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

Consultation summary

For the Discussion Papers – 'Air-handling and water systems review Part 1 and 2'

November 2021

better health ▪ better care ▪ better value

Contents

Acknowledgement to country

The Department of Health 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 and Torres Strait Islander communities and their cultures, and to Elders past, present and emerging.

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Disclaimer

Acknowledgements

The Department of Health would like to thank the people and organisations who contributed time and expertise to this document.

Feedback

Any feedback related to this document should be emailed to publichealthact@health.wa.gov.au

Summary

This report summarises community, government and industry stakeholder responses to the Department of Health's (DOH) two-part consultation on the public health risks associated with air handling and water distributions systems in Western Australia. This report includes the next steps to update the regulations for air handling and water distribution systems.

The purpose of the two consultations was to inform the review of existing regulations under the *Health (Miscellaneous Provisions) Act 1911* (the Health MP Act) and the *Health (Air-handling and Water Systems) Regulations 1994* (the Air-handling Regulations). The DOH sought to gain a better understanding of the potential impacts on, and opinions of industry, local government, other government agencies and members of the public involved with the management of health risks related to air-handling and water systems.

In April 2019, the DOH released the first Discussion Paper (Part 1 of the consultation process) entitled '*Managing the Public Health Risks Associated with Cooling Towers and Warm Water Systems in WA'*. The paper discussed four options:

- **Option A** – Deregulate the industry. That is, repeal the existing Air Handling Regulations without replacement and allow the industry to self-regulate. The DOH could provide guidance documents to help minimise the public health risks which would complement the general public health duty provisions of the *Public Health Act 2016* (the Public Health Act).
- **Option B** – Retain the status quo by making equivalent regulations under the Public Health Act.
- **Option C** – Develop new regulations to manage this public health risk with building requirements addressed by the Building Code of Australia.
- **Option D** – Manage this public health risk under Occupational Safety and Health legislation.

Over the fourteen-week consultation period a total of forty-eight (48) submissions were received with several late submissions accepted.

The second Discussion Paper (forming Part 2 of the consultation process) was available for comment from May to August 2020. As Part 1 of the review had indicated that Option C was preferred by stakeholders and is recommended by the DOH, the second Discussion Paper provided further detail on the proposed content for new regulations categorised into the following four topics:

1. Revised definitions and exemptions based on the risk of facilities or systems,
2. Revised administrative requirements and application of regulations,
3. Revised approval requirements and risk management plan (RMP) requirements; and
4. Revised monitoring, investigation and decontamination requirements.

A total of forty-six (46) respondents provided comments or submissions to the second Discussion Paper.

The DOH would like to acknowledge the contribution of each respondent to the review, and whilst it is not possible in a summary report to represent every viewpoint, this report details the main issues and themes raised in stakeholder consultation, highlighting key points of contention and consensus. The comments reported in this document are the views of respondents to the Discussion Papers and should not be taken as the views of the DOH. DOH recommendations are summarised over page.

Summary of recommendations

The DOH makes the following recommendations:

1. ***That 'Option C: Provide new, updated regulations under the Public Health Act 2016' be adopted.***

   Seventy-nine (79) per cent of respondents to Discussion Paper Part 1 nominated new regulations as the preferred option for managing public health risks associated with air handling and water systems. Stakeholders identified, and DOH agreed that the existing legislation has several inefficiencies and fails to address known risks. As such, it is necessary to repeal and replace the Air Handling Regulations with updated legislation that aligns with public health objectives.

2. ***That proposal 4.1.1 be adopted to revise definitions.***

   Proposal 4.1.1 recommended that the definitions in the Air-handling Regulations be reviewed and new terminologies developed to capture emerging public health risks. A full list of definitions proposed for adoption is included in appendix 5.

3. ***That proposal 4.1.2 be amended and adopted to apply new regulations to all air handling and water distributions systems except systems:***
   - ***Installed in a Class 1A, 4 or 10 building as defined by the Building Code of Australia, provided that it is not a water system that serves a carwash.***
   - ***That serve only a single sole occupancy unit in a class 1B, 2, or 3 building as defined by the Building Code of Australia.***
   - ***That are warm water systems forming part of an aquatic facility.***

   Proposal 4.1.2 recommended the new Regulations would apply to cooling towers and water systems in any buildings except class 1, 4, and 10 buildings under the Building Code of Australia (BCA). However, it was recognised by respondents that certain components of the Regulations should apply to air handling systems beyond cooling towers, and to water systems serving carwashes. Systems serving multiple dwellings were also nominated for inclusion, while systems serving only a single dwelling were considered appropriate for exemption.

4. ***That proposal 4.1.3 be amended and adopted to require enforcement agencies to rate the public health risk associated with each registerable air handling system.***

   Proposal 4.1.3 originally recommended public health risk rating all air and water handling systems. This proposal has been reduced in scope to restrict public health risk rating to registerable air handling systems.

5. ***That proposal 4.2.2 be amended and adopted to require the owner of a building or facility where a registerable system is located, to ensure that each registerable system servicing that building or facility is registered with the appropriate enforcement agency.***

   Proposal 4.2.2 recommended registration of all air handling and water systems. While registration of air handling and water systems was recognised as necessary for enabling rapid responses to legionnaires disease outbreaks, respondents identified that a blanket registration requirement was an unnecessary regulatory burden. Registerable systems are

defined to include water systems in vulnerable facilities, warm water systems, and cooling water systems (includes cooling towers).

6. ***That proposal 4.3.1 be adopted nominating:***
   - ***The Chief Health Officer as the appropriate enforcement agency for air handling and warm water systems serving vulnerable facilities and state-owned buildings.***
   - ***Local government as the appropriate enforcement agency for all other air handling and warm water systems***

   It is proposed that the CHO will be the enforcement agency for all vulnerable facilities including hospitals and residential aged care. Local government will be the enforcement agency responsible for the registration of other high-risk systems including cooling towers that service shopping centres, cinemas, hotel accommodation, and residential apartment complexes.

   The DOH intends to develop a centralised register for joint use with local government. It is intended that local government will have access to the register within the limits of municipal boundaries. Data input and maintenance will be a joint responsibility based on the proposed regulatory delineation.

7. ***That proposal 4.4.2 be adopted to require the design, construction and installation of new air and water handling systems to be certified for compliance with the Building Code of Australia as a requirement of registration.***

   Proposal 4.4.2 recommended new air handling and water systems be certified by the installer as a requirement of registration. Certification of compliance with the BCA will apply regardless of the need for an approval under the *Building Regulations 2012*. Existing systems will be exempt from certification (but not registration).

8. ***That proposal 4.5.1 be adopted to require mandatory risk management plans for all registerable systems.***

   Risk management plans (RMP) are recognised as industry best practice in the nationally recognised *enHealth Guidelines for Legionella Control*. The new Regulations will require RMPs for registerable air handling and water systems and prescribe minimum content and standards for RMPs.

9. ***That proposal 4.6.1 be adopted requiring independent auditors to undertake audits of risk management plans at prescribed frequencies.***

   The new regulations will require facilities with registerable air handling and water systems to undertake independent audits of the implementation of RMPs at prescribed frequencies. DOH will work with industry associations to develop auditor competency standards and will be responsible for maintaining a publicly accessible register of approved auditors.

10. ***That proposal 4.7.2 be amended and adopted to prescribe both maintenance standards and performance-based monitoring requirements for registerable air handling and water systems.***

    Proposal 4.7.2 originally recommended allowing compliance with either monthly maintenance schedules or monthly performance-based water sampling. Stakeholder responses indicated separate needs for both regular maintenance and performance-based testing. Accordingly, this proposal has been amended to prescribe both maintenance standards and performance-based monitoring requirements for registerable air handling and water systems.

11. ***That proposal 4.8 be adopted, establishing mandatory reporting requirements for specified Legionella detection limits in air handling and water systems.***

    New proposed mandatory reporting requirements for legionella in samples from air handling systems are:

    - 10 – 1000 cfu/ml in three consecutive samples, while following resampling and disinfection protocols prescribed by the regulations, and
    - >1000 cfu/ml in any sample.

    New proposed mandatory reporting requirements for legionella in samples from warm water systems are:

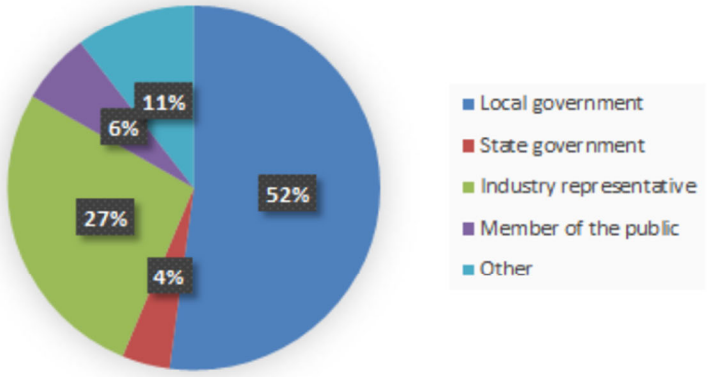
    - 10 – 100 cfu/ml in three consecutive samples, while following resampling and disinfection protocols prescribed by a verified risk management plan, and
    - >100 cfu/ml in any sample

CONSULTATION OVERVIEW

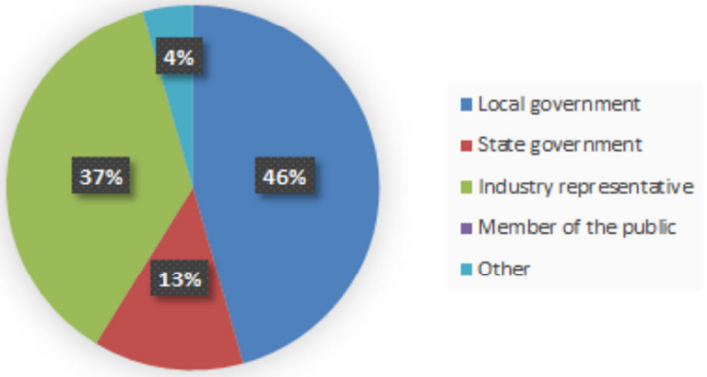
Who was consulted?

- AGED CARE FACILITIES
- CAR WASHES
- DRY CLEANERS
- ENVIRONMENTAL CONSULTANTS
- HOTEL, MOTELS, ACCOMMODATION
- LOCAL GOVERNMENT AUTHORITIES
- HOSPITALS & MEDICAL CLINICS
- SHOPPING CENTRES
- SCHOOLS
- TAVERNS & PUBLIC HOUSES
- UNIVERSITIES, TERTIARY EDUCATION, TECHNICAL/TRADE COLLEGES
- STATE GOVERNMENT AUTHORITIES

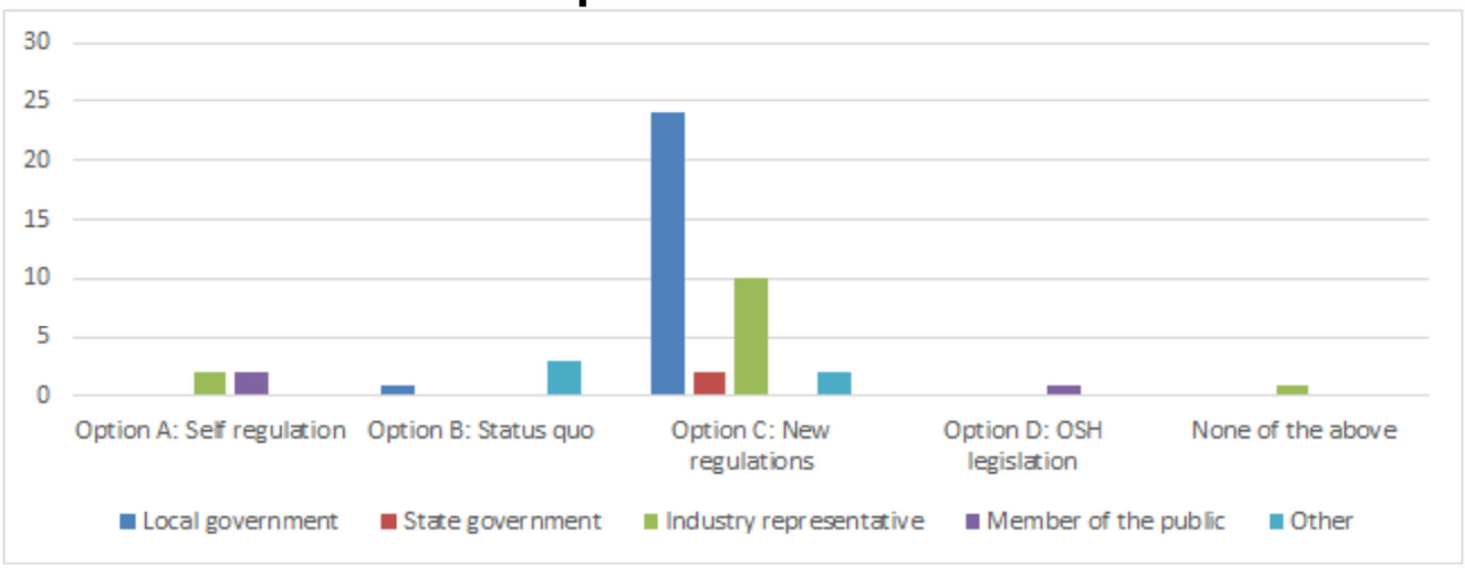
Consultation Part 1
Total Respondents 48



Consultation Part 2
Total Respondents 46



What option was favoured?



Background

The key focus of consultation was to obtain feedback on the most effective options for managing the potential public health risks associated with air-handling and water distribution systems in Western Australia (WA). The major public health risks considered were the spread of air-borne diseases such as Legionnaires' Disease caused by *Legionella pneumophila*.

With the introduction of the Public Health Act, the Air-handling Regulations under the Health MP Act must be reviewed and either repealed or replaced with new regulations aligned with the new regulatory framework of the Public Health Act.

The first Discussion Paper (Part 1) entitled '*Managing the public health risks associated with cooling towers and warm water systems in WA'* discussed the current management of cooling towers and water systems under the Air-handling Regulations which adopt Australian and New Zealand Standards 3666 Parts 1, 2 and 3. This paper considered the various options for managing the public health risks of cooling towers and water distribution systems in WA into the future, identifying potential advantages, disadvantages and costs of each option to industry, consumers and government. Four options considered as part of this review included:

- **Option A** – Deregulate the industry and provide an industry guideline or code of practice.
- **Option B** – Retain status quo by making equivalent regulations under the Public Health Act.
- **Option C** – Develop new regulations to manage this public health risk with building requirements addressed by the Building Code of Australia.
- **Option D** – Manage the public health risk under Occupational Safety and Health legislation.

There was general agreement from all sectors that any approach should be risk-based, with seventy-nine (79) per cent of respondents preferring the development of new regulations as outlined under Option C. Full details of the consultation are detailed below.

The second Discussion Paper (Part 2) released for public consultation (from May to August 2020) detailed proposed legislative / regulatory changes.

Objectives

The outcomes for managing the public health risks associated with air-handling and warm water systems are to:

1. Ensure the correct installation, operation and regular maintenance of air-handling systems installed in WA buildings.
2. Ensure the correct installation, operation and regular maintenance of water distribution systems in high risk buildings such as hospitals and aged care facilities.
3. Ensure timely and effective control measures are initiated in the event of a Legionnaires' Disease outbreak in WA to minimise the risks to public health.
4. Prevent outbreaks of Legionnaires' Disease and other airborne diseases from cooling towers and water distribution systems in WA.

Note: Public health is defined in the Public Health Act to mean the health of individuals in the context of the wider health and wellbeing of the community.

This Review does not consider Legionella risks associated with spas, as these matters have been considered as part of the recent Review of Aquatic Facilities in WA.

Methodology

Both Discussion Papers were circulated to a total of one-hundred and thirty-eight (138) local government authorities, and approximately one-thousand (~1000) industry stakeholders and twenty (~20) state authorities, as well as greater than four-hundred (>400) subscribers to the DOH Environmental Health list server.

Non-government consultation focussed on industry groups (rather than individuals) identified through the Yellow Pages using the following categories – see Appendix 1 for a full list of stakeholder groups invited to respond:

Table 1 Industry representatives consulted

Aged Care Facilities	Private Medical Clinics
Car Washes	Schools
Dry Cleaners	Shopping Centres
Environmental Consultants	Taverns & Public Houses
Hotels, Motels & Accommodation Premises	Technical & Trades Colleges
Private Hospitals	Universities & Tertiary Education Colleges

Stakeholders were invited to comment on DOH's 'Air-handling and water systems of commercial buildings review' Discussion Papers; 'Managing the public health risks associated with cooling towers and warm water systems in WA' and 'Proposed legislative content for new regulations for air-handling and water systems in WA' (available on the DOH website) and provide comment via:

1. the online citizenspace survey,
2. emailing publichealthact@health.wa.gov.au or,
3. mailing a hard copy response to the Environmental Health Directorate.

Summary of responses

The DOH received a total of forty-eight (48) responses for part 1 of the consultation and forty-six (46) responses for part 2 – see Appendix 2 for a combined list of respondents.

Table 2 Total number of responses received during the consultation period categorised by stakeholder group

Stakeholder	Response Part 1	Response Part 2
Local Government authority	25	21
State Government authority	2	6
Industry	13	17
Members of the Public/Other	8	0
Total	48	46

For the first Discussion Paper, thirty-seven (37) submissions were received online via the Citizen Space survey, with eleven (11) submissions and supplementary comments received by email. Thirty-seven (37) submissions were received for the second Discussion Paper using the online Citizen Space survey with another nine (9) submissions and/or supplementary comments received via email.

Air handling and water systems is a specialised area within Environmental Health, and a portion of local governments will not be impacted by the proposed regulatory changes because they will not have systems that require registration. The response rates are consistent with response rates to other Environmental Health regulatory review Discussion Papers published by the DOH. Of the submissions received, there was a balanced distribution between government and industry respondents, with a similar number of respondents from the same groups to both Discussion Papers.

Consultation Findings: Part 1 '*Managing the public health risks associated with cooling towers and warm water systems in WA*' Discussion Paper

Option summaries

Respondents were asked to nominate their preferred option from the four options listed below:

- **Option A** – Deregulate the industry and provide an industry guideline or Code of Practice.
- **Option B** – Retain the status quo by making equivalent regulations under the Public Health Act.
- **Option C** – Develop new regulations to manage this public health risk with building requirements addressed by the BCA.
- **Option D** – Manage this public health risk under Occupational Safety and Health legislation.

There was strong support across all stakeholder groups for Option C – Develop new regulations to manage this public health risk, with building requirements to be addressed by the BCA.

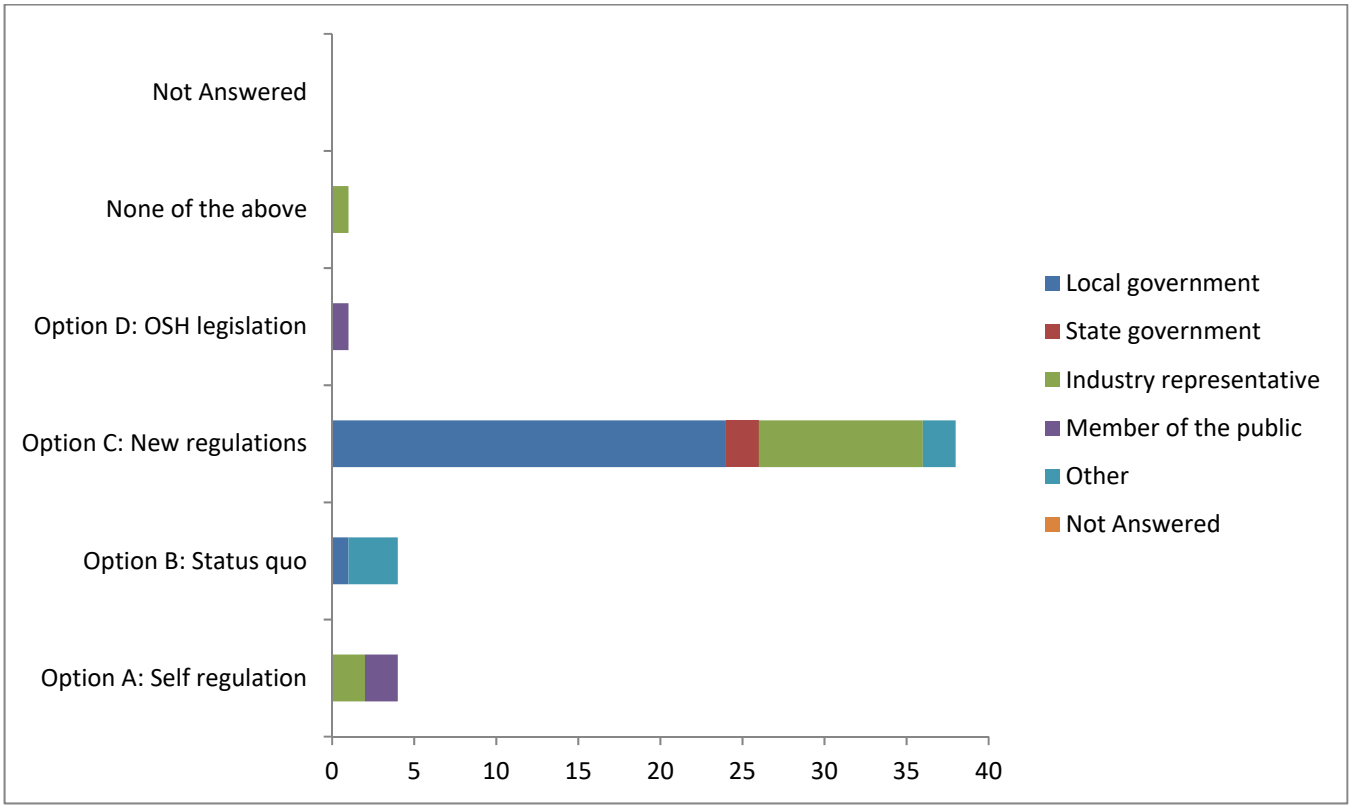


Figure 1: Number of responses for each Option received during the consultation period
Notes:
Option A 8% of total responses
Option B 8% of total responses
Option C 79% of total responses
Option D 2% of total responses
None of above 2% of total responses.

Option A – Enable the industry to self-regulate by providing an industry guideline or Code of Practice

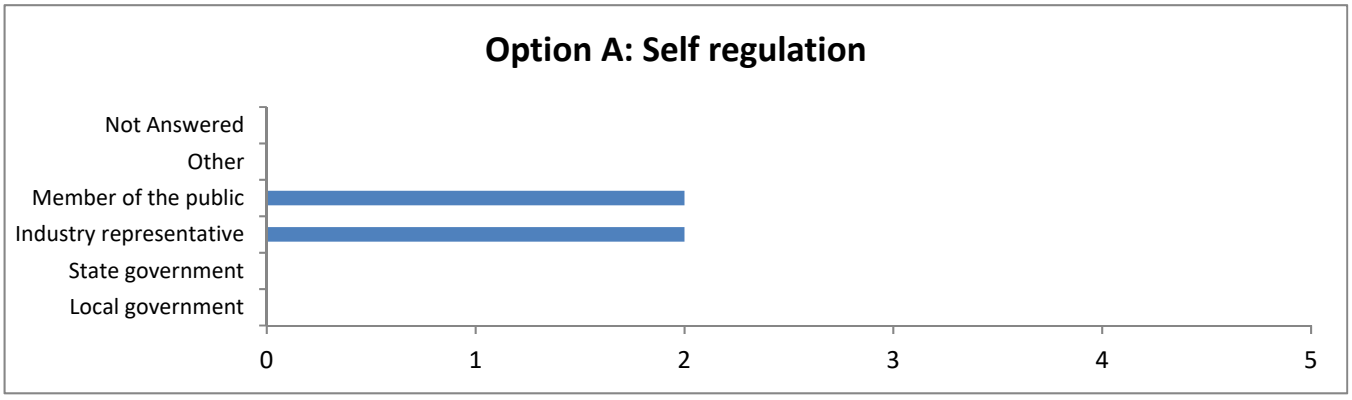


Figure 2: Total number (n=4) of responses for Option

Four (4) respondents favoured Option 1. Of these, two (2) respondents were industry stakeholders and two were members of the public. Two (2) respondents supported self-regulation by providing the industry with a Guideline or Code of Practice. The benefits of adopting this option were cited as:

- Avoiding bureaucracy within State Government.
- Keeping industry costs down.
- Self-regulation brings down the costs of governing and reduces government expenses.

Remaining respondents generally perceived the disadvantages of Option A as follows:

- Industry may adopt cost cutting measures instead of controlling public health risks.
- Legionella cases have the potential to increase in both incidence and prevalence.
- Loss of consistency in application of 'regulation'.
- Perceived lack of enforcement actions.
- Limited potential for application of a risk-based approach, and the potential for new technologies or systems to be actively overlooked

While the DOH recognises the short-term economic advantages of Option A, it considers that these are offset by the potential increased risks to public health and the economic impacts to both industry and government associated with disease outbreak.

Option B – Retain the status quo by making equivalent regulations under the Public Health Act

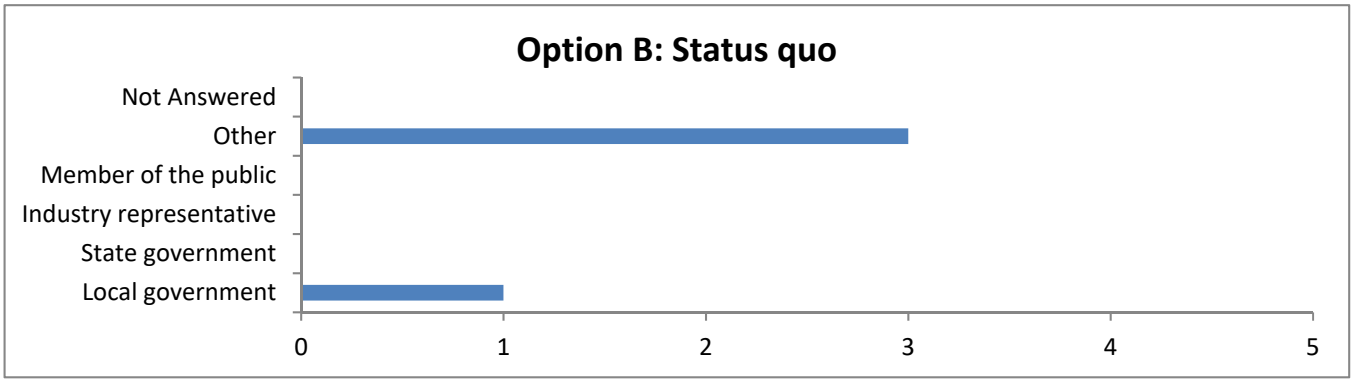


Figure 3: Total number (n=4) of responses for Option B

Four (4) respondents one (1) from local government and three (3) members of the public supported maintaining the status quo by retaining the equivalent legislative provisions under the Public Health Act.

The benefits of adopting this option were identified as:

- Necessary triggers for government investigation and risk management are maintained.
- Reduces the potential for varying interpretation of requirements.

Remaining respondents identified the following disadvantages of Option B:

- Current legislation has not been implemented well by most local governments, similar style regulations would most likely prove to be similarly ineffective.
- The current legislation is administered inconsistently across the state.
- Current regulations are not detailed enough to achieve the purpose of disease control more comprehensively.
- Potential for new technologies or systems to be actively overlooked.
- Currently there is no requirement for registration of air-handling systems or water systems.

The DOH agrees with respondents that the current legislation has scope for significant improvement. The approval mechanism in the current regulations does not provide a prescribed form and requires a high level of expertise regarding air handling and water systems. Consequently, many local governments use the building approval process to incorporate the approval of air handling and water systems in new buildings. This generates difficulties for local governments in distinguishing buildings with air handling and water systems that are likely to be implicated in the event of a legionnaires disease outbreak[1]. Furthermore, there is no way of knowing if the maintenance and operational requirements of the current regulations are working – because there is no provision for enforcement agency oversight of these requirements.

[1] Department of Health, Air-handling and water systems of commercial buildings review, 2019

Option C – Develop new regulations to manage this public health risk with building requirements addressed by the Building Code of Australia

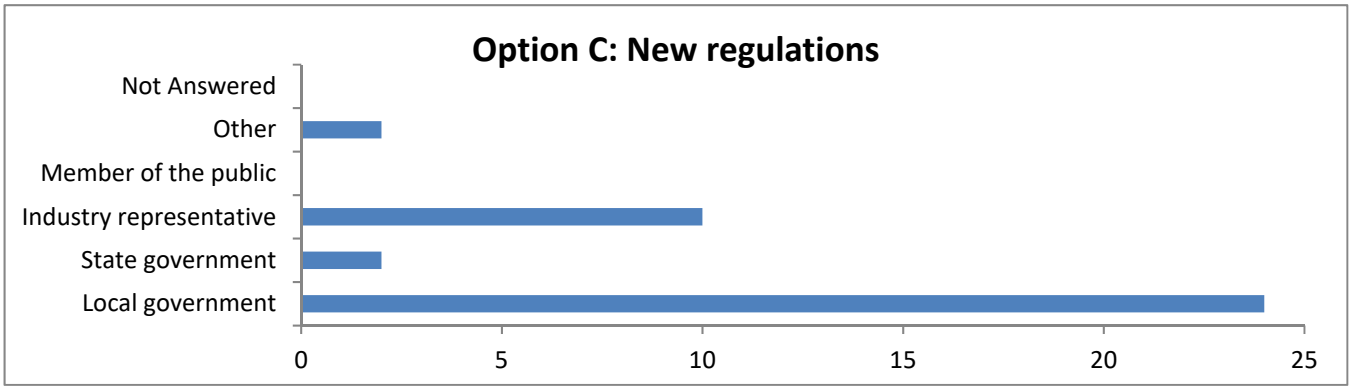


Figure 4: Total number (n=38; 79%) of responses for Option C

There was broad support for ongoing regulation under the Public Health Act, with seventy-nine (79) per cent of total respondents supporting Option C, with strong support from industry and local government. Only two (2) of the eight (8) respondents in the category of public/other sector, supported this option.

Table 3 Support for Option C by sector, expressed as a percentage of each sector

Sector	% of Sector responses in favour
Local Government	96%
Industry	77%
State Government	100%
Public/Other	25%

Respondents who supported Option C identified the key benefits as:

- Improved consistency and minimum standards requirements across industry.
- Provides clarity of responsibilities and increased effectiveness surrounding the management of Legionella.
- Legislative requirements will address a known public health risk and implement risk management measures.
- Improved consistency with other Australian and international regulations and standards.
- Require minimum competency levels within the industry (including consultants).
- If registration becomes a requirement this would assist with the investigation of legionella outbreaks.

Respondents identified the disadvantages of Option C as follows:

- The impact to local government in the role of auditing or inspecting premises with air handling and water systems is not clear.

- Extensive additional training will be required for authorised local government officers on changes to legislation and enforcement provisions, particularly if local government take on further responsibilities.
- Local government may not have the required expertise to consider the risks associated with the design, operation or maintenance of air handling and water systems.
- There will be a significant number of air handling systems and water distribution systems that are captured by regulation, increasing workload and costs for all stakeholders.
- No clarity on whether retrospective registration or approval of systems would or would not be captured.

Respondents from industry and local government have both indicated strong preferences for new regulations designed to manage disease risks associated with air handling and water systems.

Based on:

- the identified high public health risks (see appendix 6)
- the ongoing possibility of disease outbreaks[2]
- the objects of the Public Health Act 2016
- the shortcomings identified with the current regulations, and
- the commentary provided by industry and stakeholders regarding the ongoing need for regulation –

the DOH agrees with the broader stakeholder sentiment that new regulations are appropriate.

An updated regulatory framework will enable the DOH and local government to take a preventive approach by providing for the correct operation and regular maintenance of air-handling and water distribution systems in WA buildings. New regulations will also provide an opportunity to adopt new and updated industry guidelines and initiate a risk-based approach to regulating air handling and water systems in vulnerable facilities and high-risk environments.

[2] Department of Health, Air-handling and water systems of commercial buildings review, 2019

Option D – Manage this public health risk under Occupational Safety and Health legislation

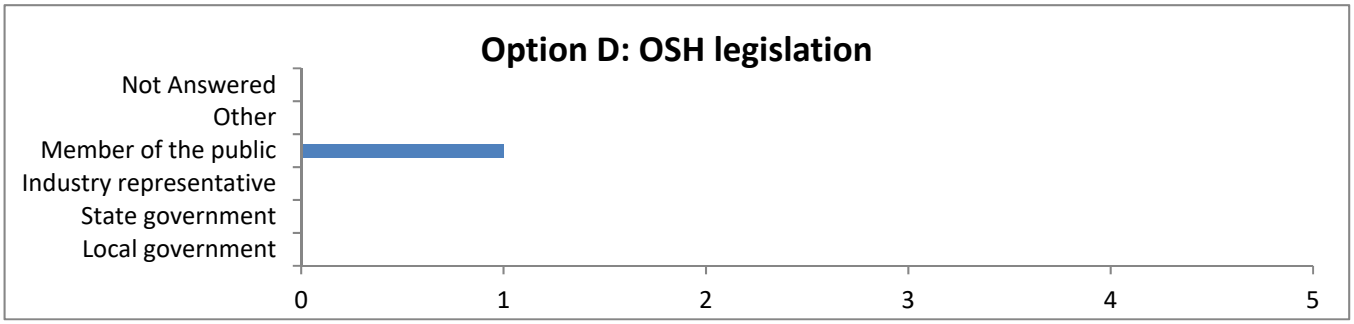


Figure 5: Total number (n=1) of responses for Option D

Only one (1) respondent, a member of the public, supported transferring the current legislative provisions to the Occupational Safety and Health legislation (OSH). This respondent saw the benefit of alignment with OSH legislation as "ensuring greater compliance and regulation".

Disadvantages of Option D were identified as:

- WorkSafe will not necessarily apply requirements consistently to buildings or sites that are not workplaces.
- Local government Environmental Health Officers (EHOs) are not authorised officers under OSH and will not have any legal authority to investigate or inspect air-handling or water systems if these requirements are transferred to OSH legislation.
- The Department of Health will no longer have jurisdiction in legionella outbreak investigations.

The DOH agrees with the disadvantages of Option D identified by respondents.

Other responses

One (1) respondent (an industry representative) did not support any of the four options; instead suggesting that WA should follow the Eastern States example and align with their requirements for maintenance and adopt a code of practice. It was considered that this option would achieve increased national consistency.

Except for the Northern Territory, all other Australian States have adopted regulations for legionella control in air handling and water systems. Certain aspects of interstate regulation refer to codes of practice and/or guidelines. While preparing recommendations for the second Discussion Paper, the DOH have reviewed and considered all interstate regulatory approaches.

Recommendation:

1. *The DOH recommends that 'Option C: Provide new, updated regulations under the Public Health Act 2016' be adopted.*

Following the initial consultation, which indicated a strong preference for the development of new regulations, the DOH developed the second Discussion Paper which detailed potential content for the new regulations.

Consultation Findings: 'Air-handling and water systems of commercial buildings review-Part 2. Proposed legislative content for new regulations for air-handling and water systems in WA' Discussion Paper

Key changes proposed to existing legislation under this Discussion Paper are as follows:

- All 'registerable systems' (water systems in vulnerable facilities, warm water systems and cooling water systems) will be required to register with a relevant enforcement agency.
- The requirement for the enforcement agency to approve applications in respect of air-handling or water systems will be removed.
- New air and water handling systems will require independent certification for compliance with the BCA. 'Registerable systems' installed prior to the commencement of the new regulations will be required to register but will be exempt from the certification requirement.
- An RMP will be required for all 'registerable systems'. RMP's will require verification by the enforcement agency. Templates and guidance will be provided by the DOH for this purpose.
- Independent auditors will audit the implementation of RMPs for 'registerable systems'.
- RMPs will require review every 1 - 5 years, depending on the public health risk categorisation of the system.
- Mandatory reporting of water sampling and testing results over set legionella thresholds will be required for registerable systems.

Scope of Proposed Regulations

- The proposed regulations will exempt air and water handling systems that serve only a single Class 1A (residential) building.
- Air handling systems will be a defined term that excludes dry systems that do not use water or other liquids to operate, humidify, clean, maintain, heat or cool the air.
- New regulatory provisions pertaining to registration, risk management plans, audits and sampling, will only apply to air and water handling systems defined as 'registerable', being water systems in vulnerable facilities, cooling water systems, and warm water systems.

Proposal 4.1 Revised definitions and exemptions

Definitions

It was proposed that new regulations would retain the existing definitions for air-handling system, cooling tower and water system in addition to some new and redefined terms.

It was further suggested that a revised definition for 'water distribution system' was needed to capture a range of possible risks beyond cooling towers including warm water systems and ice machines.

It was proposed that regulations would apply specific requirements to 'high-risk systems', and to systems serving vulnerable facilities. These specific requirements are intended to address the additional risks associated with susceptible individuals and certain system designs. The proposed term 'high risk system' has been altered to 'registerable system' to avoid confusion with the risk rating process.

The proposed definitions of registerable system and vulnerable facilities are included below:

- **Registerable system** a warm water system, a cooling water system (includes cooling towers) and water system that services a vulnerable facility.
- **Vulnerable facilities** include:
    - a *public hospital* as defined by the *Health Services Act 2016* (WA)
    - a *private hospital* as defined in the *Private Hospitals and Health Services Act 1927* (WA)
    - a residential care facility in which persons who do not require constant medical attention receive residential care as defined by Aged Care Act 1997.

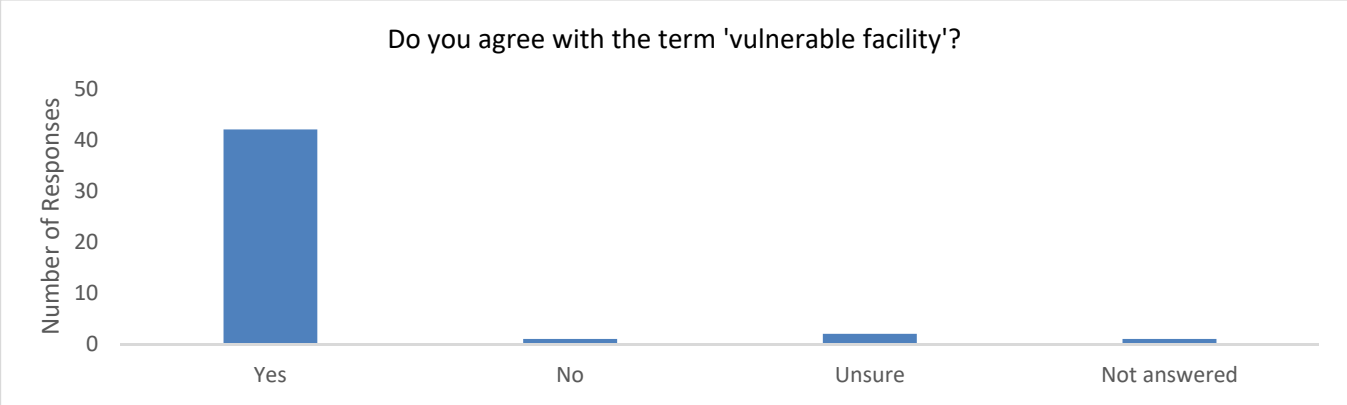


Figure 6: Total number responses for Question 4

Ninety-one (91) per cent of respondents agreed with the use of the term ‘vulnerable facility’. Several respondents suggested the use of the term ‘vulnerable occupant facility’ instead of the term ‘vulnerable facility’.

It was further suggested that “vulnerable facilities” could be broadened to include other facilities. These could then be classified by risk into high risk (e.g. hospitals, aged care, healthcare), medium risk (e.g. places accessed by immuno-compromised persons, plus any facility with a cooling tower system within 200m of a vulnerable facility) to low risk (for example, healthy population and low risk of infection).
Respondents made the following comments in relation to the terms and definitions proposed;

- **Cooling tower**: it is assumed that cooling tower has been used to reference all air-handling systems as defined by AS/NZ3666 and not just cooling towers throughout the Discussion Paper. Clarity is required if regulations will apply to all air-handling systems and not just cooling towers. Cooling tower systems are now more complex than those covered in the standard and include hybrid cooling systems. Expanding this definition would be appropriate.
- The definition of **cooling tower** should include any cooling system that has the potential to mechanically disperse water droplets or water vapour but exclude “evaporative coolers” used in residential housing,
- **Competent person**: no other jurisdiction currently requires the competent person or duly qualified person to have a tertiary qualification. In addition, industry practitioners with extensive experience may not necessarily possess a tertiary degree. Competent person should include an individual with significant (>5 years) industry experience. The concept should be applied to the person who develops the Risk Management Plan and the person

who manages an organisation that provides water treatment services. There should be a clear distinction between the designer, plumber, chemical supplier and consultant.

- **Independent auditor**: most major Australian jurisdictions require that the auditor be independent of; the facility owner, the water treatment provider and the person who develop the risk management plan. This person should be trained in how to conduct audits, they do not need to be a "competent person" from a technical perspective. The auditor should be provided training.
- **Vulnerable facilities:** add in facilities that have a high probability of occupation or visitation by persons who may be immuno-compromised or otherwise susceptible to water-borne disease-causing microorganisms.
- The following terms should be included '**disinfection of water systems'** (excluding cooling towers systems); this should follow AS3500.1 Appendix H & I and '**hot water system'** what constitutes a 'hot water system' should be clearly defined; and
- Definitions need to exclude systems with refrigerants such as R410a and R134 as it is unlikely that refrigerant based systems would pose a risk for legionella. Both the "cooling tower" and "air handling system" could be misinterpreted. The glossary (section 7) states a cooling tower is "a device for lowering the temperature of water by evaporative cooling "etc., however, the definition in Appendix 2 states that "cooling tower" "also means any other liquid cooled heat rejection or liquid cooling equipment" - which would include those operating on refrigerants other than water. The same applies to the definition of Air handling system in Appendix 2, which would include refrigerant cooled systems. These systems are unlikely to have any risk of legislation.

Recommendation:

2. *The DOH recommends that proposal 4.1.1 be adopted to revise definitions with further refinement.*

A vulnerable facility is defined to include public and private hospitals, and residential aged care facilities. Consideration of the risks proposed by systems in close proximity to (but not serving) vulnerable facilities, or by other types of facilities frequented by vulnerable persons will be addressed in a public health risk matrix developed by the DoH. The matrix is intended to consider basic systemic, geographic and demographic risks associated with a system. For further information on risk profiling refer to proposal 4.1.3.

Air handling systems and cooling towers are provided with distinct definitions and separate proposed regulatory requirements:

- 'Air handling system' has the same meaning as air-handling system as defined in AS/NZ 3666 but does not include a dry system which does not use water or other liquids to operate, humidify, clean, maintain, heat or cool the air.
- 'Cooling Tower' has the same meaning a cooling tower in AS 3666: 'A device for lowering the temperature of water by evaporative cooling in which atmospheric air is in contact with falling water, thereby exchanging heat. The term also includes those devices that incorporate a water-refrigerant or water-water heat exchanger'.

The scope of proposed regulatory requirements varies depending on the type of system: all air handling and water systems will be required to comply with the applicable installation and maintenance provisions prescribed by the regulations. Provisions relating to registration, RMPs

and audits will be specific to nominated registerable systems which will include cooling water systems, warm water systems, and water systems serving vulnerable facilities. Audit frequencies, RMP reviews and microbial sampling requirements will all be determinates of risk categorisation.

Industry representatives raised concerns regarding the term 'tertiary qualification' in referring to the definition of a competent person and requested recognition of industry experience. Accordingly, the DOH will adopt a definition of competent person aligned with AS/NZS 3666.1, 'A person who has had appropriate training or practical experience (or both) to ensure that air handling and / or water systems are operated and maintained as required by these regulations'

A full list of proposed terms and definitions can be found in Appendix 5.

Regulatory Scope and Exemptions

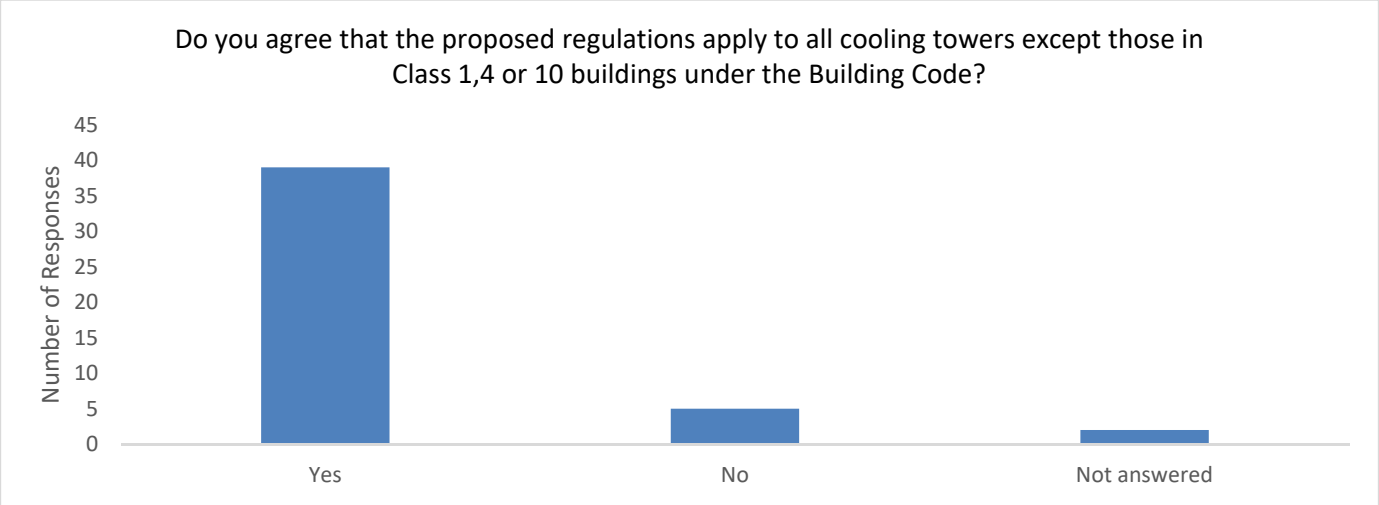


Figure 7: Total number responses for Question 1

The scope of systems considered is not limited to those installed in commercial buildings. The DOH proposed that regulations would apply to air handling and water systems in any building except those classed as 1, 4 or 10 buildings under the Building Code of Australia (BCA).

Eighty-six (86) per cent of respondents agreed with the exemptions proposed.

Some respondents sought further clarification on the types of buildings being captured under the new regulations. It was noted that the proposal would provide an exemption for Class 1b buildings being boarding houses, guest houses, and hostels providing accommodation for 12 or less people. Respondents also queried how a building's classification relates to vulnerable facilities.

The following comments were made in relation to the Building Code of Australia:

- The National Construction Code (NCC) references AS/NZS 3666.1 for Microbial (legionella) control in water services and air handling systems in two parts of the NCC (F2.7 and F4.5).
- Clause F2.7 of the National Construction Code (NCC) Volume One requires hot water, warm water and cooling water systems to be installed in accordance with AS/NZS 3666.2. However, this does not apply to a system serving only a sole occupancy unit in a Class 2 or 3 building. Further clarification is necessary on whether the regulations will apply to

those Class 2 or 3 buildings exempted from NCC compliance and whether lodging Class 1b facilities should be captured by the regulations.

- The NCC only covers requirements for water systems in certain buildings to the extent of Part F2.7 in the NCC. It does not cover water systems that are not hot water, warm water or cooling water systems and that are not in a building. If a revised definition captures other things such as hydrotherapy pools, spa pools and ice machines, car washes and the like, the NCC will not cover these.
- It was noted that under Part B2.9 of the NCC Volume 3 (being the Plumbing Code of Australia) there are no deemed to satisfy provisions for warm water systems.
- Some industry respondents stated that Class 1 and 4 buildings should not be exempt if they are rented or leased as they should be required to ensure the safety of their occupants. Consideration should be given to excluding some air-handling systems in developments such as apartment buildings (Class 2). Residential apartments that are provided their own individual air-handling system may be considered similar to a class 1 building.

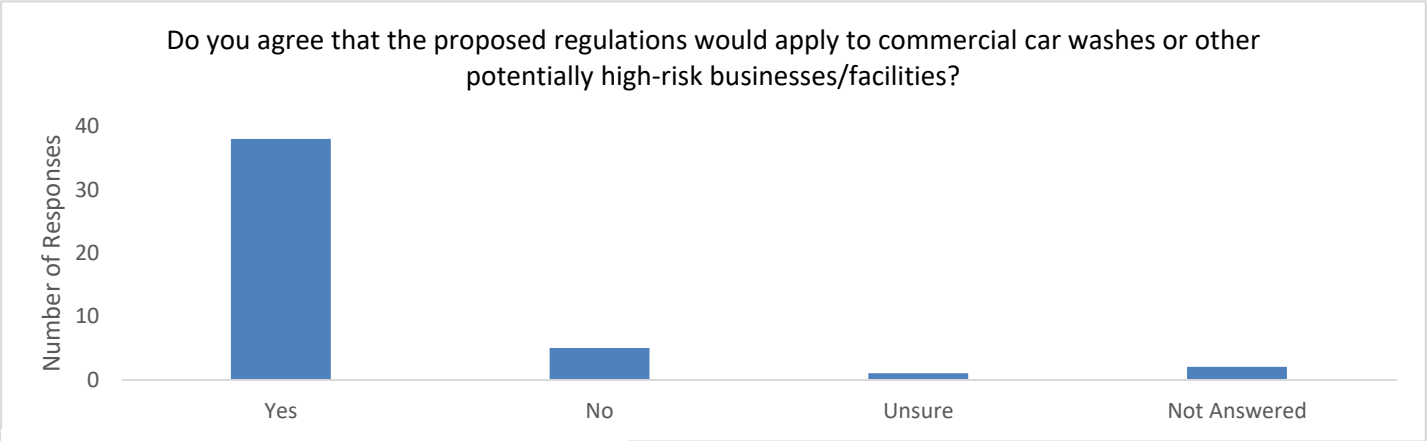


Figure 8: Total number responses for Question 3

Eighty-two (82) per cent of respondents supported the proposed regulations applying to commercial car washes or other potentially high-risk businesses or facilities.

Respondents were supportive of including potentially high-risk businesses and facilities where there was enough evidence established that similar sites have been associated with legionella outbreaks. Two (2) respondents stated that car washes in eastern Australia were more likely to use warm water systems due to their colder climates whereas this was rare in WA. It was suggested that commercial car washes could be included in the regulations with those that use a cold-water system exempt from regulation.

Should the proposed regulations apply to any other building or facility not mentioned?

Respondents were asked to consider if the proposals had captured all buildings and facilities that the regulations should apply to. Respondents identified that water distribution systems within aquatic facilities will include long lengths of pipework and regulated water temperatures within the ideal range of legionella proliferation. The water distribution systems in these facilities may also create aerosols of a size that can be inhaled into the lungs.

Respondents also identified any public businesses with mist sprayers or fogging systems (bars, breweries, restaurants, supermarkets). It was also suggested a guideline for misting systems could be developed with use of the general public health duty if any outbreak were to occur. It was suggested that it would be easy to establish a link to some foreseeable harm given the fact

that Legionella is a specific disease which is recognised as being a potential problem with such systems.

Other buildings identified by respondents as requiring consideration included: mines, quarries, industrial operations (spraying of water/industrial process for cooling), facilities with water features, maritime industry and vessels, factories, shopping centres, detention/correctional centres, reticulation system in public parks, residential care facilities, childcare centres, common areas of retirement villages, and steam rooms in health resorts and commercial premises.

One (1) respondent identified that cooling tower systems within proximity to 'vulnerable' facilities represent as high a risk as those within the facility. For this reason, the respondent considered that the protocols associated with systems in vulnerable facilities should be extended to those within 500m of a vulnerable facility.

Hybrid cooling systems were identified as requiring consideration when formulating regulation: These systems are marketed as "not being considered cooling towers under Australian regulations" with the associated benefit of avoiding regulations associated with legionella control. Some of these systems pose a legionella risk due to water cooling and the use of fan systems (which disperse water droplets).

Other commentary suggested there should be a code of practice for low risk (domestic evaporative cooling systems).

Recommendation:

3. *The DOH recommends that proposal 4.1.2 be amended and adopted to apply to all air handling and water distributions systems except systems:*
    - *Installed in a Class 1A, 4 or 10 building as defined by the Building Code of Australia, provided that it is not a water system that serves a carwash*
    - *That serve only a single sole occupancy unit in a class 1B, 2, or 3 building as defined by the Building Code of Australia*
    - *That are warm water systems forming part of an aquatic facility*

Further to stakeholder commentary, proposal 4.1.2 has been amended to capture class 1B buildings and carwashes, while excluding systems that serve only a single sole occupancy unit in a class 2 or 3 building.

Car wash water systems have been singled out from Class 10 buildings for inclusion in the regulations. While general maintenance and operating requirements are proposed to apply to all car washes, only car wash systems with warm water will be required to register and develop a risk management plan.

Legionella risks associated with spas and swimming pools have been considered as part of the recent review of Aquatic Facilities in WA. Water systems associated with private residential pools and spas, or with systems that are not captured by the BCA (such as ice machines, chilled water dispensers, and mist systems in supermarkets and public buildings), will be addressed by the general public health duty and guidelines developed by the DOH.

Systems serving more than a single tenanted sole occupancy unit in class 1B, 2, or 3 buildings will be included within the scope of the regulations. For systems serving tenanted class 1A dwellings, a landlord has a duty of care under common law. Furthermore, Regulation twenty (20)

of the Residential Tenancies Regulations 1989 imposes a requirement upon lessors to maintain the premises and comply with all laws affecting the premises, including health and safety laws.

Appendix 8 tables the different types of BCA building classifications and provides examples of corresponding building types. These are grouped into 'exempt' and 'captured' categories.

Addition risks posed by systems located in proximity to, but not serving a vulnerable facility, are addressed in recommendation 4.1.3.

Risk rating of facilities and systems

It was proposed that enforcement agencies apply a risk matrix to further rate systems. Risk rating will consider factors such as the size and type of air-handling or water system, the number of occupants or patrons per day, the location and surrounds of the system, the susceptibility of occupants, and the likelihood of disease outbreak involving the system. There are numerous risk categories to consider. The DOH proposed creating a risk matrix specifically for categorisation of air handling systems and provide further guidance to enforcement agencies.

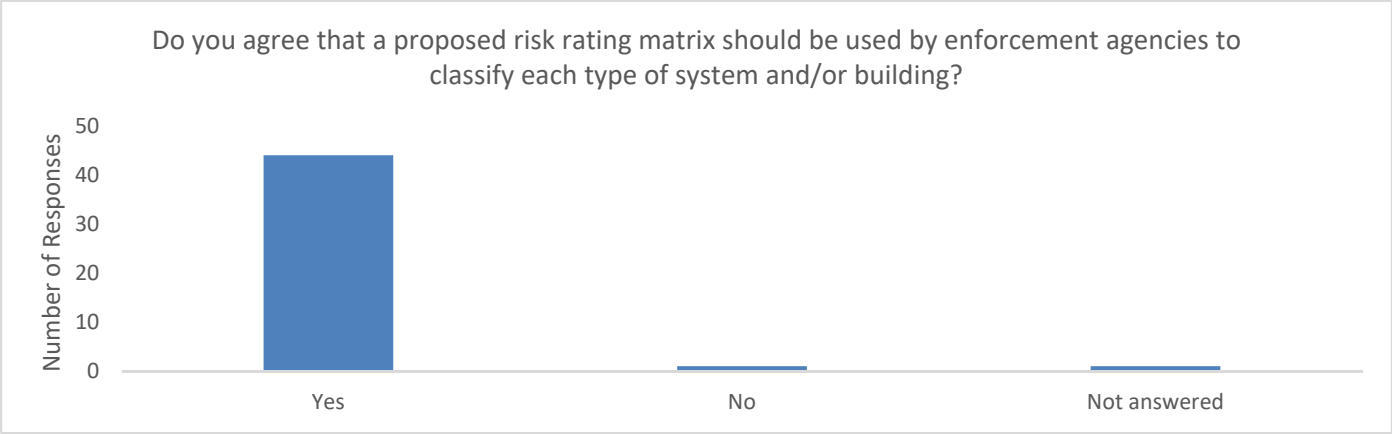


Figure 9: Total number responses for Question 2

Ninety-six (96) per cent of respondents agreed with using a risk rating matrix to assist with classifying the risk of each type of system.

It was further suggested a risk matrix be used as a guide for the applicant to assist their understanding of compliance requirements. A risk rating matrix could include a mandatory reporting process to be carried out by the applicant.

Some respondents queried what the consequences of risk rating facilities would be. These respondents felt it was unclear from the Discussion Paper if this would affect the application of future regulations to a facility, including the requirement to register.

Several respondents sought clarification on whether 'high risk businesses/facilities' will be specifically listed in regulations or categorised using a risk matrix. One respondent queried whether it was necessary to reference a risk matrix within the high-risk system definition if it will be used to classify them. The DOH has altered the term 'high risk system' to 'registerable system' to avoid confusion in this regard.

Some respondents felt that the criteria in the Discussion Paper for assessing risk included information of a technical nature e.g. whether the likelihood of a system to harbour Legionella or other microbes which would require consideration of the system components, where water might

'pool' etc. It was felt that the nature of this assessment may conflict with the intent of the BCA certification process. For this reason, it was felt that the DOH would be best placed, with subject matter experts to risk rate systems as part of a centralised register. It was also noted that an enforcement agency would require the authority to request information and this could prove challenging if applying a risk rating system (sourcing the technical information for already installed systems).

One (1) industry respondent suggested using the enHealth '*Guidelines for Legionella control in the operation and maintenance of drinking water distributions system in health and aged care facilities'* (the enHealth Guidelines) to create a simplified risk matrix based on 'Qualitative measures of consequence or impact on a facility' for water-based systems. For air-handling systems it was suggested the NSW model using the AS/NZS 3666.3 is more comprehensive.

Do you have any concerns or comments about this proposal?

Other comments regarding these proposals included:

- Can basic information e.g. make model numbers of cooling towers etc be made available on the DOH website for approved manufacturers like aerobic treatment units, septic systems, leach drains.
- Hot water systems in vulnerable facilities may also have the same issues as warm water and should also be included. Especially in older systems the thermostatic mixing valves that reduce the temperature of the water from the hot water to prevent scalding can often be far from the outlet, effectively making parts of these systems warm water systems with equivalent risk.

Recommendation:

4. *That proposal 4.1.3 be amended and adopted to require enforcement agencies to rate the public health risk associated with each registerable air handling system, as a component of registration.*

It is intended that all registerable systems shall require registration with the appropriate enforcement agency. A risk matrix being developed by the DOH will be used to further assess the public health risk posed by each registerable air handling system. The public health risk categorisation will then determine the frequencies at which audits, and risk management plan reviews will be required.

The risk matrix being developed by the DOH for air handling systems is intended for use by authorised officers in local government. It will not require a high level of technical expertise regarding air handling system componentry.

It is not proposed to extend the additional public health risk categorisation to registerable water systems. The majority of registerable water systems will be associated with vulnerable facilities. Higher risks associated with susceptible occupants within these facilities will be ubiquitous. Minimum audit and risk management plan review schedules for registerable water systems will be uniformly prescribed by regulation.

Proposal 4.2 Revised administration requirements and application of regulations

To adequately respond to an outbreak of Legionnaire's disease health authorities need to know the exact location of air-handling or water systems within the vicinity of an outbreak. If this is not known, significant time delays may be experienced attempting to determine the location of suspect air-handling and water systems for inspection and disinfection. These delays could result in potentially increased disease incidence.

Under existing requirements building owners or operators of air-handling and water systems are required to obtain the approval of their local government authority before installing or modifying an air-handling or water system or component thereof. The existing regulations do not have prescribed application or approval forms, accordingly the most common format for air handling and water system approvals is a building licence, which is often issued as a part of a larger construction.

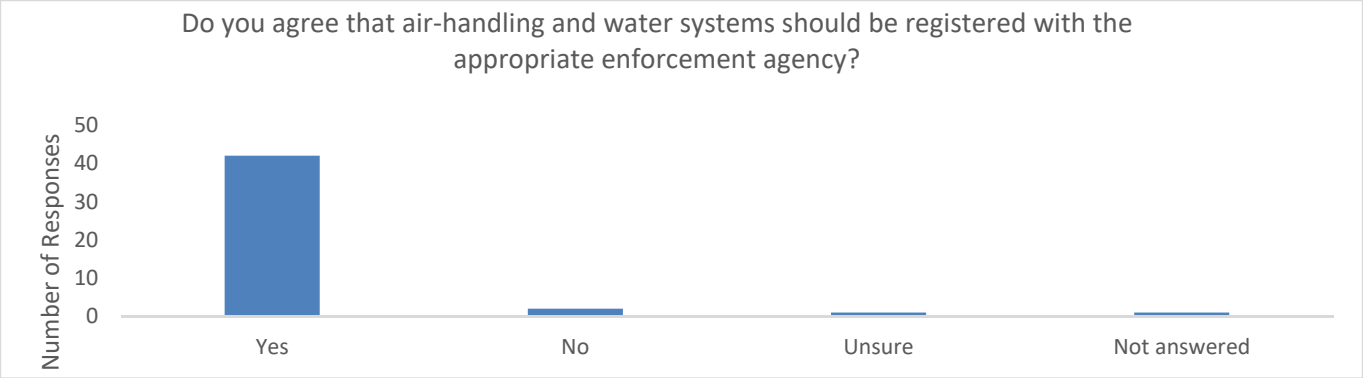


Figure 10: Total number responses for Question 7

A 2017 survey of local governments conducted by the DOH revealed that without prescribed approval processes or registration processes, identifying the location of air and water handling systems is problematic[3].

It was proposed that new regulations would require the owner of a building or facility where an air-handling or water system is located, to ensure that each system on that land is registered with the appropriate enforcement agency until decommissioned. This is in line with Part 8 of the Public Health Act which provides a framework for the registration of activities declared by the regulations to be public health risk activities.

The purpose of registration is to enable faster response in the case of a legionella outbreak, and to facilitate proactive compliance and surveillance checks to ensure maintenance standards are adhered to by landowners and/or operators. Registers should be easily accessible by enforcement agencies to ensure that outbreaks can be pinpointed in a timely manner and controlled.

Only one registration was proposed for each building or facility. However, each system or cooling tower within or upon the building or facility must be documented within the registration. Registrations could be undertaken by each local government authority or by a centralised register held by the Department of Health.

[3] Department of Health, 2019, 'Air-handling and water systems of commercial buildings review' Part 1

Ninety-one (91) per cent of respondents agreed that air-handling and water systems should be registered with the appropriate enforcement agency. Respondents requested clarity on which systems would be required to register with an enforcement agency. Some felt that registration should be limited to only high-risk systems to avoid creating an unnecessary administrative burden without benefit.

Suggestions around the registration of systems included registering each "system" rather than individual cooling towers. Some systems have multiple towers with multiple cells treated by a single chemical dosing system. If a building has multiple systems, each system should be separately registered.

In relation to the requirement to register, one respondent suggested making registration a one-off requirement with a requirement to notify of any changes to a system as a condition of registration. Another respondent suggested that as facilities with air-handling and water systems are normally long-term facilities that are in place for many years a longer registration period of 3 years would be more practical than annual registration.

Most respondents favoured a centralised register to support the investigation of legionella cases. This was viewed as a benefit particularly where an investigation may cross local government boundaries. Six (6) respondents felt that the skillset to assess system requirements as part of a registration process was lacking due to the minority of local governments having experience in this area. These respondents felt that registration and enforcement should sit with the DOH.

Recommendation:

5. *It is recommended that proposal 4.2.2 be amended and adopted to require the owner of a building or facility where a registerable system is located, to ensure that each registerable system servicing that building or facility is registered with the appropriate enforcement agency.*

In the event of a legionnaires disease outbreak, having ready access to a reliable register of systems that are potentially implicated can expedite source identification and minimise the incidence of disease.

Further to stakeholder feedback, the type of systems requiring registration has been reduced from all air and water handling systems, to registerable systems only. This will reduce administration burden, reduce costs to industry, and better align West Australian regulations with the registration requirements of other Australian states:

Table 4 Interstate registration requirements

State	What needs to be registered
Victoria	Cooling towers only
NSW	Cooling water system & warm water systems in aged care and hospitals
SA	Cooling water system & warm water system
Tas	Cooling tower & Warm water systems
ACT	Cooling water system & warm water system
NT	NA
QLD	NA

The new regulations will place the onus of registration upon the responsible person and enable registration periods between 1 – 5 years. Registers will be maintained by the appropriate enforcement agency. A definition of 'cooling water system' has been added to the proposed definitions to enable registrations to span a system, rather than individual components.

Proposal 4.3 Vulnerable facilities

Legionella is a significant concern in health and aged care facilities because of the presence of people with clinical risk factors that increase both the likelihood and the potential severity of legionella infection[4]. Accordingly, the focus is now on these facilities to produce risk management plans for their water distribution systems. These facilities are higher risk due to the high proportion of immunocompromised patients or residents typically present within these facilities.

To support a risk-based approach to regulation, the concept of 'vulnerable facilities' was presented as a potential new definition. A similar model to the *Food Act 2008* was suggested whereby private hospitals and aged care facilities that service 'vulnerable' populations must register with local government enforcement agencies whereas public hospitals and aged care facilities must register with the Chief Health Officer (CHO). Provision will be available for the enforcement agency to charge a registration or surveillance fee.

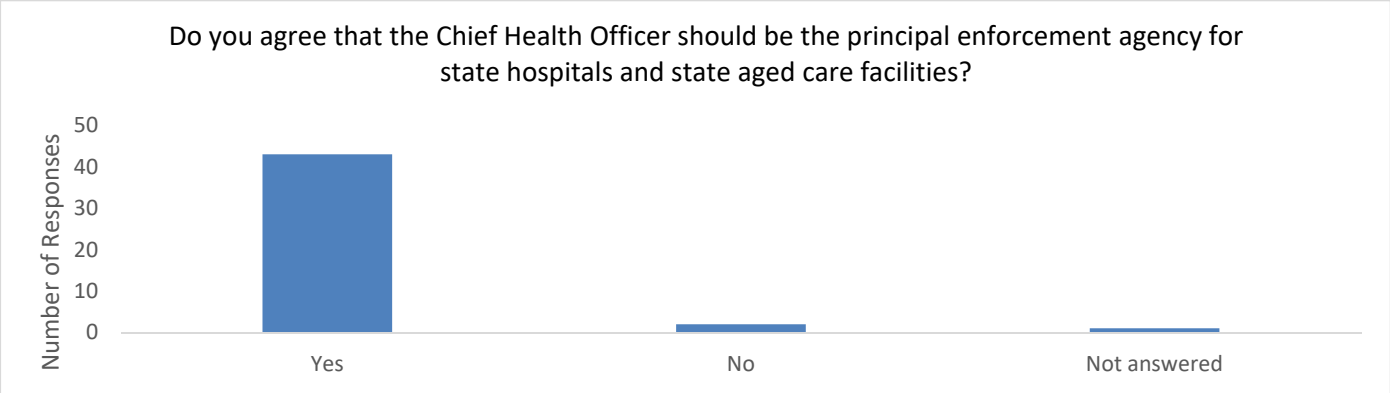


Figure 11: Total number responses for Question 9

Ninety-three (93) per cent of respondents felt that the CHO should be the principal enforcement agency for state hospitals and state aged care facilities.

Seven (7) respondents felt that registration by the DOH was preferred for all high-risk private facilities. These respondents considered that Local Government authorities would not have the necessary expertise on the nature, design and risk associated with warm water systems. One (1) respondent queried why the CHO would be responsible for state hospitals but not private hospitals, and another queried if there wasn't a conflict of interest with the DOH being responsible for public hospitals with the CHO being the enforcement agent.

One (1) respondent raised the difficulty if the CHO is the governing body in regional areas. It was suggested a collaborative approach between local government and the CHO could be utilised in these situations.

[4] enHealth (2015). *Guidelines for Legionella Control in the operation and maintenance of water distribution systems in health and aged care facilities*. Australian Government, Canberra.

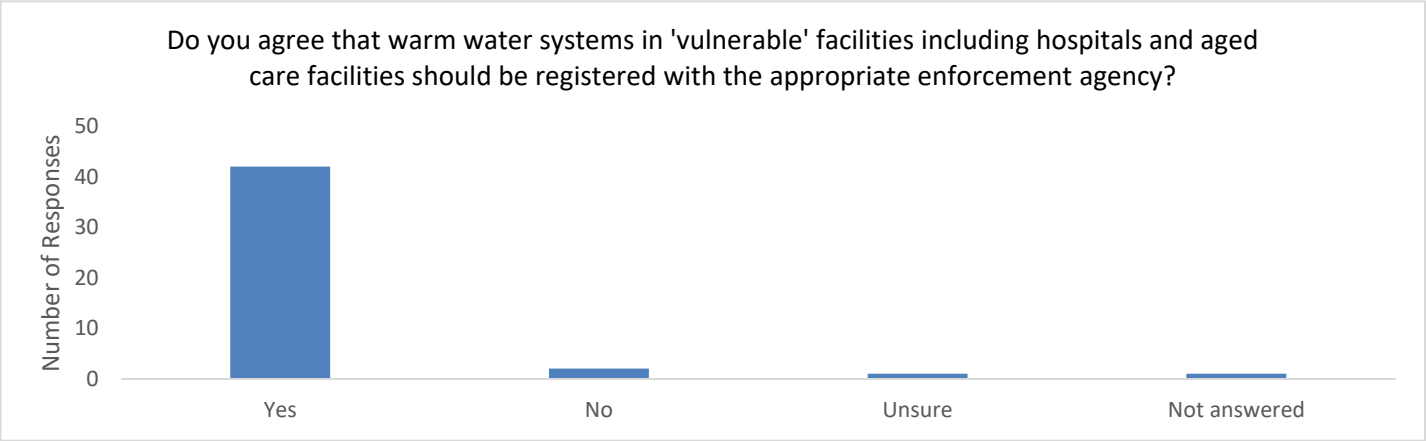


Figure 12: Total number responses for Question 8

Ninety-one (91) per cent of respondents agreed that warm water systems in 'vulnerable' facilities should be registered with the appropriate enforcement agency.

One (1) respondent from industry felt that warm water systems presented too high a risk in such facilities and an alternative solution should be installed where possible. It was felt that the main reason for using these systems was economic as these systems are cheaper (and do not require annual thermostatic mixing valve (TMV) registration and servicing costs). The respondent suggested that vulnerable facilities should be exempt from TMV registration to encourage hot water systems and TVM installations as an alternative to warm water systems.

Another respondent from industry proposed that a risk assessment of all water distribution systems (not just warm water systems) in any 'vulnerable facility' should be mandatory due to the higher susceptibility of occupants.

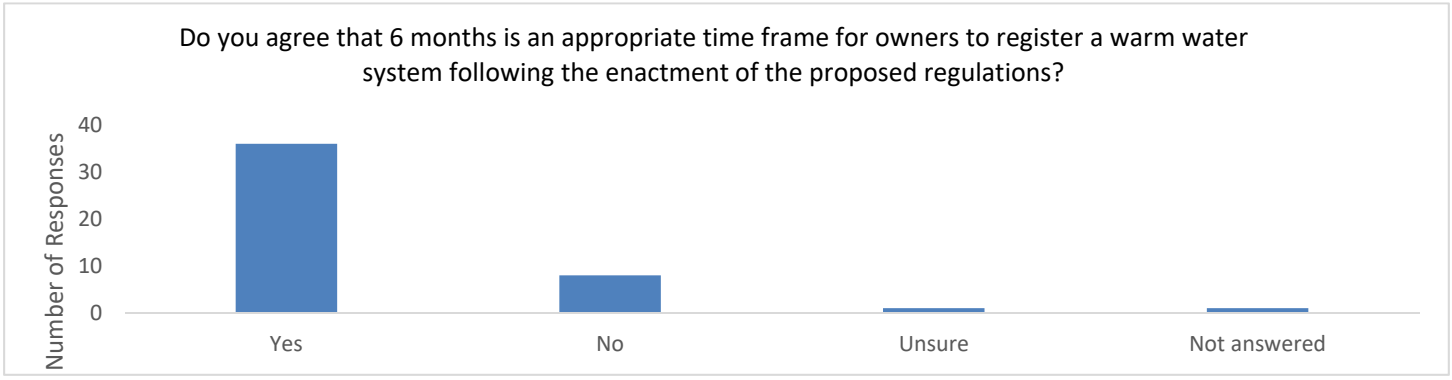


Figure 13: Total number responses for Question 10

Seventy-eight (78) per cent of respondents agreed that 6 months is an appropriate time frame for owners to register a warm water system following the enactment of proposed regulations.

Six (6) respondents suggested that a longer time frame was appropriate to enable the appointment of suitable auditors and to communicate new requirements to system owners.

The DOH agrees with respondents that a longer time frame for registration may be necessary. A longer time frame would provide industry with the opportunity to develop risk management plans, the DOH to provide training, and local government to adopt appropriate fees.

Recommendation:

6. *It is recommended that proposal 4.3.1 be adopted nominating:*
   - *the CHO as the appropriate enforcement agency for air handling and water systems serving vulnerable facilities and state owned buildings.*
   - *local government as the appropriate enforcement agency for all other air handling and water systems.*

It is recognised that a high level of expertise is required to manage risks associated with air handling and water systems in vulnerable facilities. Accordingly, it is proposed that the CHO will be the enforcement agency for all vulnerable facilities including hospitals and residential aged care. The CHO will also be the enforcement agency for systems installed on state owned facilities and buildings. Statutory fees associated with the registration of systems by the DOH are intended to be included within the regulations.

Local government will be the enforcement agency responsible for the registration of other registerable systems including cooling towers that service shopping centres, cinemas, hotel accommodation, and residential apartment complexes. Local government will have the ability to adopt fees associated with registration of air and water handling systems.

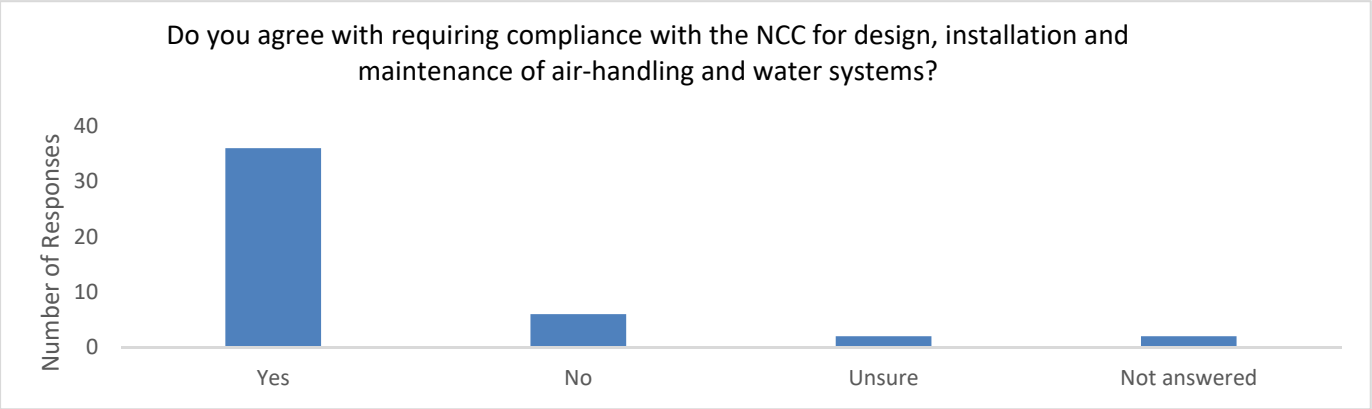
The DOH intends to develop a centralised register for joint use with local government. The DOH will have oversight of the complete register for the purposes of source identification in the event of a Legionnaires disease outbreak. It is intended that local government access to the register will be limited to municipal boundaries. Data input and maintenance will be a joint responsibility based on the proposed regulatory delineation.

Following enactment of the regulations it is intended to allow up to two (2) years for the registration of systems. The additional time is intended to enable opportunity for industry to develop risk management plans, the DOH to provide training, and local government to adopt appropriate fees.

Proposal 4.4 Revised approval and risk management plan requirements

The installation and design of cooling towers and warm water systems is generally captured by the Building Code of Australia (BCA), which requires compliance with the AS/NZS 3666.1.

Figure 14: Total number responses for Question 12



The DOH proposed that new health regulations remove direct references to Australian Standards for the design and installation of air-handling and water systems. Instead, installers will be required to provide certification that the system has been installed in compliance with the provisions of the BCA. This will remove requirements for local government authorities to assess and approve applications in respect of air-handling or water systems, thereby reducing regulatory burden. Existing registerable systems will be subject to the requirement for registration, however systems that are installed before the commencement of the new regulations will be exempt from certification requirements.

Seventy-eight (78) per cent of respondents agreed with the proposal to require compliance with the BCA for design, installation and maintenance of air-handling and water systems.

Comments regarding proposed risk management plan requirements:

- The National Construction Code (NCC) does not have sufficient requirements pertaining to the maintenance of air handling and water systems.
- Not all air handling systems will require a building permit – therefore there will be no opportunity to apply the provisions of the NCC.
- The level of reporting to the building approval authorities needs to improve to demonstrate compliance with the NCC.
- There are no Australian Standards in place for maintaining warm water systems. There are also no deemed to satisfy standards in the Plumbing Code of Australia or associated plumbing legislation for the installation of warm water systems.
- If you look at NCC for allowing alternative solutions, Legionella risk is not given any consideration, or the weight of risk has not been properly evaluated and a decision determined by an expert in Legionella control when they have in the past been installed. At a minimum it is suggested that plans and any alternative solutions should be required to be submitted as part of the registration process.

Recommendation:

7. *That proposal 4.4.2 be adopted to require the design, construction and installation of new air handling and water systems to be certified for compliance with the Building Code of Australia as a requirement of registration.*

It is proposed that the regulations shall require independent certification of new air handling systems for compliance with the BCA. For the purposes of registration, existing systems will be exempt from this certification requirement.

Some respondents identified that certain air and water handling systems may not require a building licence, and that BCA provisions would therefore not be applicable. This point is valid from the perspective of the Building Regulations, however by including this certification requirement within the new air handling regulations, the provisions of the BCA will be activated irrespective of the need for a building licence.

Legionella in warm water systems is given direct consideration by the BCA (clause F2.7 Microbial legionella control). This section references compliance with AS/NZS 3666.1, which sites prevention of Legionnaires disease amongst its objectives. A hydraulic engineer engaged to develop an alternative solution to this BCA provision will need to demonstrate equivalent outcomes. Given that both the BCA and AS/NZS 3666 make direct references to legionella, an oversight in this regard is not considered likely.

The DOH agrees with respondents who identified that the provisions of the BCA are not suitable for ensuring ongoing maintenance of air handling and water systems. For maintenance provisions, it is proposed that the new regulations will either cite or adopt similar requirements to AS/NZS 3666.2 and AS/NSZ 3666.3. Further information on proposed maintenance provisions are discussed in proposal 4.7.

Proposal 4.5 Risk management plan requirements

RMPs are used as part of an effective framework to collate and document risk-based strategies and performance-based outcomes. RMPs describe the nature of an air-handling or water system and how it should be operated and maintained. They are 'living documents' that can be reviewed and audited, both internally and externally.

Costs associated with RMP development were estimated between $500 - $2500, with an average cost estimated at $1000[5]. These costs may be partially offset through better management and maintenance of infrastructure through the implementation of the RMP.

Proposal 4.5 suggested RMPs would be mandatory for registerable systems and subject to annual reviews. RMPs were proposed as optional for other facilities and would require reviews every 2 years.

The regulations would require RMPs be developed by a competent person either employed by the owner, or by a third party. The DOH would issue guidelines for the development of RMPs and provide a template that based on Table 2.1 of AS/NZS 3666.3. RMPs would be verified by the appropriate enforcement agency to ensure they contain the necessary information as described in the DOH template. Following verification, the implementation of the RMP would be regularly audited by an approved third-party auditor at intervals appropriate to the risk. If an auditor is concerned that legislative requirements are not being met the enforcement agency should be notified.

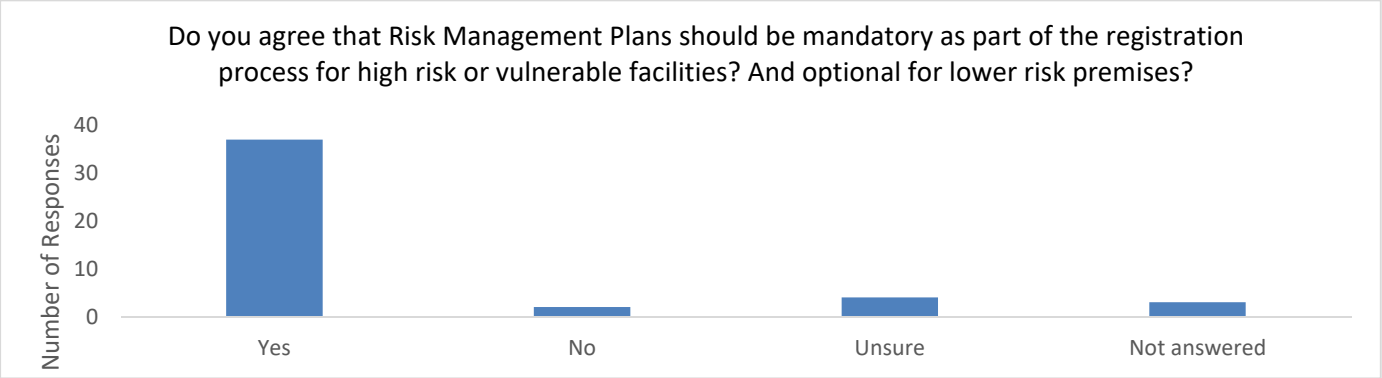


Figure 15: Total number responses for Question 13

It was proposed that the RMP would indicate whether a prescriptive monthly maintenance inspection schedule or performance-based requirements under AS/NZS 3666.3 would be implemented.

Eighty (80) per cent of respondents agreed that RMPs should be mandatory as part of the registration process for registerable systems and optional for lower risk.

Several respondents noted that this was normal for other States and generally considered best practice.

Respondents again wanted clarification on how risk would be assessed for facilities.

There was some concern from respondents around facilities being incorrectly assessed, or alternatively that a facility considered low risk may become high risk due to a change in the

[5] Victoria Department of Health (2009). *Regulatory Impact Statement Public Health and Wellbeing Regulations*. State of Victoria, Department of Health and Human Services

demographic of users. Three (3) respondents felt it was more appropriate to make RMP mandatory for all facilities.

Respondents supported the creation of guidelines on developing an RMP for air handling and water systems.

On the optional requirement to develop an RMP one (1) respondent commented that an audit requirement could be a barrier to the development of an RMP. It was felt that if a premise is not required to develop an RMP but chooses to do so, they should be encouraged and not obligated to undertake audits. Another respondent felt that an optional requirement should be at the discretion of the owner of a system rather than placing an obligation on an enforcement agency to determine (otherwise this could lead to inconsistencies of when an RMP is required).

On the cost to develop an RMP one respondent felt the cost estimates given were low and these would only be applicable to cooling towers, not for aged care facilities or hospitals (where costs would be higher due to the time taken to develop an RMP). Another respondent considered that the cost of developing a cooling tower system RMP was minimal for operations large enough to require a cooling tower for heat rejection. They also commented that many building owners (~25%) already have an RMP to ensure compliance with best practice as established in other parts of Australia.

Two (2) respondents recommended risk based RMP review frequencies, and/or RMP reviews triggered by significant system modifications.

Regarding aged care facilities it was noted that there may be duplicate requirements as these were federally accredited and funded. Aged Care Quality and Safety Commission audit aged care facilities and the enHealth Guidelines require facilities to have a legionella RMP for accreditation. It was suggested that a water based RMP should be mandatory for high-risk premises, but aged care facilities could then be exempt from registration requirements.

Recommendation:

8. *That proposal 4.5.1 be adopted to require mandatory risk management plans for all registerable systems.*

The requirement to development an RMP will be applicable to all registerable systems as defined by regulations. The DOH acknowledges the need for RMP guidelines and templates for both air handling and water systems.

RMP reviews and audits will be separate processes with different objectives. An RMP review will assess the currency and adequacy of the RMP by reviewing risks and their associated control measures. This must be undertaken by a competent person who can be either a person employed by the responsible person, or an internal risk management committee. Auditing is a separate process that will be undertaken by an independent auditor who will determine if the RMP is being sufficiently implemented at the facility.

During the registration process, the relevant enforcement agency will determine the risk category for air handling systems using a matrix developed by the DOH. The risk rating process will categorise systems into high, medium, and low public health risk categories. These categories will determine the frequency of RMP reviews and the frequency of audits. Scope will be provided in the regulations for the review of an air handling systems public health risk categorisation.

Public health risk categorisation is not proposed for registerable water systems. RMP review and audit frequencies for registerable water systems will be prescribed by regulations.

The requirement for RMP's will be voluntary for air handling and water systems that do not require registration. Compulsory audit requirements will not be applied to these types of systems.

The following table provides a summary of proposed RMP review and audit requirements.

Table 5 Proposed RMP review and audit frequencies

Registerable System Type	*Public Health Risk Categorisation*	*RMP Review Requirement*	*Audit Requirement*
Cooling water systems (including cooling towers)	*High*	*1 per year*	*1 per year*
	Medium	*1 per 3 years*	*1 per year*
	Low	*1 per 5 years*	*1 per 2 years*
Warm water systems / *Water systems in vulnerable facilities.*	*NA*	*1 per year*	*1 per year*

The DOH has been liaising directly with the Aged Care Quality and Safety Commission (the Commission) regarding the proposed new regulatory requirements. The Commission have confirmed that their assessors have neither the authority, nor the expertise, to undertake assessments of a facilities maintenance of air handling and water system infrastructure. Accordingly, the DOH does not intend on extending regulatory exemptions to aged care facilities. The new regulations will incorporate provisions of the enHealth Guidelines and complement existing ACQSC accreditation activities.

Proposal 4.6 Independent auditors

Auditor services are used to perform regular reviews of operational records against documented risk management strategies. The audit process is designed to ensure risk strategies are being adequately implemented. While an auditor's role is separate and distinct from a service technician, some familiarity with technical aspects of air-handling and water systems will assist auditors with identifying areas of poor performance or substandard results.

It was proposed that new regulations would include provisions for the approval of independent air-handling and water system auditors by the DOH. Determining the minimum competency standards for both independent auditors and service technicians would become the responsibility a professional body or national organisation. Independent auditors would undertake regular audits of RMPs and ensure maintenance and bacterial monitoring processes are being followed. Audit reports would be submitted to the relevant enforcement agency for record keeping and further investigation if required.

The proposed audit system will follow the regulatory Food Safety Auditor model regarding the approval provisions and requirement for operators to engage an auditor.

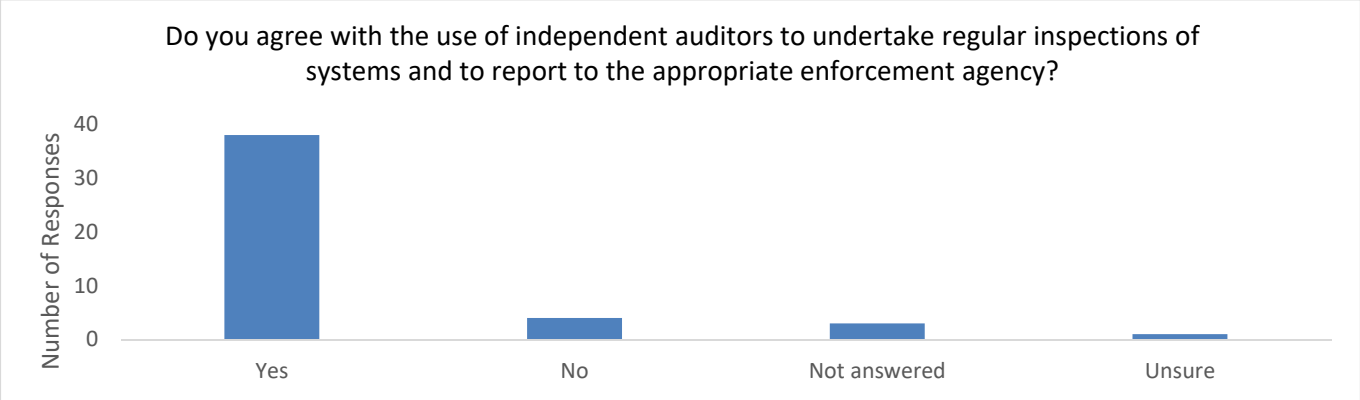


Figure 16: Total number responses for Question 14

Eighty-three (83) per cent of respondents agreed with the use of independent auditors to undertake regular inspections of systems and report to the appropriate enforcement agency.

Comments regarding the audit process can be summarised as follows:

- Auditor competency requirements need to be developed.
- Auditors need to be approved by the DOH and a public accessible register of auditors maintained.
- Clarity needs to be provided on the scope of the audit (desktop or onsite).
- Auditors require independence from the facilities they are auditing, and from the agent who developed the RMP.
- In relation to determining competency standards one (1) industry respondent commented that organisations such as the Australian Institute of Refrigeration, Air Conditioning and Heating (AIRAH), are ultimately competent to determine the minimum competency standards for the engineering aspects, but organisations offering skills in microbiology and chemistry would be appropriate for assessment of scientific competency. AIRAH in their submission have indicated they are willing to work with the DOH and its members, to establish competency requirements and manage training within their competent persons scheme.

- Six (6) respondents identified potential logistics issues occurring between the finalisation of certification requirements of auditors, and the requirement for audits to be undertaken. It was suggested that auditor training should be made available in advance of the legislation being finalised, to ensure enough auditors would be available to industry.
- Questions were also raised regarding the scope of audits, and whether they would be an onsite, or desktop undertaking. Two (2) respondents suggested that site visits were not required as the auditor is auditing the RMP - not the cooling system. It was suggested that desktop audits would suffice for this purpose and would be more cost effective. One (1) respondent suggested that a report from a service technician should suffice for low risk systems, in place of an audit. It was felt by some respondents that the results of these audits should be reported to a central agency (e.g. DOH), and a central database could then be made accessible to local councils.
- Two (2) respondents requested clarity on the role the enforcement agency would take in ensuring audits are undertaken when they are due, and the skills and knowledge required to assess audits that are received. One (1) respondent suggested audit guidelines should be developed to support independent auditors carrying out their duties.
- One (1) industry respondent commented that many Aged Care Facilities have their own Risk Management Committee made up of the Facility Manager/CEO, the Clinical Manager, WHSO and Maintenance Officer. They felt that the proposed audit requirement would impose an unnecessary cost upon Aged Care Facilities and remove a function that can be carried out internally by the organisation. They also commented that if regular external audits were made mandatory there should be funding to support that function.

Recommendation:

9. *It is recommended that proposal 4.6.1 be adopted requiring independent auditors to undertake audits of risk management plans at prescribed frequencies.*

The majority of respondents indicated that a statutory requirement for independent auditing is important for ensuring risk mitigation measures are consistently and adequately implemented at a facility.

It is proposed that the regulations will place an onus upon the responsible person to ensure RMP audits are undertaken at a prescribed frequency applicable to the system (see table 5).

The DOH will be responsible for approving auditors and maintaining a publicly accessible list for approved auditors. Competency standards will be developed in conjunction with AIRAH and other industry organisations.

Audits will not require an auditor to undertake an onsite inspection of the system. Auditors will be required to be independent from the facility they are auditing and from the agent who developed the RMP. Auditors will be required to report the results of audits to the appropriate enforcement agency in a prescribed form and within a prescribed timeframe. Mandatory system inspection is a component of separate maintenance requirements which are detailed in the following proposal.

The enforcement agency will have a role in ensuring audits are being undertaken at prescribed frequencies. This will not require enforcement agencies to undertake onsite inspections but will require a review of audit report submissions against registered systems.

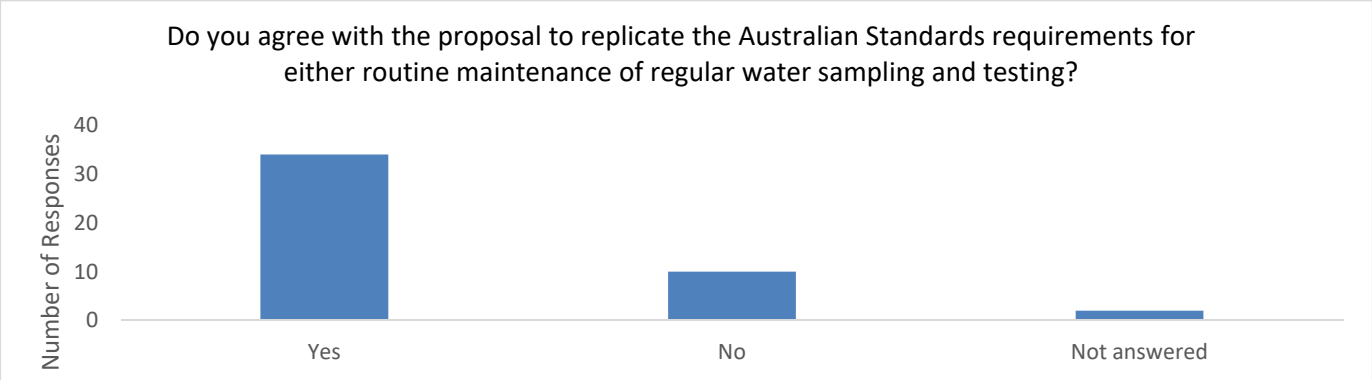
Proposal 4.7 Revised monitoring, investigation and decontamination requirements

Equipment maintenance and water sampling

Maintenance and servicing of air-handling and water systems is important to prevent the growth and transmission of legionella and other harmful bacteria. This includes ensuring cleanliness of equipment, undertaking regular service inspections of plant, and undertaking performance-based testing of water quality.

The DOH proposed that the new regulations will allow compliance with either monthly inspections and maintenance schedules, or with monthly water sampling and microbial testing as outlined in AS/NZS 3666.2, 3666.3 and 3666.4. The current regulations already require air handling and water systems to be operated and maintained in accordance with applicable Australian Standards.

Figure 17: Total number responses for Question 16



Proposal 4.7 also suggested that record-keeping, result reporting, investigation and decontamination procedures would be required under new regulations. Record keeping is important for providing operators, auditors and enforcement agencies with written documentation proving that regular maintenance and testing programs are being followed. In the event of a legionella outbreak, comprehensive records enable operators to review their own systems and demonstrate to auditors or enforcement officers that due diligence and best practices have been undertaken.

It was also proposed that authorised officers would have the power to direct remedial action as required where there are high levels of legionella or heterotrophic colony counts (HCC).

Seventy-four (74) per cent of respondents agreed with the proposal to replicate the Australian Standards/New Zealand Standard requirements for either routine maintenance schedules or regular water sampling and testing.

Comments regarding monitoring and performance-based testing

- Maintenance does not substitute for testing. Regular Legionella testing is the primary measure of whether the system poses a Legionella risk.
- The only way to monitor whether the management of Legionnaires disease risk is successful is by measuring the main parameters: Legionella and HCC. Unfortunately, if this aspect is not mandatory, our experience in jurisdictions that do not require monthly testing is that a significant percentage of water treatment providers and building owners will not undertake microbial testing whatsoever (to minimise costs).

- Monthly sampling for Legionella and HCC should be mandatory for high-risk systems such as cooling towers.
- A monthly microbial testing program is essential for a cooling tower as conditions can rapidly deteriorate within a week. Examples of issues that can arise within a short period of time include:
    - Failure of chemical dosing.
    - Chemical dosing containers running empty.
    - Water contamination (e.g., dead pigeon/rodent in the cooling tower).
    - Legionella contamination via mains water or other cooling tower systems nearby.
    - Interruption of the chemical dosing system (e.g., power failure to the dosing system or an electrician disconnects the system to use his/her drill and fails to reconnect or only reconnects at the end of the job after a week of no treatment).
- These issues may be rectified, and the water chemistry can be reported to be within parameter, however, only a microbial test will verify that the control parameters have been effective in overcoming microbial proliferation. A less frequent testing program risks missing these changes and therefore increases the risk of an outbreak.
- This should not be the responsibility of local government unless it is an emergency. Like pool water these tests should be undertaken at the same analytical lab nominated by the DOH, with direct reporting to DOH if immediate action is required.
- Water system maintenance and sampling should be governed by enHealth and the facility RMP. It is not covered in AS 3666.
- Clarify if owners are required to report monthly testing to enforcement agency (who need to keep a record) or only when levels are exceeded.
- Adequate and trended operational monitoring data is available if monthly verification monitoring is not in place. Frequency of verification monitoring should be based on the operational performance of the system and input from independent auditor.
- Consider independent sampling particularly in relation to remediation work.
- Potentially if owners know they must report results over threshold in advance this may be a disincentive to do micro testing.
- The United States standard requires a verification step that activities outlined in RMP are completed and a validation step to ensure that over time the activities planned in the RMP are successfully controlling the identified risk. Victoria, New South Wales, France, Germany, UK require routine bacteriological testing as a component of an RMP, in addition to any regular system maintenance.
- The HCC count can become very high within a month, (if left to three months potential for more community outbreaks).
- Monthly inspection and testing may become too onerous and costly, consider allowing longer maintenance schedules or testing.
- Monthly Legionella testing is a highly effective measure of the system safety and effectiveness of the chemical dosing of biocides and should be mandated.
- An example is the Synergy Muja power station cooling towers, where independent microbiological sampling and testing is the standard operating procedure. This increased frequency, at low cost, can only provide additional confidence in the operator, in the eyes of the regulator and public. The RMP should dictate the routine main schedules, not the AS3666.2. It should be mandated that microbial samples be collected at a minimum frequency at least (maybe quarterly). It should be mandated that "independent sampling" be conducted, and hence a grace period needs to be established for independent samplers to be registered, same as independent auditors. Samplers could be employed by the

microbial laboratory, if the microbial lab is not affiliated with the WTSP. This independent sampling service only costs $10 per sample in NSW. They don't have time to co-ordinate their visits with the WTSP.

Comments regarding proposed maintenance requirements

- Mandated regular testing should not be an alternative to good maintenance practices.
- It is our understanding that regular water sampling does not eliminate the need for regular maintenance. Rather it provides proof that an altered regime (to that nominated in AS3666.2, which may be unworkable in some facilities) is successful.
- AS3666.2 requires dismantling of the Cooling Tower to be 100% compliant as this is the only way to access all components for effective cleaning. This is very expensive which is why AS3666.3 is used.
- For air-handling systems regular maintenance should conform with AS 3666.3 and be monthly similar to the New South Wales model.
- AS 3500.4 and 3666.2; do not have a lot of information on maintenance for hot water vessels with regards to legionella maintenance. Mandatory draining for hot water vessels should occur on an annual basis and cold-water storage tanks should be cleaned and disinfected on an annual basis (refer to United Kingdom regulations). Most hot water vessels do not have a drain valve that would remove the build-up of sediment in the vessel.
- Warm water systems have manufacturing guidelines (which 3666.2 defer to the regulatory body) for maintenance for the operation of the heating devices and the Thermo Mixing Valve (TMV) but nothing specific for legionella maintenance with regards to draining down the system.
- RMP should include both a prescriptive maintenance schedule compliant with AS 3666.2 and a requirement to follow performance monitoring described in AS 3666.3. This would ensure that the RMP is effectively controlling human health risk over time. Bacteriological testing provides an important mechanism to ensure that regular maintenance is achieving its intended effect of controlling growth.
- Ensure service providers (who install and provide ongoing services) should also bear some obligations under the legislation in order to adhere to standards to ensure such systems work with efficacy.
- How will this apply to premises that stop using their air conditioning for extended periods of time in winter? Would it be similar to the aquatic facilities code of practice which doesn't require sampling and inspections during off-season periods?
- *DOH comment: Systems which are not in use will not be required to adhere to maintenance and operational requirements. However, specific decommissioning and start up requirements will apply before and after long term systems shutdowns.*
- AS3666.2 is rarely followed as it requires cleaning of the cooling tower fill, which is not possible in modern towers due to the circuitous water paths.
- It should be noted that there is added cost and inconvenience with regulations calling in or referring to Australian Standards as there are costs for subscribing to or purchasing the Australian Standards. This can also make it difficult or act as a deterrent when a facility owner/operator or other stakeholder wants to obtain details of the Australian Standards.
- Most warm water systems only come with a 'gate' disinfection system and not system wide disinfection system. Some may not even have injection ports to do a system disinfection. Carrying out Pasteurisations which is requirement for warm water systems in SA can lead to heat-resistant legionella strains in the water system. Stipulation of appropriate dis-infection systems may be the best method of risk control for warm water systems.

Recommendation:

10. It is recommended that proposal 4.7.2 be amended and adopted to prescribe both maintenance standards and performance based monitoring requirements for registerable air handling and water systems.

Industry feedback indicated that maintenance standards and performance-based sampling should not be mutually exclusive statutory requirements. This sentiment is reflected in interstate regulation: Victorian regulations require monthly servicing of cooling tower systems in conjunction with monthly HCC sampling and quarterly legionella sampling. NSW regulations take a similar approach by citing operational requirements in accordance with AS/NZS 3666.2 (requires monthly servicing) and a specific regulation requiring monthly performance based microbial testing in accordance with AS/NSZ 3666.3. While the South Australian regulations permit cooling tower maintenance to be in accordance with either AS/NZS 3666.2 or AS/NZS 3666.3, the South Australian Guidelines for the Control of Legionella are explicit in stating that performance-based monitoring should not be used as a blanket alternative to maintenance programs.

Accordingly, the DOH has amended this proposal to recommend that the new regulations prescribe maintenance requirements and performance-based monitoring requirements for registerable systems. Recommended maintenance and sampling schedules are based on AS/NZS 3666 and interstate legislation, and are detailed in the table below:

Table 6 – Proposed minimum servicing and sampling

Registered system	PH Risk Categorisation	Servicing requirement	HCC Monitoring	Legionella Monitoring
Cooling tower	High	1 per month	1 per month	1 per month
	Medium	1 per month	1 per month	1 per 2 months
	Low	1 per month	1 per 2 months	1 per 3 months
Warm water system / water system in vulnerable facility.	NA	In accordance with verified facility RMP	In accordance with verified facility RMP	In accordance with verified facility RMP

Note to Table 1 - While AS 3666.3 recommends monthly sampling of legionella and HCC in all cooling water systems – it should be recognised that monthly sampling is an alternative to the provisions of AS 3666.2. The regulations propose to require mandatory monthly inspection and operational requirements. Performance based microbial sampling is proposed as an adjunct to these activities. Accordingly, lesser sampling frequencies are considered appropriate for lower risk systems. It should be noted that Victorian regulations allow for quarterly legionella testing for all cooling water systems.

The DOH is of the opinion that the provisions of AS/NSZ 3666.2 and AS/NZS 3666.3 are appropriate for the maintenance and operation of air handling systems. However, it is acknowledged that the performance-based requirements of AS/NZS 3666.3 are not intended for water systems. Accordingly, the DOH intends to have additional regulatory provisions for the adoption of guidelines. The enHealth Guidelines provide guidance on maintenance and performance-based monitoring of water systems in health and aged care facilities. These

guidelines have already been endorsed by the DOH, and are supported by the 'National risk management plan template for legionella control in the operation of water systems'.

Under the new regulations, it is proposed that:

- The maintenance and operation requirements for air handling systems will be based on AS/NZS 3666.2 and the performance-based requirements of AS/NZS 3666.3.
- The provisions for maintenance and operation of water systems will be based upon AS/NZS 3666.2 and the enHealth Guidelines.
- Systems which are not in use will not be required to adhere to maintenance and operational requirements. However, specific decommissioning and start up requirements will apply before and after long term systems shutdowns.

In addition to maintenance and performance-based sampling requirements the regulations are intended to adopt:

- Requirement for cooling towers to be equipped with continuous / automatic biocide dosing systems.
- Prescribed requirements for the disinfection of recirculating water.
- Shut down and start up requirements (for long term shutdowns).
- Response protocols for sampling results.

Proposal 4.8 Testing results and reporting

Mandatory reporting requirements are proposed where the results of microbial sampling exceed set threshold levels. In the event of a threshold level exceedance, the responsible person will be required to notify the appropriate enforcement agency within 24 hours of receipt of the laboratory report.

The concentration of legionella detected in any routine testing is an important consideration. It is likely that detections may occur even if regular maintenance is being conducted and compliance with AS/NZS 3666 is being achieved. However, appropriate responses to detection levels will vary between systems. Where equipment creates aerosols or where the interface for human contact is present, even low concentrations of legionella detections can be considered significant and immediate disinfection is required.

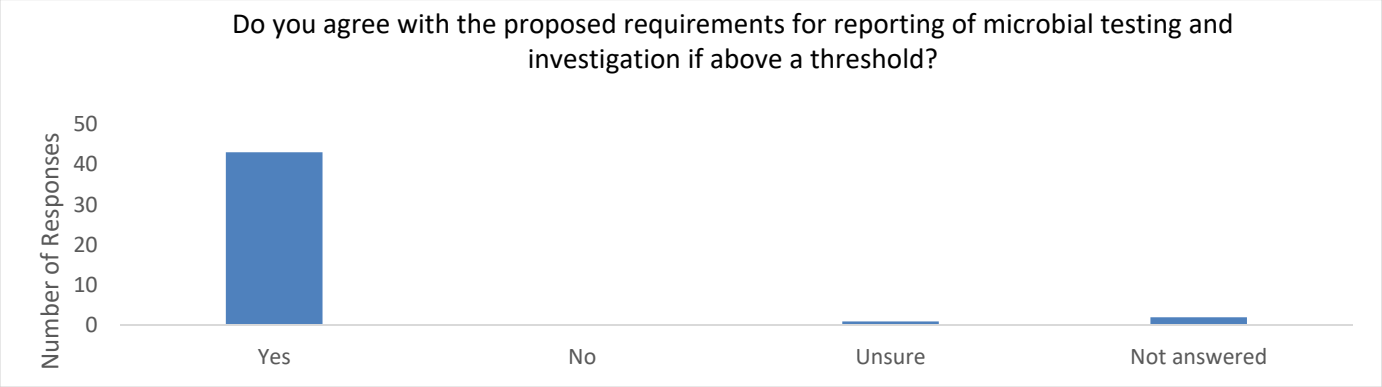


Figure 18: Total number responses for Question 18

The DOH proposed mandatory reporting requirements for legionella detections above 10 cfu/ml[6] in systems that serve vulnerable facilities, or in air handling systems classified as a high public health risk. Mandatory reporting requirements for detections of legionella above 1000 cfu/ml were proposed for any facility. It was further proposed that reporting requirements would be applied when legionella is detected at concentrations >10 cfu/ml in three consecutive water samples that include post-disinfection follow-up testing.

Ninety-three (93) per cent of respondents agreed with the proposed requirement for reporting microbial testing and investigation if above a threshold.

Comments regarding proposed microbial testing requirements:

- Legionella test result reporting should be mandatory not only for “high risk or vulnerable facilities” but also for facilities with high-risk components such as spa pools, warm water systems and misters.
- Critical control point for the results of Legionella testing and essential to the integrity of everyone doing the ‘right thing’ is independent water sampling (sic).
- For water distribution systems the conditions that may lead to Legionella proliferation are not likely to change as rapidly (as air handling systems), therefore less frequent microbial testing program is appropriate.
- Even well-maintained systems can occasionally have positives for legionella or HCC, this often highlights something that has gone amiss that has not been spotted on routine servicing such as malfunctioning equipment.

[6] Colony forming unit – refers to an estimate of the number of viable units of bacteria per millilitre of water

- Microbial testing could work in a similar way to aquatic facilities where retesting is required after carrying out rectification work when microbial levels are too high.
- 10 cfu/ml is going to prove a huge administrative burden for facilities and it is suggested that 100 cfu/ml is the threshold for reporting by vulnerable facilities.
- If microbial reporting is required there needs to be clarity on who is responsible. This could be a challenge if the onus is on the owner as there could be a lack of awareness, or issues if the responsible person is a tenant (not a part of the registration process).
- The Discussion Paper references the reporting of results at the discretion of an auditor, however, the frequency of sampling may not coincide with the frequency of audit.
- Information needs to be provided on the correct disinfection procedure as well as evidence that would be required to satisfy that disinfection has occurred.
- Need to differentiate between L.pneumophila & Legionella spp particularly in warm water systems due to the differences in associated clinical risk.
- Would people voluntarily submit information if it might lead to enforcement action.
- Recommend the inclusion of a mechanism to review and reset the levels which trigger additional audits to enable changes to be made as required.
- The threshold limits, reporting timeframe and recommended action should be in a guideline.
- This should also apply to any independent microbiological sampling and testing results. Procedures will need to be in place, by the operator, detailing actions to be taken and by whom and by when. Water treatment providers often provide this service either at no or low cost. There should be a provision that appropriate cost recovery from the operator of the system for emergency response activities be mandatory. Without this there is an artificial incentive to take short cuts, which should be removed from the process of managing the risk of exposure to Legionella.
- The designation of threshold concentrations should be risk based.

Test Result	**Required Control Strategy**
Not detected (<10 cfu/ml)	Maintain monitoring at a frequency proportional to risk (see RMP)
Detected as between 10-1000 cfu/ml (<1000 cfu/ml)	Review limits by CHO & determine risk for non-vulnerable facilities and separately “vulnerable facilities” or those in close proximity
Detected (>1000 cfu/ml)	Review limits by CHO & determine risk for non-vulnerable facilities and separately “vulnerable facilities” or those in close proximity

Recommendation:

11. That proposal 4.8 be adopted, establishing mandatory reporting requirements for specified Legionella detection limits in air handling and water distribution systems.

In response to comments provided, it was considered appropriate to align mandatory reporting requirements for cooling water systems with Victorian legislation. Accordingly, it is proposed to amend reporting requirements for legionella detections in cooling water systems to:

- 10 – 1000 cfu/ml in three consecutive samples, while following resampling and disinfection protocols prescribed by the regulations, and
- >1000 cfu/ml in any sample

Mandatory reporting results for legionella detection in warm water systems are proposed to be:

- 10 – 100 cfu/ml in three consecutive samples, while following resampling and disinfection protocols prescribed by a verified risk management plan, and
- >100 cfu/ml in any sample

The adjusted mandatory reporting thresholds will provide vulnerable facilities with the opportunity to resolve low level legionella detection through mandated response protocols before reporting requirements to the appropriate enforcement agency are triggered. Persistent, or high-level legionella detections will require reporting.

Reporting will be to the mandatory enforcement agency, in a prescribed form, within 24 hours of receipt of a laboratory report confirming a breach of a reporting threshold.

Auditors who review RMPs will check that sampling is being undertaken at the required frequency and may require evidence of reporting when threshold levels are exceeded. It will not be the responsibility of the auditor to report legionella test results.

Further stakeholder comments:

- Appropriate enforcement agency is the DOH allowing a centralised system and higher technical knowledge. LG officers may assist DOH when required for investigative purposes.
- Estimated numbers of cooling towers in WA; the DOH's estimate is a 2 - 3 fold increase on estimates by industry of the number of cooling towers in WA.
- Difference between 'cooling tower' and 'cooling tower system'. In practice two or more cooling towers are often combined into a single cooling tower system. This system is then managed as an individual entity (even though it may combine two to ten cooling towers). This system is treated as a whole from a water treatment and microbiological perspective because the water is common to all of the cooling towers. The system pipework connects all of the cooling towers together. There will be one RMP per system and one set of microbiological results per system (each month).
- 'Competent person': No other Australian jurisdiction requires the competent person or duly qualified person to hold a tertiary qualification. In NSW the previous requirement for tertiary qualifications is unworkable for several reasons; no tertiary qualification fits the concept of developing RMP's, experienced practitioners may not have tertiary degrees it doesn't make sense to exclude them. The competent person should include individuals with significant (>5 years) industry experience (e.g. practical experience in cooling tower maintenance and an understanding of risk management). Competent person should be applied to the person who develops the RMP, the person who manages an organisation that provides water treatment services, this should not apply to the auditor or the individual services technician who provides the water treatment service to the facility. This should take into consideration individuals starting out that would need to gain experience.
- 'Independence': All major jurisdictions allow risk management plans to be developed by the water treatment provider. The water treatment provider has knowledge of applied water treatment and the cooling tower systems. Practical knowledge and experience of the water treatment provider delivers the greatest value to the industry and public health. This does not preclude consultants from being able to do it.
- Audit of RMP: Most Australian jurisdictions require that the auditor be independent of the facility owner, the water treatment provider and the person who developed the RMP. The purpose of the audit is to ensure compliance of the maintenance of the cooling tower system to the RMP. Therefore, the auditor does not need to be a "competent person" or tertiary qualified (no technical water treatment or cooling tower education), there training should be in how to conduct audits. NSW and Vic auditors are required to complete an auditor's course which introduces them to the regulations and concepts/terminology.
- Consider promoting the use of heated water systems, combined with the use of thermostatic mixing valves (TMVs) or thermostatically controlled taps for temperature control, located at or near the point of use to minimise the risk of legionella developing (reducing the need to audit warm water systems). Another benefit is that there are deemed to satisfy prescriptive standards for the installation and maintenance of heated water systems.

- DMIRS proposing reforms to plumbing regulation to put in place requirements for owners and occupiers of high-risk facilities to test and maintain TMVs and Backflow Prevention Devices in accordance with AS.
- Limits for reporting and action differ substantially from enHealth guidelines to AS3666 (our paper favoured AS too heavily (investigate the difference)).
- *DOH response - sampling regimes and response protocols in AS3666 are not intended to be applied to warm water systems (they are specific for air handling systems). The enHealth Guidelines are for water handling systems only, and not air handling. The two are not directly comparable.*
- Indoor air quality from large commercial buildings due to build environment (HVAC). Missing HVAC hygiene.

Cost impact revisions

Discussion Paper Part 1 acknowledged that the number of air handling systems in WA that were likely to require registration, was *'likely to be a significant overestimation'*. Responses from different industry bodies confirmed this and suggested that at least a 50 per cent reduction in the estimated number of facilities with cooling tower systems was appropriate. Furthermore, the costs attributed to regulatory controls were based upon 2009 costings in a Victorian regulatory impact assessment. The following table provides revised costs based on a 30% reduction in estimates of cooling towers, and updated servicing prices from the *Victorian Public Health and Wellbeing Regulations Sunset Review – Regulatory Impact Statement 2019*[7].

Table 7 – Revised costs associated with implementation of current and proposed regulatory requirements

Requirement status	Activity	Cost per annum	Based on 396 warm water systems	Based on 2234 cooling towers
AS 3666 maintenance and sampling	Maintenance and sampling	$3633 per cooling tower $7,975 per warm water system	$3,158,100	$8,116,122
New requirements	Registration	$120	$47,520	$268,080
	Administration	$78	$30,888	$174,252
	Risk management plan	($433 / year / cooling tower) *medium public health risk ($1300 / year / warm water system)	$514,800	$968,066
	Audit costs	$325	$128,700	$726,050
	Record keeping	$88	$34,848	$196,592
	Total (new)	$1,044 (cooling tower) $1,911 (warm water system)	$756,756	$2,333,040
Total			**3,914,856**	**10,449,162**

[7] Victoria State Government (2019). *Public Health and Wellbeing Regulations Sunset Review Regulatory Impact Statement.* State of Victoria, Department of Health and Human Services.

Initial costs to industry associated with the proposed regulations were estimated at $10,437,800 per annum. This figure was based on an estimated 3192 cooling towers, which industry has advised was likely a significant overestimation. Conversely, these costs were based upon pricings that were ten years old at the time of publication and therefore may have been an underestimation. Furthermore, industry costs for warm water systems were not included in the discussion papers. These cost estimate aberrations have been corrected and the revised cost to industry is estimated at $14,364,018.

It is important to consider that the current regulations already require air handling and water systems to be operated and maintained in accordance with AS/NZS 3666. The new regulations propose to mandate the microbial testing components of AS/NZS 3666.3, and introduce new costs associated with risk management plans and audits.

Next Steps

The information gathered from consultation indicate that there is a majority preference across all sectors for the continuation of regulation of this area. The recommended legislative approach identified through the Discussion Papers will be considered by the Minister for Health. The DOH will continue to work with industry and government to ensure new and emerging risks with air handling and water systems are adequately addressed through the regulatory process

Appendix 1 – Stakeholder Engagement List

The following stakeholder groups were targeted in communications designed to encourage a submission.

Local Government
138 local governments in WA
Industry and Associations
Shopping Centres/Complexes
Liquor Licensed accommodation premises
Hotels, Motels, other accommodation
Universities, tertiary education colleges, technical and trade colleges
Hospitals, Medical Clinics
Aged care facilities
Environmental Consultants
Pathology and testing laboratories
Dry Cleaners
Car Wash premises
Environmental Health Australia (EHA)
Public Health Advocacy Institute of Western Australia
Australian Institute for Refrigeration, Air conditioning and Heating (AIRAH)
Air conditioning and Mechanical Contractors Association (AMCA)
Air conditioning and Refrigeration Equipment Manufacturers Association of Australia (AREMA)
Australian Hotels Association (AHA)
Refrigeration and Air Conditioning Contractors Association Australia (RACCA)
Western Australian Local Government Association WA + Metropolitan Environmental Health Managers Group
State Government
Department of Mines, Industry Regulation and Safety
Department of Planning, Lands and Heritage
Department of Primary Industries and Regional Development
Department of Education
Department of Water and Environmental Regulation
Department of Finance
Department of Biodiversity, Conservation and Attractions Parks and Wildlife Service
Department of Primary Industries and Regional Development
Department of Local Government, Sport and Cultural Industries
Department of Jobs, Tourism, Science and Innovation
Department of Premier and Cabinet
Department of Transport
Department of Treasury
Economic Regulation Authority
Worksafe

Appendix 2 – Combined consultation submission list for Discussion Papers

Local Government
Town of Bassendean
City of Bayswater
City of Belmont
Town of Cambridge
Shire of Chittering
Shire of Cunderdin
Shire of Dandaragan
Shire of Dardanup
Shire of Esperance
City of Gosnells
City of Greater Geraldton
City of Joondalup
City of Kalgoorlie-Boulder
City of Kwinana
Shires of Meekathara, Mount Magnet, Yalgoo and Cue
City of Melville
Shire of Mundaring
City of Nedlands
Town of Port Hedland
Shire of Serpentine-Jarrahdale
City of Subiaco
City of Stirling
City of Swan
Shire of Quairading
Town of Victoria Park
City of Wanneroo
Industry and Associations
Australian Institute for Refrigeration, Air conditioning and Heating (AIRAH)
AJJS Auditors Pty Ltd
Budget motel/Commercial Tavern
Compliance Water Services
CETEC
Ecosafe International
Edith Cowan University
Engineers Australia
Hydrochem Pty Ltd
Hydro Flow Pty Ltd
Iclean Dry Cleaners, Dry Cleaning & Alteration Services
IDEXX Laboratories
Jones Lang Lasalle
Lush Carwash & Cafe

Nalco Water
Phoenix Shopping Centre
Prince of Wales Hotel
Rockingham Shopping Centre
VEOLIA
Western Australia Local Government Association and the Metropolitan Environmental Health Managers Group (MEHMG)
State Government
Building Management and Works
Department of Biodiversity, Conservation and Attraction
Department of Mines, Industry, Regulation and Safety
North Metropolitan Health Service

*Respondents who wished to remain anonymous were not included in this list

Appendix 3 – Citizen space online survey questions part 1

Question 1: What is your name?

Question 2: What is your email address?

Question 3: Please indicate who you represent?

Question 4: What is the name of the organisation you represent? If you are a member of the public please type 'public'.

Question 5: A consultation summary paper will be circulated upon completion. Details of the organisation you represent will be added to the paper. No personal emails or names will be included. Are you OK for your organisation details to be included in the summary paper?

Question 6: Please indicate your preferred option for managing the public health risk associated with commercial cooling towers and warm water systems in Western Australia. Only select 1 option as part of this question.

Question 7: Based on your answer to the previous question, please explain why this is your preferred option.

Question 8: Please provide details of any alternative options below. Please explain your ideas by providing examples of complaints, case studies, data or other useful evidence and references.

Question 9: Do you have any other comments about the future management of cooling towers and warm water systems in WA? This is your opportunity to raise concerns about cost implications or any other unforeseen impacts associated with the other options discussed in the Discussion Paper.

Appendix 4: Citizen space survey part 2

Question 1: What is your name?

Question 2: What is your email address?

Question 3: Please indicate who you represent?

Question 4: What is the name of the organisation you represent? If you are a member of the public, please type 'public'

Question 5: Would you like your response to be confidential?

Revised definitions and exemptions

Question 1: Do you agree that the proposed regulations apply to all cooling towers except those in Class 1, 4 or 10 buildings under the Building Code?

Question 2: Do you agree that a proposed risk rating matrix should be used by enforcement agencies to classify each type of system and/or building?

Question 3: Do you agree that the proposed regulations would apply to commercial car washes or other potentially high-risk businesses/facilities?

Question 4: Do you agree with the term 'vulnerable facility'?

Question 5: Should the proposed regulations apply to any other building or facility not mentioned? Please detail your answer.

Question 6: Do you have any concerns or comments about this proposal? Please detail your answer.

Administration requirements and application of regulations

Question 7: Do you agree that air-handling and water systems should be registered with the appropriate enforcement agency?

High risk systems and vulnerable facilities

Question 8: Do you agree that warm water systems in 'vulnerable' facilities including hospitals and aged care facilities should be registered with the appropriate enforcement agency?

Question 9: Do you agree that the Chief Health Officer should be the principle enforcement agency for State hospitals and State aged care facilities?

Question 10: Do you agree that 6 months is an appropriate amount of time for owners to register a warm water system following the enactment of the proposed regulations?

Question 11: Do you have any other ideas or comments to make about any of these proposals? Please detail your answer.

Compliance with the Building Code of Australia

Question 12: Do you agree with requiring compliance with the BCA for design, installation and maintenance of air-handling and water systems?

Risk Management Plans

Question 13: Do you agree that Risk Management Plans should be mandatory as part of the registration process for high risk or vulnerable facilities? And optional for lower risk premises? Please include any further comments you have in this section including any costs or benefits of this proposal.

Independent auditors

Question 14: Do you agree with the use of independent auditors to undertake regular inspections of systems and to report to the appropriate enforcement agency?

Question 15: Do you have any other ideas or comments to make about any of these proposals? Please detail any costs or benefits of these proposals. Please detail your answer.

Regular maintenance inspections and water testing

Question 16: Do you agree with the proposal to replicate the Australian Standards requirements for either routine maintenance schedules or regular water sampling and testing?

Question 17: Do you have any other ideas or comments regarding this proposal? Please detail your answer.

Testing results reporting

Question 18: Do you agree with the proposed requirements for reporting of microbial testing and investigation if above a threshold?

Question 19: Do you have any other ideas or comments to make about any of these proposals? Please detail them below.

Final Comments

Question 20: Do you have any other ideas or comments to make about any of these proposals? Please detail your answer.

Appendix 5: Table of proposed defined terms to be included in new regulations

Definitions	
AS/NZS 3666	means the standards published as — a) AS/NZS 3666.1:2011 Air-handling and water systems of buildings – Microbial control Part 1: Design, installation and commissioning; b) AS/NZS 3666.2: 2011 Air-handling and water systems of buildings – Microbial control Part 2: Operation and maintenance; and c) AS/NZS 3666.3:2011 Air-handling and water systems of buildings – Microbial control Part 3: Performance-based maintenance of cooling water systems
Air-handling system	means an air-handling system as defined in AS/NZ 3666 but does not include a dry system which does not use water or other liquids to operate, humidify, clean, maintain, heat or cool the air
Accredited laboratory	accredited laboratory means a laboratory accredited as complying with ISO/IEC 17025 by— (a) the National Association of Testing Authorities Australia; or (b) another entity the chief health officer is satisfied is appropriately qualified to accredit a laboratory as complying with ISO/IEC 17025.
Accredited test	Means an analytical procedure conducted by a National Association of Testing Authorities accredited laboratory.
Approved auditor	An auditor approved by the Chief Health Officer under Section… being a person who is not - a) the person who prepared the risk management plan b) the occupier c) the person who installed the system d) a person who operates or maintains the cooling water system or who has done so in the last 5 years.
Competent person	A person who has had appropriate training or practical experience (or both) to ensure that air handling and / or water systems are operated and maintained as required by these regulations.
Cooling tower	A device for lowering the temperature of water by evaporative cooling in which atmospheric air is in contact with falling water, thereby exchanging heat. The term also includes those devices that incorporate a water-refrigerant or water-water heat exchanger.
Cooling water system	A heat exchange system comprising a cooling tower, heat rejection plant, and interconnecting water recirculating pipework and associated pumps, valves and controls.
Disinfection	The preventative maintenance action of applying a shock treatment to a system, in conjunction with system cleaning, in order to reduce the general concentration of infectious agents.
Humidifying/ Humidification system	A system that artificially regulates the humidity of an inside environment.
Registerable system	means: a) a water system that serves a vulnerable facility; or b) a warm water system or c) a cooling water system.
Responsible person	The responsible person is any person who owns, manages, or controls the air handling or water distribution system.
Risk management plan	Means a risk management plan verified by an appropriate enforcement agency.
Vulnerable facility	A facility of a type listed in table 1.
Water distribution system	water distribution system means the infrastructure within a facility from every point where water enters the facility through the infrastructure to every point where the water is used, but does not include a cooling tower.

Definitions	
Warm water	warm water means water that is not more than 60°C and not less than 25°C;
Warm water system	warm water system means a reticulated water system that distributes or recirculates warm water through the majority of its branches by means of a temperature controlling device.

Table 1: Vulnerable facilities

Facility	Extract / comments
Public hospital	a public hospital as defined by the *Health Services Act 2016* (WA)
Private hospital	a private hospital as defined in the *Private Hospitals and Health Services Act 1927* (WA)
Aged care facility	a residential care facility in which persons who do not require constant medical attention receive 'residential care' as defined by the Aged Care Act 1997.

Appendix 6 – Risk Rating matrices and definitions

A number of risk assessment tools are available to determine the risk level for each identified public health risk. These tools include a health consequences table (Table 4), risk likelihood table (Table 5) and risk qualitative matrix (Table 6).

These risk assessment tools are available from AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines [27] and the Health Risk Assessment (Scoping) Guidelines [28].

The DOH has five Public Health Risk levels (shown Table 3), each requiring a varying degree of DOH involvement in their management.

Table 4 Definition of risk levels

Risk Level	DOH management requirements
Very Low Public Health Risk	No further assessment required
Low Public Health Risk	Some mitigation/management may be required – no detailed assessment of health hazards required but addressed with routine controls
Moderate/Medium Public Health Risk	Substantial mitigation/management required – assessment required of health hazards
High Public Health Risk	Not an acceptable risk. The DOH needs to be involved in the management of high public health risks. Major mitigation/management (including offsets) may be required – assessment required of health hazards
Extreme Public Health Risk	Potentially unacceptable: modification of proposal required

Table 5 Health consequences table adapted from the 2011 Health Risk Assessment (Scoping) Guidelines, DOH WA

Category	Acute Health Consequences (per hazard or outbreak)	Chronic Health Consequences (per project lifecycle)
1 Catastrophic	• >1 fatality • OR >5 permanent disabilities • OR Non-permanent injuries requiring hospitalisation for 5 – 10 % of populations at risk • OR Acute health effect requiring hospitalisation for 5 – 10 % of populations at risk	**Chronic health effect requiring medical treatment for 10 – 15 % of population at risk**
2 Massive	• 1 fatality • OR 2 – 5 permanent disabilities • OR Non-permanent injuries requiring hospitalisation for 2 - 5 % of populations at risk • OR Acute health effect requiring hospitalisation for 2 – 5 % of populations at risk	**Chronic health effect requiring medical treatment for 5 - 10 % of population at risk**
3 Major	• No fatality • AND 1 permanent disability • OR Non-permanent injuries requiring hospitalisation for 1 – 2 % of populations at risk • OR Acute health effect requiring hospitalisation for 1 - 2 % of populations at risk • OR Evacuation is necessary	**Chronic health effect requiring medical treatment for 2 - 5 % of population at risk**
4 Moderate/ Significant	• No fatality • AND No permanent disability • AND Non-permanent injuries requiring hospitalisation for 1 – 2 % of populations at risk • OR Acute health effect requiring hospitalisation for 1 – 2 % of populations at risk • AND No evacuation	**Chronic health effect requiring medical treatment for 1 - 2 % of population at risk**

Category	Acute Health Consequences (per hazard or outbreak)	Chronic Health Consequences (per project lifecycle)
5 Minor	• No fatality • AND No permanent disability • AND Non-permanent injuries requiring hospitalisation for 1 – 5 persons • OR No Acute health effect requiring hospitalisation • AND No evacuation	**Chronic health effect requiring medical treatment for 0 - 1 % of population at risk**
6 Negligible/ Slight	• **No fatality** • **AND No permanent disability** • **AND No Non-permanent injuries requiring hospitalisation** • **AND No Acute health effect requiring hospitalisation** • **AND No evacuation**	**No chronic health effect requiring medical treatment**

Table 6 Risk likelihood table adopted from the 2011 Health Risk Assessment (Scoping) Guidelines, DOH WA

Likelihood	Expected or Actual Frequency	% Chance of chronic health effect during life of project
Almost Certain	More than once a year	**Over 90%**
Likely	Once in 1 to 3 years	**61 – 90%**
Possible/ Occasionally	Once in 3 – 5 years	**31 – 60%**
Unlikely	Once in 5 – 10 years	**6 – 30%**
Rare/Remote	**Once in more than 10 years**	**Up to 5%**

Table 7 Risk matrix (qualitative)

Likelihood	Consequences					
	Slight/ Negligible	Minor	Moderate	Major	Massive	Catastrophic
Almost certain	Low	Medium	High	Extreme	Extreme	Extreme
Likely	Low	Low	Medium	High	Extreme	Extreme
Possible	Very Low	Low	Low	Medium	High	Extreme
Unlikely	Very Low	Very Low	Low	Low	Medium	High
Rare/ Remote	Very Low	Very Low	Very Low	Low	Low	Medium

Appendix 7 Testing results reporting

Table 2: replication of AS/NZS3666.3 Table 3.1 Control strategies for the presence of Legionellae

Test result, cfu/ml	Required control strategy	Reporting required
Not detected (<10 cfu/ml)	(1) Maintain monthly monitoring. Maintain water treatment program.	No
Detected as between 10-1000 cfu/ml (<1000 cfu/ml)	(2) Investigate problem. Review water treatment program Take necessary remedial action including immediate online disinfection in accordance with Appendix B and undertake control strategy (3) (3) Retest water within 3-7 days of plant operation: a. If not detected, continue to retest water every 3-7 days until two consecutive samples return readings of not detected and repeat control strategy (1). b. If detected at <100 cfu/ml repeat control strategy (2) c. If detected at >100 cfu/ml investigate problem and review water treatment program, immediately carry out on line decontamination in accordance with Paragraph C2 of Appendix C and repeat control strategy (3) d. If detected at >1000 cfu/ml undertake control strategy (4)	Yes – Upon third consecutive detection while following required control strategy resampling.
Detected (>1000 cfu/ml)	(4) Investigate problem Review water treatment program. Take necessary remedial action including immediate online decontamination in accordance with Paragraph C2 of Appendix C and undertake control strategy (5) (5) Retest water within 3-7 days of plant operation. a. If not detected, continue to retest water every 3-7 days until two consecutive samples return readings of not detected and repeat control strategy (1). b. If detected at <100 cfu/ml repeat control strategy (2) c. If detected at >100 <1000 cfu/ml, investigate problem and review water treatment program, immediately carry out online decontamination in accordance with Paragraph C2 of Appendix C and repeat control strategy (5) d. If detected at >1000 cfu/ml investigate problem and review water treatment program, immediately carry out system decontamination in accordance with Paragraph C3 of Appendix C and repeat control strategy (5).	Yes

Appendix 8 – Proposed exemptions as building classifications

Class	System Type	Explanation
	Exempt	
Class 1A	All systems	A single dwelling being a detached house, or one or more attached dwellings, each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit.
Class 2	System serving only a single sole occupancy unit	Class 2 buildings are apartment buildings. They are typically multi-unit residential buildings where people live above and below each other. The NCC describes the space which would be considered the apartment as a sole-occupancy unit (SOU). Class 2 buildings may also be single storey attached dwellings where there is a common space below. For example, two dwellings above a common basement or carpark.
Class 3	System serving only a single sole occupancy unit	Class 3 buildings are residential buildings other than a Class 1 or Class 2 building. They are a common place of long term or transient living for a number of unrelated people. Examples include a boarding house, hotel, motel, guest house, hostel or backpackers (that are larger than the limits for a Class 1b building). Class 3 buildings could also include dormitory style accommodation, or workers' quarters for shearers or fruit pickers. Class 3 buildings may also be "care-type" facilities such as accommodation buildings for children, the elderly, or people with a disability, and which are not considered to be Class 9 buildings.
Class 9b	Warm water system serving an aquatic facility	Aquatic facility
Class 10	All systems except carwash	A non-habitable building or structure. Class 10A examples include a private garage, carport or shed. Class 10B examples include a structure being a fence, mast, antenna, wall or swimming pool. Class 10C is a private bushfire shelter.
	Captured	
Class 1B	All systems	A boarding house, guest house, hostel or the like with a total area of all floors not exceeding 300m^2, and where not more than 12 reside, and is not located above or below another dwelling or another class of building other than a private garage.
Class 2	Systems serving more than a single sole occupancy unit	Class 2 buildings are apartment buildings. They are typically multi-unit residential buildings where people live above and below each other. The NCC describes the space which would be considered the apartment as a sole-occupancy unit (SOU). Class 2 buildings may also be single storey attached dwellings where there is a common space below. For example, two dwellings above a common basement or carpark.
Class 3	Systems serving more than a single sole occupancy unit	Class 3 buildings are residential buildings other than a Class 1 or Class 2 building. They are a common place of long term or transient living for a number of unrelated people. Examples include a boarding house, hotel, motel, guest house, hostel or backpackers (that are larger than the limits for a Class 1b building). Class 3 buildings could also include dormitory style accommodation, or workers' quarters for shearers or fruit pickers. Class 3 buildings may also be "care-type" facilities such as accommodation buildings for children, the elderly, or people with a disability, and which are not considered to be Class 9 buildings.
Class 4	All systems	A dwelling in a building that is Class 5, 6, 7, 8, or 9 if it is the only dwelling in the building.
Class 5	All systems	Class 5 buildings are office buildings that are used for professional or commercial purposes, excluding Class 6, 7, 8 or 9 buildings. Examples of Class 5 buildings are offices for lawyers, accountants, general medical practitioners, government agencies and architects.
Class 6	All systems	Class 6 buildings are typically shops, restaurants and cafés. They are a place for the sale of retail goods or the supply of services direct to the public. Some examples are: ▪ A dining room, bar, shop or kiosk part of a hotel or motel ▪ A hairdresser or barber shop ▪ A public laundry ▪ A market or showroom ▪ A funeral parlour ▪ A shopping centre.
Class 7	All systems	Class 7 buildings include two sub classifications: Class 7a and Class 7b. Class 7a buildings are carparks. Class 7b buildings are typically warehouses, storage buildings or buildings for the display of goods (or produce) that is for wholesale.
Class 8	All systems	A factory is the most common way to describe a Class 8 building. It is a building in which a process (or handicraft) is carried out for trade, sale, or gain. The building can be used for production, assembling, altering, repairing, finishing, packing, or cleaning of goods or produce. It

Class	System Type	Explanation
		includes buildings such as a mechanic's workshop. It may also be a building for food manufacture, such as an abattoir. A laboratory is also a Class 8 building, even though it may be small in size. This is due to their high potential for a fire hazard.
Class 9	All systems	Class 9 buildings are buildings of a public nature. Class 9 buildings include three sub classifications: Class 9a, Class 9b and Class 9c. Class 9a buildings are generally hospitals which are referred to in the NCC as health-care buildings. They are buildings in which occupants or patients are undergoing medical treatment and may need physical assistance to evacuate in the case of an emergency. This includes a clinic (or day surgery) where the effects of the treatment administered would involve patients becoming unconscious or unable to move. This in turn requires supervised medical care (on the premises) for some time after treatment has been administered. Class 9b buildings are assembly buildings in which people may gather for social, theatrical, political, religious or civil purposes. They include schools, universities, childcare centres, pre-schools, sporting facilities, night clubs, or public transport buildings. Class 9c buildings are aged care buildings. Aged care buildings are defined as residential accommodation for elderly people who, due to varying degrees of incapacity associated with the ageing process, are provided with personal care services and 24 hour staff assistance to evacuate the building in an emergency
Class 10	Water system serving commercial carwash	Car wash

This document can be made available in alternative formats on request for a person with a disability.