

# A BETTER WAY OF SEEING

THE BENEFITS OF  
HUMAN CENTRIC LIGHTING

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AGED CARE | HEALTHCARE





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As the Australian population grows, it ages. Across the country, pressure is mounting on healthcare facilities, which must cope with the increased demand that the shift toward an ageing demographic brings. According to a 2018 report published by the NSW Bureau of Health Information, patient numbers across the state's emergency departments are at a record high, with 703,410 patients presenting to emergency departments between October and December 2017 - a 2% increase from the same quarter in 2016.<sup>1</sup>

The increased demand on emergency services coincides with the increasing popularity of 'wellness', which considers health in a broader sense. Beyond the direct care given by a doctor or other healthcare professional 'wellness' is an attitude to health that involves making active choices toward a healthy life everyday.

The dual phenomenon of an ageing population and 'wellness' makes the appropriate design of healthcare and aged care facilities more critical than ever. Today, all aspects of healthcare design must be carefully considered to maximise patient comfort, support the work of healthcare staff, positively impact on wellness, and provide maximum benefits to the healthcare sector in general.

Design decisions which effect this change are all encompassing, and include everything from fit-out to furniture and lighting material to floor plan. This whitepaper will take a closer look at lighting and the role it plays in enhancing performance, efficiency, and comfort for both patients and staff in healthcare facilities.

RODUCTION


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# WHAT IS HUMAN CENTRIC LIGHTING?

Human centric lighting (HCL) systems feature controllable lighting that sits on a spectrum of correlated colour temperatures (CCTs). The systems are designed to evoke particular human biological responses<sup>2</sup> and support health, wellbeing, and performance. CCTs are measured in Kelvin (K) and range from 2700k (warm) to 6500k (cool), a broad spectrum that gives them the ability to evoke different responses on a biological level.

Dynamic and responsive, HCL systems are vastly different to conventional artificial lighting, which is fixed at the same temperature and intensity regardless of activity or time of day. Carefully designed lighting can aid, or even correct, circadian rhythms and other biological responses to light. Humans respond to the light around them: they are most alert during the middle of the day and are attuned to the rising and setting of the sun as its time changes throughout the year. HCL lighting systems have the ability to trigger this response if natural light is unavailable. CCT levels have three main agencies; cool (blue) temperatures are used to keep us alert, warm (yellow) temperatures are calming and are often used in healthcare facilities to enhance patient comfort, and medium (white) temperatures may improve the quality of sleep.<sup>3</sup>

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“ These are recommended tuneable white products that may assist Lighting Designers to achieve certain colour temperatures during certain time frames, hence supporting Human Centric Lighting. The HCL system needs to be designed and warrantied by the lighting designer/architect or the contractor involved. ”

# THE BENEFITS OF HUMAN CENTRIC LIGHT

## IMPROVED HEALTH OUTCOMES

HCL can significantly boost patient and staff comfort, in turn helping to achieve elevated health outcomes. Warm, lower intensity light works with the body's natural circadian rhythms,<sup>4</sup> improving the overall quality of sleep.<sup>5</sup> Additionally, it regulates the production of crucial hormones. With a properly functioning circadian rhythm, appropriate amounts of dopamine are secreted for pleasure, alertness and muscle coordination; cortisol is produced for stress response and effects weight; serotonin controls moods; and the release of melatonin allows for sleep and refreshes our body during the night.<sup>6</sup> Exposure to appropriate light throughout the day is particularly important for young children (both patients and visitors), in whom exposure to bright electric light has been shown to suppress the production of melatonin and other crucial naturally occurring chemicals which are vital during the developmental years.<sup>7</sup> In Denmark's Hillerød hospital, a trial of HCL systems yielded overwhelming positive results: according to Lux Review, 73% of women involved in the study reported that HCL had a positive impact on their pain during labour.<sup>8</sup> Additionally, the Centre for Health Design reports that proper lighting in healthcare can reduce depression amongst patients, decrease the length of hospital stays, ease pain, and reduce agitation amongst dementia patients.<sup>9</sup>

## PRODUCTIVITY

Investing in a proper HCL system has long-term pay-offs including enhanced productivity, visual acuity, safety, and sustainability. In conjunction with its high level of adaptability, these characteristics make HCL systems an obvious choice when choosing a lighting solution. While blue or 'cool' light is often associated with phones and mobile devices that disrupt the quality of sleep, in the right circumstances it can have a tremendous effect on worker productivity. According to Lighting Society Europe, HCL significantly enhances performance and wellbeing, to the point of enhancing productivity by 4.5%, reducing errors by 2%, and slashing absentee rates.<sup>10</sup>

## VISUAL ACUITY

Lighting has a direct impact on visual acuity. Light sources with higher amounts of blue light stimulate the intrinsically photosensitive retinal ganglion cells (ipRGC) photoreceptors, which in turn cause the pupils to contract. This contraction results in better visual acuity and allows clearer vision for longer, as the eye accommodates – rather than is stressed by – the light. While this clarity is not ideal at all times of day, it may aid healthcare and aged care employees in working effectively for extended periods of time.

## SAFETY

As HCL systems significantly improve visibility, they can reduce the risk of trips and falls, which are a major cause of injury in Australian workplaces: according to SafeWork, 56% of workplace slips, trips and falls were caused by environmental factors.<sup>11</sup> As HCL systems are adaptable, they can be modified to the mode of work, thus ensuring appropriate lighting of all spaces and enabling the meeting of enhanced safety outcomes.



# HEALTHCARE SECTOR

Adjustable HCL lighting allows for tailored lighting in specialised areas. Research shows that lighting affects moods; in MRI chambers, for example, patients are significantly less nervous when exposed to scenes of nature.<sup>12</sup> A similar effect can also be achieved by adjusting the CCTs of the lighting system in the chamber. Alternately, red or amber light has been installed in many nurses' stations as it produces a sense of calm.



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# INCREASED EFFICIENCY AND SUSTAINABILITY

Contemporary HCL systems use LED luminaires, which offer significant energy savings and can boost a project's sustainability credentials. LED light bulbs use anywhere between 1/3 and 1/30 of the electricity consumed by incandescent or CFL light bulbs,<sup>13</sup> making them a valuable addition to projects where energy consumption is a major consideration. With a low carbon footprint and mercury-free composition, LED fixtures are the desirable option. This is true in terms of both ambient and task lighting, where Kelvin shifting LED options can use as little as 0.4 watts per square metres of office space – significantly less than that required by similar task lights.<sup>14</sup> These efficiencies can lead to considerable cost savings. HCL Systems use luminaires which have long lifetimes ranging between 15,000 to 50,000 hours. As this is between 5 and 10 times longer than that of a halogen bulb the installation of a HCL system will provide long-term cost savings on bulbs additional to the lower cost of maintenance labour.

## REFERENCES

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We have sales and customer service in each capital city of Australia, and an expanding global network of brands.

We are continually exploring insights and ideas that push the limits of what's possible, to create the standard for what's to come.

Pierlite now offers tunable troffers that can assist in achieving desired outcomes for HCL systems. Products such as PIERLITE GenLED can now be used in projects that require WELL standard certification.



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