



# GETTING IN RHYTHM

## Using lighting to manage anxiety & depression, promote healing in healthcare settings

By Lindsey Burghgraef & Lynn Drover

As the healthcare industry continues to shift focus from simply caring for the sick to a more holistic approach of total health management, and as mounting evidence surfaces that anxiety and depression are more prevalent in the general population, it's becoming increasingly critical for hospitals to find ways to reduce stress and anxiety throughout all areas of a facility. It is estimated that nearly 1 in 5 Americans in the general population have some form of mental illness or mood disorder, such as depression. In healthcare workers, that rate is even higher.

Evidence has shown that poor mental health can directly contribute to physical health problems as well and, in more extreme cases, increased risk of suicide. In addition, data has shown that patient recovery times are adversely affected by anxiety. What all of this means for the healthcare industry is that treating a person as a "whole", rather than a list of symptoms is critical to optimizing an individual's overall health. For facility managers and healthcare designers, it means striving to build care environments for patients and healthcare workers that positively impact mental health.

In the health sciences today, there is a growing understanding of the complex overarching and critical role circadian rhythm plays in mental and physical health. Circadian rhythm is defined as physical, mental and behavioral changes that follow a daily cycle, primarily in response to particular wavelengths of light and darkness in the environment.

The human eye's retinal signals go to the pineal gland, which, in turn, regulates many hormones in the endocrine system organs. When bodies are not synchronized with the natural daily light cycles, cognitive abilities become impaired and the body's melatonin, cortisol levels, and glucose metabolism are disrupted. This results in increased mood instability and anxiety, decreased empathy and increased stimulant/sedative use.

Interestingly, lighting is one of the more powerful tools that designers and engineers are utilizing to meet these challenges.

### LIGHTING IN PATIENT ENVIRONMENTS

Due to vulnerability, patients certainly suffer from disruption of circadian rhythm, and even in very immediate ways. Overnight patients without enough access to natural light cycles will have trouble sleeping. But circadian desynchronization also causes weakened immunity, higher pain levels, and increased anxiety and depression. Psychological stress and anxiety, in turn, can lead to slower recovery and wound healing, as well as more postoperative complications.

LED lighting technologies, which originated out of the desire for power savings, have rapidly evolved into powerful tools to improve health and well-being, and there are some even simpler lighting interventions available as well.

For example, constant clinical interruptions and the need for nurse observation make it difficult to maintain consistent appropriate



(L) Tunable white LED lighting is combined with other thoughtful features in this palliative care suite designed by Puchlik Design Associates (now a part of HED) for the Providence Holy Cross Medical Center in Mission Hills, California.

(R) This staff break room at a Henry Ford Allegiance Health facility was designed by HED as part of an addition project. The space gives staff their own private access to daylight and views.

darkness levels at night. Care must still be taken to screen the patient from light pollution of bright corridors and nighttime nurse visits. This calls for strategic placement and sizing of observation windows, as well as planning locations and color temperatures of task lighting used by night-time nurses so they will not disturb sleep. Light-blocking privacy curtains also provide additional protection.

Thankfully, daylight and exterior views are a code requirement for most patient rooms. However, labor and delivery, ICU and NICU patients may not always benefit from them due to clinical requirements that often require the patient to be positioned within the room with less than optimal views.

In these cases, tunable LED lighting can be programmed to simulate the 24-hour cyclical circadian color temperature shift. This can be implemented in patient rooms to help maintain the patient's natural sleep and wakeing cycles. Its value was recently demonstrated by a trial published by the National Center for Biotechnology Information, in which programmed illumination was shown to reduce levels of depression in cancer patients.

Finally, to the extent possible, a hospital can improve the patient's sense of control over the lighting in his or her environment, which has also been shown to reduce pain and anxiety. By providing remote-controlled window coverings, ambient and reading lighting options and even color temperature in accent locations, patients can optimize their personal environmental conditions.

### LIGHTING IN STAFF ENVIRONMENTS

The industry is undeniably faced with an epidemic of burnt-out workers. In addition to physical and psychological effects of circadian desynchronicity, cognitive abilities such as focus and attention become impaired, which can ultimately lead to medical errors. This struggle is often critically underestimated for night-shift workers who are forced to try to be awake during hours when

bodies naturally need regeneration and sleep. Daytime workers can suffer from this as well because typical hospitals are designed to prioritize natural light and views for patients, thus leaving staff in interior windowless spaces.

So, what can actually be done specifically for professionals in the healthcare industry?

First, provide real daylight wherever feasible for daytime workers. But for the night-shift teams, recent research has looked more closely at the timing and wavelengths of sunlight, and the effects on the human endocrine system. The challenge is maximizing mental alertness, minimizing stress and avoiding the other health problems associated with desynchronization. Some interesting developments include:

- It has been found that brightness is only one aspect of circadian lighting. The different trigger points in the body are sensitive to the quality and color temperature of the available light. A constant but relatively low illumination of the bluish light of daylight may keep night-shift nursing staff awake without unduly disturbing sleeping patients.
- While raising the correlated color temperature of work environment lighting will increase alertness, it may also make it harder for night-shift workers' bodies to re-synchronize. On the other hand, providing the clinic or nursing unit with a nearby break room with lighting, in the very short wavelength range approaching sunlight (5000-6500 degrees Kelvin), can provide staff with the multiple brief opportunities to "tune" their melatonin levels during their shift.
- Some of the worst effects of desynchronicity, many of which linger for days, may be lessened by developing rotating work schedules to separate nightshifts long enough for the worker to recover from their impacts.

It has long been understood that design considerations to protect physical safety of patient and staff are imperative, and now it is becoming increasingly clear that supporting emotional and mental well-being of both groups are equally important.

Following control of hospital-acquired infection, circadian rhythm synchronicity may well be the greatest single environmental contributor to better outcomes. Given today's growing data and the lighting tools at the industry's command, there is no reason to wait for effective Evidence-Based lighting design interventions in the care environment.



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