



Report 20: 2022-23 | 21 April 2023

PERFORMANCE AUDIT

Regulation of Air-handling and Water Systems



**Office of the Auditor General
Western Australia**

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The Office of the Auditor General acknowledges the traditional custodians throughout Western Australia and their continuing connection to the land, waters and community. We pay our respects to all members of the Aboriginal communities and their cultures, and to Elders both past and present.

WESTERN AUSTRALIAN AUDITOR GENERAL'S REPORT

Regulation of Air-handling and Water Systems

Report 20: 2022-23
21 April 2023

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**THE PRESIDENT
LEGISLATIVE COUNCIL**

**THE SPEAKER
LEGISLATIVE ASSEMBLY**

REGULATION OF AIR-HANDLING AND WATER SYSTEMS

This report has been prepared for submission to Parliament under the provisions of section 25 of the *Auditor General Act 2006*.

Performance audits are an integral part of my Office's overall program of audit and assurance for Parliament. They seek to provide Parliament and the people of WA with assessments of the effectiveness and efficiency of public sector programs and activities, and identify opportunities for improved performance.

This audit assessed if the Department of Health and three local government entities regulate air-handling and water systems to minimise the risk of Legionella.

I wish to acknowledge the entities' staff for their cooperation with this audit.

A handwritten signature in grey ink that reads "Labuschagne".

SANDRA LABUSCHAGNE
ACTING AUDITOR GENERAL
21 April 2023

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Auditor General's overview

In our community the growth of Legionella bacteria in air-handling and water systems can, in rare instances, result in a serious lung infection known as Legionnaires' disease.

In Australia's largest outbreak of Legionnaires' disease at the Melbourne Aquarium in 2000, 125 people were hospitalised and four died. In the investigation that followed, Legionella was found in the Aquarium's cooling towers.

Thankfully WA has not experienced an outbreak of Legionnaires' disease, however this doesn't mean that it can't or won't occur. While individual cases remain rare, the risk of an outbreak may increase as our infrastructure and population ages, the climate warms and new uses for water in our built environment emerge.

As members of the public we do not often see or have access to air-handling and water systems. In fact, many of us would be unaware of their existence. Yet we are entitled to expect that they are effectively managed to minimise public health risks.

Our audit found inconsistencies in how owners maintain and test their systems. It also found that the existing regulatory framework requires improvement. The Department of Health has recognised this and is developing new regulations for air-handling and water systems. However, legislative change can be a long process and Legionella risks remain in the interim. Rather than await new legislation, I encourage all State and local government entities that own these systems to maintain and test in accordance with standards.

The Department of Health and the local government sector should also work together to support property owners through education and awareness, particularly for vulnerable and high-risk settings such as hospitals and aged care facilities.

Executive summary

Introduction

This audit assessed if the Department of Health (Department) and three local government entities (LG entities) effectively regulate air-handling and water systems to minimise the risk of Legionella. To consider how well this public health risk is managed we also included a sample of State government entities who operate these systems.

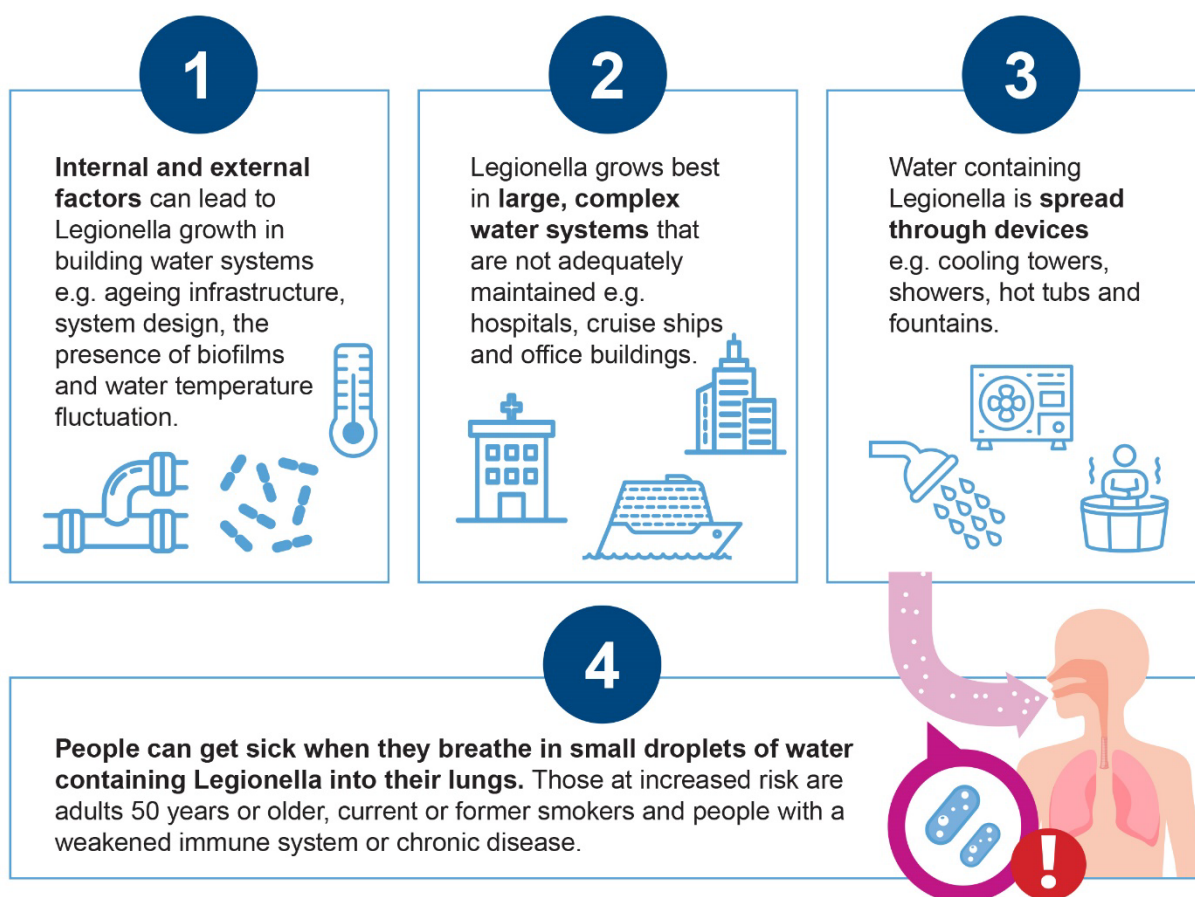
Background

Air-handling and water systems circulate water through built environments. Common examples include:

- cooling towers and evaporative air conditioners – devices commonly used for air cooling in hotels, hospitals, shopping centres, office towers and universities
- warm water systems – plumbing systems that distribute water at warm temperatures (approximately 40°C) to reduce the risk of scalding, often found in hospitals and aged care settings.

Wet surfaces within these systems can support the growth of viruses, fungi and bacteria. The most concerning risk is the growth of *Legionella pneumophila* (*Legionella*) bacteria. These bacteria naturally occur in the environment but can proliferate in poorly managed systems. If water droplets containing these bacteria are inhaled, it can result in Legionnaires' disease (Legionellosis), see Figure 1.

Legionnaires' disease is a rare but potentially life-threatening lung infection. Symptoms include fever, muscle and joint pain, headaches, dry cough and shortness of breath. Older adults, current or former smokers and people with weakened immune systems are at an increased risk of infection.



Source: OAG based on US Centers for Disease Control and Prevention information

Figure 1: Common sources and transmission of Legionella bacteria from water systems

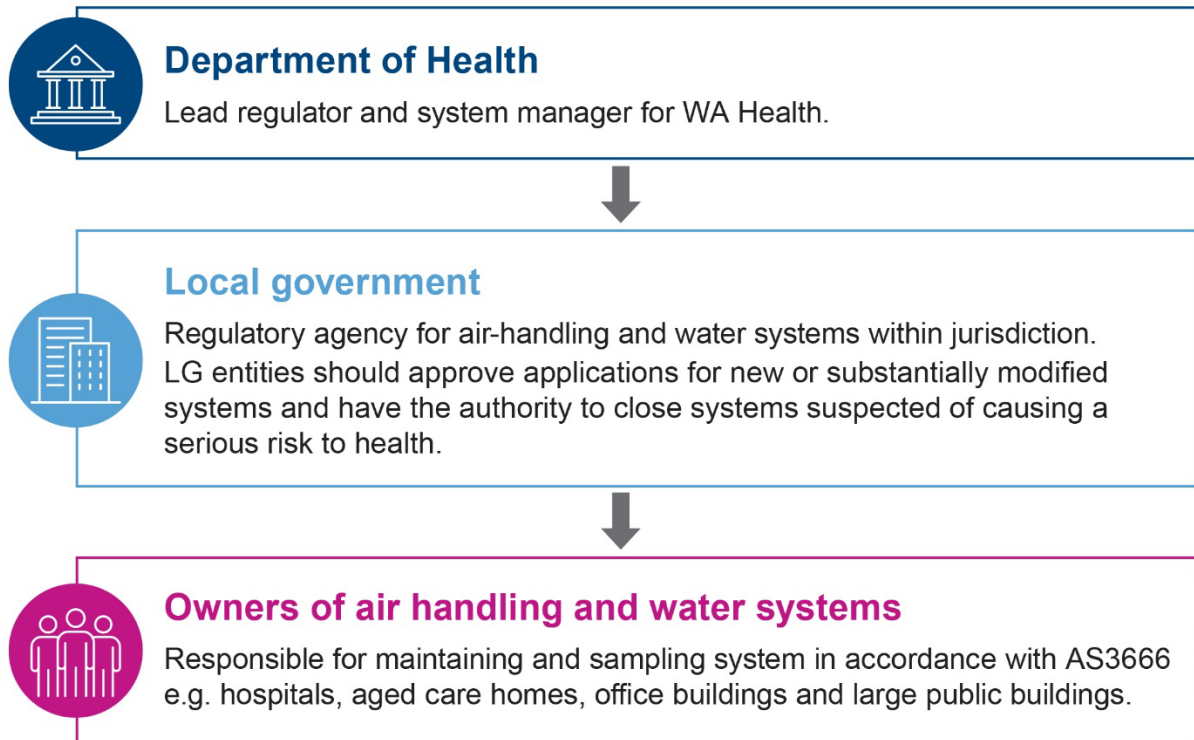
The Health (Air-handling and Water Systems) Regulations 1994 (the Regulations) detail the requirements for the design, installation, maintenance and operation of air-handling and water systems.

The Regulations are based on the Australian/New Zealand Standard 3666 titled *Air-handling and water systems of buildings – Microbial control* (the Standard). The Standard details minimum requirements for installing, operating and maintaining air-handling and water systems, with the aim of minimising health risks from viruses, fungi and bacteria.

We examined a selection of State and LG entities that have various responsibilities under the current Regulations (Figure 2):

- Department – lead regulator, as well as system manager for Health Service Providers (HSPs). HSPs are responsible for the delivery of health services within their local communities and manage infrastructure including air-handling and water systems in WA public hospitals.
- Three LG entities – the Cities of Joondalup, Melville and Perth were selected as they are enforcement agencies under the Regulations. All three LG entities also have buildings with air-handling and water systems within their boundaries and two are owners of cooling towers. The Department estimates the majority of LG entities in Western Australia (WA) have cooling towers or warm water systems within their boundaries.
- Three State entities that own and operate several different types of air-handling and water systems. Two HSPs, the North Metropolitan Health Service (NMHS) and WA Country Health Service (WACHS) were included as hospital settings are considered at

increased risk of Legionella due to their design and need to accommodate vulnerable populations. The other State entity selected was the Department of Local Government, Sport and Cultural Industries (DLGSC), who runs buildings open to the public, including museums, galleries and theatres.



Source: OAG

Figure 2: Current regulatory framework for air-handling and water systems

When administering regulation, it is important that the health of the community and a reasonable expectation of compliance is considered. A risk-based approach, that considers the consequences of an actual or potential event and the likelihood of occurrence is vital.

Conclusion

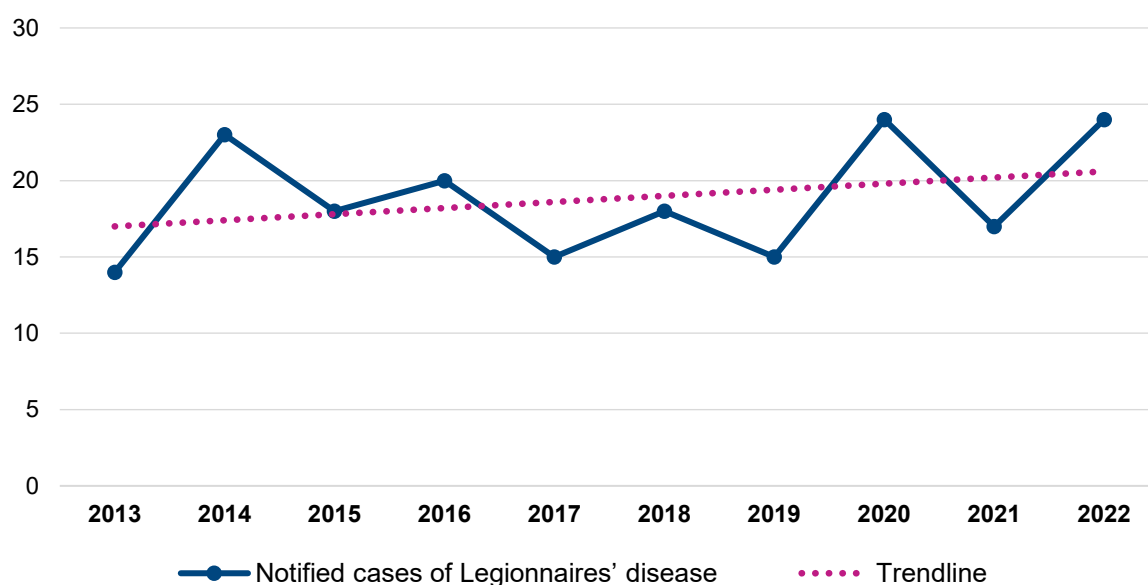
The number of notified cases of Legionnaires' disease is relatively low in WA, and there has not been an outbreak as has occurred in other states. But exposure to Legionella from air-handling and water systems remains a public health risk with potentially serious consequences, particularly for vulnerable groups. The existing regulatory framework requires improvement to ensure it effectively minimises the risk. Gaps in the current arrangements result in limited monitoring and information so it is not clear if low case numbers are the result of good practice by system owners, environmental factors or both.

The Department completed a review of the current regulatory arrangements in 2021 and has recommended new legislation that would update the regulatory approach in WA and see the Department take on responsibility for high-risk settings and State-owned buildings. However, the legislation forms part of a broader reform program and may take some time to introduce and implement. The differences we observed in how owners monitor and maintain their systems demonstrate that better education and guidance from the Department's public health unit is needed ahead of updated legislation.

Findings

Case numbers are low and there have been no outbreaks identified in WA

Legionnaires' disease is an urgently notifiable disease and must be reported to the WA Chief Health Officer within 24 hours of confirmation. Historically WA has experienced low levels of the illness, with no outbreaks¹ identified since the introduction of the Regulations in 1994. Data provided by the Department indicates that a total 188 cases were reported over the last 10 years (2013-2022). In 2022, there were 24 cases, with a slight upwards trend noted in cases over the 10 years examined (Figure 3).



Source: OAG

Figure 3: Numbers of notified Legionnaires' disease cases in WA over a 10-year period

Of the 188 cases in the past 10 years:

- 132 were suspected as being acquired in the WA community
- 46 were suspected to be acquired interstate or overseas
- five were suspected as being acquired in a WA hospital
- five were of an unknown source.

As with many notifiable diseases, the true number of cases may be higher as under diagnosis and under reporting may be present.

While the overall community risk posed by *Legionella* appears to be low, hospital and aged care settings are of particular concern. These facilities frequently feature both warm water systems and cooling towers in an environment that caters to highly vulnerable people who have increased susceptibility and likelihood of severe consequences from Legionnaires' disease. Currently the Regulations do not provide specific guidance or particular focus on higher risk groups or settings.

¹ Two or more cases linked in time and place to a common source.

Gaps in the current Regulations reduce their effectiveness in minimising the public health risk

Roles and responsibilities are fulfilled inconsistently by LG entities

Roles and responsibilities for regulators and owners are articulated under the Regulations and the Standard. However, the Department acknowledges the Regulations are poorly applied across LG entities and concedes authorised officers within LG entities may not have the specialised skills and knowledge required for air-handling and water systems. In the absence of guidance, LG entities are waiting for the new regulations to provide clarity on what they should be doing.

Currently the main activity of LG entities relevant to air-handling and water systems is case investigation. The Department completes an initial case investigation and then requests assistance from LG entities to contact and attend sites that have been visited by a Legionnaires' disease patient and have an air-handling or water system onsite. The relevant LG entity then collects water samples from systems identified and submits these samples to the State laboratory for Legionella testing.

We examined a summary of investigation data for 37 community acquired cases investigated by the Department over a three-year period from 2020 to 2023. A potential source was identified in 10 of the cases, meaning approximately 70% had no known source identified. While determining a source is not always possible, we noted several examples of incomplete case investigations, with the Department citing a lack of participation or response from the LG entity involved. None of the investigations involved the three LG entities included in this audit.

The Department and LG entities do not have accurate records on the number, type and location of air-handling and water systems

A key limitation of the current framework is the lack of accurate records detailing the type and location of air-handling and water systems. All three LG entities in our sample had registers for air-handling systems located within their boundaries but these were not complete or current. Having accurate and readily accessible system details is important for a timely and effective public health response to a Legionella outbreak.

Delays in identifying a contaminated system can mean that more individuals are exposed, particularly in busy public environments, as the system is not swiftly identified and decontaminated or shutdown. There is also a risk that Legionella can spread from a contaminated system to those within the surrounding area. Timely access to accurate details of systems within a nominated geographical area is therefore important.

Several attempts by LG entities to collate and maintain accurate records were evidenced, however activity has been sporadic and suffered from a lack of response from system owners. In 2017, the Department unsuccessfully attempted to determine the number of cooling towers and water systems within WA. It estimates there are approximately 3,000 sites fitted with a cooling tower and 400 vulnerable premises fitted with a warm water system, but the true numbers could be higher.

The Department has proposed a central register that it will collate and manage with input from LG entities who have systems within their boundaries. Details on the establishment and maintenance of the register are yet to be considered and its success will depend on timely submission of information. It is important that information on systems in higher risk settings (i.e. hospitals and aged care facilities) be prioritised for complete and accurate record keeping.

LG entities use the certified building licence process to assess and approve new or significantly modified systems

The Regulations require LG entities to provide written approval to a person who proposes to install or significantly modify an air-handling or water system. However, the three LG entities were unable to demonstrate a consistent process for assessing or approving the installation of new or significantly modified systems that complied with the Regulations.

The Department has identified a lack of a prescribed format for submission and approval as one of the barriers to LG entities meeting this requirement. There may also be a lack of awareness about the requirement by industry and potentially limited technical expertise within LG entities. For example, the three LG entities did not inform potential owners/builders of their obligation to apply to install a new or significantly modified system via their website.

The three LG entities rely on the certified building licence process to confirm that a commercial development complies with the National Construction Code and its adopted standards.

The certified building licence process allows for assessment of system design and installation requirements by those with specialised technical expertise and is the Department's proposed arrangement for new regulations.

The limited monitoring and information required under current regulations reduces assurance on whether systems are being effectively maintained

The existing regulatory framework does not require compliance monitoring activities by either the Department or LG entities. This means that information on how well owners are managing their systems is limited, and reduces the level of assurance on whether systems are being effectively maintained.

At present, the regulatory framework relies on self-regulation by owners. While self-regulation is common and appropriate in many sectors, the Department has assessed (including through public consultation) that as serious illness or death could eventuate from mismanagement of air-handling and water systems, a regulated approach is required.




The current Regulations enable but do not oblige LG entities to conduct inspections of air-handling and water systems within their jurisdiction. We found that two of the three LG entities do not conduct any or only limited monitoring activities. The third LG entity did conduct annual inspections of five cooling towers known to be in their jurisdiction, using an inspection template based on the Standard. Limited monitoring means the detection of non-compliance and use of enforcement powers are also limited. Under the current arrangements the first indicator of an issue is most likely to be the notification and subsequent investigation of a Legionnaires' disease case. More consistent risk-based compliance monitoring would move from a reactive to a more preventative approach.

The *Health (Miscellaneous Provisions) Act 1911* does not bind the Crown, meaning State government entities are not covered by the requirements of the current Regulations. New regulations under the *Public Health Act 2016* will require monitoring and compliance of all owners, including State government entities. However, it is reasonable to expect that managing the risk of Legionella in vulnerable facilities, particularly those owned by the State, should be prioritised while the new regulations are in progress.

There is inconsistency in how owners maintain and test their air-handling and water systems

Owners respond differently to detections that should produce a uniform response

The Standard sets out the minimum requirements for regular routine maintenance. Where these requirements are not practical (i.e. where systems need to be shutdown), the Standard provides an alternative approach based on regular testing and specifies the action to be taken in response to a detection of Legionella. Table 1 shows the control strategies as determined by the test result and the number of Legionella bacteria identified.

Legionella test result (cfu*/mL)		Required control strategy
	Not detected (<10)	<ul style="list-style-type: none"> System under control Maintain monitoring and treatment program
	Detected as <1,000	<ul style="list-style-type: none"> Immediate decontamination (alternative or higher dose of biocide than usual) Review control strategy Re-test within 3-7 days of plant operation Assess if further remedial action is necessary
	Detected as ≥ 1,000	<ul style="list-style-type: none"> Immediate decontamination (chlorine-based biocide) Review control strategy Re-test within 3-7 days of plant operation Assess if further remedial action is necessary

Source: OAG based on Department of Health information

* colony forming units

Table 1: Control strategies for the presence of Legionella

We found the Standard was not consistently followed because different owners tested at different frequencies and took different actions in response to detections. Inconsistent application of the Standard does not align with best practice and reduces confidence that the risk from Legionella is effectively managed.

The State and LG entities we reviewed were aware of the number of air-handling and waters systems they owned and were responsible to maintain. They all had asset registers that included these systems. Our sampled entities owned 87 air-handling and water systems, comprising 20 cooling towers and 67 warm water systems.

Two LG entities, DLGSC and the two HSPs were able to provide documented evidence for Legionella testing of the systems they owned. In the two HSPs who manage systems in high-risk settings, we found the frequency of testing varied depending on the hospital site. For example, the regularity of cooling tower testing varied from once a month to no testing within a two-year period.

Regular testing is important because it provides assurance and mitigates the risk of an outbreak. Results in the two HSPs showed:

- detection of Legionella was more common in warm water systems than cooling towers
- since July 2020 one HSP performed a total of 3,309 Legionella samples. An average of 4.6% of samples detected Legionella and required remedial flushing and/or thermal disinfection. Overall this percentage has declined over time. Where legionella was detected, the Department advised that 50% of those detections were borderline results (i.e. 10 CFU/ml)
- a total of four cooling towers samples showed a Legionella detection in the two-year period we reviewed
- the other HSP provided results for 803 water samples in 2022. These results showed Legionella was detected in 6.5% of the samples. While there is no evidence of any hospital acquired cases of Legionnaires' disease within this HSP, we found inconsistencies in record keeping including a lack of consistent remedial action. This indicates a need for greater management oversight across various sites.

Case study 1: Example of HSP activity in Legionella management and prevention

One HSP has invested significantly in the management of its on-site water systems. Initiatives include:

- the adoption of an overarching Water Quality Management Policy and Framework that defines the requirements and outcomes for effective onsite water management
- the development of site-specific Facility Water Safety Plans that detail the individual characteristics of systems and risks that are present at each site
- a risk-based monitoring and validation program
- the implementation of management software to record and document water monitoring activities.

A review of these initiatives undertaken by the Department indicated some area for improvement but in general found that the Water Quality Management System provided a reasonable risk-based framework for identifying and managing water quality risks.

The Department is developing a universal water risk management framework and assessment tool for HSPs to encourage consistency and reduce risk

In December 2021, the Department initiated a review of processes and procedures by HSPs to control Legionella. The review indicated there were varying strategies between HSPs to minimise and control Legionella in their water-based systems which could reduce the level of assurance and increase risk.

Following the completion of the review, work has started in the Department to develop a universal water risk management framework for Legionella control and a risk assessment tool for HSPs. The purpose of the risk assessment tool is to identify potential gaps and improvement opportunities within State owned health facilities. Six pilot hospital sites (three metropolitan and three regional) have been selected to trial the risk assessment tool.

The pilot program is scheduled for completion by July 2023 with the results to be presented to WA Health's Executive Committee. The implementation timeframe for the framework is yet to be established but the Department anticipates this work will benefit vulnerable settings, LG entities and the industry more broadly to standardise better practice, ensure consistency and reduce risk.

Aged care facilities have both warm water systems and vulnerable people, but little is known about how well their systems are managed

Aged care facilities are a high risk due to a combination of warm water systems and vulnerable people but are mostly privately owned and operated with little known about how well systems are managed. The LG entities we spoke to have limited awareness of warm water systems within their jurisdiction. Larger aged care facilities may also feature the use of cooling towers.

The Department liaised directly with the Commonwealth Aged Care Quality and Safety Commission regarding its proposed new regulatory requirements. The Commission informed the Department that the Aged Care Quality Standards do not include specific requirements relating to air-handling and water systems. Accordingly, the Department intends to ensure that aged care facilities are captured by the new regulations but there is nothing to address the risk in the interim.

New regulations are likely to take some time, better guidance and education would help reduce risk in the interim

The Department has identified the need to update the regulatory framework

In 2017 the Department started a review of the current Regulations. The review encompassed all subsidiary legislation under the *Health (Miscellaneous Provisions) Act 1911* and covered a wide range of public health risks such as asbestos, drinking water and public events. For air-handling and water systems the review included two consultations to seek the opinions and potential impacts of any proposed changes on industry, LG entities and other interested parties.

The review found that the Regulations have several limitations and are inconsistently administered by LG entities. Specifically, there is no requirement for air-handling and water system registration, no notification requirement when elevated levels of *Legionella* are detected and no requirements for maintenance and testing to be reviewed or checked. Further, in the event of non-compliance with the Regulations, enforcement options are limited and the maximum penalty is \$1,000.

A key purpose of the review was to determine the most effective options for managing the public health risk of air-handling and water systems into the future. Four options were considered:

- A. Deregulate to enable self-regulation and provide an industry guideline or code of practice.
- B. Develop equivalent regulations under the *Public Health Act 2016* and retain the status quo.
- C. Develop new regulations to manage the public health risk, with building requirements addressed by the Building Code of Australia.
- D. Manage the public health risk under occupational safety and health legislation.

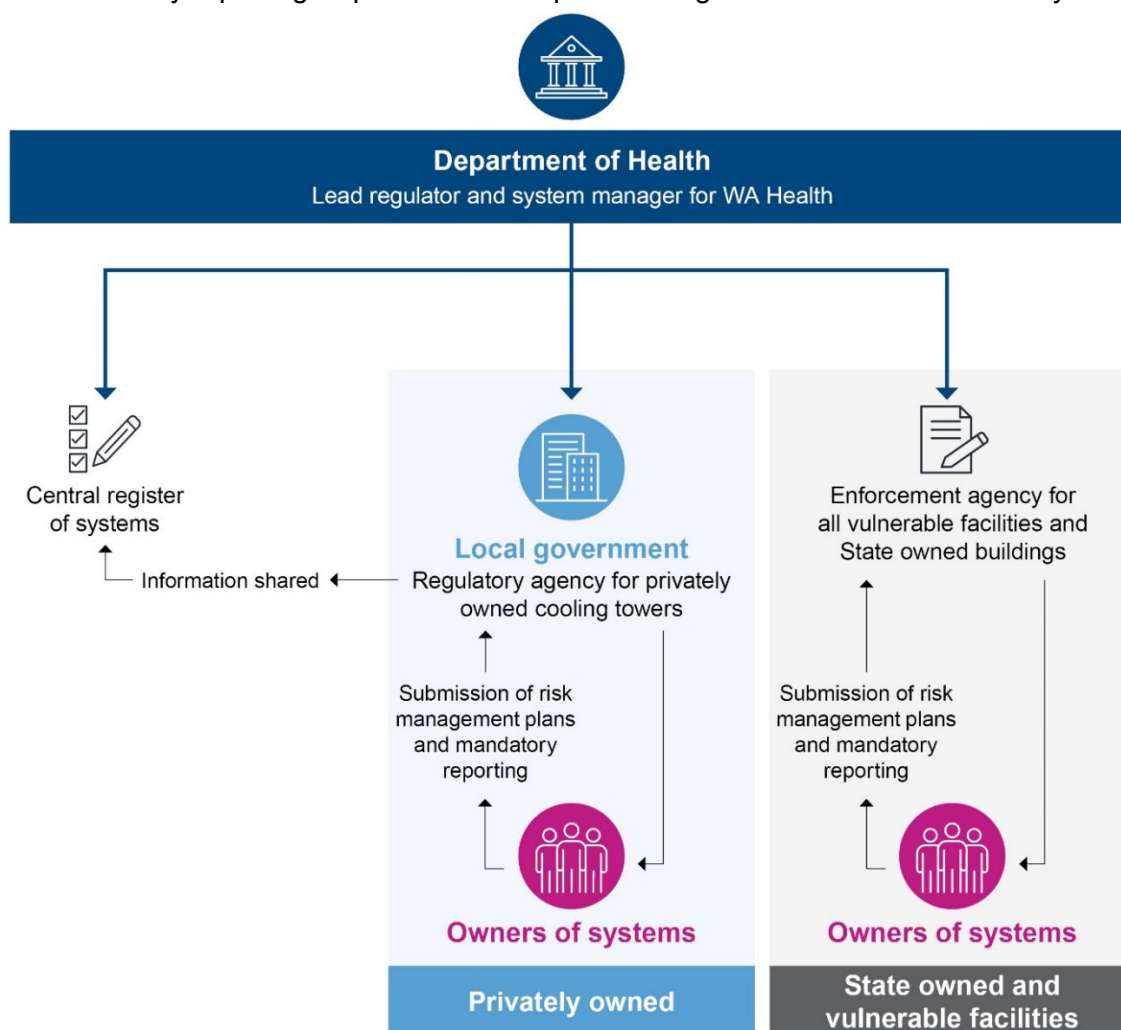
The Department and respondents who participated in the consultation strongly supported option C. This position was informed by a public health risk assessment undertaken as part of the consultation. The assessment classified the public health risk of death from *Legionella* as high and the risk of illness as medium. These classifications indicate that control measures are necessary to mitigate and manage the public health risk to the community.

The Department has designed new regulations, but they will take time to enact and implement

Following the outcome of the review the Minister for Health approved the drafting of new regulations. The Department has completed policy instructions to inform the drafting process. The proposed regulatory framework for air-handling and water systems is detailed in Figure 4.

Under the new regulations the Department intends to take responsibility for regulating hospitals (both public and private), aged care facilities and all State-owned buildings. LG entities will be responsible for privately owned cooling towers within their boundaries. Further changes include requiring or adopting:

- the responsible person where a cooling tower or warm water system is located, to register each system with the appropriate enforcement agency. A prescribed form for registration and certificates of approval will be introduced
- the installer of systems to certify that the system has been designed and installed in accordance with the applicable requirements of the Building Code of Australia, as a requirement of system registration
- mandatory risk management plans for all systems
- minimum maintenance and performance-based testing requirements for systems
- mandatory reporting requirements for specified Legionella detection limits in systems.



Source: OAG

Figure 4: Proposed regulatory framework for air-handling and water systems

The proposed changes align with arrangements in other jurisdictions such as Victoria. While an official timeframe has not been established, the Department had indicated that the proposed package of new environmental health regulations under the *Public Health Act 2016* may not be in place for at least two years. It has now advised that the individual regulations may be introduced separately based on priorities and risk.

Improved education and guidance is needed ahead of updated legislation

Currently the Department is conducting limited education or awareness activities relevant to air-handling and water systems as part of its oversight role. While the local government sector and the industry have been advised of the likely framework for the new regulations there is limited advice on how the public health risk should be minimised in the interim. This leads to a current holding pattern that awaits the implementation of the new regulations.

The Department has commenced preparations for the introduction of the new regulations. We reviewed planning documents that proposed engagement with LG entities and industry through training presentations, letters, updated web content and guidelines. However, these activities have no timeframe assigned. In the meantime, the Department should provide updated guidance to owners of systems particularly in vulnerable or high-risk settings to help ensure they adopt better practice.

Recommendations

1. The Department of Health, in consultation with local government entities should:
 - a. review current guidance to industry and local government entities in preparation for the adoption of the proposed new regulatory framework
 - b. develop and implement an education program to support and encourage system owners to achieve more consistent risk-based practice
 - c. establish and maintain a central register of air-handling and water systems within WA
 - d. consider splitting the implementation of the environmental health regulation package under the *Public Health Act 2016* to focus on areas of highest priority, including the air-handling and water systems regulations.

Implementation timeframe: July 2024

Department of Health response:

Recommendation supported.

The Department will review all current regulatory guidance material on the website for our co-regulators and industry and develop any information required which reflects the requirements for compliance with the Australian Standards that are at the core of best practice management of air handling and warm water systems currently and central to the proposed regulations being developed under the *Public Health Act 2016*. This approach will inform system owners and operators and other regulatory entities of what is proposed in the future and encourage transition to anticipated management practices that will provide more oversight.

The Department will develop guidance material and training to promote the proposed regulations and the expectations for future compliance to effect better risk-based management of systems.

The establishment of a central register was identified through consultation as a key requirement for the Department to undertake and manage to support implementation of new regulations. Considerations such as procurement of a suitable platform to host a register, how the information will be collected from third parties, how access to the registration information will be managed for the public and co-regulators and the cost for the register and staffing to maintain it, shall be factored into a forward work plan. In the meantime, the Department will inform co-regulators and industry of the intention to establish a register with the information that is likely to be required and the process to be adopted. In line with recommendations 1a and 1b, information relevant to these stakeholders about a proposed centralised register will be prepared in advance of any implementation.

DLGSC response:

The Department of Local Government, Sport and Cultural Industries is supportive of this recommendation.

2. Local government entities, in consultation with Department of Health should:
 - a. develop ways to gather the information on air-handling and water systems in their areas that will support a central register
 - b. consider introducing a risk-based monitoring/compliance process for air-handling and water systems within their jurisdiction.

Implementation timeframe: December 2024

City of Joondalup response:

Supported

City of Melville response:

Supported

City of Perth response:

Supported

3. State and local government entities who own air-handling and water systems should:
 - a. develop risk management plans
 - b. ensure that systems are operated and maintained in accordance with Australian/New Zealand Standard 3666, *Air-handling and water systems of buildings – Microbial control*.

Implementation timeframe: July 2024

Department of Health response:

Recommendation supported. Work by the Department is already underway.

DLGSC response:

The Department of Local Government, Sport and Cultural Industries is supportive of this recommendation. The development by the Department of Health of a universal water risk management framework for Legionella control and a risk assessment tool that can be adopted by all State and Local Government entities would support implementation of this recommendation.

City of Joondalup response:

Supported

City of Perth response:

Supported

Response from the Department of Health

The Department has proactively commenced preparations for the implementation of a stronger regulatory process for air-handling and warm water systems. The Department will support stakeholders through the transition to effect better risk-based management of systems. Health System Providers are reviewing legislative requirements and developing quality assurance mechanisms and educational tools.

Response from the City of Joondalup

The City of Joondalup appreciates the opportunity to participate in the Office of the Auditor General performance audit on the regulation of air-handling and water systems. The City acknowledges the public health risks posed by air-handling and water systems and supports the recommendations provided.

The City recognises its obligations as an owner of air-handling and water systems, to ensure that appropriate operational and maintenance activities continue to be performed to manage any risk to public health.

The City also understands the importance of its role in promoting public health and that local governments are typically well placed to engage with businesses to provide advice on legislative obligations and monitor for compliance.

The City looks forward to working with the Department of Health in the lead up to a new regulatory framework that will be introduced as part of phase 5 implementation of the *Public Health Act 2016* and is confident that new regulations and any associated guidance will provide improved and consistent management of air-handling and water systems.

The City acknowledges that a new regulatory framework is approximately two years away. The City is committed to implementing the recommendations to ensure that the current risks associated with air-handling and water systems are being addressed.

Response from the City of Melville

We thank the Office of the Auditor General for the opportunity to participate in the Performance Audit which provide a valuable contribution to identifying opportunities for improvement.

Response from the City of Perth

On balance, the City accepts and welcomes the audit findings. The City has a strong risk based community/environmental health programme. While oversight of air-handling and water systems attracts a lower risk profile than other enforcement responsibilities (e.g., food safety, aquatic facility safety, lodging house), opportunity for improvement is acknowledged. The City is committed to continuous improvement and looks forward to working with the Department of Health on this matter.

Response from the Department of Local Government, Sport and Cultural Industries

The Department of Local Government, Sport and Cultural Industries (DLGSC) accepts the findings of this audit. DLGSC is supportive of improved practices regarding the Regulation of Air-handling and Water Systems that take a risk-based approach and are in line with the Australian/New Zealand Standard 3666 *Air-handling and water systems of buildings – Microbial control*. This includes the support of revised and/or new legislation to achieve this outcome.

Audit focus and scope

The objective of this audit was to assess if the Department of Health and local government entities effectively regulate air-handling and water systems to minimise the risk of Legionella.

We based our audit on the following criteria:

- Are sound arrangements in place for the management and oversight of the Legionella risks for air-handling and water systems?
- Do entities that regulate air-handling and water systems effectively administer requirements?

As part of this audit we:

- reviewed documentation related to the regulation of air-handling and water systems
- analysed available data from the Department of Health, North Metropolitan Health Service, WA Country Health Service, Department of Local Government, Sport and Cultural Industries and three local government entities (City of Joondalup, City of Melville and City of Perth)
- interviewed key staff at audited entities
- visited sites to view air-handling and water systems in operation.

Individual cases of Legionnaires' disease were not examined in relation to their potential sources, action/s taken or the investigation outcome.

A different sub-species of Legionella (*Legionella longbeachae*) can be found in soils and compost products and can also result in illness. This audit did not include *Legionella longbeachae*.

This was an independent performance audit, conducted under section 18 of the *Auditor General Act 2006*, in accordance with Australian Standard on Assurance Engagements ASAE 3500 *Performance Engagements*. We complied with the independence and other ethical requirements related to assurance engagements. Performance audits focus primarily on the effective management and operations of entity programs and activities. The approximate cost of undertaking the audit and reporting was \$225,000.

Auditor General's 2022-23 reports

Number	Title	Date tabled
19	Information Systems Audit – Local Government 2021-22	29 March 2023
18	Opinions on Ministerial Notifications – Tourism WA's Campaign Expenditure	27 March 2023
17	Information Systems Audit – State Government 2021-22	22 March 2023
16	Opinions on Ministerial Notifications – Triennial Reports for Griffin Coal and Premier Coal	22 March 2023
15	Opinion on Ministerial Notification – Stamp Duty on the Landgate Building, Midland	8 March 2023
14	Administration of the Perth Parking Levy	16 February 2023
13	Funding of Volunteer Emergency and Fire Services	22 December 2022
12	Financial Audit Results – State Government 2021-22	22 December 2022
11	Compliance with Mining Environmental Conditions	20 December 2022
10	Regulation for Commercial Fishing	7 December 2022
9	Management of Long Stay Patients in Public Hospitals	16 November 2022
8	Forensic Audit Results 2022	16 November 2022
7	Opinion on Ministerial Notification – Tom Price Hospital Redevelopment and Meekatharra Health Centre Business Cases	2 November 2022
6	Compliance Frameworks for Anti-Money Laundering and Counter-Terrorism Financing Obligations	19 October 2022
5	Financial Audit Results – Local Government 2020-21	17 August 2022
4	Payments to Subcontractors Working on State Government Construction Projects	11 August 2022
3	Public Trustee's Administration of Trusts and Deceased Estates	10 August 2022
2	Financial Audit Results – Universities and TAFEs 2021	21 July 2022
1	Opinion on Ministerial Notification – Wooroloo Bushfire Inquiry	18 July 2022

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