliness and environmental health. Traditionally, efforts have been focussed on screening and identifying cases of trachoma, performing surgery on adults with advanced disease and administering antibiotics to affected children. Whilst this has had a significant impact on trachoma rates in WA remote communities, facial cleanliness (F) and environmental health (E) related interventions are becoming increasingly recognised as key preventative measures that will play a role in eliminating the disease.

Squeaky Clean Kids has been widely embraced by the Aboriginal environmental health practitioner workforce. As experts in local knowledge and culture, individuals have been working with trachoma 'at risk' communities to better improve the F and E components of SAFE. Resources available (free of charge) for those involved in the program include:

- ***Soap***: Supplied by Soap Aid for schools and homes in identified communities;
- ***Soap holders***: to ensure soap is readily accessible in showers;
- ***Towel hooks***: to encourage individual towel hanging and discourage shared towel use;
- ***Acrylic mirrors***: 3000 donated by Rotary Melbourne for home/school installation at children's height;
- ***Stickers*** (see below): Developed by the EHD and Bundiyarra Aboriginal Community Aboriginal Corporation's environmental health team (Geraldton) to promote face washing. The sticker has been adopted as a resource by environmental health programs in other Australian jurisdictions.

Under the *Squeaky Clean Kids* program, the Aboriginal environmental health workforce facilitates the distribution of soap in schools and homes where trachoma has been or remains endemic. They also undertake referrals for assessments of health hardware in homes to ensure individuals have access to facilities that allow them to wash themselves and their children. These referrals include a *Safe Bathroom* assessment.

The *Safe Bathroom* assessment process determines the effectiveness of bathroom plumbing (health hardware) and that the bathroom facilities are safe for people to wash in. To support facial cleanliness (F), mirrors are offered to schools and homes and installed at a height in bathrooms where young children can see their faces. Soap holders and towel hooks can be installed by environmental health practitioners to better support improved hygiene in shared bathrooms. When a *Safe Bathroom* assessment is complete, a sticker (below) is placed between the hand basin and the mirror to encourage individuals to wash their face when washing hands.

Safe Bathroom sticker

Aboriginal environmental health practitioner training

The EHD delivered nine training sessions across the Kimberley, Pilbara, Midwest and Goldfields regions, focusing on the environmental health component of the *Squeaky Clean Kids* program and the implementation of *Safe Bathroom* assessments. Environmental health practitioners were guided through the process of how to offer and conduct a *Safe Bathroom* assessment, as well as manage repairs and referrals to housing maintenance agencies.

In line with a consultative approach across government, *Safe Bathroom* assessments have been formally endorsed by the Housing Authority (WA), who wrote to all funded environmental health service providers stating support for the initiative. This support has dramatically influenced the *Safe Bathrooms* roll-out across WA. Early indications are that health hardware in bathrooms is improving and householders appreciate the level of interaction and assistance provided by environmental health practitioners in their homes.

Aboriginal and Torres Strait Islander Environmental Health Conference

WA Aboriginal environmental health practitioners represented the largest jurisdictional participation of presenters at the 11th National Aboriginal and Torres Strait Islander Environmental Health Conference held in September 2017 in Cairns.

The aim of the conference is to increase the understanding and awareness of environmental health issues in Aboriginal and Torres Strait Islander communities, with a key focus on Aboriginal and Torres Strait Islander environmental health practitioners. The presentations showcased many of the varied activities the program has in WA and there is strong interest from other states to incorporate these into their own programs. The 12th National Conference will be held in Perth in September 2019.

Squeaky Clean Kids and *Safe Bathroom* checklist training in Kununurra

TOBACCO COMPLIANCE

2,135

Store visits and/or audits related to the Tobacco Products Control Act 2006

65	50	41	3
Complaints investigated	Infringements written	Warnings issued	Prosecutions

Tobacco licensing

3,155	493
Tobacco licences renewed	New licences issued

14 of the new tobacco licences issued involved premises intending to sell shisha

11

Training sessions conducted

Tobacco Compliance Survey

Since 1992, the EHD has coordinated surveys of tobacco retailers in the Perth metropolitan area. These surveys measure compliance with the *Tobacco Products Control Act 2006*, in terms of determining the proportion of retailers who are willing to sell tobacco products to minors.

The results of a recent survey conducted in September-October 2017 have shown that 90 per cent of all retailers were compliant with the legislation in refusing to sell a tobacco product to a minor. There was also an increasing trend of retailers requesting identification from any person who appeared to look under the age of 25 when attempting to purchase a tobacco product. The results of this latest survey are a significant improvement from previous surveys in which compliance was between 55 and 71 per cent. The recent survey indicating a 90 per cent compliance success rate is the highest recorded compliance percentage across all tobacco compliance studies.

Shisha and the law

Shisha smoking, or hookah, is a method of smoking tobacco sweetened with fruit or molasses sugar through a bowl and hose. Shisha is growing in popularity and has emerged as a compliance issue in WA. In response, the EHD has continued to undertake planned proactive operations to educate business owners about their responsibilities and obligations, and take strong compliance action where necessary.

The updated factsheet titled Shisha and the Law is circulated to new businesses upon application and during inspections. Seven after-hours operations have been conducted in the last year, and results have shown an increasing rate of compliance by licensed shisha businesses.

FOOD

The Food Team works within a food regulatory system responsible for administering the Food Act 2008, with the aim of ensuring food for sale is safe and suitable for human consumption. With functions at the national, state and local government level, the Food Team works to provide leadership, strategic direction, education and statewide coordination of food safety, food regulation and nutrition related matters.

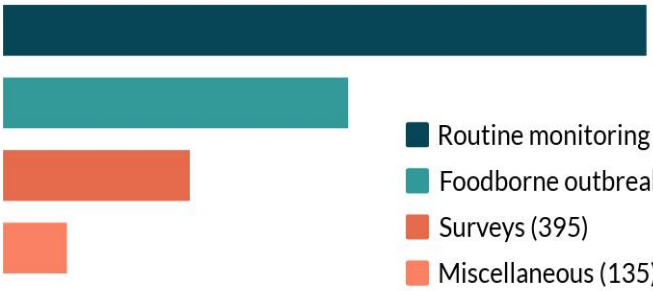
8,994

Responses to incoming enquiries and incidents

6,258	2,520	132	49	35
Telephone enquiries	Email enquiries	Pathogen notifications	Foodborne outbreaks	Food recalls

Food Samples Analysed

total samples **2,621**



- Routine monitoring (1,361)
- Foodborne outbreaks/food poisoning (730)
- Surveys (395)
- Miscellaneous (135)

Audits and Assessments

144 Project work

18 Novel foods

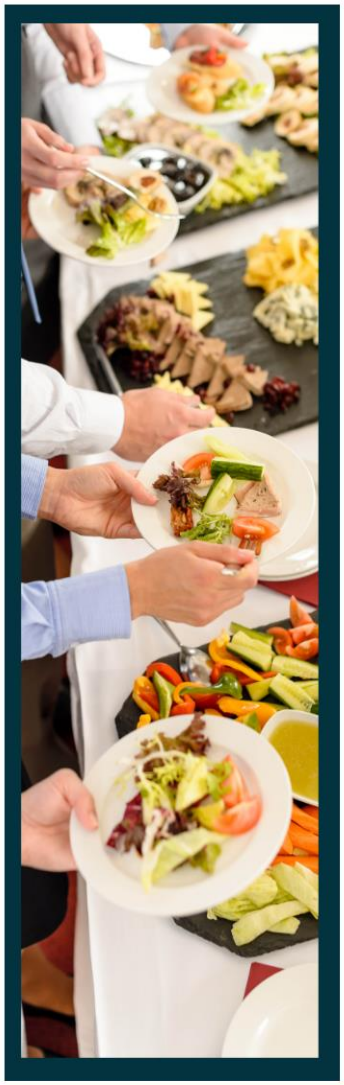
378

128 Meat, dairy and bivalve mollusc processors

88 Public hospitals and food businesses

Food Safety Activities

- Compliance and enforcement (118)
- Applications/renewals (76)
- Presentations (8)
- Publications (5)



Foodborne Illness Reduction Strategy 2018-2021+

The EHD released the WA Foodborne Illness Reduction Strategy 2018-2021+ in June, 2018. The Strategy is a collaborative partnership with input from State and local government agencies, industry stakeholders, producers and researchers.

The aim of the Strategy is to implement a coordinated approach across the WA food supply chain from paddock to plate, to control foodborne pathogens and reduce the level of foodborne illness. It has been developed in response to high rates of foodborne illness, to reduce the number of cases in WA.

The Strategy will align with national-level food industry strategies, and will focus on research, cross industry collaboration and partnerships, communication of shared responsibility across the food industry, primary production, food service and retail monitoring and surveying, and consumer awareness.

Targeted implementation plans will be developed based on food-health risks associated with foodborne illness, including for Campylobacteriosis and Salmonellosis. The first implementation plan will focus on reducing Salmonellosis, as detailed in the infographic below.

Reduction Target

Our aim is to reduce the rate of human cases of foodborne Salmonellosis by 30%.

Priority 1
Consumer Awareness

Informing the public of safe food handling practices in the home kitchen and when buying food.

Priority 2
Stakeholder Engagement

Communicating our shared responsibility to enhance statewide and local food safety culture – across the food industry and government portfolios.

Priority 3
Primary Production and Processing

Managing, surveying and monitoring food safety risks on farm; and in other primary production and processing environments, including transport and storage.

Priority 4
Food Service and Retail

Managing, surveying and monitoring food safety risks in our food service and retail industries.

Priority 5
Partnerships

Strengthening our food regulatory system by formalising partnerships between state and local governments; and food industry bodies.

Priority 6
National Strategies and Policy Development

Implementing the state actions of national-level strategies; and contributing to policy that supports foodborne illness reduction.

Priority 7
Collaborative Research

Collaborating with local researchers to analyse Salmonella risks in the food supply chain.

Foodborne Illness Reduction Strategy 2018-2021+ : Priorities to reduce Salmonellosis

Food poisoning outbreak investigation training

In 2017-18 the EHD, in partnership with OzFoodNet, ran three food poisoning outbreak investigation training workshops directed at local government environmental health officers and public health employees.

The workshops focussed on the roles and responsibilities of the various agencies, together with the purpose and processes involved in food poisoning outbreak investigations. Representatives from the EHD, OzFoodNet, North Metropolitan Health Service, PathWest and officers from the Cities of Melville, Canning and Cockburn delivered presentations to participants. Case studies were shared by officers involved in previous outbreaks and all attendees participated in a practical outbreak investigation. The workshops also provided an opportunity for participants to network with other agencies involved in investigations.

The training was well attended by 57 environmental health officers, representing 31 different local governments. An additional 16 Public Health Unit and four EHD officers participated in the training.

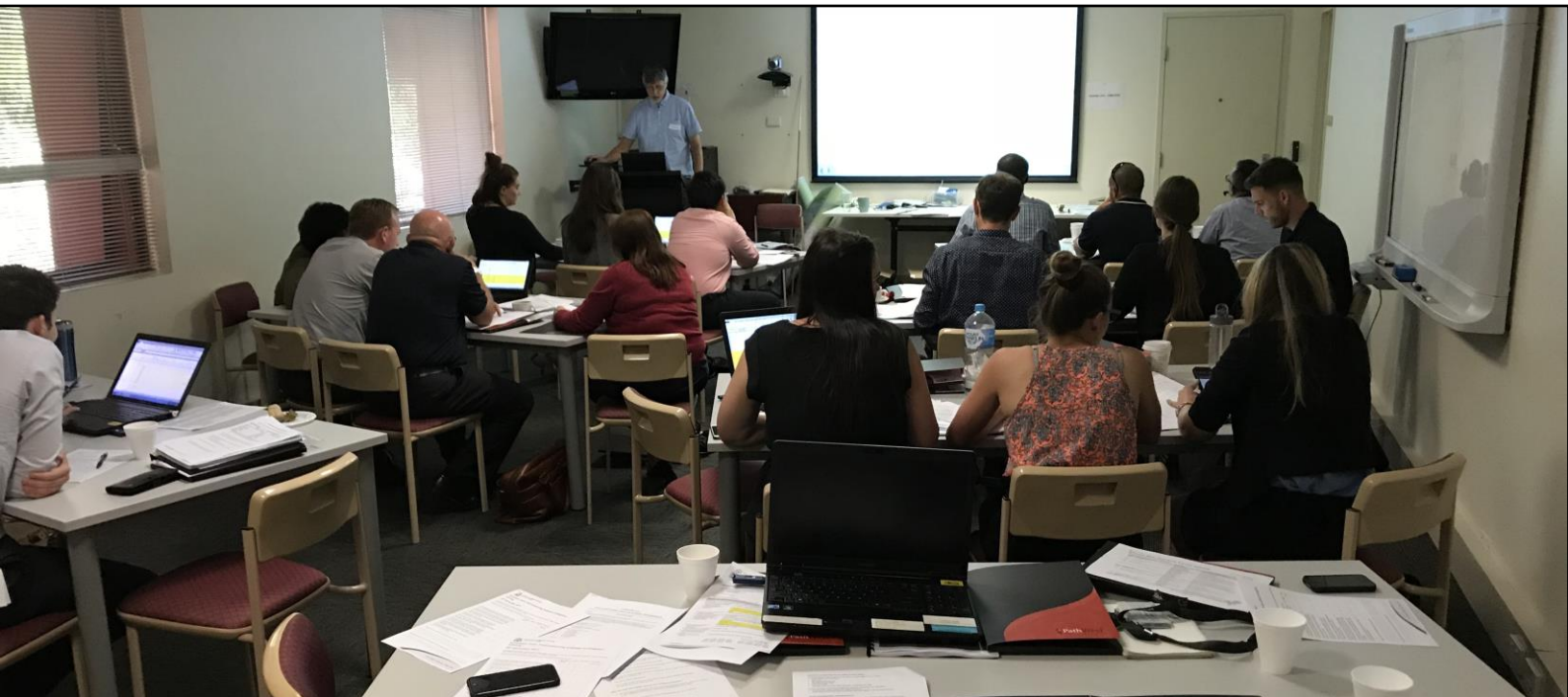
Food Safety Week 2017

During Australian Food Safety Week 2017, the EHD hosted a seminar on *Reducing Foodborne Illness Across the Food Chain*. The seminar outlined the roles and responsibilities of different agencies involved in the management of foodborne illness across the food chain.

Presentations were delivered by representatives from a range of organisations including DPIRD, Murdoch University, local government, OzFoodNet, EHD's Food Unit and the Department of Health's Communications Directorate.

The seminar forms part of the Western Australian Foodborne Illness Reduction Strategy and supports foodborne illness reduction though the development and retention of skills and knowledge within key stakeholders. Topics covered the management of foodborne illness throughout the food chain including primary food production, food service and food safety at home. The seminar was open to local government environmental health officers, government and food industry stakeholders with a role to reduce foodborne illness.

Participants at the *Food Poisoning Outbreak Investigation* training



Our year in review

Raising awareness of brewed beverages

The EHD continued its pursuit to raise awareness of the risks associated with manufacturing brewed beverages, such as kefir, kvass and kombucha tea, through the delivery of a series of presentations throughout 2017-18 to local government. Four presentations were delivered through WA local government regional meetings. A presentation titled *Brewing the Perfect Storm* was presented at the 71st Environmental Health Australia (EHA) State Conference. Based on feedback given both on the day and through an online survey conducted after the conference, the presentation was well received by conference participants.

The aim of this presentation series was to explain the fermentation process used and the potential biological and chemical hazards that may result from a poorly managed manufacturing process, including acidosis, toxin producing *Aspergillus* and lead poisoning. Presentations also highlighted significant work undertaken in Europe (Sweden) and in the USA, where fermented products like kombucha tea and kimchi require a food safety program to manage the risks associated with these types of food commodities.

The importance of food recalls

During 2017-18, WA was affected by 35 food recalls while the number of national food recalls for the same period was 59. The primary role of the EHD's food recall officers is to guide local government environmental health officers, and in some cases WA food manufacturers, through the process of initiating a food recall. Most of the food recalls were categorised as undeclared allergens, foreign matter or microbial contamination.

In an effort to optimise food recalls in WA, the EHD surveyed local government and determined that there was a greater need for improved communication between environmental health officers and food businesses responsible for initiating a food recall, early recognition of an unsuccessful food recall, and a better understanding of the importance of a well-established traceability system.

In response, the EHD has embarked on a major initiative to assist local government in developing a better understanding of food recall roles/responsibilities and to highlight the importance of initiating an effective food recall in a timely manner.

Eat if you dare: Novel foods

A *novel food* is a food or ingredient that does not have a history of being consumed in Australia and New Zealand, and is regulated by Standard 1.5.1 (Novel Foods) of the Australia New Zealand Food Standards Code.

During 2017-18, the EHD assessed 18 potential novel food items through the national Advisory Committee on Novel Foods (ACNF), one of which was a product called Nata de Coco – a growing medium for herbs that can be consumed as a food after the herbs have been harvested. Using the Food Standards Australia New Zealand (FSANZ) guidance tool, the EHD considered whether the food in question was non-traditional by definition and if a public health and safety assessment was required, before making a recommendation to the ACNF.

The EHD's initial assessment identified six foods that met the criteria for *Non-Traditional* and *Not-Novel foods*, three were considered *Non-Traditional* and *Novel foods* requiring safety assessment, and one was deemed to be a *Traditional food*. Eight submissions did not result in a recommendation as the assessment concluded that they either required further information to reach a recommendation, did not warrant a recommendation in relation to the novel food definition, or were deemed a nutritive substance, food additive or processing aid. One was assessed as a compliance issue.

Resources for assessing or starting a food business

The EHD updated and produced new resources to assist local government enforcement agencies with the risk assessment of food manufacturing businesses.

The Assessment of Businesses that Manufacture Food fact sheet provides guidance to *Food Act 2008* (Food Act) authorised officers on the assessment of new food manufacturing businesses. The fact sheet has been updated to include a new section on the assessment of the applicant's skills and knowledge. The fact sheet outlines a number of factors that authorised officers should consider when assessing a proposal for a new food manufacturing business including risk assessment of food manufacturing activities, suitability of the proposed premises and assessment of skills and knowledge.

Thinking about Starting a Food Manufacturing Business? is a new fact sheet, in the form of frequently asked questions, that provides prospective food manufacturing business owners with a simple overview of the food legislative requirements when starting a new food manufacturing business. The fact sheet is available on the Department of Health website for the general public and for Food Act enforcement agencies to distribute.

Research on egg layer farms

In a first for WA, the egg industry was invited to participate in a collaborative research project with the Department of Health and Murdoch University. This project presented a unique opportunity for the EHD to foster new, and build on existing, stakeholder relationships, which will in turn assist in management efforts to reduce foodborne illness.

The project commenced in late 2017 following extensive consultation with industry stakeholders, including both national and state industry bodies, local government agencies and food businesses. The EHD engaged the expertise of Murdoch University's School of Veterinary and Life Sciences who assembled a specialist team to develop and implement the project.

Key project objectives included the provision of baseline data in relation to benchmarking biosecurity and food safety management practices on egg layer farms, evaluation of the industry's microbiological risks, determining the prevalence of *Salmonella* and potential factors contributing to its presence, and identifying industry best practices. The project has recently been completed.

Report on the Food Act 2016-17

The *Food Act 2008* (WA) Enforcement Agency Reporting Information 1 July 2016 to 30 June 2017 was compiled during 2017-18, providing a summary of the reports received from enforcement agencies on the performance of food regulatory functions.

There are 138 Food Act enforcement agencies in WA, including 137 local governments and the Department of Health, who are required to report annually to the Department of Health's Chief Executive Officer (the Director General) on the performance of regulatory functions under Section 121 of the Food Act. Enforcement agencies report information on authorised officers, registration and assessment of food businesses, compliance and enforcement activities, primary production and processing, regulatory food safety auditing, food safety education and training, and highlights.

Further information about Food Act reporting, including previous reports, can be viewed on the Department of Health website.

State regulated export registered (Tier 1) establishments

Tier 1 establishments are meat food businesses that have been registered with the Department of Agriculture and Water Resources (DAWR) to export meat products to limited international markets. Under the Food Act, the Department of Health acts as the enforcement agency and also appoints meat inspectors as authorised officers for these establishments.

There are six Tier 1 establishments that are registered and audited on a regular basis by the Department of Health. In the 2017-18 financial year, activities have included trials on camel and donkey meat for human consumption, several visits from the Indonesian government, and various compliance and enforcement actions being undertaken by the EHD, including the issuing of infringement notices and improvement notices.

Hospitals

The EHD has started to shift the monitoring of hospital food safety management to ensure it is in line with the system manager model that focuses on surveillance reporting from health regions within WA. The aim of transitioning to the new model is to clearly define the roles and responsibilities and accountabilities of the Department of Health and hospitals that produce and process food for vulnerable populations to achieve an efficient and effective balance between system wide governance and decision making. The proposed methodology will include reviewing the current regulatory process for food safety compliance, consultation with relevant Department of Health and WACHS stakeholders and the collection of data from hospitals as performance indicators.

National food monitoring activities

Australia's food supply is continuously monitored by Australian and New Zealand government agencies to ensure it is safe and complies with standards for microbiological contaminants, pesticide residue limits and chemical contamination. The EHD has continued to work together with other food regulation agencies in Australia and New Zealand on the Implementation Subcommittee for Food Regulation (ISFR) to enable a nationally coordinated approach to monitoring food safety.

WA successfully completed two ISFR surveys in the past year. A compliance survey to investigate mandatory folic acid fortification by Australian flour mills found a high level of compliance. These results will be used by the Commonwealth Department of Health to review the effectiveness of fortification, including health impacts to reduce the risk of neural tube defects in babies and any impacts mandatory fortification may have on enforcement agencies.

A survey of plasticisers in Australian foods was also completed. The survey was led by FSANZ to support a risk assessment of Australian consumers' dietary exposure to seven plasticisers which may be used in food packaging materials. The survey results were pleasing, finding estimated dietary exposure for Australian consumers to be below internationally recognised safe levels. These results will add to FSANZ series of research into the migration of packaging chemicals, which has consistently shown negligible risk for Australian consumers.

WATER

25,792
Water monitoring samples collected

15,843 Aquatic facilities

5,073 Drinking water

3,411 Environmental waters

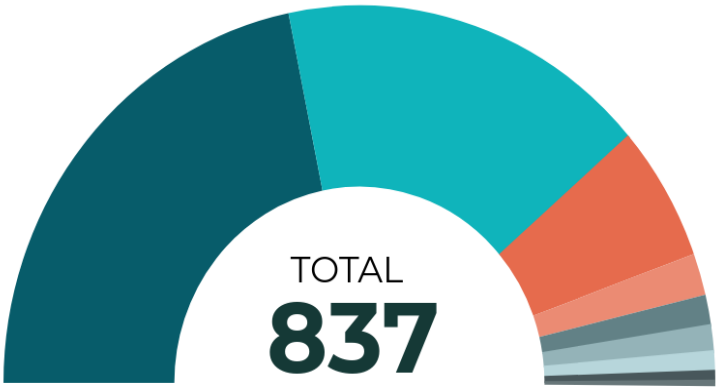
*An additional 100 miscellaneous samples were collected

1,281 Wastewater and recycling schemes

44 Airconditioners (Legionella)

40 Abattoir and meat processors

Assessments and Approvals

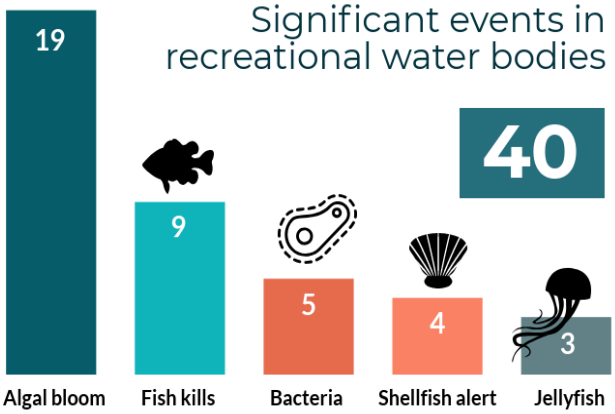


- Subdivisions (WAPC) (364)
- Sewage treatment apparatus (282)
- Aquatic facilities (97)
- Onsite wastewater systems (29)
- Development approval reviews (21)
- Recycled water quality management plans (20)
- Biosolids (14)
- Recycled water schemes (7)
- Drinking water quality management plans (3)

Responses to Events of Public Health Significance

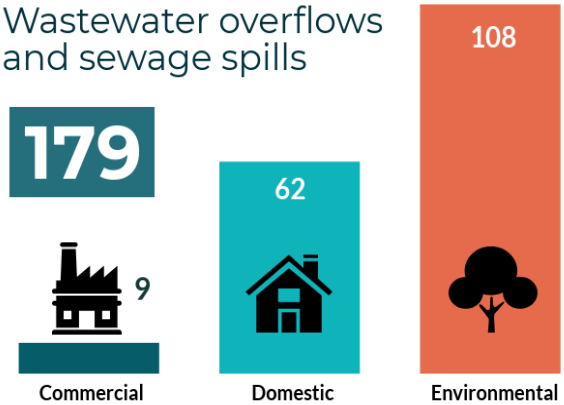
Significant events in recreational water bodies

40



Wastewater overflows and sewage spills

179



Recreational water site visits/sanitary inspections

Between November 2017 and May 2018, the EHD undertook a total of 32 recreational water site visits/sanitary inspections, to assess and expand current microbiological monitoring program sites for recreational waterways. Site visits/inspections were undertaken in the Perth metropolitan (2), Peel (2), Southwest (20), Great Southern (5), and Wheatbelt (3) regions. These targeted many inland lakes, reservoirs and river sites utilised for primary and secondary contact recreation (e.g. swimming, water skiing, kayaking), some of which are popular camping sites.

The primary aim of the sanitary inspections was to identify and assess faecal contamination sources that may impact upon water quality at these recreational sites, in accordance with the National Health and Medical Research Council, 2008, Guidelines for Managing Risks in Recreational Water. In time, they will also form part of the site classification map as published on the Department of Health's website.

Mindarie Marina *Alexandrium sp.* algal bloom

In December 2017, the Mindarie Marina experienced an *Alexandrium sp.* algal bloom, which was the second identified bloom of this type to occur within consecutive years. Both blooms have involved exceedingly high concentrations of *Alexandrium sp.* and the presence of the associated toxin in mussels within the waterway was in excess of the Food Standards Code maximum level.

In response, the Department of Health issued a media statement advising people not to eat fish, crabs or shellfish collected from Mindarie Marina and advised the Mindarie Marina (Managing Authority) to erect warning signs to this effect. The bloom also generated concern within local algal/phytoplankton taxonomists and the DPIRD regarding the potential for *Alexandrium* sp. movement along the Perth metropolitan coastline, with the potential to impact upon the commercial shellfish harvesting industry.

Officers from the EHD, Shire of Nannup and Department of Biodiversity, Conservation and Attractions undertaking a site visit at Worker's Pool

Broome flood event leading to wastewater overflow

Between 27–31 January, Broome received a total of 697.2mm of rainfall, with the highest daily total (439.4mm) recorded on 30 January. Three weeks later, the town received a further 499mm over a four day period (16-19 February), with 376.8mm falling on 17 February. The combined rainfall total saw Broome endure its wettest year on record, causing extensive stormwater infiltration into Water Corporation's Broome South and Broome North wastewater treatment plants. This consequently resulted in wastewater overflows into Roebuck Bay and surrounding agricultural stockyards.

The EHD played an overarching role in the management of the overflow event, providing advice and recommendations in relation to the need for health related actions, as well as assistance in interpreting sampling results. In response, the Water Corporation and Shire of Broome issued media advisories to avoid swimming and other forms of primary contact recreation within Roebuck Bay. Health warning signs were erected and bacterial water sampling was undertaken to confirm when the water quality was considered safe to reopen Roebuck Bay for recreational activity.

Audit of recycled water schemes

During 2017-18, the EHD reviewed a total of 51 audit reports, of which 22 corresponded to municipal recycled water schemes operated by local governments.

The EHD found that audit reports conducted in WA have improved since the publication of the EHD Internal Audit Check List and the corresponding Audit Score Guide for low risk recycled water schemes, both of which are available on the Department's website.

A summary of key audit outcomes of municipal schemes indicated that:

1. The vast majority of schemes have a good understanding of the regulatory requirements and are working towards compliance with the approval conditions.
2. The majority of schemes require improvements on supporting documentation including recycled water quality management plans, records of inspections, maintenance activities and training.
3. Sampling is conducted at the appropriate location and frequency. However, schemes that have experienced staff turnover tend to score poorly on this category.

Erosion of a stormwater drain near Cable Beach following extensive water infiltration

Flood path from Broome South waste water treatment plant to Roebuck Bay

Images courtesy of Water Corporation

Algal blooms and other health issues in constructed lakes

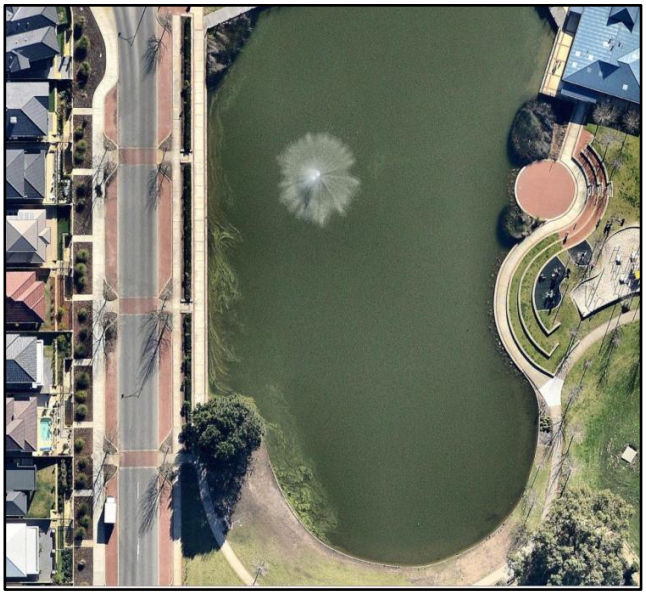
During 2017-18, the EHD was involved in providing health advice and guidance to investigations relating to odour issues, sub-standard water quality, sewage spills and cyanobacterial (blue-green algae) blooms in constructed lakes. In particular, lake water aerosols and use of water for irrigation purposes, may present a potential exposure risk, whereby passive recreation lake users are inadvertently exposed to algal toxins and/or pathogenic microorganisms. This may occur via water aerosol inhalation or direct skin contact with irrigation water or recently irrigated surfaces.

In accordance with health guidelines, water sampling undertaken by local government authorities at constructed lakes confirmed cyanobacterial species well above acceptable levels for primary contact (e.g. swimming). In response, the EHD recommended warning signs/temporary restrictions be implemented (as appropriate) and assisted one particular local government involved to pursue further algal testing and toxin analysis.

Whilst novel PCR genetic testing was able to indicate the likely presence of algal toxins, it was unable to identify the dominant toxin strain, or express toxin concentration in a current guideline interpretable format. Conventional cyanobacterial analysis using liquid chromatography–mass spectrometry was later utilised to successfully identify the dominant strain and relevant toxin concentrations. This information enabled public health interventions to be put in place following the investigation.

The EHD will continue to address the public health concerns associated with constructed lakes during 2018-19.

As part of this effort, staff also participated in the WALGA Wetlands Management seminar/workshop held in September.



Beeliar Lake affected by algal presence
Image Courtesy: City of Cockburn

Lake Brearly affected by a blue-green algal bloom

Perth Children's Hospital water contamination investigation

Environmental Health leads the way

The EHD played a major role in both the initial and Chief Health Officer's investigation into the lead in Perth Children's Hospital's (PCH) potable water supply.

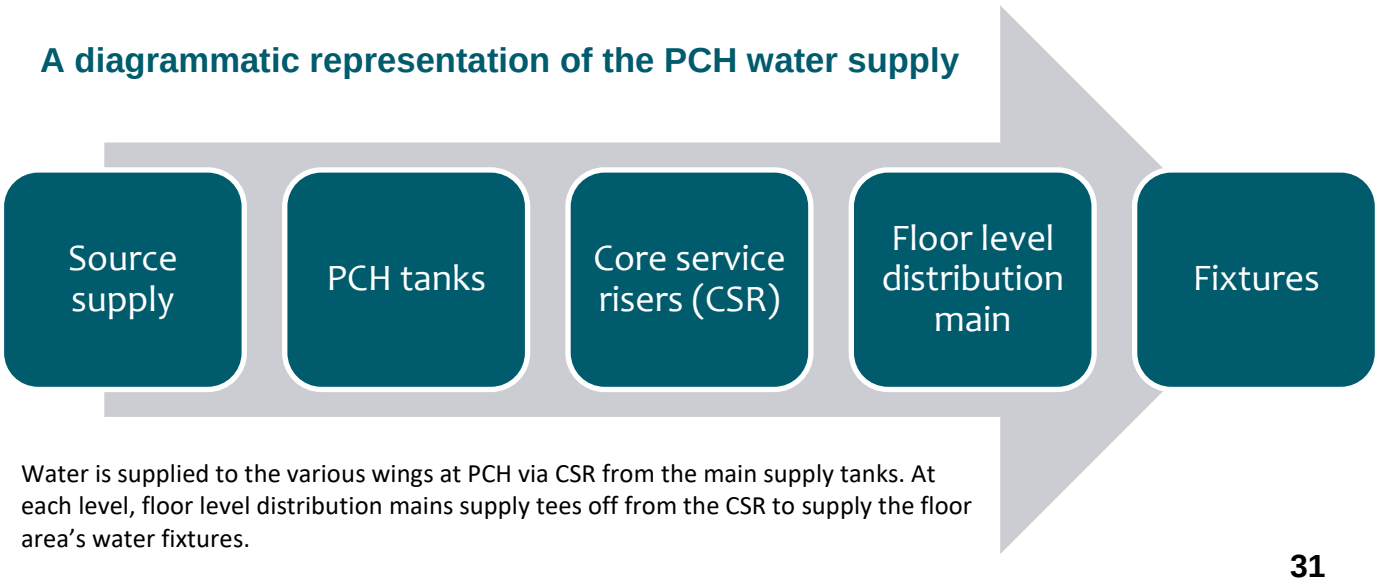
After several failed attempts to pinpoint the source of lead contamination of the potable water system using the initial ongoing sampling program data that was provided to the Department of Health, the EHD assisted in designing a more comprehensive sampling program. The aim of this program was to provide a clearer picture of the extent of lead contamination across PCH and close in on the most likely source of lead contamination observed at the fixtures.

Through the data collected via the EHD designed sampling program (30MS Sampling Method), a detailed statistical analysis was conducted, providing the basis of more precise experiments to pinpoint the source of lead contamination.

A forensic approach to water quality investigation

The subsequent Chief Health Officer's investigation, in which EHD played a pivotal role, adopted a forensic investigative approach that considered every component of the potable water system from source to tap in a logical step-wise progression. The sampling data showed that the source water supplied to PCH was compliant with the Australian Drinking Water Guidelines and the lead contamination was only introduced into the system post supply tanks. The sequential sampling data then indicated that no lead was detected in the water at the core service risers (CSR) and lead levels at the floor level distribution main were not elevated. The sequential sampling method was then applied to a number of locations to map the progressive change in lead levels from floor level distribution main to individual fixtures. From the data derived, it was observed that the progressive lead levels consistently peaked at the pipework at the Thermostatic Mixing Valve (TMV) assembly boxes across all sampled locations. TMVs are used to mix hot and cold water to deliver constant temperature warm water.

A diagrammatic representation of the PCH water supply



Water is supplied to the various wings at PCH via CSR from the main supply tanks. At each level, floor level distribution mains supply tees off from the CSR to supply the floor area's water fixtures.

Perth Children's Hospital water contamination investigation

Extraction of water in direct contact with brass fittings

The Chief Health Officer's investigation then proceeded to determine if the brass fittings installed in the TMV assembly boxes were the main contributor to the lead levels observed at the fixtures. This was achieved via a direct syringe extraction of the water from the binder test point, where results showed elevated lead levels in most samples after 30 minutes of stagnation and all samples after 24 hours stagnation.

Upon closer inspection of all fittings in the TMV assembly box, it was found that not all brass fittings were watermarked. The next stage of the investigation was to identify if there was a particular brass fitting within the TMV assembly box that was undergoing dezincification and leaching out lead into the water.

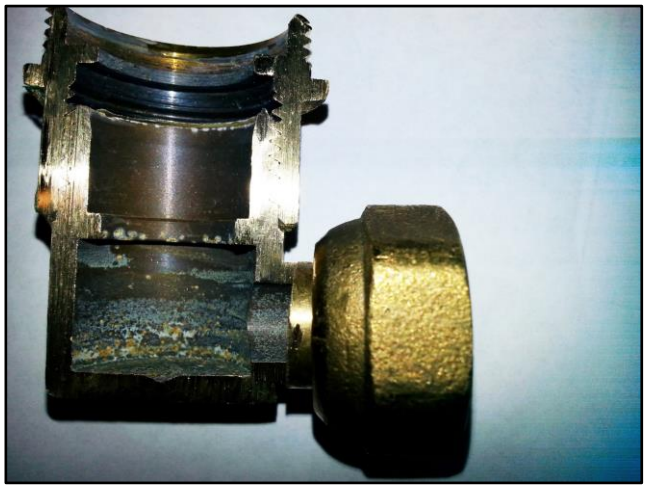
Confirmation of dezincification in brass fittings

The Department then engaged Curtin University to determine the level of dezincification of the fittings. A sample of brass fittings were disassembled, sectioned and analysed using Scanning Electron Microscopy and Energy Dispersive X-Ray Spectroscopy. This analysis demonstrated that dezincification was evident in some of the brass fittings and the un-watermarked fittings were undergoing the most corrosion and dezincification.

The findings of the EHD through the initial and Chief Health Officer's investigation were instrumental in the scoping of remedial works required to bring the lead levels at PCH's water supply to compliant levels.

Department of Health representatives involved in the investigation team

Water extraction from binder test point at TMV assembly box



Visible signs of corrosion on un-watermarked brass fitting

Government sewerage policy

Since 2010, the EHD has been part of an inter-agency committee for the revision of the Government Sewerage Policy – Perth Metropolitan Region (1995) and draft Country Sewerage Policy (2002, amended 2003). A unique Government Sewerage Policy 2018 (the Policy) that applies to metropolitan and country areas has been developed by the committee, in partnership with a range of government agencies, including the Department of Planning, Lands and Heritage and the Department of Water and Environmental Regulation.

The revised Policy maintains inter-agency Government support for the development of scheme sewerage disposal systems as the preferred method of sewage disposal. It is now more closely aligned with the planning process to provide guidance on what information is required at each stage of development. Where it can be demonstrated that it is not feasible to develop a sewerage scheme, the Policy provides a clear exemption process that will enable onsite sewage treatment and disposal. The exemption process adopts industry best practice, refers to national standards and equitably establishes universal minimum onsite sewage treatment and disposal criteria that will protect public health.

The Policy also enables innovation providing it aligns with the appropriate Australian Standards and environmental criteria imposed by relevant government agencies. As part of the implementation process, the EHD plans to conduct educational wastewater management workshops for environmental health officers, environmental health consultants, site-and-soil evaluation professionals and others involved with wastewater management processes.

Full scale groundwater replenishment scheme operational

Approval to recharge the Leederville and Yarragadee aquifers with water from the Beenyup Advance Water Recycled Plan was granted by the Chief Health Officer on 4 August 2017. This is Australia's first full scale groundwater replenishment scheme, which has recharged more than seven billion litres of water. The scheme is operated in accordance with the endorsed Recycled Water Quality Management Plan and the Memorandum of Understanding for Wastewater Services and Groundwater Replenishment between the Water Corporation and the Department of Health. Stage 2 is currently under commissioning and when completed will double the recharge capacity from 14 to 28 billion litres of water per year.

Beenyup advanced water recycling plant (Stage 1)

Community water fluoridation program continues to expand

Community water fluoridation in WA continued to expand in 2017-18, with Kununurra and Yanchep receiving the benefits of community water fluoridation (late 2017) following directives made in 2015 and 2016, respectively, by the then Minister for Health.

Fluoridation of drinking water supplies allows communities to receive the benefits of this important public health initiative, including improved oral health outcomes, life-long reduction in incidence of dental caries and reduction in the admissions load on the public health system. Fluoridated drinking water particularly benefits children and those on a lower income as it is delivered directly into the home at no incremental cost. Around 92 per cent of the Western Australian population, including the Perth metropolitan area and most major regional communities, receive the benefits of community water fluoridation.

During the year, the WA Department of Health, along with other Australian states and territories, also worked collaboratively with the National Health and Medical Research Council to develop two key documents on fluoridation, the 2017 Public Statement – Water Fluoridation and Human Health in Australia and the supporting Water Fluoridation and Human Health in Australia: Questions and Answers.

Community water fluoridation plays a key role in maintaining oral health

Interim guidance for sewage overflows into built environments

Sewage overflow events are loss of control incidents that may occur into the natural and/or built environments. In the greater Perth region, an average of two overflow events occur per week into buildings. These events require a prompt and effective response to reduce the risk to public health.

To assist this process, the EHD has developed an interim guidance document (Interim Guidance for the Notification and Risk Management of Sewage Overflows into Buildings) which provides direction on the notification and remediation requirements for sewage overflows impacting buildings.

The document has been developed from an extensive literature review, sourcing current and relevant standards of practice supported by both science and industry. It aims to guide and assist relevant stakeholders involved with these events, including wastewater service providers, restoration companies, local government authorities and affected members of the public.

A typical response to an event is classified in three steps (pre-remediation, remediation and post-remediation) and a risk matrix has been developed for the notification based on level of public health risk. By applying this evidence based guidance document, all stakeholders can be assured that the appropriate safeguards have been put in place to reduce risk and protect public health.

ENVIRONMENTAL HEALTH HAZARDS

Pesticide Safety and Licensing

2,533 Pest management technician licences renewed

44 Pest management vehicle inspections undertaken

Pest management business registrations renewed **718**

368 New pest management technician licences issued

New pest management businesses registered **85**

Contaminated sites

107 Contaminated site applications assessed

4 Contaminated site inspections

452 Contaminated sites requiring EHD sign-off

20 *Cannabis grow houses reported

*Illicit drug residue detections in homes **71**

*Data collected from October 2017

Contaminated sites

The EHD continued to provide specific and detailed public health advice to the Department of Water and Environmental Regulation on contaminated land and water issues, as required by the *Contaminated Sites Act 2003*. Further ongoing collaboration with other state and local agencies including the Department of Planning, Land and Heritage, Department of Biodiversity, Conservation and Attractions, Department of Fire and Emergency Services, Department of Transport, Australian Department of Defence, LandCorp, Water Corporation and several local governments, resulted in timely and effective remediation of sites contaminated with asbestos, per- and poly-fluoroalkyl substances (PFAS), and a range of other organic and inorganic chemicals.

The EHD was also involved in providing advice to a number of project and stakeholder groups. Contentious legacy asbestos issues relating to the Wittenoom-Roebourne Road and properties within the Wittenoom Asbestos Management Area were re-evaluated. In addition there were a number of contentious sites related to residential properties affected by or in close proximity to contaminated mine tailing and waste treatment facilities and legacy asbestos waste within public recreational reserves.

Per- and poly- fluoroalkyl substances

Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are the most widely recognised PFAS, used in firefighting foams, fire retardants and non-stick cook wear coatings. Given their chemical stability and resistance to degradation in the environment and human body, they are persistent, able to bioaccumulate and possibly biomagnify within the food chain.

The EHD has continued to provide advice to Government to assist in the assessment and management of public health risks associated with PFAS. Multi-agency stakeholder collaboration has resulted in the development and release (January 2018) of a National Environmental Management Plan for PFAS to assist in providing guidance for the assessment and management of contaminated sites.

While a number of studies have explored the association between blood levels of PFOS and PFOA, the true impact of exposure on human health remains unclear. In response, PFOS and PFOA guideline values have been set to reduce biota and human exposure as far as practical while uncertainty remains around their potential to adversely affect human and environmental health.

Asbestos and public health

As a system manager, the EHD has continued to assist local government on matters relating to the Health *(Asbestos)* Regulations 1992. These efforts aimed to increase local government understanding of the mechanisms by which the risks associated with asbestos can be reduced and risk communication related to public health arising from incidents such as fire damaged asbestos, debris from use of high pressure water systems to clean asbestos cement roofs and other matters of non-compliance with the Asbestos Regulations.

Significantly, the EHD commenced a project on aging asbestos cement roofs and obstacles to removal, and will continue to engage with both government and non-government stakeholders on a number of other asbestos related issues. Officers from the EHD also presented on health risks associated with asbestos, removal strategies and policies at a variety of conferences and workshops throughout 2017-18.

Revision of the Asbestos Regulations is ongoing with consideration being given to any comments or issues raised with the EHD by government and non-government representatives.

Asbestos identification App

In 2015, the EHD contributed funding and expertise to the development of a mobile phone application (App), *Asbestos-Containing Material (ACM) Check*, that allows the user to identify and assess the condition of in-situ asbestos materials located in residential settings. The App development formed part of a Doctor of Philosophy (PhD) project undertaken by a student from Curtin University.

In the early stages of development, officers from the EHD provided advice on products and materials to include in the App, and reviewed drafts of the checklist utilised within the App. An EHD officer then helped to evaluate the accuracy of the App by trialling its use during field investigations.

The PhD was completed and passed in 2018. The App is now available for free from the App Store and Google Play, and aims to reduce exposure to asbestos fibres that can cause a wide range of health issues, including mesothelioma. The App is simple to use and will benefit renovators and tradespeople, as well as anyone interested in protecting themselves and their family. The data collected using *ACM Check* will also help researchers to map the presence and condition of asbestos-containing materials in WA housing.

Air quality at schools and childcare centres

The EHD has partnered with researchers at Curtin University to investigate traffic-related air pollutants (TRAP) around schools (completed project) and child-care centres (ongoing). The school study assessed TRAP at schools due to the idling of cars during drop-off and pick-up. TRAP were increased during these times, but after anti-idling interventions were introduced, improvements in air quality were observed. The second study is investigating air quality around child-care centres that are situated proximal or distal to busy roads. Both of these studies will contribute to EHD policies and advice concerning sensitive buildings (such as schools and childcare centres) and TRAP.

Proximity of petrol stations to sensitive receptors

During 2017-18, the EHD received enquiries about the separation distance between petrol stations and homes and/or schools, as noise, odour, light and gaseous emissions have the potential to impact on public health. The most significant concern relates to gaseous emission exposure, particularly of benzene, which is a known human carcinogen.

Proximity of petrol stations cont.

Historically, advice has been based on the Environmental Protection Authority separation distance document (50m for normal business hours operation and 200m for 24-hour operations) but the justification for those distances is unclear. In response to this preliminary work, the EHD will continue to collaborate with the Department of Water and Environmental Regulation to monitor and model gaseous emissions from Perth petrol stations to establish evidence-based recommendations to prioritise public health and safety.

Port Hedland Noise and Dust Taskforce

The EHD has represented the Department of Health on the Port Hedland Noise and Dust Taskforce since 2009. During 2017-18, the work of the Taskforce came to an end after it finalised its report to Government. The report made seven recommendations, four of which were informed by the findings of the Health Risk Assessment overseen by the EHD. Read the Taskforce report and learn more about the recommendations by visiting the Department of Jobs, Tourism, Science and Innovation website. The Government is expected to comment on the report next year.

Our year in review

Meth Desk project up-dates

In November 2017, a cross-sector project initiated by the WA Police Force, Department of Health, Department of Communities, and Child Protection and Family Services commenced in an effort to tackle risk management associated with illicit drug use. The project also involved representatives from the Department of Water and Environmental Regulation and local government.

Consultation included the major real estate bodies in Perth, Tenancy WA, Department of Mines and Industry Regulation Safety, Consumer Protection, Real Estate Institute of Western Australia, and Department of Health approved service providers for forensic testing and remediation after the detection of methylamphetamine (meth) clan labs. A collaborative working group met several times throughout the year to progress a range of project initiatives.

The EHD is now leading the way on risk management associated with illicit drug use. The integrated package stemming from this work is the first of its kind in the world.

Meth testing in homes

The EHD led the country in the development of guidance on risk management addressing the growing public health issues arising from the manufacture of methylamphetamine (also known as meth or ice). Part of this process was to ensure that clean-up service providers, including forensic testers, analytical laboratories and contracted industrial cleaners, were assessed to be competent, experienced, equipped and able to successfully remediate clandestine laboratories according to the Guidelines.

Due to heightened community awareness of the potential for on-going health issues associated with methylamphetamine use and manufacture, there has been an increasing demand for services of this nature. In response, the EHD developed a standard operation procedure to review 15 submissions from industrial cleaning companies requesting to be added to the list of approved companies qualified for testing and remediation of chemical residues. Only two applications were successful. The EHD has also published a series of new guidance documents for both local government and the general public to assist them in managing low-level illicit drug residues in residential dwellings (see overleaf).

Illicit drug manufacturing paraphernalia found at a residential home

Public information and resources on illicit drug use

The EHD responded to a public call for more information regarding illicit drug use by producing the following series of informative documents available on the Department of Health's *HealthyWA* website:

Illicit drug activities and residues in homes is an outline of the types of illicit drugs used and manufactured and how to report illegal drug-related activities.

Meth smoke houses is a guide for the public defining the difference between methylamphetamine use and manufacture (clan lab), as well as associated health risks.

Public fact sheet on the risks associated with meth contamination in residential dwellings provides information on health risks associated with methylamphetamine and who to contact for further assistance about clean-up procedures.

Repairing the damage from a cannabis grow house is a guide for property owners and managers responsible for a residence that was used as an illegal grow house.

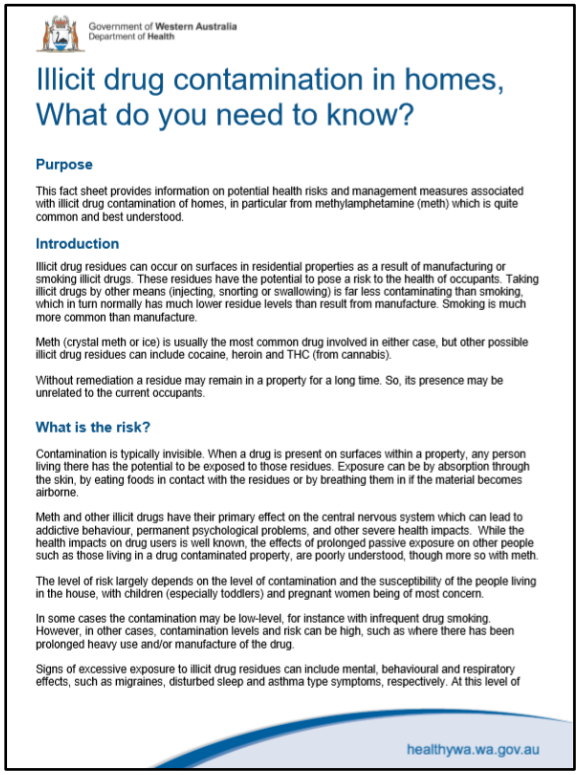
New guidance documents for local government

The EHD also responded to local government requests for further information on risk management associated with illicit drug exposure by developing a series of resources, which are available on the Department of Health's corporate website:

The Interim guidance on management of low-level methylamphetamine residues for local government defines the notification process to follow and defines the responsibilities of the owner to ensure the property is cleaned.

The Interim guidance for accredited cleaners for remediation of low level meth contamination includes a process to ensure the cleaning is thorough, safe and documented.

New guidance on risks associated with cannabis grow houses provides a list of options available to local government regarding the notification and risk management process.



Government of Western Australia
Department of Health

Illicit drug contamination in homes, What do you need to know?

Purpose

This fact sheet provides information on potential health risks and management measures associated with illicit drug contamination of homes, in particular from methylamphetamine (meth) which is quite common and best understood.

Introduction

Illicit drug residues can occur on surfaces in residential properties as a result of manufacturing or smoking illicit drugs. These residues have the potential to pose a risk to the health of occupants. Taking illicit drugs by other means (injecting, snorting or swallowing) is far less contaminating than smoking, which in turn normally has much lower residue levels than result from manufacture. Smoking is much more common than manufacture.

Meth (crystal meth or ice) is usually the most common drug involved in either case, but other possible illicit drug residues can include cocaine, heroin and THC (from cannabis).

Without remediation a residue may remain in a property for a long time. So, its presence may be unrelated to the current occupants.

What is the risk?

Contamination is typically invisible. When a drug is present on surfaces within a property, any person living there has the potential to be exposed to those residues. Exposure can be by absorption through the skin, by eating foods in contact with the residues or by breathing them in if the material becomes airborne.

Meth and other illicit drugs have their primary effect on the central nervous system which can lead to addictive behaviour, permanent psychological problems, and other severe health impacts. While the health impacts on drug users is well known, the effects of prolonged passive exposure on other people such as those living in a drug contaminated property, are poorly understood, though more so with meth.

The level of risk largely depends on the level of contamination and the susceptibility of the people living in the house, with children (especially toddlers) and pregnant women being of most concern.

In some cases the contamination may be low-level, for instance with infrequent drug smoking. However, in other cases, contamination levels and risk can be high, such as where there has been prolonged heavy use and/or manufacture of the drug.

Signs of excessive exposure to illicit drug residues can include mental, behavioural and respiratory effects, such as migraines, disturbed sleep and asthma type symptoms, respectively. At this level of

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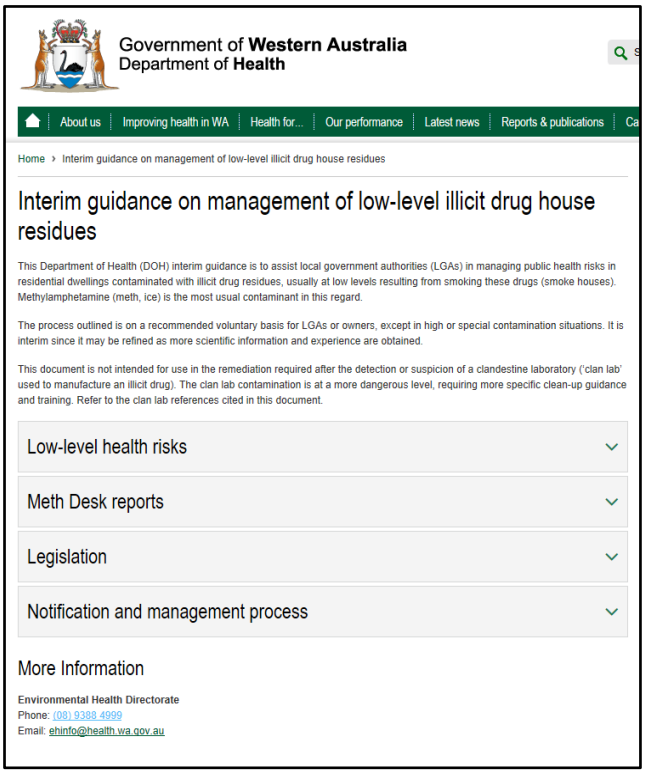

Government of Western Australia
Department of Health

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Home › Interim guidance on management of low-level illicit drug house residues

Interim guidance on management of low-level illicit drug house residues

This Department of Health (DOH) interim guidance is to assist local government authorities (LGAs) in managing public health risks in residential dwellings contaminated with illicit drug residues, usually at low levels resulting from smoking these drugs (smoke houses). Methylamphetamine (meth, ice) is the most usual contaminant in this regard.

The process outlined is on a recommended voluntary basis for LGAs or owners, except in high or special contamination situations. It is interim since it may be refined as more scientific information and experience are obtained.

This document is not intended for use in the remediation required after the detection or suspicion of a clandestine laboratory ('clan lab' used to manufacture an illicit drug). The clan lab contamination is at a more dangerous level, requiring more specific clean-up guidance and training. Refer to the clan lab references cited in this document.

Low-level health risks

Meth Desk reports

Legislation

Notification and management process

More Information

Environmental Health Directorate
Phone: (08) 9388 4999
Email: ehinfo@health.wa.gov.au

MEDICAL ENTOMOLOGY

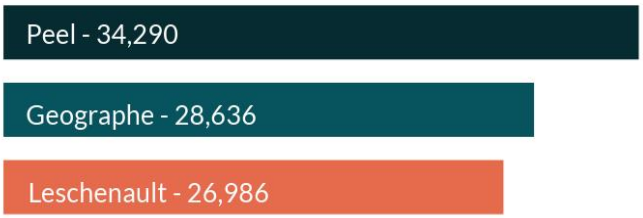
Surveillance efforts throughout WA are used to inform public health warnings and interventions

537 Mosquito traps set over 24 nights in the Southwest of WA

89,912

Adult mosquitoes collected

Adult mosquitoes trapped by region



25 Ross River virus detections

45 Barmah Forest virus detections

34 aerial larvicide applications totalling **5,259 ha**

24 **Sentinel chicken flocks managed throughout WA**

3,870
blood samples tested

56 Mosquito-borne virus infections detected in chickens

Stakeholder engagement

17 Local government funding applications assessed

5 Media statements issued related to mosquitoes

2 Mosquito management courses conducted

Annual mosquito collection and virus isolations from northern WA

Officers from the EHD, PathWest and University of Western Australia embarked on the Directorate's annual mosquito survey of the Kimberley and Pilbara regions (21 March - 20 April 2018). The trip was timed to coincide with the end of the region's wet season and provided an opportunity to meet with environmental health officers and discuss local mosquito issues.

Mosquitoes were trapped at a range of locations including Halls Creek, Wyndham, Kununurra, Lake Argyle, Billiluna, Fitzroy Crossing, Derby, Broome, Port Hedland, Newman, Tom Price, Paraburdoo and Mount Magnet. Adult mosquitoes were collected using dry ice baited EVS/CO_2 (encephalitis vector surveillance/carbon dioxide) traps, before being transported to Perth on dry ice. The samples are currently being processed by PathWest laboratory where they will be tested for viruses of public health significance, including Ross River virus, Barmah Forest virus, Murray Valley encephalitis virus and Kunjin virus. The results from this survey will be published in the 2018-19 Yearbook.

Mosquitoes from a single EVS/CO_2 trap set overnight in Broome

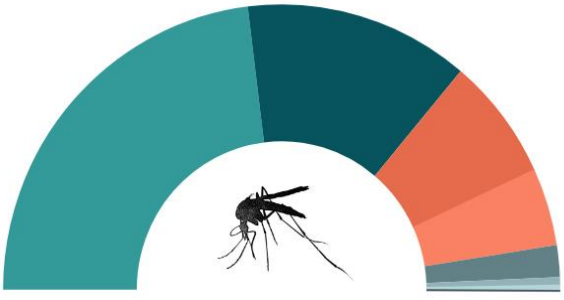
2016-17 Northern WA Mosquito Trapping Data

270 Mosquito traps set across the Kimberley, Pilbara and Gascoyne regions of WA.

202,021

Adult mosquitoes collected

Adult mosquitoes trapped by Local Government region



- Shire of Broome (93,147)
- Shire of Wyndham/East Kimberley (52,236)
- Shire of Halls Creek (28,402)
- Shire of Derby/West Kimberley (17,669)
- Town of Port Hedland (7,224)
- Shire of Meekatharra (1,688)
- Shire of East Pilbara (1,186)
- Shire of Ashburton (469)

*2016-17 data is presented here as sample processing and reporting undertaken in 2017-18

Mosquito management training courses: Mandurah and Broome

The EHD held its biennial five-day mosquito management course in Mandurah (September 2017) and a three-day short course in Broome (April 2018), the latter of which focused on mosquito management issues in the north of the State. Both courses were well attended and included participants from across WA, the Northern Territory, New South Wales, South Australia and New Zealand, representing local and state government, Aboriginal environmental health organisations, public health units, the New Zealand Defence Force, chemical and pest control companies and port authorities.

The courses included theoretical and practical components, and provided participants with the knowledge and skills required to develop and implement a mosquito management program within their own jurisdictions. Participants also gained hands-on experience during practical demonstrations of surveillance and control equipment, field site visits to collect adult and larval mosquitoes, laboratory mosquito identification sessions and group work on specific mosquito management scenarios.

Embracing technology: Training microscopes

The EHD purchased six training microscopes with the ability to wirelessly transmit high definition images to handheld mobile devices. The microscopes were used for the first time during mosquito identification sessions at the Broome mosquito management course and proved to be an excellent training tool. Demonstrators were able to point to specific features on mosquito species that are used for identification in real time to the whole group. Course participants could then also use the live image on their handheld device to work through the identification key together, greatly increasing the speed and accuracy of the process for those learning to identify mosquitoes.

The microscopes will also be useful for local governments and other organisations involved in mosquito identification. They can be used to capture still images or videos that can be sent to Medical Entomology for further review and confirmation if required. Contact the Medical Entomology team on medical.entomology@health.wa.gov.au if you would like further information regarding the microscopes.

Course participants undertaking mosquito identification

Annual Combined CLAG Forum

In June 2018, the EHD hosted its seventh annual combined Contiguous Local Authorities Group (CLAG) Forum. A total of 47 participants attended on the day, including personnel from 20 local governments, Edith Cowan University and the South Eastern Regional Centre for Urban Landcare. Representatives from an additional three local governments situated in regional WA linked in via videoconferencing facilities.

Key themes included the public health risk associated with mosquito breeding in storm and waste water infrastructure, an update on mosquito management in WA, evaluation of the EHD's Fight the Bite campaign and using marketing and media to enhance mosquito management programs. Several local government officers also presented on completed projects, including mosquito management videos and public education initiatives. The level of attendance at this one-day event indicates that mosquito management remains a high priority for many local governments throughout WA. It is hoped that the information presented at the forum will be used as a tool by participants to improve current mosquito management programs throughout the State.

Zika virus post-doctoral fellowship

During 2017, an officer from the EHD undertook a Post-Doctoral Fellowship at the University of California to investigate the risk of North American mosquito species facilitating a local Zika virus outbreak.

Zika is a mosquito-borne virus historically associated with mild symptoms such as rash, fever and muscle/joint pain. However, during recent epidemics, the virus has been associated with more serious clinical manifestations including microcephaly in infants and Guillain-Barré syndrome. The work was able to demonstrate that California has mosquito species capable of facilitating a local outbreak, particularly in the southern part of the State. Furthermore, there was evidence that different strains of Zika virus exist, and that the virus can replicate within mosquitoes and be transmitted at different rates.

The opportunity to work at an international University, in collaboration with the California Department of Public Health, was invaluable. The knowledge and experience gained will be integrated into the work undertaken by the Medical Entomology team within the EHD, to further improve mosquito management here in WA.

Participants at the 7th annual combined CLAG Forum

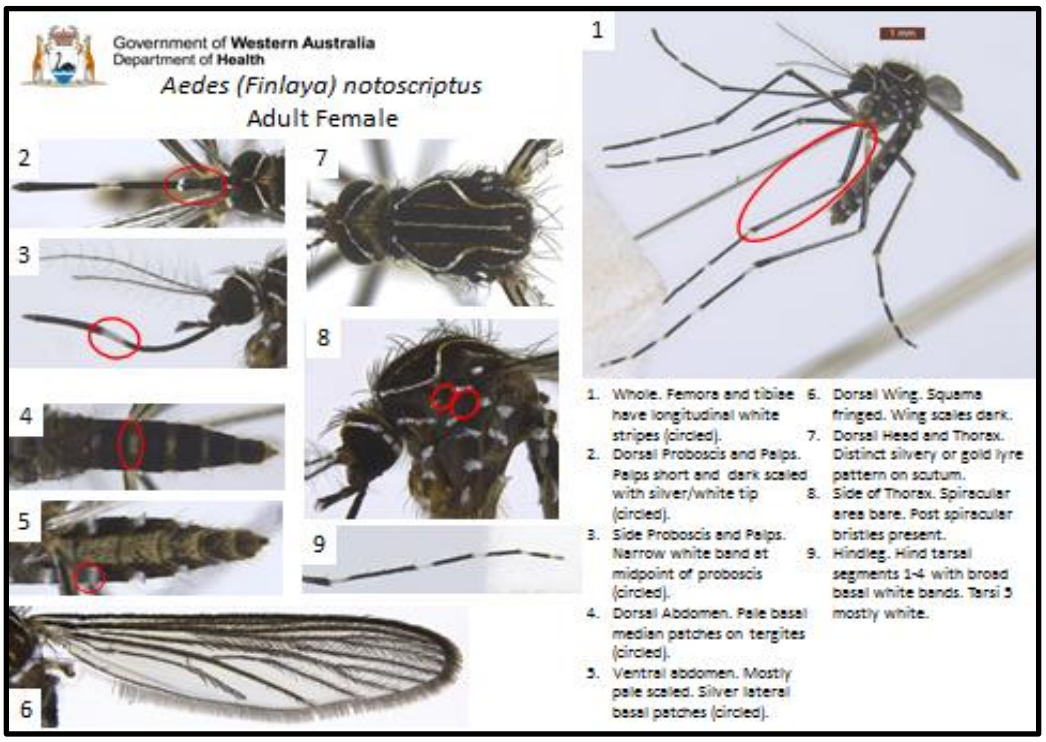
Training resources for mosquito managers

In WA there are more than 100 species of mosquitoes, yet only a small proportion of these impact on amenity or present a risk to public health. Accurate mosquito identification therefore plays a critical role in determining the presence or absence of disease vector/nuisance species, and in turn informing mosquito management efforts.

Officers from the EHD have now photographed more than 80 local adult species, as well as some exotic species, using a Leica stereo microscope with camera and montage software. These images have been compiled into important training resources, including photographic keys and species description sheets that include a brief summary of key diagnostic features. This suite of resources has been made available to a range of stakeholders including local government, to assist with more rapid, accurate mosquito identification, in keeping with EHD's role as system manager.

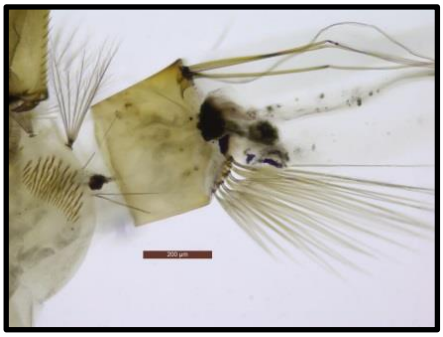
Exotic mosquitoes in tyre shipments at WA ports

During 2017-18, the EHD confirmed three detections of exotic mosquito species at shipping ports in WA. These mosquitoes were collected by officers from the Commonwealth Department of Agriculture and Water Resources (DAWR). The first detection of *Aedes albopictus* (Asian tiger mosquito) occurred at Dampier (December 2017) in a shipment of tyres originating from Malaysia. The remaining two detections (April and May 2018) occurred at Rous Head, Fremantle in shipments of tyres from Japan that travelled via Singapore. Both were confirmed to be *Culex spathifurca* which has not been detected in WA previously. Fortunately, this is not a species of public health concern. The EHD provided technical support in regards to mosquito control treatments and ongoing monitoring by DAWR. Import conditions are currently being amended to require offshore fumigation of tyre imports of older unused and second hand tyres, which provide an ideal habitat for container-breeding mosquitoes.



Aedes notoscriptus species identification sheet

Culex spathifurca larval head



Culex spathifurca anal segment

EVENTS

The Environmental Health Directorate plays an important role in approving, planning and assessing events throughout WA, as well as monitoring crowd incidents and event trends worldwide.

Foo Fighters concert at nib Stadium

Assisted in the planning and approval of

36

major events in WA

Cricket at Optus Stadium

Optus Stadium

EHD officers have been working since 2014 with Venues Live, VenuesWest, Multiplex, the Town of Victoria Park, Brookfield Asset Management, JMG Building Surveyors and a multitude of other consultants to ensure the health and safety of the thousands of people attending events at Perth's Optus Stadium is carefully considered.

EHD's involvement ensured all parties complied with the *Health (Public Buildings) regulations 1992*, and that a variety of other safety and amenity issues, such as crowd management, were considered and addressed.

Optus Stadium open day - February 2018

23 events monitored

Lorde concert • Cricket games
Hot Dub Time Machine concert
Perth Royal Show • Ed Sheeran concert • A Day on the Green
Perth Stadium open day • Foo Fighters concert • AFL games

RADIATION HEALTH

Radiation Health provides the secretariat for the Radiological Council of Western Australia in enforcing the Radiation Safety Act 1975. The aim of the Act is to regulate the keeping and use of radioactive substances, irradiating apparatus (x-ray equipment) and certain electronic products (eg lasers and transilluminators) in order to protect public health and to maintain practices in the use of radiation.

10,103
Total Radiation Safety Act applications

Registrations

193 New applications

789 Renewed

106 Terminated

406
Amendments to registrations and licences (outside renewal process)

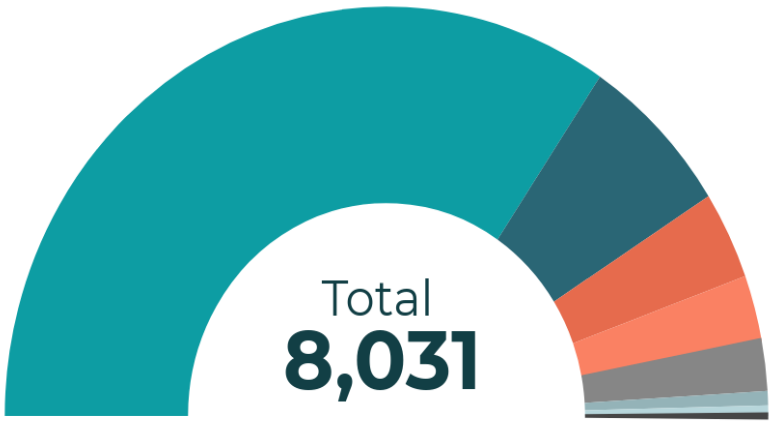
Licences

973 New applications

2,877 Renewed

966 Terminated

Various Radiation Health Unit activities



- General incoming correspondence (5,525)
- Radiation safety examination papers assessed (550)
- Applications to import radioactive substances (327)
- Radiation incidents reviewed and actioned (58)
- Medical x-ray equipment compliance tests recorded (1,042)
- Industrial radiation device compliance tests (418)
- Building plans assessed for structural radiation shielding (82)
- Medical research projects: Patient radiation dosimetry and risk statements reviewed (29)

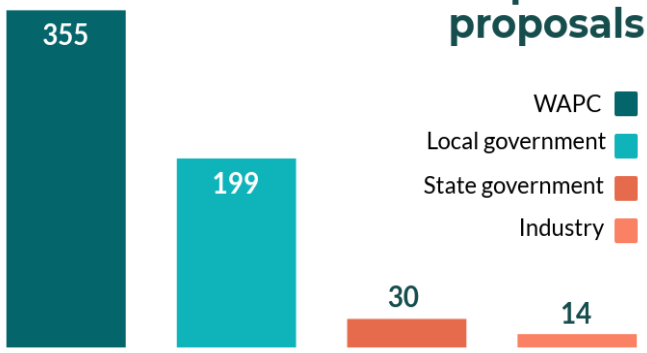
DEVELOPMENT ASSESSMENT PANEL

Review and advise on land-use, industrial and other planning proposals to ensure protection of public health.

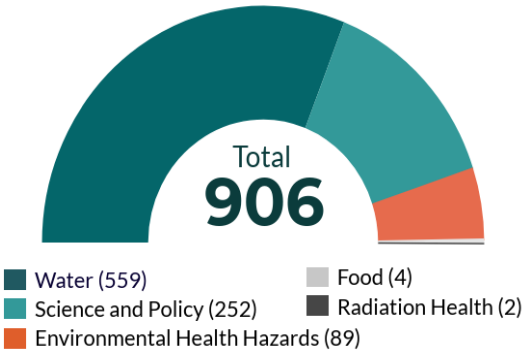
Development Assessment Panel (DAP) related activities

589	49	29
Total development assessments received	Average development assessment per month	Development Assessment Panel meetings

Stakeholders requesting EHD advice for development proposals



Individual EHD unit responses to development assessments



Types of proposals received

Subdivision	326		33	Structure, development, precinct plans
Local planning strategy/scheme	73		19	Region schemes and planning
Development approval applications	62		14	Environmental approvals and licensing

Committees

During 2017-18, officers from the EHD participated in the following committees and working groups:

Committee/Working Group	Organisational level
Access to Agricultural Chemicals Working Group	*National*
Advisory Committee for the Purity of Water (ACPOW)	*State*
Advisory Committee on Novel Food	*National*
Air Quality Coordinatng Committee	*State*
Asbestos Safety and Eradication Council (ASEC) - for Asbestos Safety and Eradication Agency	*National*
Australasian College of Toxicology & Risk Assessment (ACTRA)	*National*
Australian Council of Smoking and Health (ACOSH)	*National*
Australian Institute for Disaster Resilience (AIDR) Crowded Places Handbook Working Group	*National*
Australian Meat Regulators Group (AMRG)	*National*
Australian Shellfish Quality Assurance Advisory Committee	*National*
Avian Industries Consultative Group Meeting	*National*
Cockburn Sound Management Council	*State*
Contiguous Local Authorities Groups (x17 individual CLAGs)	*Local*
CRC for Water Sensitive Cities Western Regional Advisory Panel	*State*
Defence Interagency Working Group	*State*
Department Executive Committee (DEC) - Risk and Audit Sub-committee	*State*
Department of Fire and Emergency Services Working Group	*State*
Environmental Health Standing Committee (enHealth)	*National*
enHealth Advocacy Committee	*State*
enHealth Technical Working Group on Environmental Health (TWGEH)	*National*
enHealth Water Quality Working Group	*National*
Essential and Municipal Services Implementation Steering Committee	*State*
Events Working Group	*State*
Expert Reference Panel for Aboriginal and Torres Strait Islander Environmental Health	*National*
Fluoridation of Public Water Supplies Advisory Committee	*State*
Food-borne Illness Reduction Strategy – Across Government Advisory Group	*State*
Food-Medicine Interface Working Group	*National*
Food Regulation Standing Committee (FRSC)	*National*
FRSC Primary Production and Processing Working Group	*National*
FRSC Strategic Planning Working Group	*National*
Front of Pack Labelling (FoPL) Committee	*State*
Goldfields Region Aboriginal Health Planning Forum	*State*

Continued overleaf

Committees cont.

During 2017-18, officers from the EHD participated in the following committees and working groups:

Committee/Working Group	Organisational level
Health Star Rating (HSR) Dairy Alternatives Working Group	*State*
Health Star Rating (HSR) Social Marketing Group	*State*
Implementation Subcommittee for Food Regulation (ISFR)	*National*
Interagency Collaborative Working Group for Recreation in Water Catchments	*State*
ISFR Surveillance, Evidence and Analysis Working Group	*National*
ISFR Food Safety Management Working Group	*National*
ISFR Food-Medicine Interface Working Group	*National*
ISFR Nutrition, Health and Related Claims Working Group	*National*
Joint Consultative Committee (JCC)	*State*
Local Health Authorities Analytical Committee (LHAAC)	*State*
Minimum Training Licensing Requirement Working Group	*National*
Mosquito Control Advisory Committee (MCAC)	*State*
Mosquito Control Association of Australia (MCAA)	*National*
Municipal Services Working Group	*State*
National Arbovirus and Malaria Advisory Committee (NAMAC)	*National*
National Cruise Ship Policy Working Group	*National*
National Trachoma Control and Surveillance Reference Group	*National*
Novel Food Committee	*National*
Pesticides Advisory Committee (PeAC)	*State*
Pilbara Aboriginal Health Planning Forum	*State*
Policy Engagement Group (PEG)	*State*
Policy Framework Project Advisory Group	*State*
Public Buildings Working Group	*State*
Public Health Act Reference Group	*State*
Public Health Planning Group	*State*
Smoke Management Liaison Group	*State*
Special Interest Group for Asbestos-in-soil (SIGNAL)	*State*
Steering Committee – Western Trade Coast Managed Aquifer Recharge Feasibility Study	*State*
WA Asbestos Across-Agency Group	*State*
WA Health Emergency Management Committee	*State*
WA NLIS Cattle Implementation Working Group	*State*
Wastewater Services & Groundwater Replenishment Health Advisory Committee	*State*

Publications

The following peer-reviewed publications were co-authored by individuals from the EHD:

Inglis, T., Spittle, C., Carmichael, H. Downes, J., Chiari, M., & McQueen-Mason, A. (2018). Legionnaires' Disease Outbreak on a Merchant Vessel. *Emerg Infect Dis, 24*(7), 1345-1348.

Larcombe, AN., Janka MA, Mullins BJ, Berry LJ, Bredin A, Franklin PJ. The effects of electronic cigarette aerosol exposure on inflammation and lung function in mice. *Am J Physiol Lung Cell Mol Physiol*. 2017; 313(1): L67-L79

Larcombe, AN., Janka MA, Mullins BJ, Berry LJ, Bredin A, Franklin PJ. Reply to "Letter to the Editor: The effects of electronic cigarette aerosol exposure on inflammation and lung function in mice". *Am J Physiol Lung Cell Mol Physiol*. 2017; 313(5): L970-L971

Mackenzie, JS., Lindsay, MD., Smith, DW., & Imrie, A. (2017). The ecology and epidemiology of Ross River and Murray Valley encephalitis viruses in Western Australia: examples of One Health in Action. *Trans R Soc of Trop Med Hyg. 111*(6), 248-254.

World Health Organization. (2017). Potable reuse: Guidance for producing safe drinking-water. Geneva, Switzerland: WHO. Available: http://apps.who.int/iris/bitstream/handle/10665/258715/9789241512770-eng.pdf?sequence=1

COMMUNICATION ACTIVITIES

47 Freedom of information requests

10 Cabinet comments

105 Briefing notes

40 Memos to Executive Director

7 Memos to ADG

216 Letters signed by Executive Director

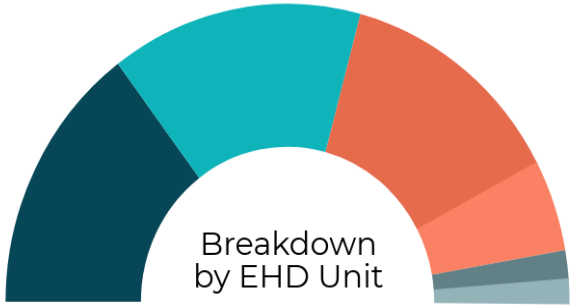
29 Letters drafted for ADG signature

28 Letters drafted for DG signature

11 Parliamentary questions

4 Contentious issue briefing notes

313 Ministerial Correspondence



Food (92) EHH (90) Water (82)
Science and Policy (31) Directorate (10)
Radiation Health (8)

Common Ministerial Topics

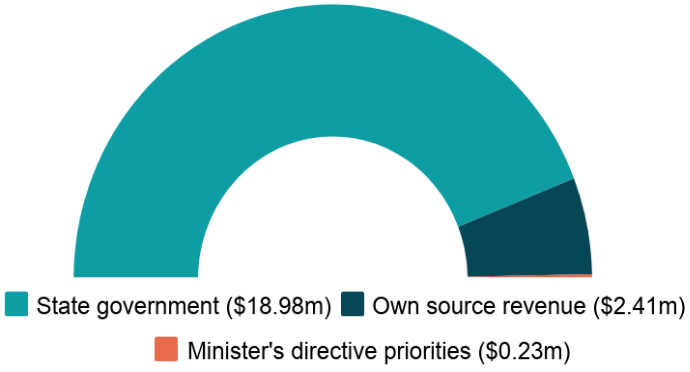
- Fluoridation of drinking water
- Labelling of sugar, oils and fats
- Water quality at Perth Children's Hospital
- Pregnancy warning labels on alcoholic beverages
- Low THC hemp seeds as food
- Use of pesticides

Position acronyms
Director General (DG)
Assistant Director General (ADG)

FINANCIAL OVERVIEW

$21.62 million EHD FUNDING

EHD FUNDING SOURCE



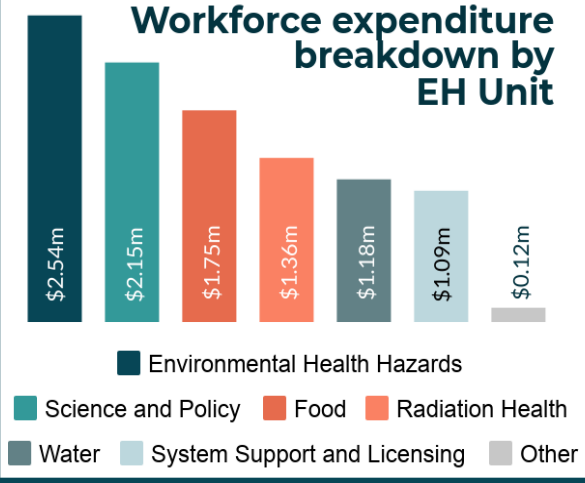
Own source revenue breakdown

- **37.6%** Tobacco control licensing
- **31.5%** Radiological Council authorisations
- **29.7%** Pesticide licensing
- **0.6%** Waste water management
- **0.6%** Food safety

$21.22 million EXPENDITURE

EHD EXPENDITURE

Workforce expenditure breakdown by EH Unit



Yearbook contributors

Thank you to the following EHD staff who made a significant contribution to the 2017-18 Yearbook.

Aaron Lim
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Amy Tran
Andrew Jardine
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Danielle Kidd
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Fiona Doyle
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Jared Koutsoukos
Jay Nicholson
John Coles
John Perrett
Kahlia Belli
Katy Roberts
Kelly Crossley
Ken Merton
Kim Unwin
Manoj Agarwal
Mark Fallows
Matthew Lester
Michael Lindsay
Mirella Goetzmann
Nilusha Somaweera
Paul Iriks
Peter Franklin
Peter Neville
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Stan Goodchild
Tiffinee Plaisted
Tracey Stamp
Vic Andrich
Willow Warren
Zack Alach

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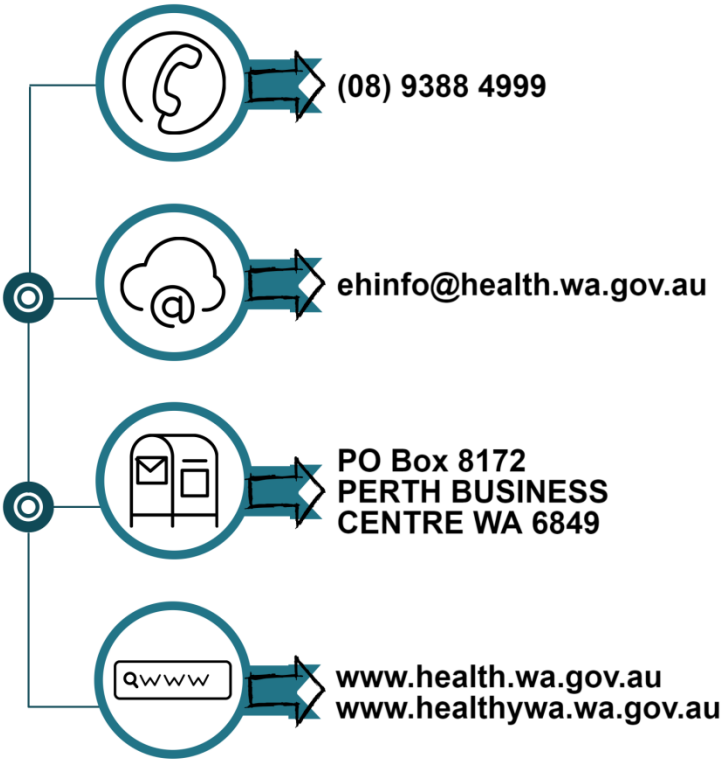

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