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SoularchApex

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Specs

Operating Platform	Linak
Sleep Deck	Width: 900 - 1500mm Length: 2000 - 2200mm
Height	184 - 760mm
Safe Working Load	250kg
Max Back Rest Angle	65°
Max Knee Break Angle	32°
Trendelenburg	12° (+/-)

OPTIONAL

Side Support Device	Additional support and safety
Foot End Staff Control Panel	More comfort and versatility on daily tasks

The Soularch Apex is a low electric bed, designed for aged care use. It is made to last whilst offering comfort and safety expected for loved ones.

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Find out more



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Cover:
Depiction of future medical technology using digital health monitoring system in a smart hospital room

Source: Adobe stock images AI

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IHEA MISSION STATEMENT

To support members and industry stakeholders
to achieve best practice health engineering in
sustainable public and private healthcare sectors.

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Editor's Message



IT ONLY SEEMS like yesterday that I was putting pen to paper or should that be key strokes to file for the autumn editorial piece, how quickly dead lines approach and that lovely sound they make as they whoosh past.

I want you to ask yourself a couple of questions. How much power do your actions and spoken words carry and have you ever had anyone question your credibility? I ask this because during the recent months I was involved in a situation where a close associate had their word and credibility challenged against what was written in a report. He, and we will call him Joe for the purpose of anonymity, has given me license to comment on this matter, so no personal information, just the case facts.

It began a decade or so ago when Joe underwent a medical procedure where there were two possible outcomes, the fitting of a pacemaker or a procedure called atrial fibrillation ablation. Joe chose ablation which was very successful and for the many years since went about his normal work a day life without any issues. That was until recently when Joe's employer sent him to attend a mine site pre-employment medical examination.

Joe is in good health so it was a total shock to find that he had failed his mine site medical because his medical records had noted that he was fitted with a pacemaker. Now here is the point, Joe protested that he was not fitted with nor has ever been fitted with a pacemaker and in spite of overwhelming documented proof that he had undergone several episodes of MRI examination where, as you and I know would fry a pacemaker resulting in a sentinel event, together with a letter from his general practitioner stating the same, the examining clinician refused to believe him.

This set Joe on a very costly path to prove he was correct and the medical record was not. Not being able to attend to the mine site to conduct his employment obligations Joe had to take personal leave, make and attend several expensive consultant appointments just to obtain their assessment

declaring he was not fitted with nor has ever been fitted with a pacemaker. Joe has since resolved the issue and a note has been finally placed on his medical record.

Someone somewhere had incorrectly created his medical record. The medical institution concerned refused to accept any responsibility for the original error, in fact was quite indifferent to the fact that an error had been made and refused to cooperate without supporting evidence to the contrary.

The elephant in the room here is nobody wants to believe the truth or more to the point risk believing what is the truth. They do not want the responsibility of being the person to declare what is true even though they know deep down.

Yet, we live in a world of contradiction where we have world leaders sprouting ridiculous and obviously false claims and their constituents wholeheartedly believing them, in spite of what is before their very own eyes. We see and read internet articles that are produced by "influencers" that have no expertise in the subject matter they are commenting on and the stupid thing here is they command a massive following of believers. Talk about snake oil salesmen. I wonder how much damage they have caused due to their incompetence.

Whether it is due to poor time management or the lack of the required skills, the growing tendency for people to use artificial intelligence to compose and produce reports, yes even medical reports has seen the need for controls to be implemented to curtail this risky and fraudulent endeavour. People pass off AI composed pieces as their own for the accolade but refuse to accept responsibility when proven incorrect.

A decade or so ago a IHEA member once presented a conference paper on holding people responsible for consequences arising from instructions and directives issued under their signature. In those days quite a challenging proposal but with the recent unification of Australia's Work



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Health and Safety regulations this very same objective has had to come into effect due to the consistent flaunting of one's work safety obligations. Laws, codes of practice and codes of conduct are some of the controls needed to remind us of how we should be behaving.

I am old school and I believe a person's credibility is a function of proven morality and ethics and not upon the number of followers or likes I can generate.

My father, in spite of his shortcomings, taught me that a person's hand shake was their bond, a bond that was not to be taken lightly. Now it has degenerated into a symbol of power where one world leader tries to dominate another in a hand to hand tug of war. As a young boy I also remember him saying to his mates "You are always welcome at my fire," a line repeated in the film "A man from Snowy River" that symbolises friendship and trust.

"When did we, as human beings, lose the ability to trust one another, that is without a mountain of supporting documents?"

When did we, as human beings, lose the ability to trust one another, that is without a mountain of supporting documents? When did deception override the need for truth and when did blame take over from taking responsibility?

When did corruption and entitled behaviour become acceptable over integrity and humbleness?

I do not know the answer to these quandaries and I suppose I never will but I know one thing and that is episodes like the one Joe recently had to contend with are growing in frequency and magnitude and mostly due to someone not giving a rats...

By the way no AI was used in the creation of this piece, you can tell by the poor grammar.

Kindest regards
Frederick Foley



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IAQ - AIR QUALITY INDEX

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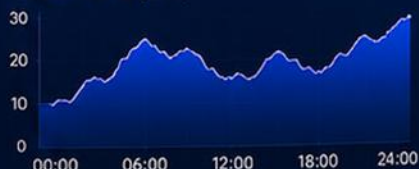
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Start a Conversation

National President's Message

Margaret
Tobin Centre

Paediatric
Intensive Care Unit



AS WE MOVE into the winter edition of *Healthcare Facilities*, the pace of change across Australia's health infrastructure sector shows little sign of slowing. For healthcare engineers, one of the clearest developments is the growing recognition that resilient digital infrastructure is now as fundamental to safe healthcare delivery as our traditional mechanical, electrical and building systems. The convergence of engineering, technology and clinical operations will increasingly shape how we plan, maintain and renew healthcare assets.

State governments also continue to progress significant capital investment. Construction is underway on Western Australia's Byford Health Hub, bringing health and community services together in an integrated local setting. In Queensland, delivery activity is advancing for the new Coomera Hospital, with at least 600 overnight beds planned over two construction stages.

In regional New South Wales, construction has commenced on the Glen Innes Hospital Redevelopment, including a new acute services building with an expanded emergency department and medical imaging facilities. The Victorian Government has committed \$32Bn across health services and infrastructure developments and upgrades.

In South Australia, the recent completion of the \$74 million Noarlunga Hospital expansion delivered an additional

48 beds, while major developments at Mount Barker and Flinders Medical Centre continue to progress exceptionally well. In the Northern Territory, over \$100M has been recently committed to hospital and health facility construction and upgrades, including significant investment in central sterilisation infrastructure across Territory hospitals.

These projects reflect broader themes across our sector: regional access, integrated care, digital resilience, adaptability and the need to deliver increasingly complex facilities within constrained operational and financial environments. They reinforce the importance of healthcare engineering expertise being involved early in planning and sustained throughout the asset lifecycle.

Looking ahead, I strongly encourage members to join us for the **IHEA National Symposium WA 2026**, to be held **16–18 November at the Esplanade Hotel Fremantle**. The Symposium will provide an important opportunity to reconnect, share practical experience and explore the innovations and challenges shaping healthcare infrastructure. I encourage members from every state and territory to make the journey west and contribute to the conversation.

I look forward to seeing many of you in Fremantle.

Best regards,
Michael

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New South Wales/ACT

HELLO TO EVERYONE and welcome to another quarterly journal.

As the year progresses we are happy to report that we have had 2 exciting site tours and also planning our annual end of year PD day with the ever-popular Sydney Harbour cruise.

First off, we were invited to tour the head quarters and manufacturing site at Condell Park for ZIP Water. For all the members we were pleasantly surprised to be welcomed into their modern facility to see the manufacturing process of producing the famous ZIP Water products.

Steel sheets getting loaded into the giant presses and folding machines and then heading off to the production line, the whole process is in house and controlled by Australians and Australian standards. What a pleasure to see an Aussie built company thriving in the suburbs of Sydney.

We did discuss the issues that they experienced when installing in hospitals and how they overcome many of the issues, including the different types of water conditions they experience across different sites. One person did cross my mind and that was our great friend Mark Collen from CETEC Labs who is one of the IHEA longest members, long time sponsor and go to man when talking about water quality.

A few quick phone calls later, Mark was sitting down with the technical team having a chat about certain issues and ideas, so I do hope soon we get a report back from Mark to discuss how we can identify issues with installed equipment in our hospitals and how we can mitigate problems that come from different conditions of water.

This is why being a member of the IHEA benefits us all. People coming together and discussing problems they encounter on a daily basis, finding solutions and implementing to our environment.

More recently, we had the opportunity to visit the Wilhelm Integrated Solutions headquarters for another outstanding industry tour. Members were given an insight into the breadth of services Wilhelm provides to the healthcare sector, along with demonstrations of their specialist equipment, workshop capabilities and project delivery processes. It was another great example of industry partners opening their doors and sharing knowledge that ultimately benefits our hospitals and healthcare facilities.

Planning is also well underway for our annual IHEA/ SBME NSW/ACT Professional Development Day and Sydney Harbour Cruise later this year. The committee has now finalised this year's theme: Engineering Under Pressure, and we are currently securing sponsors and confirming what promises to be another excellent line-up of speakers. Registrations will be opening soon, and we encourage





everyone to keep an eye out for the announcement and get in early.

So book the date of the 4th of December into your calendar, because tickets will sell out fast.

Looking ahead, we are also organising a site tour of the Nepean Hospital Stage 2 Redevelopment following commissioning. This will provide members with the opportunity to see one of NSW's largest recent healthcare infrastructure projects firsthand and hear about the challenges, lessons learnt and innovations delivered throughout the project.

It's shaping up to be another busy and exciting year for the NSW/ACT Branch, and we look forward to seeing as many members as possible at our upcoming events and also we do encourage people spread the word of the IHEA and keep the learning and networking strong.

Cameron Ivers
NSW/ACT President.



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Victoria/Tasmania

W WELCOME TO THE Victoria / Tasmania Winter Update 2026

Our Lunch & Learn sessions have seen significant growth over this period, reflecting strong engagement across the team. We also had an excellent recent site visit to the Galvin Experience Centre, which provided valuable insights and learning opportunities.

Looking ahead, we are excited for our upcoming site visit to Sunshine Hospital on 09 July — details are provided below.

Regards,
Michael McCambridge
John Mihalnac
Steven Ball
Pablo Perez-Reigosa
Michael Goodman
Vanessa Galina

BRANCH ACTIVITIES

Lunch & Learn: Consolidation and Efficiencies in Medical Gas Testing

Date: Wednesday, 06 May 2026

Time: 12:30 PM to 1:30 PM (AEST)

Location: Zoom

Attendees: 30

Cale Watson is the Managing Director of Medical Equipment & Gases Australia Pty Ltd, a family-owned and operated business with more than 25 years' experience in the medical gas industry. Based in Sydney, Cale oversees the supply, servicing, and maintenance of medical gas equipment for healthcare facilities across Australia. Prior to this, the business specialised in medical gas cylinder distribution, and Cale previously worked as a Solutions Architect in IT.



Healthcare facilities are continually seeking ways to reduce operational costs, minimise disruption, and strengthen compliance particularly within complex medical gas environments.

This session highlighted clear, demonstrated efficiencies and cost savings achieved by health services that have consolidated medical gas device and gas outlet testing under a single contractor model. Through real-world examples, Cale will outline how cross-department collaboration and contractor consolidation can:

- Streamline compliance processes
 - Reduce site disruptions and eliminate duplication of labour
 - Lower administrative burden
 - Improve leak detection outcomes
 - Reduce overall operational costs
 - Enhance safety, accountability, and service consistency
- By adopting a coordinated and collaborative approach, facilities can move beyond fragmented service models to achieve measurable financial and operational benefits without compromising safety or regulatory requirements.

Lunch + Learn: Medical Air & Vacuum Plant: AS 2896

Compliance, Reliability & Innovation

Date: Wednesday, 20 May 2026 (AEST)

Time: 12:30 PM to 1:30 PM

Location: Zoom

Attendees: 12

Adam Dunlop is the Food & Medical Market Manager at Busch ANZ. Adam is a mechanical engineer with over a decade of experience specialising in vacuum solutions across the Food and Medical sectors in Australia and New Zealand. He is passionate about delivering efficient, reliable systems that elevate performance and industry standards.



Medical air and vacuum plant systems are critical components of hospital infrastructure, where reliability, compliance, and efficiency directly influence patient safety and clinical performance.

Join us for a practical, end-user-focused Lunch + Learn exploring AS 2896 compliance requirements, best-practice plant configurations, and the latest innovations designed to improve uptime, reduce maintenance burdens, and lower operational risk.

We Covered

- AS 2896 compliance essentials for end-users
- Common compliance gaps — and how to address them
- Best-practice configurations for medical air and vacuum plant equipment
- Refrigerated vs desiccant dryers — practical considerations for hospital environments
- Modern redundancy options and reliability improvements
- Innovations enhancing safety, efficiency, and uptime



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SETTING A HIGHER STANDARD

Knox Private Hospital - ICU
Victoria

The path to better care begins from the ground up.

- Remote condition monitoring (OTTO) and the shift toward predictive maintenance
- Practical strategies for optimising maintenance and reducing operational risk

Designed for healthcare engineers, asset managers, maintenance teams, design engineers, and facility managers, this session provides actionable insights to strengthen compliance, enhance plant resilience, and future-proof medical gas infrastructure.

Site Visit: Discover the Galvin Experience Centre

Date: Thursday 28 May, Melbourne

Time: 12:30 PM to 1:30 PM

Location: Zoom

Attendees: 14

We embarked on an exclusive tour of the Galvin Engineering Experience Centre in Melbourne, a purpose-built, hands-on environment designed for architects, engineers, and healthcare professionals to explore inclusive and compliant bathroom solutions for high-care settings.

This immersive session went beyond the traditional showroom experience, offering interactive demonstrations, technical insights, and full-room walkthroughs tailored to aged care, healthcare, mental health, education, and childcare environments.

We experienced a number of interactive demonstrations, tapware and bathroom fixtures in action through real-time demonstrations. Product features that enhance safety, hygiene, durability, and water efficiency in high-care environments. We gained practical insights into water management strategies and performance considerations critical to clinical and residential care settings.





We receive guidance on:

- Compliance and regulatory requirements
- Infection prevention and control
- Maintenance planning and lifecycle considerations
- Product selection for specialised environments
- CPD-aligned learning outcomes

• Person-centred and inclusive design principles
Walked through curated, fully realised pods designed for high-risk and high-care spaces. Experience integrated solutions including:

- Ligature-resistant tapware
- Thermostatic Mixing Valves (TMVs)
- Smart water management systems
- DDA-compliant fixtures
- Clinical and residential care fit-outs

We saw how complete bathrooms and clinical areas are thoughtfully designed to support independence, dignity, and safety across multiple sectors.



Lunch + Learn: Honeywell

Date: Wednesday, 10 June 2026 (AEST)

Time: 12:30 PM to 1:30 PM

Location: Zoom

Presenter: **Kalpna Jadhav** - Sustainability Solutions Consultant, with over 26 years of diverse experience in the Building Automation industry, I bring a unique blend of technical expertise and commercial acumen to drive sustainable transformation across the APAC region. My career spans program management, process deployment, detailed design engineering, system sales, marketing, and offer management enabling me to deliver impactful, customer-centric solutions.

JULY ACTIVITY



Sunshine Hospital Site Tour: Predictive Maintenance, Smart Infrastructure and Healthcare Assist Reliability

Date: Thursday 9 July

Time: 8:30 am to 1:20 pm

Location: Sunshine Hospital, 176 Furlong Road, St Albans, Victoria.

Lunch sponsor: Camfil

IHEA was pleased to invite members and industry colleagues to a professional development event and site tour at Sunshine Hospital, hosted in collaboration with Western Health.

This practical session explored how predictive maintenance, condition monitoring, indoor air quality, healthcare sustainability, asset investment planning and critical infrastructure technologies are being applied across modern healthcare environments.

The program featured presentations from Western Health, the Asset Management Council, Camfil, Veridian Pulse, SAS Asset Management, Victaulic and Forbes McGain OAM, with a strong focus on practical case studies and real-world applications.

Key themes included the transition from reactive to predictive maintenance, improving healthcare asset reliability,

building stronger business cases for engineering projects, safely reducing low-value energy use, optimising indoor air quality, and applying hybrid fire suppression systems in sensitive environments such as data centres and MRI rooms.

The event also included a Sunshine Hospital site tour and practical plant room workshops. Attendees will be split into groups to view demonstrations of precision maintenance tools on HVAC equipment, including air handling units and pumps, as well as predictive maintenance tools such as vibration data collection, thermal imaging and online monitoring systems.

This event was of particular interest to healthcare engineers, facility managers, asset managers, infrastructure teams, consultants, contractors and suppliers working across healthcare environments.

All lunch & learn sessions are available on IHEA Website under the members section – [Resources Learning + Professional Development | IHEA](#)

Committee meetings are held monthly on the 2nd Wednesday at 9:30 am via Teams. Branch members are welcome to attend—email the Committee of Management for an invite.

Michael McCambridge

Vic/Tas Branch President

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Western Australia

WINTER IS HERE and today it is cold and raining, a good day to be indoors writing this branch report.

It has only been a short time since our autumn report and little has transpired but even so our Western Australian members were treated with two very entertaining and informative professional development sessions.

The first was held in May at the new headquarters of Fosters Services. Alex Foster and his team are valued members of the IHEA WA family and dedicated devotees of Electrical Vehicles and Sustainability. Their new headquarters is a tribute to both with an extensive electrical vehicle fleet, public accessible vehicle charging stations, recycled office furniture and ergonomic worker friendly layout.

The evening was well supported with Alex leading the delegation throughout the complex explaining points of interest along the journey. Alex led the overall tour with his expert staff responding to the more detailed questions on a one to one basis. One interesting, non-electrical point I picked up on was the fleet vehicles experiencing a high level of tyre issues. Electric vehicles do not come with a spare tyre, only a can of "Gloop" and you only get one opportunity to fix a flat that does not always work. This is something that someone touring country WA in an EV needs to be aware of. Another tyre issue is the high wear rate and replacement cost.

It seems the issue is the extra battery load the tyres have to contend with resulting in the fitting of specialist EV tyres.

Our thanks go to Alex and his team for putting on great event once again



Alex briefing the group.



Alex welcoming the group.

A few weeks ago members met in Belmont at the Country Comfort Inn to hear Mr Ben Russel, Engagement Officer for Standards Australia speak on the process of developing an Australian Standard. There has always been a bit of a mystery surrounding Standards Australia and how this secret organisation operating in the shadows of corporate Australia would regularly produce these yellow covered documents. We would then read these fonts of information and proclaim in a loud voice to nobody listening "We have to do What, When and How!". And we would ask ourselves Who Wrote this? Why didn't someone ask me? I could have set them straight.

Well spoiler alert, Standards Australia isn't a secret organisation set on making the doing of things difficult for difficult sake. They are a not for profit organisation of people who are not subject matter experts of any of the standards they produce. They are facilitators and collaborators of the expertise gathered together with the desired outcome to produce a set of guidelines to ensure a safer Australia. I will not delve into the details of how Standard Australia goes about creating a new or revising an existing standard, that I

will leave to Mr Steve Delides, your newly appointed IHEA National Board Standards representative. Steve will be producing a journal article in the Spring Edition. Steve will be your link to Standards Australia, so now there is no excuse not to become involved in the creation or modification of the regulations you have to comply with. Your ideas and expertise matters, in fact Standards Australia is asking for it. Your IHEA is offering you a pathway to be heard.



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Steve and Bill.



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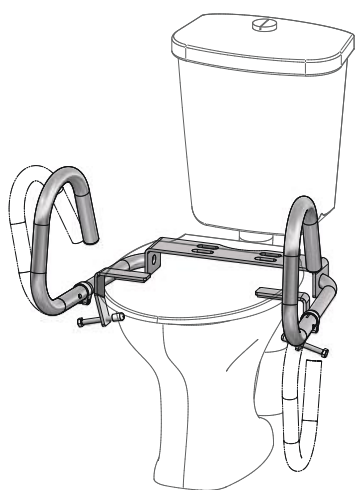
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- Hotels, motels, hostels, residential and other accommodation outlets



CHILDREN'S RAIL AND STEP

The children's rails assist them with their safety and independence. The step attaches to the rail and in many cases the child is able to get off the toilet without any assistance. The step can fold up against the bowl when other people wish to use the toilet. Throne Accessories also produce a range of smaller rails to fit infant toilets used in pre-schools and kindergartens. The step is suitable for any of the Throne Support Rails.

DIGNITY, INDEPENDENCE AND CONFIDENCE FOR EVERYONE

THRONE SPACER

THE ULTIMATE AND MOST VERSATILE
TOILET SEAT RAISER

The Throne Spacer has been developed to add height without changing the appearance of a standard toilet and toilet seat, and offers comfort and safety.

*Two sizes!
50mm & 80mm
heights*

*The best option
OT's could
hope for!*



- Use with or without Throne Rails
- The Throne Spacer fits under the toilet seat
- Unobtrusively integrates with the bathroom decor
- Raises the height of toilet seats and electronic bidets
- Easily installed and conveniently transportable
- Spacers and rails are available from reputable healthcare suppliers

BARIATRIC TOILET SUPPORT RAIL

This particular Bariatric Rail model meets the needs of the larger built person. The handgrips are supported by adjustable legs that are firmly positioned to the side of the toilet by rubber-capped feet to prevent tripping. The Bariatric model comes in polished stainless steel.



Our thanks go to Mr Steve Delides, to The Flowio Group and especially to Mr Ben Russel Standards Australia for bringing this meeting together.

Now while we are talking about professional development sessions. These take a lot of planning and are not cheap to

put together. I have noticed that when we advertise an event we get a lot of people registering and on the day only a portion shows up. Having sat in the FM chair for many years I fully understand that stuff happens that can prevent one from attending, but the ensuing silence is deafening and

somewhat disrespectful to both the speaker and to the organisers. I know most of our members and you are all highly respected professional people so if you cannot make an event send us an SMS or a phone call. They say there is always a silver lining well for me, my lunch the day after an event is usually pretty simmicko.

Remember to save the dates November 16 to 18 for our symposium.

Kindest regards
Frederick Foley
Vice President



Explaining the process.



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UNIFYING OPERATIONAL TECHNOLOGIES: FROM SILOS TO CONNECTED HEALTHCARE

Healthcare teams are balancing more than ever. Ageing facilities. Staffing gaps. Higher safety expectations. Sustainability targets that can't wait. These challenges don't sit apart – they're connected, and they directly impact performance and patient care. Yet many hospitals still rely on systems that operate in silos. Building controls, asset management, security and IT each do their job – but not together. That lack of connection limits visibility, slows response and makes risk harder to manage.

SEE CLEARLY. ACT FASTER.

A connected approach changes that. By bringing systems together into a single operational view, teams can understand what's happening in real-time and act on it. Open protocols, APIs and cloud platforms connect existing technologies without starting from scratch. Data can flow across systems instead of stopping at them, allowing businesses to apply AI and data analytics to drive real outcomes. The result is better awareness, faster decisions, and fewer surprises.

SHIFT FROM REACTIVE TO PROACTIVE

When data works together, it becomes insight. Patterns emerge earlier. Issues can be addressed before they escalate.

Predictive maintenance helps reduce unplanned downtime. Energy and HVAC systems can run more efficiently when informed by connected data. Cyber risks across operational technology can be easier to detect and manage. The impact is straightforward: improved uptime, potential cost savings, and trackable progress toward sustainability goals.

IMPROVE THE EXPERIENCE OF CARE

Better operations support better environments. More consistent air quality management. Improved response times. More efficient workflows. Staff spend less time managing issues and more time focused on patients. Visitors move more easily through complex

facilities. Everyone benefits from safer, more efficient spaces.

START WHERE YOU ARE

You don't have to rebuild everything to move forward. Connecting what you already have is a practical first step.

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Queensland

IT HAS BEEN a surprisingly mild start to winter; our wood heater has not been getting much action. The need to prepare the winter report has come rather unexpectedly!

Innovation in health engineering is typically slow - reliable and time-tested solutions are favored. This is understandable given the risk adverse environment in which health engineers practice where clinical acceptance can be slow, critical spares need to be managed, resources for significant change are limited and staff familiarity often trumps everything especially for those late-night weekend callouts.

Change though may be forced through obsolescence, evolving medical equipment upgrades, changing clinical requirements (or expectations) and the ongoing need to continually improve sustainably, but every so often technical innovation occurs that drives change as the benefits cannot be ignored. This innovation may come from our health engineering colleagues or from the wider health industry where suppliers see gaps and opportunities. Change is also no longer an event that occurs when new facilities bring new equipment and different ways of thinking, our existing facilities are also expected to change and evolve. The partnerships we build, whether they be through our regular internal contacts, wider industry involvement or through attendance at IHEA's professional development opportunities, helps us to manage and plan for change as new ideas are brought to light.

Whilst there is so much discussion and concern over the impacts and benefits of AI on our working lives, this in time will probably become yesterday's news (just like big data?). I wonder what the next big thing will be that we must grapple with.

2026 Queensland Program

The Queensland COM is still recovering from the National Conference and there are no events that have occurred since to report on. The COM though has been busy planning future events and our upcoming Queensland events (please keep an eye out for email updates) are as follows:

- Brisbane Afternoon PD, Pineapple Hotel, 30 July – **The Rise of Intelligent Infrastructure in Healthcare Facilities.** Our annual special meeting will also be held as part of this event – details to be emailed.
- Cairns PD, early September. Details are finalized for a morning tour, afternoon PD and dinner.
- Brisbane afternoon PD and Christmas Dinner. Late November.

This journal may have already been distributed before July PD occurs. A big thank you to our sponsors, Honeywell, Ampcontrol and NHP who will be sharing about operational technology, smart isolated power supply systems, whole-of-site electrical infrastructure monitoring, predictive insights, power quality and operational resilience.

It is great to see our Cairns conference coming together and thank you to Cliff Pollock and his team at Cairns and Hinterland Hospital and Health Service for assisting in our plans. Thanks also to the AIRAH team for enabling us to take advantage of coinciding with their conference.

Committee of Management (COM)

A big ongoing thankyou to the Queensland COM for sharing the workload of organizing and planning all our events. We are always looking for more volunteers.

President	Danny Tincknell
Vice President	Linda Jordinson
Treasurer	Michael Ward
Secretary	Josiah Padgett
State National Board Representative	Nic Coffey
COM member	Christopher Aynsley-Hartwell
COM member	Mark Fasiolo
COM member	Mark Collen
COM member	Adrian Duff
COM member	Liam Duller
COM member	Michael Campbell

If you would like to communicate with the QLD Branch via email, please do so at ihea.qld@ihea.org.au. We greatly appreciate all feedback on our events and welcome any ideas for topics that you are especially interested in.

Again, it was great to catch up with everyone at the National Conference and we hope to see you at our afternoon PD's throughout the remainder of 2026.

A reminder also of the IHEA National Symposium being held in Western Australia on 16-18 November.

Happy Winter!

Danny Tincknell

President, QLD Committee of Management



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Intelligent Wastewater Treatment Control for Healthcare Facilities

Hospitals, aged-care facilities and other healthcare providers generate complex wastewater streams from cleaning, sanitation, sterilisation, laboratory activities, kitchens, laundries and general clinical operations.

Within Australia, healthcare wastewater is commonly discharged to municipal sewerage systems for co-treatment, subject to the requirements of the relevant water authority and trade-waste approval. In some applications, however, healthcare and aged-care facilities may need to treat or condition wastewater onsite before it can be discharged to sewer, transferred for further treatment or released through an approved environmental discharge pathway.

Depending on the facility, treatment process and applicable approval conditions, wastewater may need to remain within defined limits for parameters such as pH, biochemical oxygen demand, chemical oxygen demand, suspended solids, nutrients, pathogens, trace metals and other regulated contaminants. Discharge volumes may also need to be measured and reported to support trade-waste licensing, charging and compliance obligations.

Healthcare wastewater treatment can involve several complementary processes, including:

- Screening and filtration;
- Settling, coagulation and flocculation;
- Biological treatment and aeration;
- pH correction;
- Chemical oxidation or disinfection; and
- Final monitoring and controlled discharge.

Automated Chemical Treatment with the Aquarius ULTIMA

The Aquarius ULTIMA Controller has been implemented across a range of applications suited to healthcare and institutional wastewater treatment, including flow-paced pH neutralisation and chemical oxidation using bleaching or other approved treatment agents.

By integrating premium-quality analytical sensors with accurate flow-measurement equipment, the ULTIMA can calculate and control the quantity of treatment chemical required as wastewater conditions and flow rates change.

For pH-neutralisation applications, the controller can use continuous pH measurement to regulate acid or alkali dosing and maintain wastewater within the required discharge range. Where additional assurance is required, a secondary sensor can provide independent verification or be incorporated into the control and alarm strategy.

For oxidation or disinfection processes, chemical dosing can be paced against the measured wastewater flow, with feedback from applicable water-quality sensors used to confirm treatment performance.

Controlled Discharge and Process Interlocking

The ULTIMA can also act as an intelligent go/no-go control point within the wastewater treatment process.

Measured parameters can be used to control a discharge pump, valve or sluice gate, preventing wastewater from leaving the

treatment system until predefined conditions have been satisfied. These conditions may include:

- pH within the approved operating range;
- Adequate tank level or retention time;
- Completion of the required treatment cycle;
- Acceptable oxidation or disinfection conditions;
- Valid sensor signals; and
- Confirmation that no critical alarms are active.

This approach helps reduce the risk of untreated or out-of-specification wastewater being discharged due to changing process conditions, equipment faults or operator error.

Flow Totalisation and Trade-Waste Reporting

Instantaneous flow readings from an integrated flow meter can be transmitted directly to the ULTIMA Controller. The controller and associated AquaReporter software can then use this information to calculate cumulative wastewater discharge volumes.

This assists facilities in:

- Monitoring daily, monthly and annual wastewater totals;
- Accounting for trade-waste discharge limits;
- Supporting licence and approval reporting;
- Reviewing chemical usage against wastewater volume;
- Identifying unusual discharge events; and
- Maintaining accessible operational and compliance records.

Through AquaReporter, authorised personnel can also remotely review process values, alarms, equipment status and historical trends, improving visibility without requiring operators to remain continuously present at the treatment system.

A Flexible Platform for Healthcare Wastewater Management

Each healthcare wastewater application presents different treatment requirements. The ULTIMA provides a flexible control platform that can integrate pH, flow, level, conductivity, oxidation-reduction potential and other compatible water-quality measurements.

The system can be configured to support standalone chemical-treatment processes or form part of a broader wastewater treatment arrangement incorporating filtration, separation, aeration, biological treatment and disinfection.

By combining continuous measurement, proportional chemical dosing, process interlocking, remote monitoring and discharge totalisation, the Aquarius ULTIMA helps healthcare and aged-care facilities achieve more controlled, transparent and reliable wastewater treatment operations.

Aquarius Technologies works with customers to develop wastewater-control solutions suited to their treatment process, site infrastructure and applicable discharge requirements.

Looking to improve the control, monitoring or reporting of your healthcare wastewater treatment system? Contact Aquarius Technologies to discuss how the ULTIMA Controller can support your application.



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Using AI to Turn Your CMMS into a Decision Support System

Matthew Wood

Abstract

Traditional Computerized Maintenance Management Systems (CMMS) excel at recording work orders, parts usage, and preventive schedules, yet they rarely shape decisions in real time. By integrating Artificial Intelligence (AI), runtime and condition data, and explicit risk frameworks, the CMMS can evolve into a Decision Support System (DSS) that forecasts failures, prioritizes interventions by business risk appetite and asset criticality, and aligns maintenance spend with clinical continuity and safety.

An Alenabled CMMS delivers measurable gains in patient safety, reduced procedure delays, and lower adverse event rates. This ultimately improves Patient Outcomes.

This paper describes how predictive models work in practice; why embedding risk appetite and criticality is essential; how runtime telemetry and condition assessments raise prediction confidence; and why continuous data enhancement is the single largest driver of sustained value.

We present a CMMS-agnostic reference architecture, a healthcare-relevant use case, a 12-month implementation roadmap, and a pragmatic value and ROI framework. The intent is to help health infrastructure leaders shift from reactive firefighting to proactive, risk-managed stewardship that is defensible to clinicians, auditors, and executives.



Case Assessment 3-in-1 scenario that:

Tristram's secondary chemistry curriculum includes a chapter on chlorine dioxide (ClO_2) chemistry.



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Introduction: From System of Record to System of Insight

Hospitals and health services operate under intense demands: ageing infrastructure, constrained budgets, tight accreditation timelines, workforce shortages, and an increasingly digital clinical environment that leaves little tolerance for downtime. Facilities teams already capture rich data in their CMMS—work orders, labour, parts, task history—and in building automation and monitoring systems. However, these data points often live in silos and are backward-looking. The result is a “system of record” that enables reporting after the fact, not a “system of insight” that helps prevent costly disruptions.

Artificial Intelligence changes the operating model. When paired with reliable data pipelines, sound governance, and risk-aware decision logic, AI can predict failure risk, estimate Remaining Useful Life (RUL) of the asset, and recommend the next best intervention well before a service-affecting incident. Crucially, predictions are not acted on uniformly: they are filtered through business risk appetite and asset criticality so that scarce resources are directed where they matter most to patient safety and operational continuity.

This is not merely an IT initiative. It is a multi-disciplinary program that unites innovation (AI and analytics), people (technicians, engineers, clinical risk, IT security), process (SOPs, governance, KPIs), and technology (CMMS, BMS/SCADA, data platforms). The outcome is a resilient, learning maintenance system that manages health infrastructure risk through innovation, people, process, and technology.

How AI-Driven Predictive Maintenance Models Work

Data Foundation

A successful predictive program draws from four data families, independent of CMMS brand:

1. **Historical CMMS work orders** (failure codes, cause, remedy, labour, parts, MTBF/MTTR)
2. **Asset registry** (class, make/model, age, duty, redundancy, location, maintenance strategy)
3. **Runtime and condition data** (hours run, temperature, vibration, pressure, current, alarms from BMS/SCADA/OEM gateways)
4. **Context** (occupancy, ambient conditions, maintenance backlog, vendor performance).

Modelling Approaches

1. **Supervised learning:** classification models predict the probability that an asset will fail within a defined horizon (e.g., 14–30 days). Regression models estimate RUL.
2. **Time-series forecasting & anomaly detection:** learn “normal” behaviour from telemetry, then surface deviations (e.g., a rising condenser approach temperature) that often precede failure.
3. **Survival analysis:** techniques like Weibull or Cox models estimate hazard rates based on age, duty, and failure history, supporting replacement/overhaul timing.

4. **Ensembles & explainability:** combining models improves robustness; explainability (feature importance, contributions) is vital for technician trust and auditability.

Outputs Technicians and Leaders Can Act On

Effective models produce outputs people can act on: probability of failure, estimated lead time or RUL, dominant drivers of risk, recommended actions with timing, and confidence indicators reflecting data density and freshness.

MLOps Lifecycle (Machine Learning Dev Ops)

Predictive systems are never finished. Data ingestion must be automated; models should be retrained on a cadence (e.g., monthly/quarterly) or on drift signals; and performance should be monitored using precision/recall, false-positive rates, and lead-time accuracy.

Human-in-the-loop validation—technician confirmation/override and structured feedback at work-order close-out—continuously improves calibration and trains the AI to provide more accurate results.

Integrating Risk Appetite and Asset Criticality

AI without context can mislead. In healthcare, risk is not uniform: a brief HVAC upset in an admin area differs materially from a chiller fault that threatens theatres and ICU. The operating model must therefore embed **asset criticality** and formal **risk appetite** so that AI recommendations convert to the right actions at the right time.

Criticality Framework

A practical criticality schema scores assets (e.g., 1–5) across dimensions such as:

- (a) Safety & clinical impact
- (b) Operational impact on clinical throughput
- (c) Compliance/accreditation exposure
- (d) Financial impact
- (e) Resilience (redundancy/bypass).

Scores combine into an Asset Criticality Index (ACI). The ACI is reviewed periodically, especially when clinical services, infrastructure configuration, or redundancy change.

Risk Appetite, Thresholds, and Escalation

Risk appetite bridges policy and action, giving teams clear thresholds for prioritising maintenance decisions. Example: “We accept low residual risk for non-clinical services; we do not accept moderate risk on critical clinical assets without active mitigation.” Appetite maps to decision thresholds. For ACI 4–5 assets, relatively low risk scores may trigger predictive inspections; for ACI 1–2 assets, thresholds are higher and intervention windows longer. Escalation paths (e.g., automatic notifications to clinical operations for ACI 5) are defined in SOPs.

A Simple Prioritization Construct

The Decision Priority Score (DPS) is designed to balance likelihood of failure, timetofailure, consequence, and

organizational risk appetite in a single, transparent construct. Rather than producing a definitive ordering, DPS enables tiered prioritization aligned with clinical criticality and leadership-defined risk tolerance. Importantly, coefficient tuning and thresholds are governed by operational and clinical stakeholders, ensuring that AI-generated insight supports—rather than replaces—engineering judgement.

A Decision Priority Score (DPS) can order the backlog:

$$DPS = (\alpha \cdot \text{RiskScore} + \beta \cdot 1/\text{RUL}) \times \gamma \cdot \text{ACI} \times \delta(\text{Appetite}).$$

Weights are tuned with stakeholders; thresholds by ACI translate into scheduling rules and escalation. The goal is not mathematical elegance, but transparent prioritisation aligned with clinical risk and business objectives.

Role of Runtime Data and Condition Assessments

Models trained only on historical work orders seldom achieve the lead time or precision needed to change behaviour.

Runtime telemetry (temperature, vibration, current, pressure, alarms) often deviates well before a functional failure. **Condition assessments** (e.g., structured inspections scored 1–5) supply human observations that complement sensors, especially where instrumentation is sparse.

Data fusion—combining telemetry, work orders, and condition scores—improves precision, extends lead time, and reduces false positives. Over time, technicians learn to trust alerts that consistently align with what they observe in the field. Confidence indicators (e.g., “72% sensor coverage; last condition assessment 14 days ago”) help users interpret and challenge recommendations appropriately.

The Risk of Poor-Quality Data (and How to Reduce It)

Data quality is the single greatest risk to AI-enabled decision support. Poor data yields confident-sounding but unreliable predictions, creating operational risk, alert fatigue, and reputational damage. Typical issues include missing or inconsistent failure codes; ambiguous free-text that hides root causes; mis-tagged sensors (signals not tied to the right asset ID); time-stamp and time-zone inconsistencies; sparse or stale telemetry; and inconsistent close-out discipline.

Mitigation Principles

Governance and definitions: adopt a compact, unambiguous failure taxonomy; standardize task result codes; clarify mandatory close-out fields.

Human-in-the-loop nudges: embed prompts in the CMMS close-out (e.g., “What did you observe? Was the AI alert accurate?”) and make fields easy to populate on mobile.

Sensor-to-asset mapping: maintain a register linking telemetry points to asset IDs with calibration dates and units.

Data quality KPIs: track % work orders with valid failure codes; % assets with current ACI; % critical assets

with telemetry coverage; data freshness; and % AI alerts acknowledged/acted.

Progressive instrumentation: retrofit sensors where the risk and ROI justify it (e.g., bearings on critical pumps).

These actions create a “data flywheel”:
better data → more accurate predictions → higher trust and adoption → richer feedback → better data.



Architecture: Turning CMMS into a Decision Support System



Security design recognises the boundary between operational technology (OT) and IT, uses least-privilege access, encrypts data in motion and at rest, and maintains audit trails suitable for accreditation and incident reviews.

Value and Return On Investment

Value is realised across four domains:

- **Reliability:** reduced downtime and improved equipment availability
- **Cost:** fewer emergency callouts, optimised preventive maintenance, and inventory benefits
- **Safety and compliance:** reduced clinical disruption and stronger auditability
- **Sustainability:** energy savings from early detection of inefficiencies

With disciplined data quality and targeted asset classes, organisations commonly report payback within 12–18 months. Regular value reporting sustains executive sponsorship.

Illustrative Healthcare Use Case: Chilled Water Plant Serving Theatres and ICU

This use case is presented as an **illustrative, composite example** derived from established healthcare engineering standards and documented case studies, rather than a single named facility. Central chilledwater plants are widely recognized as **missioncritical infrastructure** in hospitals due to their role in maintaining infection control, thermal stability, and continuous operation in theatres and intensive care units (ICUs).



Asset/system: Central chilledwater plant supplying airhandling units serving operating theatres and ICU wards. Such systems are fundamental to meeting minimum temperature, humidity, and ventilation requirements defined by healthcare design guidance for critical care environments.

Criticality context: Operating rooms (ORs) and ICUs are classified as highcriticality clinical spaces due to infection risk, patient vulnerability, and the absence of acceptable downtime. HVAC system reliability—of which chilledwater availability is a cornerstone—is therefore prioritized above energy efficiency in healthcare facility design and operation.

Operational challenge: Healthcare literature documents that chilledwater system degradation or failure can lead to immediate clinical disruption, including loss of environmental control in surgical and critical care areas, necessitating emergency response measures and temporary cooling solutions to maintain patient safety.

Data Inputs (representative):

- Historical CMMS work orders and failure codes for chillers, pumps, and cooling towers
- BMS/SCADA telemetry including condenser approach temperature, chilledwater supply/return temperatures, compressor current, VFD speeds, and alarm history
- Periodic condition assessments conducted by facilities technicians

Predictive Approach:

Published healthcare case studies demonstrate the application of predictive and optimization techniques to chilledwater plants serving suites of operating rooms, including anomaly detection on temperature differentials and current draw to identify developing faults before service impact.

Decision Logic (Illustrative):

- Asset Criticality Index (ACI): 5 (critical clinical service)
- Risk appetite: low tolerance for residual risk

- Predictive triggers: risk score exceeding a defined threshold (e.g., >0.30 within 21–30 days) or estimated remaining useful life below a predefined intervention window
- Escalation: automatic prioritization of predictive inspections and notification to facilities leadership for ACI5 assets

Interventions

Typical mitigations include targeted inspections, lubrication and alignment, condenser and heatexchange performance restoration, verification of water flow, and prepositioning of critical spares—actions consistent with bestpractice guidance for reliable healthcare chilledwater operation.

Outcomes (Illustrative):

Healthcare case literature reports that proactive management of chilledwater plants can reduce unplanned downtime, improve clinical resilience, and extend equipment life, while also delivering secondary benefits such as energy efficiency and reduced reactive maintenance burden.

Impact on Patient Outcomes (Illustrative)

Alenabled CMMS platforms do not deliver care directly; however, by improving infrastructure reliability, they support patient outcomes indirectly but materially. Healthcare engineering literature consistently associates predictive, riskbased maintenance with improved equipment availability, fewer unplanned disruptions, faster resolution of critical failures, and more stable infectioncontrol environments.

These benefits are contingent on data quality and governance and vary by asset class and maturity. From a patientcentred perspective, the value lies in **risk reduction**: fewer preventable disruptions and greater confidence that critical infrastructure will perform when patient acuity is highest.

Illustrative examples are derived from healthcare engineering standards and published case literature rather than a single named organization.



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Implementation Roadmap (12 Months)

Phase 0 – Mobilize (0–1 month): confirm scope (critical asset list, outcomes), baseline data quality and telemetry coverage, define criticality scoring and risk appetite statements, stand up governance.

Phase 1 – Foundations (1–3 months): cleanse and standardize CMMS codes; map sensors to asset IDs; implement secure integration; create a feature store; establish data-quality KPIs and a visible dashboard.

Phase 2 – Pilot (3–6 months): build first models for one or two asset classes (e.g., chillers, AHUs); embed decision rules (DPS) and push tasks to CMMS; capture technician feedback at close-out; iterate UI for explainability; document SOP updates.

Phase 3 – Scale (6–9 months): expand asset coverage; refine thresholds by ACI tier; introduce predictive inventory (lead-time aware) and vendor SLAs; formalise model review cadence.

Phase 4 – Institutionalize (9–12 months): link predictive insights to capital planning (repair vs replace); publish quarterly value reports; plan continuous improvement and new data sources (e.g., power quality).

Technology succeeds only when people adopt it. Adoption grows when technicians see that predictions are

- (a) **accurate** enough to be useful, and
- (b) **explainable**. The user interface should expose why an alert fired (e.g., “Condenser approach temperature up 2.6°C vs baseline; compressor current +7%”). This builds trust and becomes a true Decision Support System.

Action: Start with a pilot on 1–2 high-impact asset classes and recruit respected technicians as champions. Update SOPs to include predictive triggers and acceptance criteria (“What is enough evidence to open a predictive inspection?”). Establish a cross-functional model review board (Facilities, Clinical Risk, IT Security, Finance) that meets quarterly to review thresholds, exceptions, and post-incident learnings.

Risks and Mitigations

Risk	Description	Mitigation
Data quality gaps	Missing codes, mis-tagged sensors, stale telemetry	Governance & KPIs; technician prompts; targeted sensor retrofit
Model drift	Changing loads or operating profiles	Scheduled retraining; drift monitoring; seasonal features
Alert fatigue	Too many/low-quality alerts	Calibrated thresholds by ACI; summarised digests; explainability
Cybersecurity	Expanded integrations increase attack surface	Network segmentation (OT/IT), MFA, encryption, audit trails
Change resistance	Scepticism among technicians or leaders	Champions, co-design, transparent quick wins, training
Over-reliance on AI	Blind acceptance of recommendations	Human-in-the-loop approvals; SOP guardrails; escalation paths

Alignment to IHEA Theme: Innovation, People, Process, Technology

Innovation: predictive models, anomaly detection, explainable decision rules.

People: technicians and engineers empowered by transparent recommendations; governance that brings Facilities, Clinical Risk, IT Security, and Finance together.

Process: SOPs that define triggers, thresholds, and feedback loops; quarterly value reporting.

Technology: secure integration between CMMS and building systems; scalable pipelines and model lifecycle management. Together, these elements deliver risk-managed, predictive maintenance that protects patient care while improving cost and resilience.

Conclusion

AI-enabled CMMS is a strategic capability for health infrastructure. It transforms maintenance from reactive to proactive by forecasting failures, prioritising by risk appetite and criticality, and prescribing actions supported by runtime evidence. The cornerstone is data quality and governance: better data leads to better models, higher trust, and sustained value.

The path to AI-enabled asset management is incremental: start with high-impact assets, co-design with technicians, use explainability to build confidence, and scale with disciplined governance. The reward is a more predictable, safer, and more efficient healthcare environment.

Final Word

Treat your CMMS as an appreciating asset. Every work order completed correctly—with root cause analysis, downtime and cost data—has a financial value when used by AI – as it becomes a better Decision Support System tailored to your business.

Appendices

Appendix A – Example Criticality Framework (1–5 scale)

- Safety & Clinical Impact
- Operational Impact
- Compliance Risk
- Financial Impact
- Resilience (Redundancy).

Weights can be applied where certain dimensions dominate.

Appendix B – Data Quality KPI Checklist

% work orders with valid failure codes; % work orders with cause/remedy/parts completed; % assets with current ACI; % critical assets with telemetry coverage; data freshness (median hours since last update); % AI alerts acknowledged/acted; % sensor-to-asset mappings validated.

Appendix C – DPS Pseudocode (illustrative)

for asset in assets:

risk = predict_failure_probability(asset, horizon=30)

rul = predict_remaining_useful_life(asset)

aci = asset.criticality

appetite = appetite_factor(aci)

dps = (alpha*risk + beta*(1/max(rul,1))) * gamma*aci * appetite

if dps > threshold_by_aci(aci): create_predictive_inspection(asset)

References & Standards (selected)

ISO 31000 (Risk Management);

ISO 55000/55001 (Asset Management);

IEC 60812 (FMEA); ISO 14224 (Failure data taxonomy – adaptable for facilities);

NIST SP 800-82 (ICS Security);

AS/NZS 3000 (Electrical installations);

AS 4187 (Reprocessing of reusable medical devices – context for critical areas).

ASHRAE. HVAC Design Manual for Hospitals and Clinics.

American Society of Heating, Refrigerating and AirConditioning Engineers.

ANSI/ASHRAE/ASHE Standard 170. Ventilation of Health Care Facilities.

American Society for Health Care Engineering (ASHE).

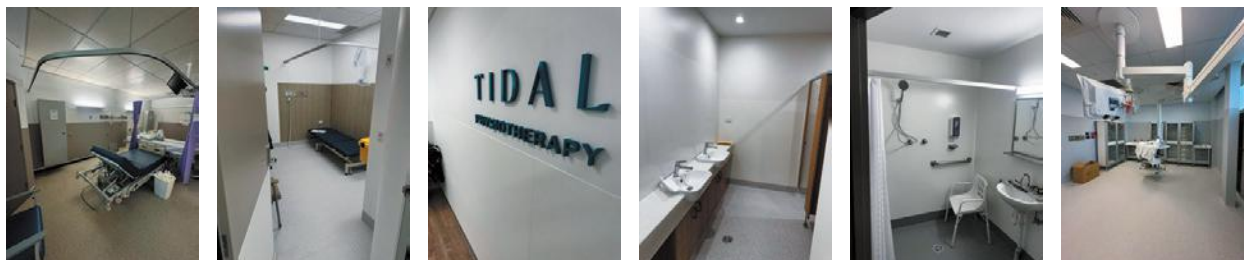
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Occupational Hygiene in Healthcare Facilities Raising Awareness

Josiah Padget

Abstract

Occupational hygiene is a critical yet often under-recognised function within healthcare facilities management. While healthcare environments focus on patient care, they also present chemical, biological, physical, ergonomic, and psychosocial hazards affecting staff, contractors, patients, and visitors. This paper outlines the occupational hygiene framework, emerging exposure limit changes, and common healthcare hazards. It advocates for implementing an Occupational Hygiene Management Plan, complementary to existing Health and Safety Management Plans, and embedding occupational hygiene into asset management, plant operations, maintenance, infection prevention, and construction oversight to strengthen compliance, governance, and safer healthcare environments.

Introduction

Occupational hygiene is the anticipation, recognition, evaluation, and control of workplace hazards that may result in injury, illness, or disease. In healthcare, this definition has broader implications than in many other sectors because hazardous exposures may affect not only workers, but also vulnerable patients, contractors, and visitors.

Healthcare buildings are complex operational environments that contain laboratories, sterilising departments, operating theatres, pharmacies, workshops, plant rooms, medical imaging suites, kitchens, laundries, and live clinical areas—each with distinct and often overlapping exposure risks.

For facilities managers, engineers, and maintenance teams, occupational hygiene is not solely the responsibility of the hospital's health and safety personnel. Facilities teams have a direct role in identifying and managing hygiene-related risks. Effective occupational hygiene management supports safe operations, asset reliability, infection prevention, workforce wellbeing, and regulatory due diligence. A mature occupational hygiene program enables healthcare organisations to move beyond reactive incident response and toward proactive risk management.



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Occupational Hygiene as a Prevention Function

The central role of occupational hygiene is prevention. In practice, this means identifying how work activities create exposure pathways and intervening before those exposures lead to disease or injury. Unlike occupational medicine, which focuses on diagnosing and treating illness, occupational hygiene focuses on controlling exposure at its source.

A useful operational model is the five-part occupational hygiene framework:

- **Anticipate** hazards before they arise by understanding tasks, materials, processes, and planned changes.
- **Recognise** hazards that are already present.
- **Evaluate** the likelihood and severity of harm through observation, risk assessment, sampling, monitoring, and comparison against relevant standards.
- **Control** risk using the hierarchy of controls.
- **Communicate** risks, findings, and control measures to workers and stakeholders.

For healthcare facilities teams, this framework is most effective when embedded into everyday decision-making—particularly procurement, maintenance planning, contractor management, shutdowns, refurbishments, and emergency response.

Common Occupational Hygiene Hazards in Healthcare

Healthcare facilities contain an unusually broad hazard profile, depending on the services delivered, operational activities, and geographic location. Table 1 provides examples of common hazards and sources encountered in healthcare settings.

The significance of this hazard range is that many exposures are not confined to one department. A maintenance activity in a plant room, roof space, or construction zone can create downstream risks for occupied clinical areas if not properly assessed and controlled.

Several examples highlight why anticipation and recognition are essential:

Asbestos

In older healthcare buildings, asbestos-containing materials may still be present in plant rooms, service risers, wall linings, insulation, or other legacy building products. These materials become hazardous when fibres are disturbed, become airborne, and are inhaled. Associated health risks include asbestosis, lung cancer, and mesothelioma.

Facilities teams should treat intrusive works, drilling, demolition, and access to concealed spaces as high-risk triggers for asbestos review. Up-to-date hazardous materials registers and management plans are essential for safe work and regulatory compliance. The asbestos register should be reviewed and consulted before any maintenance, renovation, or building works are undertaken. Although asbestos has



Photo 1. Damage wall lining containing asbestos materials.

been banned in Australia, asbestos-containing materials are still occasionally accidentally imported, making verification of construction materials an ongoing priority.

Solvents

Solvent exposure in healthcare may occur in engineering workshops, pathology laboratories, and body preparation areas. Solvents can cause a range of health effects, often affecting the central nervous system. Importantly, combined exposure to multiple solvents may produce additive or synergistic effects.

- **Additive effects** occur when the combined effect of two chemicals is equal to the sum of their individual effects.
- **Synergistic effects** occur when two or more substances interact to produce a combined effect greater than the sum of their individual effects.

Examples of combined exposure include increased liver toxicity from xylene and toluene, increased hearing loss risk when ototoxic solvents are combined with noise, and enhanced airway irritation or carcinogenic risk when formaldehyde is present alongside other chemicals. This reinforces the need to assess mixed exposures, rather than considering each substance in isolation.

Cytotoxic Drugs

Pharmacy and treatment areas handling anticancer drugs require careful task review, environmental monitoring, and strict



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handling and storage procedures. Carmustine is one example of a hazardous cytotoxic agent. It is a small molecule designed to cross the blood-brain barrier to treat brain cancers. Known adverse effects include neurotoxicity, liver and kidney toxicity, bone marrow suppression, and secondary cancers.

Certified purple nitrile gloves are commonly used for handling cytotoxic drugs. However, glove performance is determined by breakthrough time, and this may vary

significantly between agents. While some gloves may provide protection for several hours against certain drugs, carmustine can permeate glove materials far more rapidly (less than 20 minutes) because of its molecular properties. In practice, this means facilities and clinical support teams must ensure that engineering controls, storage arrangements, waste handling, and PPE specifications are aligned with the specific agents in use.

Table 1. Hazards to anticipate in healthcare environments.

Hazard	Healthcare Examples	Healthcare Sources
Chemical	Disinfectants (glutaraldehyde, hydrogen peroxide, peracetic acid); Cytotoxic drugs (carmustine, thiopeta); Waste anesthetic gases (nitrous oxide) and halogenated volatile anesthetics (isoflurane, sevoflurane, desflurane); Compressed gases – asphyxiation (carbon dioxide), Solvents (xylene, formalin, toluene, acetone); VOCs; Chlorhexidine, Cleaning chemicals; Respirable Crystalline Silica; Asbestos; Welding fumes; Lead	CSSD, Morgue, Pharmacy, Oncology, Workshop, Cleaners, Surgery, Pathology, Handwashing, Construction, Existing Building Materials, Custom Lead Shield Manufacture
Biological	Fecal – Hepatitis A, Rotavirus, Norovirus, <i>C. difficile</i> , <i>Shigella</i> Bloodborne - HIV, Hepatitis B & C Environmental - <i>Legionella</i> , <i>Pseudomonas</i> , <i>Mycobacteria</i> & Mould Animals / Pests – Psittacosis, Histoplasmosis, Cryptococcosis, Leptospirosis Allergens – Plant derived (latex), Insect droppings, Pollen Biotechnology - Recombinant DNA / GMOs, Viral Vector & Gene Therapy Antimicrobial / Antifungal - Resistance Respiratory Infections – Influenza, COVID, RSV, Pertussis Contact-transmitted parasitic infestation - Scabies	Sharps, Exposure/Needle Stick Injuries, Plumbing Works, Trade Waste, Cooling Towers, Sick Patients and Staff, Laundry, Plant Rooms, Pidgeon Nesting, Lab Animals, Pest Management, Laboratories, PPE, Remote Work
Physical	Steam, Noise, Ionising Radiation (x-rays, fluoroscopy, CT, Radioactive tracers), Non-Ionisation Radiation (UV, Lasers, EMF, MRI, IR), Heat Stress, Cold Stress, Hand Arm and Whole-Body Vibration	Medical Imaging, Radiation Oncology, Kitchens, CSSD, Freezers, Ground Maintenance, Waste Management, Research Labs, Mobile Towers, Plant Rooms, Machine Operation, Driving, Cryogenic exposure
Ergonomics	Manual Handling and Lifting, Repetitive Movements, Awkward or Sustained Postures, Workstation Design, Pushing, Pulling & Transporting Loads	Patient Repositioning / Transfers, Static Standing Maintenance, Computer Work
Psychosocial	Occupational violence, Fatigue, Emotional load, Shift work, Poor work control, Isolated work, Bullying, Harassment & Discrimination, Trauma Exposure	ED, Mental Health, ICU, Night Shifts, Overtime, Chronic Understaffing, Remote Work, Workplace Culture, Abusive Patients



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Electromagnetic and Radiofrequency Fields

Healthcare campuses commonly contain roof-mounted telecommunications infrastructure that can generate radiofrequency electromagnetic fields (RF-EMF). Although exposures are typically controlled within applicable standards, roof access and maintenance activities near transmitting equipment should remain subject to task-specific risk assessment, permit controls, and restricted access where required. The established biological effect of excessive RF exposure is tissue heating, with thermal burns possible at high localised exposures; with the eyes being particularly sensitive to thermal injury.

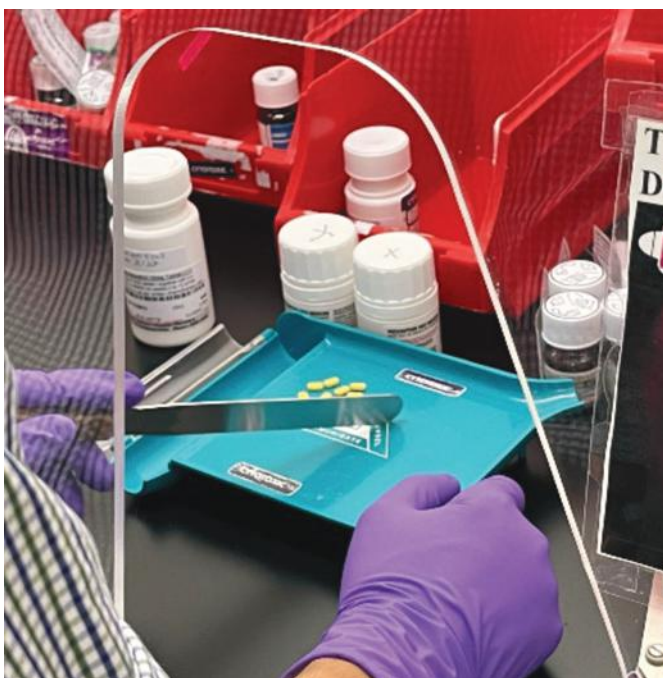


Photo 2. Pharmacist counting out cytotoxic medication.

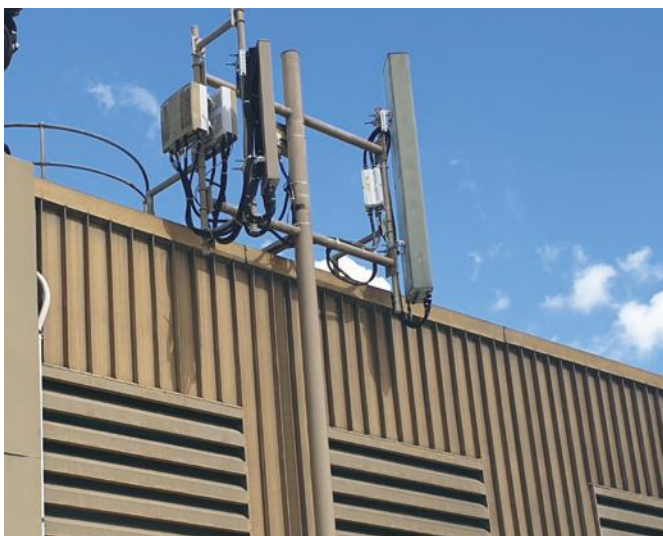


Photo 3. Roof mounted mobile tower.

Within hospitals, the most significant electromagnetic field source is typically magnetic resonance imaging (MRI). MRI systems generate strong static magnetic fields, switched gradient magnetic fields, and radiofrequency fields. The primary occupational risks are acute and include projectile incidents involving ferromagnetic objects, interference with active implants or medical devices, sensory effects associated with movement through strong static fields, peripheral nerve stimulation from gradient fields, and RF-induced heating or burns where controls fail.

Airborne Hazards and Why Particle Size Matters

Airborne contaminants are a major occupational hygiene concern in healthcare because they can migrate beyond the immediate work area and affect adjacent occupied spaces. These contaminants may take the form of gases, vapours, dusts, fibres, fumes, or aerosols. Each behaves differently in air and presents distinct health implications.

Particle size is especially important. Larger inhalable particles may enter the nose and upper airways, while smaller respirable particles can penetrate deep into the lungs. In general terms, inhalable particles are those up to approximately 100 micrometres in aerodynamic diameter, while respirable particles are typically those small enough to reach the gas-exchange regions of the lungs. Particle size directly influences sampling strategy, health risk, and control design.

Mould spores provide a useful example. *Alternaria alternata* spores are generally around 20–60 µm in size and are more likely to deposit in the upper airways, contributing to inflammation of the sinus.

By contrast, *Aspergillus fumigatus* conidia are typically around 2–3 µm, making them respirable and capable of reaching deep into the lungs. In immunocompromised patients, this can result in a serious lung infection.

This is why healthcare projects involving demolition, refurbishment, ceiling works, penetrations, or wet-area failures require robust containment, pressure control, filtration, and verification monitoring.

Local and Systemic Health Effects

Respirable crystalline silica generated during concrete cutting or drilling presents a classic deep-lung deposition risk and may lead to silicosis, a permanent scarring of lung tissue. This is a clear example of a predominantly localised respiratory health effect.

A critical point for healthcare facilities professionals is that some airborne hazards do not simply cause local irritation at the site of contact; they can have systemic effects throughout the body. Cadmium is a useful example. Following inhalation, cadmium may be absorbed through both the upper and lower respiratory tract and distributed throughout the body. It can contribute to kidney damage, lung injury, adverse skeletal effects, cardiovascular disease, and reproductive harm, and

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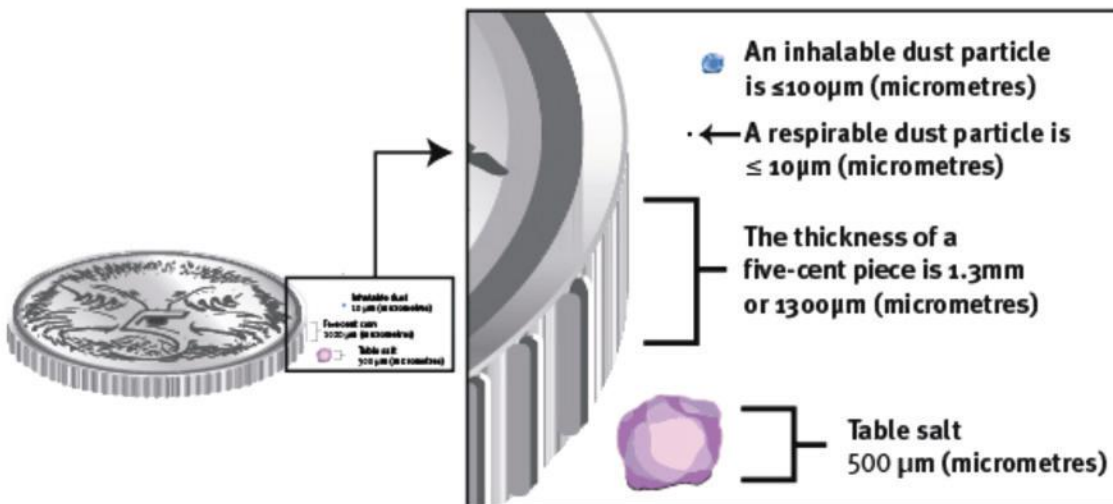


Figure 2. Safe Work Australia's illustration of particle sizes compares to a 5 cent coin.

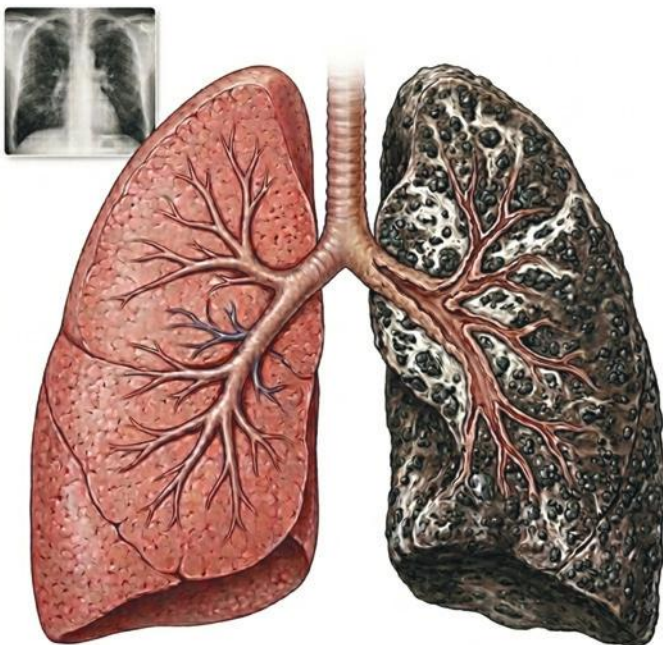


Figure 3. Respirable Crystalline Silica causes fibrosis of the lung tissue.

may remain stored in the body for decades. This distinction matters when planning maintenance activities. Work that appears minor - such as welding, grinding, cutting, or surface preparation—may generate contaminants with significant long-term consequences if poorly controlled.

Changing Exposure Standards and Compliance Implications

The end of year transition from Workplace Exposure Standards (WES) to Workplace Exposure Limits (WEL) represents a significant regulatory and operational change. It includes revisions to over 200 airborne exposure limits, the addition of over 30 new airborne contaminants, and the introduction of non-threshold genotoxic carcinogens (NTGCs).

Workplace exposure limits for airborne contaminants

November 2025

Figure 4. Workplace exposure limits for airborne contaminants.

It is important to note that exposure limits are not "safe" limits; they are legal limits. Some individuals may still experience adverse health effects at exposures below the WEL. Accordingly, the duty remains to eliminate or minimise exposure so far as is reasonably practicable.

For healthcare facilities teams, this has several implications:

1. **Legacy risk assessments may no longer be sufficient.** Historical assumptions about acceptable airborne concentrations may require review.
2. **Sampling programs may need updating.** Existing exposure monitoring plans should be checked against revised contaminants and updated limits.
3. **High-risk maintenance tasks may require reassessment.** Plant maintenance, construction, chemical handling, and contractor activities are likely priority areas.
4. **Documentation and communication must improve.** Engineering, safety, and contractor management teams need to understand when controls must be strengthened under revised limits.



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Table 2. Selected airborne contaminants associated with welding activities: comparison of WES and WEL.

Chemical Name	WES 8-Hour TWA (mg/m ³)	WEL 8-Hour TWA (mg/m ³)
Aluminium (fume)	5	1
Beryllium	0.002	0.00002
Boron Oxide	10	10
Cadmium	0.01	0.001
Chromium	0.5	0.5
Chromium (VI)	0.5	Non-threshold genotoxic carcinogen
Cobalt (fume)	0.05	0.02
Copper	0.2	0.2
Iron	5	5
Iron Oxide (fume)	5	5
Lead (fume)	0.05	0.05
Magnesium Oxide (fume)	10	10
Manganese	1	1 (Inhalable) 0.02 (Respirable)
Molybdenum	10	10 (Inhalable) 3 (Respirable)
Nickel (fume)	1.0	0.1
Tin	2	2
Titanium Dioxide	10	10
Vanadium (fume)	0.05	0.05
Zinc	10	2
Zinc Oxide (fume)	5	2
Welding Fume	1.0	1.0
Inhalable Dust	10	10

Table 3. Selected gases associated with welding activities: comparison of WES and WEL.

Chemical Name	WES TWA (ppm)	WEL TWA (ppm)	WES Peak (ppm)	WEL Peak (ppm)
Ozone			0.1	0.1
Carbon Monoxide	30	20		
Carbon Dioxide	5000	5000		

From 1 December 2026, certain substances classified as non-threshold genotoxic carcinogens will no longer have assigned Workplace Exposure Limits (WELs). This is because there is no “safe” exposure. The priority is to eliminate these substances from the workplace wherever reasonably practicable. Where elimination is not practicable, they should be substituted with safer alternatives or exposures reduced to as low as reasonably practicable (ALARP).

Exposure Assessment and the Need for Statistical Interpretation

A key technical principle in occupational hygiene is that compliance cannot be determined from isolated measurements alone. Statistical analysis is required to assess whether exposure is adequately controlled over time. In other words, a single sample result is not sufficient to characterise ongoing exposure risk with confidence.

This is highly relevant in healthcare because many exposures are variable, intermittent, and task-dependent. A facility may experience short periods of high exposure during maintenance, shutdowns, reprocessing, or contractor works, even when average conditions appear acceptable.

A sound exposure assessment program therefore requires:

- Characterising similar exposure groups,
- representative sampling,
- task-based monitoring where relevant,
- repeat sampling overtime if deemed appropriate,
- interpretation by competent professionals generally member of the Australian Institute of Occupational Hygiene, and
- clear linkage between monitoring results and control decisions.

Welding and Maintenance Activities in Healthcare

Welding provides a useful example of how changing exposure limits affect routine maintenance work in healthcare settings. Exposure depends on the metals being welded, the

equipment and consumables used, the work method, and the effectiveness of barriers, ventilation and extraction.

Under the revised exposure framework:

- Manganese and molybdenum now need to measure inhalable and respirable fractions,
- Chromium (VI) is treated as a NTGC, and
- Limits for aluminium, cadmium, beryllium, and nickel have been significantly reduced in recognition of their health risks.

Conclusion

Healthcare facilities often have a diverse and complex occupational exposure profiles. Chemical, biological, physical, ergonomic, and psychosocial hazards can arise from routine operations, maintenance, infrastructure upgrades, and emergency works. Because these hazards may extend beyond workers into patient-care environments, occupational hygiene in healthcare demands a prevention-first, systems-based approach.

By applying the principles of anticipation, recognition, evaluation, control, and communication, healthcare facilities professionals can better manage risk, ensure regulatory compliance, and protect workers and building occupants.

To support this, healthcare organisations should implement an Occupational Hygiene Management Plan that complements the existing Health and Safety Management Plan. This plan provides a structured framework for identifying, assessing, and controlling biological, chemical, physical, and ergonomic hazards, while integrating occupational hygiene into facilities management and daily operations.

As exposure standards evolve, embedding occupational hygiene across health and safety and facilities management rather than treating it as a separate function is essential to strengthening governance, improving resilience, and delivering safer healthcare environments for all user.

References

- Australian Institute of Occupational Hygienists. (n.d.). *What is occupational hygiene?* <https://www.aioh.org.au/about/oh/>
- Australian Radiation Protection and Nuclear Safety Agency. (2021). *Radiation Protection Series S-1 (Rev. 1): Standard for limiting exposure to radiofrequency fields – 100 kHz to 300 GHz*. https://www.arpansa.gov.au/sites/default/files/rps_s-1.pdf
- Jahn, S. D., Bullock, W. H., & Ignacio, J. S. (Eds.). (2024). *A strategy for assessing and managing occupational exposures* (4th ed.). AIHA.
- National Institute for Occupational Safety and Health. (2023, April). *Managing hazardous drug exposures: Information for healthcare settings* (DHHS [NIOSH] Publication No. 2023-130). Centers for Disease Control and Prevention. <https://www.cdc.gov/niosh/docs/2023-130/default.html>

- National Institute for Occupational Safety and Health. (2024). *NIOSH list of hazardous drugs in healthcare settings, 2024* (DHHS [NIOSH] Publication No. 2025-103). Centers for Disease Control and Prevention. <https://www.cdc.gov/niosh/docs/2025-103/default.html>
- Safe Work Australia. (2015, February 27). *Managing risks of exposure to solvents in the workplace*. <https://www.safeworkaustralia.gov.au/doc/managing-risks-exposure-solvents-workplace-information-sheet>
- Safe Work Australia. (2020, August 28). *Model Code of Practice: How to manage and control asbestos in the workplace*. <https://www.safeworkaustralia.gov.au/doc/model-code-practice-how-manage-and-control-asbestos-workplace>
- Safe Work Australia. (2023, September 4). *Asbestos registers at the workplace*. <https://www.safeworkaustralia.gov.au/doc/asbestos-registers-workplace>
- Safe Work Australia. (2024, April 23). *Workplace exposure limits for airborne contaminants*. <https://www.safeworkaustralia.gov.au/doc/workplace-exposure-limits-airborne-contaminants>
- Safe Work Australia. (2025, May 29). *Changes to workplace exposure limits: Effective from 1 December 2026*. https://www.safeworkaustralia.gov.au/sites/default/files/2025-07/changes_to_workplace_exposure_limits_-_june_2025.pdf
- United States Pharmacopeia. (n.d.). *General Chapter <800> hazardous drugs—Handling in healthcare settings*. <https://www.usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare>



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Net Zero by Design: Aligning People, Process and Technology Through Asset Management in Australian Healthcare

David Chokolich

SIGURAN

Abstract

Australian healthcare facilities face rising energy costs, ageing infrastructure, increasing climate-related risks, and intensifying regulatory expectations. Achieving Net Zero emissions is no longer a sustainability initiative but a core operational and strategic requirement. This paper outlines a practical, asset management-led approach to Net Zero, grounded in ISO 55000 principles and tailored to the realities of Australian hospitals. It demonstrates how aligning people, process and technology enables healthcare organisations to transition from reactive and fragmented, technology-first decision making to integrated, whole-of-life planning that delivers measurable operational, financial and resilience outcomes.

Keywords

Net Zero; Asset Management; ISO 55000; Healthcare Engineering; Electrification; Energy Transition; Governance; Operational Resilience; Sustainability; Australia.

Introduction

Healthcare is one of the most energy-intensive sectors in Australia. Hospitals operate continuously, rely on complex clinical technologies, and require stringent environmental controls. As a result, they consume more energy per square metre than almost any other building type (Australian Government, 2023). At the same time, many public and private facilities are ageing, with infrastructure that was never designed for electrification, digital integration or decarbonisation.

Climate risk is now operational risk. Heatwaves, extreme weather events, and grid instability increasingly affect hospital operations, patient safety and business continuity (CSIRO, 2022). Governments at all levels are tightening emissions reporting requirements, while energy price volatility continues to pressure operating budgets.

In this context, Net Zero is not a future aspiration — it is a present-day asset management challenge. The question is no longer *whether* healthcare organisations should pursue Net Zero, but *how* they can do so in a way that is technically feasible, financially responsible and operationally safe.

This paper argues that the most effective pathway is **Net Zero by Design**: a structured, asset management-led approach that aligns people, process and technology to deliver long-term, integrated outcomes.

Why Net Zero Matters in Healthcare

Energy intensity and cost pressures

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infrastructure and clinical devices. Energy costs represent a significant portion of operating expenditure, and price volatility exposes organisations to financial risk.

Ageing infrastructure

Many Australian hospitals were built decades ago, with mechanical and electrical systems approaching or exceeding endoflife. These assets often lack the efficiency, interoperability and electrification readiness required for modern Net Zero pathways.

Climate and operational risk

Extreme heat, bushfire smoke, flooding and grid instability increasingly disrupt healthcare operations. Hospitals must maintain safe internal environments regardless of external conditions.

Regulatory and stakeholder expectations

Federal and state governments are tightening emissions reporting requirements, while boards, insurers and communities expect credible decarbonisation plans.

The Problem: Fragmented Approaches

Despite strong intent, many healthcare organisations struggle to progress Net Zero meaningfully. Common challenges include:

Technologyfirst decisionmaking

Hospitals often pursue isolated technology upgrades — solar panels, battery storage, building analytics, digital twins — without a clear understanding of wholeoflife value, asset condition or system dependencies.

Siloed teams

Engineering, facilities management, sustainability, finance, ICT and clinical operations frequently operate in parallel rather than in partnership.

Poor asset information

Many facilities lack accurate, complete or standardised asset data.

Shortterm planning cycles

Annual budgeting and reactive maintenance undermine longterm decarbonisation planning.

Asset Management as the Integrator

Asset management provides the structure, governance and discipline required to align Net Zero objectives with operational reality.

ISO 55000 alignment

ISO 55000 emphasises value, alignment, leadership and assurance — all essential for credible Net Zero pathways.

Wholeoflife thinking

Net Zero requires understanding asset interdependencies, lifecycle costs, renewal timing and longterm performance requirements.

Governance, risk and value

Asset management frameworks ensure that decarbonisation decisions are riskbased, evidencedriven and aligned with organisational objectives.

Shared organisational language

Asset management bridges the gap between engineering, finance, sustainability and clinical operations.

People: Capability and Culture

Technology and process improvements cannot succeed without the right people and culture.

Leadership alignment

Executives must understand that Net Zero is an operational and financial strategy, not just an environmental one.

Clear roles and accountability

Organisations need defined responsibilities across engineering, sustainability, finance and operations.

Upskilling FM and engineering teams

Decarbonisation requires new competencies: electrification planning, data analytics, digital systems, demand management and lifecycle modelling.

Engaging clinicians

Clinical operations drive energy demand. Engaging clinicians in behaviour change, scheduling and operational optimisation can unlock significant savings.

Process: Turning Strategy into Action

A Net Zero strategy is only valuable if it can be operationalised.

Asset information standards

Standardised data structures, naming conventions and condition assessment methodologies enable reliable decisionmaking.

Energy and carbon baselines

Accurate baselines allow organisations to quantify opportunities, track progress and justify investment.

Riskbased prioritisation

Decarbonisation actions must be prioritised based on risk, criticality, cost and value.

Integrated planning cycles

Capital planning, maintenance planning, ICT planning and decarbonisation planning must be synchronised.

Technology: Enabler, Not the Hero

Technology is essential, but it must be deployed strategically.

Digital twins and analytics

These tools provide visibility of asset performance, energy consumption and system interactions.

IoT sensors

Realtime monitoring enables continuous improvement and operational efficiency.

Electrification pathways

Transitioning from gas to electricity is central to Net Zero.

Framework Element	Description
Strategic Alignment	Ensuring Net Zero goals align with organisational strategy and clinical priorities.
Integrated Asset Planning	Unifying capital, maintenance, ICT and sustainability planning.
Operational Optimisation	Improving performance of existing systems before major investment.
Capital Sequencing	Coordinating upgrades to avoid stranded assets.
Continuous Improvement	Monitoring, learning and adapting over time.

Table 1 Net Zero by Design Framework Overview**

Interoperability challenges

Legacy systems often lack the ability to communicate effectively.

Net Zero by Design Framework

Below is a structured framework for embedding Net Zero into organisational planning.

Barriers to Expect

Common barriers include:

- Data gaps
- Competing priorities
- Funding constraints
- Change fatigue

These barriers are real and common. Data gaps slow progress. Funding is finite. Competing priorities are constant in healthcare. And change fatigue is real. But with the right governance and sequencing, these barriers can be managed—not ignored.

Enablers for Success

Success requires:

- Executive sponsorship
- Clear governance
- Capability investment
- Fitforpurpose technology
- Transparent reporting

Success depends on strong sponsorship, clear governance, and

investment in capability. Technology must be fit for purpose, not fashionable. And transparent reporting keeps everyone accountable and aligned.

The Role of Healthcare Engineers

- Translating strategy into operations
- Data-driven decision-making
- Managing risk & resilience
- Leading cross-functional collaboration

Healthcare engineers are central to Net Zero. They translate strategy into operations, manage risk, optimise performance and lead crossfunctional collaboration.

The Future of Healthcare Assets

The future will be defined by:

- Electrification of everything
- Aldriven optimisation
- Predictive maintenance
- Integrated digital ecosystems

Looking ahead, healthcare facilities will become smarter, cleaner, and more resilient. Electrification will accelerate. AI will optimise operations. Predictive maintenance will reduce downtime. And digital ecosystems will integrate everything from clinical demand to asset performance.

Conclusion

Net Zero is an asset management challenge. Achieving it requires alignment of people, process and technology through structured, wholeoflife planning. With the right capability, data and planning, Australian healthcare can transition to a lowcarbon future that is operationally robust, financially responsible and clinically safe.

References

1. Australian Government. (2023). *National greenhouse accounts factors*. Department of Climate Change, Energy, the Environment and Water.
2. CSIRO. (2022). *State of the climate 2022*. Commonwealth Scientific and Industrial Research Organisation.
3. International Organization for Standardization. (2014). *ISO 55000: Asset management — Overview, principles and terminology*. ISO.
4. NHS England. (2020). *Delivering a 'Net Zero' National Health Service*. NHS.
5. WA Government. (2023). *Western Australian climate policy*. Government of Western Australia.

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Why Healthcare Can No Longer Treat OT and IT Separately

For many years, healthcare networks were relatively straightforward. Information Technology teams looked after business systems, user devices, and applications, while Operational Technology teams managed building systems, security infrastructure, clinical systems, and medical devices. Those worlds rarely crossed paths.

That's no longer the case.

Modern hospitals are becoming increasingly connected. Smart buildings, Internet of Things (IoT)-enabled medical devices, nurse call systems, Real-Time Location Services (RTLS), security systems, and Building Management Systems (BMS) all rely on the network to function effectively. As a result, healthcare organisations can no longer afford to treat Operational Technology and Information Technology as separate environments. The future lies in convergence, but convergence done properly.

The challenge is that simply connecting Operational Technology and Information Technology together introduces risk. Organisations need to ask some important questions. Do we have the right network policies and security controls to support Operational Technology? Do our Operational Technology suppliers understand the Information Technology environment they are connecting into? Can we create a converged architecture while maintaining the appropriate separation between clinical, operational, and enterprise systems? Have we selected technology partners that support both operational outcomes and cybersecurity requirements?

These questions matter because the network has become the foundation of modern healthcare operations. If designed correctly, a converged Operational Technology and

Information Technology network enables greater visibility, improved operational efficiency, stronger cyber resilience, and a better experience for clinicians, patients, and facility managers. If designed poorly, it can increase operational risk, create security vulnerabilities, and impact critical services.

Technology is only part of the equation. Successful outcomes require delivery partners who understand both Operational Technology and Information Technology. The reality is that many projects still approach these disciplines independently, creating gaps between facilities teams, biomedical engineering, security teams, and enterprise IT. Modern healthcare environments need specialists who can bridge those gaps and design networks that support the entire facility, not just individual systems.

At Operational Intelligence, we help healthcare organisations navigate this convergence. Our team understands the unique requirements of both Operational Technology and Information Technology environments, ensuring networks are designed to remain secure, resilient, and operationally effective. We work with healthcare providers, consultants, and contractors to create architectures that reduce risk while enabling the connected hospital of the future.

The conversation is no longer whether Operational Technology and Information Technology should converge, it is how to do it safely and effectively. If you're planning a new healthcare facility, upgrading existing infrastructure, or simply want to understand what a modern healthcare network should look like, contact Operational Intelligence to learn how a converged network can help de-risk your environment and deliver resilient operations for years to come.



TIME TO UPGRADE

Why Hospital Filter Specifications Must Move with the Standards

Philipp Schluter
CAMFIL

The phase-out of AS 1324, the arrival of AS 16890, and what this means for healthcare engineering practice

Air filtration sits at the intersection of infection control, energy efficiency, and patient safety. Yet the classification system that underpins filter specifications in Australian hospital engineering guidelines has been built on a methodology that dates, in its origins, to a British Standards test developed in 1957. With AS 1324 on its way out and AS 16890 the incoming operative Australian standard, the sector has both a responsibility and an opportunity to bring its guidelines into the twenty-first century.

Where We Are: Current Hospital Filtration Under AS 1324

For decades, Australian hospital HVAC designers have worked with a filter grading system defined by AS 1324.1:2001, *Air filters for use in general ventilation and air-conditioning*. That standard classified filters into coarse grades (G1–G4) and fine grades (F5–F9), where the grading reflected average efficiency against a single synthetic test dust at a single representative particle size of 0.6 µm.

Hospital engineering guidelines across Australian jurisdictions have used these grades as the basis for area-by-area filtration schedules. The

common clinical hierarchy runs broadly as follows:

- **General areas and consulting suites:** minimum F5, with F7 the practical design standard in most recently delivered facilities
- **Most other spaces:** G4/F8 was the typical requirement
- **Critical care areas (ICU/CCU), immunocompromised patient zones, and procedure rooms:** F7–F8 supply filtration for AHU filters with HEPA for nominated areas
- **Negative and positive pressure isolation rooms:** Supply minimum F8 and recommends HEPA on protective pressure areas.
- **Operating theatres and sterile environments:** HEPA filtration to AS 4260 (which is unaffected by the current transition).

These requirements flow from AS 1668.2 *The use of ventilation and air-conditioning in buildings: Mechanical ventilation in buildings* which is adopted under the National Construction Code and which every state and territory health engineering guideline references as its baseline. The Victoria VHBA *Engineering Guidelines for Healthcare Facilities Volume 4*, the NSW *Engineering Services Guide*, the WA *Health Facilities Guidelines Engineering Services 2025*, and the AusHFG Part E all sit on top of this AS 1668.2 platform.

The system has provided a workable framework. The problem is that “workable” is not the same as “accurate.”

The Problem with AS 1324

AS 1324's efficiency method was based on a 1957 test developed for respirator filters and subsequently pressed into service for HVAC classification. The standard carries an inherent tolerance margin on penetration of $\pm 15\%$, and, critically, it does not account for the deactivation of electrostatic charge in filter media. Many current filter media rely heavily on electrostatic

enhancement to achieve their rated efficiency. In service, atmospheric fine particles discharge this enhancement early in filter life, significantly degrading performance over time. In effect, the electrostatic charge provides a short-term bonus on fine particle filtration when the filter is brand new that can dissipate quickly and unpredictably subject to environmental conditions.

The practical consequence is significant. McAffrey and Matthieson (2024) write that filters previously determined as having a minimum efficiency of greater than 20% to AS 1324 Number 1 dust have been found

to be less than 5% to ISO ePM1. In Camfil's independently audited AS/ISO 16890 testing, AS 1324 F5 filters commonly used in Australia captured a mere 1% of ePM1 particles in discharged state. Under AS/ISO 16890 test conditions discharged AS 1324 F7 rated filters only captured ePM1 21%. For hospital specifiers seeking a minimum level of fine particle removal for infection control purposes, this range is clinically unacceptable as a basis for specification.

Furthermore, AS 1324 provides no granular information about a filter's performance across the particle size

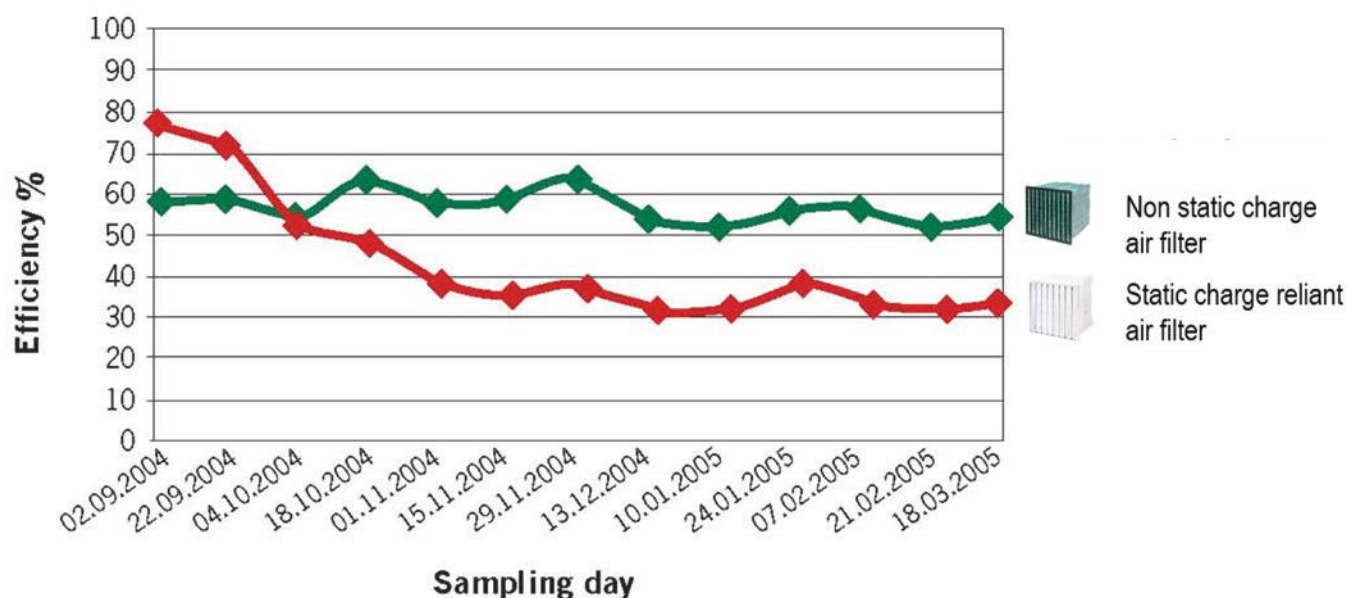


Figure 1 Comparison of filtration efficiency over time of static charged filter and non-static charged filter. Static charged filter drops from near 80% to 30% within three months, whereas non-static charged filter retains filtration efficiency over time

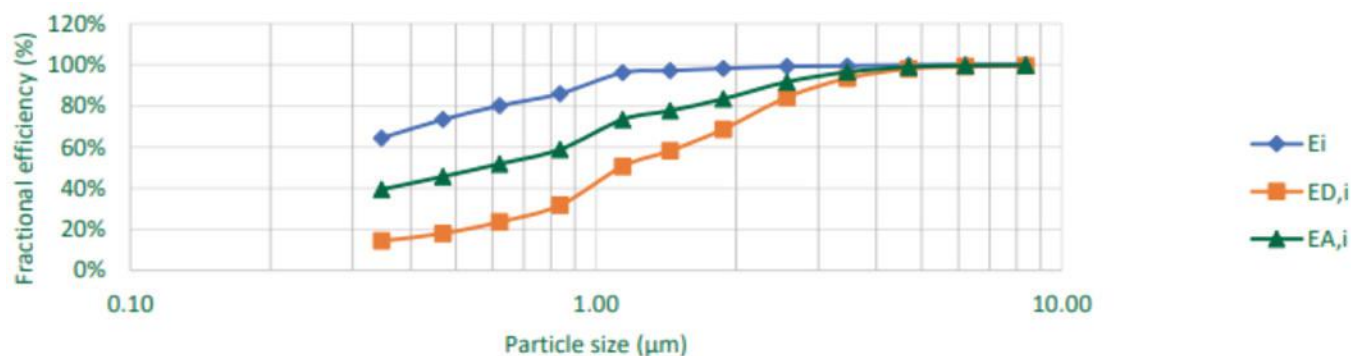


Figure 2 AS/ISO 16890 test result of AS 1324 “F7” rated filter. Ei = Initial Efficiency, ED,i = Discharged Initial Efficiency, EA,i = Average Initial Efficiency. Filter rated as AS/ISO 16890 ePM10 80%

spectrum that is most relevant to airborne pathogen transmission, the sub-2.5 µm range encompassing respiratory aerosols, bacteria, and fine particulate.

The New Standard: AS 16890

After five years of development work with Standards Australia, AS 16890, Australia's modified adoption of ISO 16890, was published in 2024. The standard is now operative, and AS 1324.1:2001 will retain currency for a transition period of two years, after which only AS 16890 will be the Australian Standard for air filters for use in general ventilation and air-conditioning. With the publication of AS 16890 occurring in November 2024, the two-year transition window points to November 2026 as the effective sunset date for AS 1324.

AS 16890 classifies filters based on their measured removal efficiency across three particulate matter fractions:

- **ePM1** – particles 0.3 µm – 1 µm (virus-laden aerosols, ultrafine particulate)
- **ePM2.5** – particles 0.3 µm – 2.5 µm (fine respirable particulate, bacteria-carrying aerosols)
- **ePM10** – particles 0.3 µm – 10 µm (Coarse respirable dust, larger bioaerosols)

Filters achieving ≥50% removal efficiency in one of these fractions are classified accordingly, in 5% increments (e.g., ePM2.5 65%). Filters below the ePM10 ≥50% threshold are classified as Coarse, rated by first-cycle arrestance.

Critically, AS 16890 tests filters pre- and post-electrostatic discharge (graphed as *E_i* and *ED_i* in Figure 1) and averaging the results (*EA_i*), meaning a filter must demonstrate genuine, durable performance, not just clean-filter lab results inflated by electrostatic enhancement. This gives designers a far more reliable prediction of in-service behaviour.

Further, to achieve an AS 16890 grade of ePM1 or ePM2.5 the filter must demonstrate a minimum of 50% particulate removal at the fractional

efficiency in fully discharged state, further ensuring that the filter will at least achieve a minimum of 50% particulate at any given time and not merely as an average over its lifetime.

Mapping AS 1324 Grades to AS 16890: What the Equivalence Actually Looks Like

For healthcare engineers updating specifications or auditing existing guidelines, understanding the approximate equivalences between the two systems is essential. The mapping is not a clean one-to-one conversion and there is no crosswalk between the standards as the test methodologies are fundamentally different, but the following approximations, drawn from AIRAH DA15 guidance and Eurovent 4/23, provide a working reference:

AS 1324 Grade	Suggested AS 16890 Equivalent
F5	Coarse or ePM10 50%–60%
F6	ePM10 60%–70%
F7	ePM2.5 ≥50%
F8	ePM1 ≥50%–60%
F9	ePM1 ≥70%–80%

The critical practical implication is this: what was specified as “F7” in an AS 1324 framework maps approximately to ePM2.5 ≥50% under AS 16890. However, because AS 1324 F7 has been shown, in practice, to deliver in the range of ePM2.5 35–40% efficiency after electrostatic discharge, a healthcare guideline that specified F7 may need to specify *at minimum* ePM2.5 ≥50% to ensure equivalent or better real-world performance. (Note: an ePM2.5 capture rate of below 50% is rated ePM10 or Coarse, and fails to provide any assurance on ePM2.5 capture).

This matters directly for general areas and more critically for clinical spaces which fall in the F8 range. The de facto Australian standard of F7 for general patient areas, when re-examined through AS 16890

performance testing, may have been delivering meaningfully less fine particle removal than designers believed. Updating guidelines to specify ePM2.5 ≥50% for general clinical areas, with ePM1 ≥50% for higher-acuity patient zones, would represent both an honest translation and an improvement in actual delivered air quality.

In areas where the standards and guidelines mandate HEPA, the transition has been partly negated. But for the large middle ground of general wards, procedure rooms, and outpatient areas, the work of updating specifications is still ahead of the sector.

The Prefilter Question: A Case for Simplification

One persistent feature of many hospital HVAC filtration schedules is the specification of a two-stage arrangement: a Coarse prefilter (typically G4 or equivalent) upstream of a higher-efficiency secondary filter. The prefilter's stated purpose is to extend the service life of the downstream filter by capturing larger particles before they reach and load the final filter media.

This logic was sound when final filters had limited dust-holding capacity and tended to load quickly leading to frequent replacement cycles. It is less defensible today, and the transition to AS 16890 provides a logical moment to revisit it.

Modern high-efficiency bag filters and rigid-cell filters rated to ePM2.5 ≥50% or ePM1 ≥50% are designed with substantially greater dust-holding capacity than their AS 1324 predecessors, a direct consequence of advances in filter media technology and the deeper-pleat, high-surface-area geometries now standard in this product class. AS 16890 Part 3 specifically characterises dust-holding capacity using ISO 12103 A2 fine synthetic dust, which is more than twice as heavy per unit volume as the ASHRAE test dust used in AS 1324, meaning that a filter rated for adequate

capacity under AS 16890 conditions is demonstrably robust in service.

When a modern AS 16890 final filter has sufficient dust-holding capacity on its own, the upstream Coarse prefilter may become redundant. The downstream filter service life extension achieved by adding a Coarse or ePM10 prefilter is marginal, and the increase of pressure drop and maintenance of the pre-filters make this arrangement uneconomical. Importantly, the Coarse or ePM10 pre-filter does not meaningfully contribute to air quality and overall filtration efficiency.

The costs of maintaining the two-stage arrangement are tangible and compounding. First, there are the capital and labour costs of purchasing, stocking, and replacing two filter sets rather than one, and given that the pre-filter is often replaced more frequently than the secondary filter, doubled maintenance events, doubled disposal, doubled labour time. Second, there is the energy penalty: every additional filter stage adds permanent pressure drop to the system. A Coarse prefilter in satisfactory service condition will add 30–100 Pa of static pressure resistance, depending on filter selection, air speed and dust loading. Across a hospital-scale AHU fleet operating continuously, that pressure drop represents substantial additional fan energy that is paid for every hour of every day, whether the prefilter is contributing meaningfully to downstream filter life or not.

Third, and often overlooked, is the microbial risk. Air filters, particularly in humid climates, accumulate dust and moisture, creating a substrate that can

support mould and bacterial growth. Modern AS 16890 rated filters' service life is often not limited by their dust holding capacity, but by concerns of microbial growth, a particular concern in the healthcare environment.

The recommendation to healthcare engineers and guideline authors is clear: where a final filter of appropriate AS 16890 classification can demonstrate sufficient dust-holding capacity for the expected service interval in the specific application, the requirement for an upstream Coarse prefilter should not be assumed as default. In the vast majority of Australian metropolitan hospital sites, a well-selected single-stage AS 16890 rated filter offers equal or superior infection control performance, lower lifecycle cost, and reduced energy consumption.

The Guideline Gap

AS 16890 is now operative. AS 1668.2:2024 already references it as the basis for filter selection in systems seeking reductions in outdoor air rates. Yet the engineering guidelines that hospital engineers and their consultants use every day such as Victoria's HTG-2020-004, NSW's 2023 Engineering Services Guide, and the AusHFG Part E engineering services section still express filtration requirements for the most part in AS 1324 grades.

Those documents are, from the moment of AS 1324's sunset in November 2026, referencing a withdrawn standard.

The Australasian Health Infrastructure Alliance, state Health Building Authorities, and Health

Infrastructure bodies across Australia should treat the transition period as a deadline. The work required is translating existing filter grade schedules from AS 1324 language into AS 16890 equivalents, with the opportunity to simultaneously correct for the performance gap that the old standard's methodology obscured. That correction, consistently applied, would deliver measurably better air quality in general wards and clinical areas across Australia's hospital estate.

The clock is running. The standard has changed. The guidelines should follow.

Endnotes

- 1 McCaffrey, D. & Mathieson, P. (2024). *A change in the air*. Ecolibrium, October 2024. AIRAH. Available at: <https://theecolibrium.com/2024/10/07/as-iso-16890-air-filter-standard-australia/> The author acknowledges AIRAH Design Application Manual DA15 (Air Filters and Cleaning Devices) and the IHEA journal as primary technical references for this article.

The following standards and guidelines are cited:

Victoria - HTG-2020-004

Victorian Health Building Authority (VHBA). (2020, May). *Engineering guidelines for healthcare facilities: Volume 4 - Heating, ventilation and air conditioning* (Health Technical Guideline HTG-2020-004). Victorian Government. <https://www.vhba.vic.gov.au/sites/default/files/2020-06/VHHSBA-Engineering-Guidelines-for-Healthcare->

Facilities-Vol-4-Heating-ventilation-air-conditioning-20200530.pdf

NSW – Engineering Services Guide / GL2023_009

NSW Health. (2023, April). *Engineering services* (Guideline GL2023_009). NSW Ministry of Health. https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/GL2023_009.pdf

NSW Ministry of Health. (2022). *Engineering services guide*. NSW Ministry of Health, St Leonards NSW. ISBN 9781760234614. <https://www.health.nsw.gov.au/Hospitals/Publications/engineering-services-guide.pdf>

AusHFG Part E

Australasian Health Infrastructure Alliance (AHIA). (2023). *Australasian Health Facility Guidelines (AusHFG)*. [healthfacilityguidelines.com.au. https://healthfacilityguidelines.com.au/australasian-health-facility-guidelines](https://healthfacilityguidelines.com.au/healthfacilityguidelines.com.au/australasian-health-facility-guidelines)

For Part E specifically (Engineering Services / Mechanical-HVAC), the URL is: https://healthfacilityguidelines.com/ViewPDF/ViewIndexPDF/Mechanical_HVAC_Engineering_Design

AS 16890 (AS/ISO 16890:2024)

Standards Australia. (2024). *AS 16890: Air filters for general ventilation* (Parts 1–4). Standards Australia.

AS 1324 (AS 1324.1:2001)

Standards Australia. (2001). *AS 1324.1: Air filters for use in general ventilation and air-conditioning - Part*

AS 1668.2

Standards Australia. (2024). *AS 1668.2: The use of ventilation and air-conditioning in buildings - Part 2: Mechanical ventilation in buildings* (2024 edition). Standards Australia.

AIRAH DA15

Australian Institute of Refrigeration, Air Conditioning and Heating

(AIRAH). (2019). *DA15: Air filters and cleaning devices* (2nd ed.). AIRAH. https://www.airah.org.au/Web/Web/Shop/Item_Detail.aspx?iProductCode=DA15

Eurovent 4/23

Eurovent. (2022, January). *Eurovent 4/23 - Selection of EN ISO 16890 rated air filter classes for general ventilation applications* (4th ed.). Eurovent Association, Brussels. https://www.eurovent.eu/wp-content/uploads/eurovent-rec-4-23-selection-of-en-iso-16890-rated-air-filter-classes-fourth-edition-2022-en-web_0.pdf

ISO 12103-1:2016

International Organization for Standardization. (2016). *ISO 12103-1:2016 — Road vehicles: Test contaminants for filter evaluation — Part 1: Arizona test dust*. ISO. <https://www.iso.org/standard/63386.html>



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The Global Burden of Antimicrobial Resistance and Healthcare-Associated Infections

As a healthcare professional, are you feeling the heavier weight on your shoulder to provide care, while also dealing with compressed budget constraints and overflowing operational demands? Across Australia, all healthcare facilities have now recognised that hygiene is the vital strategic value in the ongoing fight against healthcare-associated infections and antimicrobial resistance.

We all are, in fact, under the burden to be able to predict outbreaks before they happen. This requires a synergistic approach that combines human-operated precision with the efficiency of technology.

The Advantage of Precision Machinery

Certain cleaning tasks, especially in complex areas, require human-operated precision to achieve a 'deeper clean'. Think of patient bathrooms, high-touch surfaces in treatment rooms, or the fine grout lines in tiled areas — these places are notoriously difficult to clean properly.

This is where specialised machinery excels. For example, Duplex's Floorscrubbers use a unique contra-rotating brush technology to reach deep and remove embedded contaminants, which is vital for infection control in tight spaces like patient bathrooms and busy treatment rooms.

For detailed cleaning, Duplex's Jetsteam and Jetvac machines, powered by Tecnovap technology, are key. Effective steam cleaning machines should be reliable, effectively clean and disinfect high-touch points, sensitive equipment, and hard-to-reach crevices where traditional methods fail. This high-heat steam should effectively kill bacteria, viruses, and mould without harsh chemicals, which cuts chemical costs and makes the environment safer for patients, visitors, and staff. The industrial components ensure continuous, high-performance operation. In Jetvac models, the combination of high-heat cleaning and instant vacuuming leaves surfaces hygienically clean and dry quickly, which is critical for rapid room turnaround.

Smarter Staff, Smarter Systems

Of course, precision alone is not enough. Hospitals and aged care facilities are vast, and keeping them spotless is a never-ending challenge. Staff are stretched, and every extra hour spent pushing a mop is an hour not spent on patient care.

That's why many facilities are turning to robotic scrubbers from innovators like FloorBotics. These autonomous machines quietly cover long corridors, open foyers and waiting areas with clockwork efficiency. They don't get tired, they don't miss patches, and they provide consistent results shift after shift.

This isn't about replacing human workers — it's about freeing them. Instead of spending time on repetitive chores, cleaning teams can focus on the delicate, complex tasks that only people can handle. Staff satisfaction rises, burnout drops, and patients benefit from more attention.

Data That Works Harder

One of the under-appreciated benefits of robotics is information. These machines map their environments and report back with precise cleaning coverage. That means managers know exactly which areas were cleaned, when, and with what efficiency. For audits and compliance, that level of detail is gold. For continuous improvement, it's a game-changer.

A Synergistic Approach for Enhanced Care

A forward-thinking approach to healthcare hygiene combines the detailed precision of human-operated, high-performance machines like advanced scrubbers and powerful steam systems with the tireless efficiency of autonomous robotics. This integrated strategy creates a smarter, more cost-effective way to work. By embracing this approach, healthcare facilities can elevate care quality, not just in hygiene, but in all aspects of operational excellence, which directly helps in the fight against antimicrobial resistance.

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Clean Air, Safe Care: Why Filter Maintenance Matters

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Healthcare environments are dynamic, with varied occupancy, procedures, and environmental loads. This makes routine filter replacement and scheduled maintenance not just advisable — but essential.

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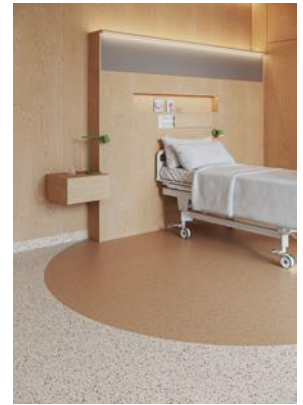
For more than 40 years, Australian hospitals have relied on Tarkett's iQ Homogeneous Vinyl because it was designed with exactly that challenge in mind. Manufactured as a true Homogeneous Vinyl floor with a full 2.0 mm wear layer, its performance characteristics extend throughout the material, helping it withstand the demands of busy healthcare environments while maintaining its appearance over time.

One of the defining differences is iQ Surface Restoration™, a capability unique to iQ Vinyl. Rather than relying on waxes, polishes or chemical coatings to maintain appearance, the floor can be restored through dry buffing alone. Mechanical friction renews the surface without water, chemicals or stripping, allowing maintenance teams to restore the floor while it remains in service. The result is a floor that continues looking

and performing as intended, without the disruption traditionally associated with refurbishment.

For hospitals, the implications extend well beyond maintenance. Every replacement project requires planning, labour, waste removal and often the temporary closure of clinical areas. Extending the life of a floor helps reduce those interruptions, lowering whole-of-life costs while allowing facilities to remain operational for longer.

Durability also plays an important role in sustainability. The longest-lasting floor is often the one with the lowest environmental impact because fewer replacements mean less material consumption, less waste and lower embodied carbon over the life of a building. When iQ Vinyl eventually reaches the end of its service life, Tarkett's ReStart® take-back and recycling program recovers post-use Homogeneous Vinyl and processes it into raw material for new resilient flooring, keeping valuable materials in circulation rather than sending them to landfill.



Backed by a 20-year commercial warranty and decades of proven performance in Australian healthcare, iQ Vinyl offers something increasingly important for healthcare owners and specifiers: confidence that today's flooring decision will continue delivering value long after the project is complete.

Revitalising Healthcare Floors — Without the Disruption

By Higgins Coatings

In healthcare environments, flooring is more than an aesthetic consideration. It is a critical component of infection control, patient safety, and operational continuity. Yet for many facility managers, the prospect of floor replacement triggers a familiar dilemma: the floors need attention, but the cost, downtime, and disruption make full replacement feel almost impossible to justify.

Higgins Coatings' Floor Rejuvenation service was developed precisely for this challenge.

Rather than tearing out and replacing existing flooring, our process restores tired, worn surfaces to a like-new condition — typically within just one to two days. Using high-performance Dr. Schutz treatment systems, globally recognised for durability in demanding commercial environments, we deliver seamless, hygienic finishes specifically engineered for operating theatres, clinical areas, and high-traffic hospital corridors.

The financial case is compelling. Floor rejuvenation typically costs up to 50% less than full replacement, eliminating expenses associated with removal, disposal,

and extended downtime.

Rejuvenated floors meet healthcare compliance standards, resist chemical exposure, and are easy to maintain — all without extended facility shutdowns.

A Complete Maintenance Solution for Healthcare Facilities

Floor Rejuvenation is just one part of Higgins Coatings' comprehensive service offering for the healthcare sector. As Australia's leading commercial painting and maintenance provider — family owned and operated since 1949 — we bring the scale of a 25-branch national network with the expertise of local, on-the-brush specialists. From interior and exterior painting and ongoing painting maintenance to specialised access works, Building Services, and external façade cleaning via our Altitude Aerial Pressure Washing service, we can provide facility managers a proactive, structured approach to asset care — reducing reactive spend and protecting the built environment year-round.



With 25 branches across Australia, there's a Higgins team local to you — ready to deliver smarter, safer, and more cost-effective maintenance solutions for your healthcare facility. For more information visit www.higgins.com.au or contact 1300 HIGGINS.

The Gas No One Sees

Rethinking nitrous oxide decommissioning in a major hospital

Hospitals are full of systems most people never notice — pipes behind walls, plant rooms humming quietly, gases flowing unseen. For BeaconMedaes, these hidden systems are precisely where some of healthcare's most complex sustainability challenges now sit.

Nitrous oxide is one such challenge. Used safely and effectively in clinical care for decades, it is familiar and trusted. As healthcare facilities sharpen their focus on carbon reduction, that final step — what happens when systems are switched off — is impossible to ignore.

At a large metropolitan hospital, the planned decommissioning of part of its nitrous oxide pipeline network brought this issue into sharp focus. What could have been routine infrastructure work became a test of how modern hospitals manage the environmental consequences of legacy systems.



monitoring to confirm control at every step. Nothing dramatic happened — which was precisely the point.

What surprised the team was what emerged along the way. Monitoring revealed a previously undetected leak — a minor pipeline leakage was detected during operations, estimated at 0.6 L/min at an unidentified location. Over 12 months, this would equate to 315,360 litres, or 624 kg of N₂O. The GWP of this leak would result in approximately 185,952 kg of CO₂-equivalent emissions annually over a 100-year period.

A quiet problem with lasting consequences

Nitrous oxide draws little attention outside operating theatres. It has no colour, no smell, no visible presence. Environmentally, however, it carries significant weight, with a warming effect far greater than carbon dioxide.

For many years, decommissioning practices met safety and compliance requirements but rarely addressed environmental impact. Residual gas was vented, the task completed, and the emissions largely invisible. Increasingly, hospitals are questioning whether that approach still reflects their responsibilities.

Choosing a different approach

Working with HHMG Australia, the hospital looked beyond conventional methods to find an alternative that offered certainty and accountability. BeaconMedaes supported the project by introducing a solution designed not to release nitrous oxide at all.

Instead of venting residual gas, the approach focused on destroying it on site during the decommissioning process. Using the Medclair Mobile Destruction Unit (MDU), nitrous oxide was broken down into harmless gases before it could ever reach the atmosphere.

What the process revealed

The work itself unfolded quietly and deliberately. Sections of pipe were cleared in stages, with constant

More than an end point

The total volume of nitrous oxide removed via the MDU was calculated at 4,990 litres, equivalent to a mass of 9.88 kg. When adjusted using the Global Warming Potential (GWP) factor of 298, this is comparable to approximately 2,941 kg of CO₂-equivalent emissions over a 100-year period — or around 1.5 million litres of CO₂ in atmospheric terms.

Conversion basis:

- 1 kg N₂O = 505 L at STP
- 1 kg CO₂ = 545 L at STP
- N₂O to CO₂ 298 x GWP

From BeaconMedaes' perspective, the project reflects a broader shift in healthcare facilities management. Decommissioning no longer has to be a quiet finale. With the right approach, it can become a moment of insight, responsibility, and measurable environmental benefit.

Rather than defaulting to decommissioning, BeaconMedaes follows a structured three-step methodology:

1. First, nitrous oxide leaks are identified using advanced medical gas scanning systems.
2. Second, the total volume of leakage is quantified through on-site monitoring with a nitrous oxide analyser.
3. Three, a targeted mitigation strategy is deployed, with either a Central Destruction Unit (CDU) or Mobile Destruction Unit (MDU) selected based on the scale of the emissions.

With BeaconMedaes leading a more deliberate approach, what was once unseen and unaccounted for becomes measurable — and no longer ignored.

Life is in the details.

Contact BeaconMedaes 0429 854 457 or email medicalgas.au@beaconmedaes.com



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