

Minimizing disruption, maximizing sleep in the hospital

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Credit: University of Pennsylvania

If you have ever been to a hospital, either as a patient or a caregiver, you know how hard it can be to get a good night's sleep. The beeps, chatter, code alarms, and clatter that go along with hospital care can be omnipresent, even after sundown.

While the various alarms and check-ins are a part of the necessary patient care when staying overnight at a hospital, health systems are aware of the burdens such noise can cause. Today, top hospitals are tirelessly trying to find unique ways to combat disruptions and improve sleep.

Sleeping for a healthy body, healthy mind

Sleep is important for everyone, but it is especially important for a patient's recovery process.

"Sleep and [circadian rhythms](#) likely serve many different, yet vital functions. From helping to regulate inflammation to growing new cells important for recovery to rest for the nervous system. It's not just the brain, but cells everywhere in your body may benefit from sleep," explains

Sigrid Veasey, MD, a professor of Sleep Medicine in the Perelman School of Medicine at the University of Pennsylvania.

Every patient in a hospital has a body working to heal itself. They have cells responding to illness, surgery, or chemotherapy. And that healing process requires the perfect balance of inflammatory responses and release of growth hormones to make new cells for healing.

"Growth hormones are released during sleep to generate new cells in the body from your skin to your intestines and muscles. About 90 percent of growth hormones are released when you are sleeping. It's why sleep is so much more important for someone in a hospital who is healing," Veasey says.

Sleep also plays a vital role in managing inflammation to fight infections. Bodies use inflammation to fight off infections or processes that aren't supposed to be there. On the flip side, bodies can also become over-reactive with inflammation and infections, such as with arthritis. Sleep helps to balance out the good from the bad inflammation.

Of course, sleep also serves as a time for rest. "Sleep lowers adrenaline levels. For example, it helps lower blood pressure and allows the heart to rest—something which can be incredibly important for anyone with cardiovascular problems," Veasey explains.

Sleep also can impact mental health conditions; as mental health is equally exacerbated by sleep disorders. Mood, mania, and other factors can be impacted by sleep loss. "A healthy body and healthy mind requires healthy sleep!" Veasey says.

With interrupted or limited sleep, a body might have trouble fully healing, which could lead to potential longer stays in a hospital, negative patient experiences, and poor health outcomes.

A new hospital, built for sleep

At Penn Medicine, the development of the Pavilion at the Hospital of the University of Pennsylvania (HUP) created a unique opportunity to take on the challenge of sleep disruption in hospitals.

"Every single design choice for the Pavilion was made with the patient in mind," says Kathryn Gallagher, MS, BSN, who spent most of her 35 years at Penn Medicine as a surgical critical care nurse and nurse manager, before becoming a clinical liaison helping to plan the design and transition to the new building. "When it comes to the patient experience, we know that being able to get enough rest is incredibly important. Noise reduction, especially at night, and patient comfort are paramount in the Pavilion's design."

In addition to sourcing ideas from the PennFIRST design and construction management team—including the global healthcare design expertise of HDR—the Pavilion team spoke with Penn physicians, nurses, quality experts, and patients to try to make the patient spaces as comfortable as possible.

"We took feedback from simulations, design expertise, patients, and more to build around decreasing patient challenges, including sleep issues. It's all about minimizing noise, increasing comfort, providing natural light, and a quiet environment to reduce disruptions, and promote sleep" Gallagher shares.

Inspiration from the Magic Kingdom

One of the biggest design elements contributing to improved sleep for patients comes from the design plan for each patient floor—each patient floor is designed with an "on-stage/off-stage" concept. Patient rooms are located around the facility's perimeter while medication rooms, supply rooms, and staff spaces are located at the core of each floor, which reduces cart traffic, noise and interruptions to a minimum near the [patient rooms](#).

"The on-stage and off-stage design was actually inspired by Disney theme parks, as their staff spaces are out of sight to maximize the visitor

experience. With this approach at the Pavilion, we'll be able to keep hallways and patient care areas as quiet and clutter-free as possible. For example, limiting the traffic such as delivery of supplies and trash, and providing decentralized staff documentation spaces will help decrease noise and distractions near the patient's rooms," Gallagher explains.



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Limiting noise, increasing infection control

In addition, design choices were made to limit disruptions from staff in patient rooms themselves—which now, in light of the ongoing COVID-19 pandemic, has extra benefits for infection control.

Workstations outside of rooms and monitoring windows into each patient room will allow nurses to observe their patients without having to constantly walk in to check on a patient if they are resting.

Another sleep-friendly feature called the patient server decreases patient room foot traffic, and potential noise disruptions, through a pass cabinet. These floor-to-ceiling pass-through cabinets will house clinical supplies and medications for patients and they can be loaded from the hallway, without having to interrupt patients.

Patient-first design

Not only do all patient care areas use noise-reducing materials, such as ceiling tiles that help

with sound absorption, but each patient room has technology which allows them to personalize their room based on their own needs.

"We tried to design the patient room with hospitality features used in hotels. Patients can personalize elements of their room for their own comfort—from controls to window shades, to decrease or limit outside light, to the ability to change the room temperature, or obtain privacy through switchable glass, Gallagher explains. Patients can also use their room's 75-inch smart screen on the wall opposite the bed to provide relaxation music or visuals.

The ability to change the temperature in patient rooms is a big game changer, says Veasey, as patients can optimize temperatures based on their preferences for sleep.

"There are sleep activated cells in your brain that are temperature sensitive, and these are different for everyone. Some are activated by cold but others by warmer temperatures," Veasey says. "By providing patients the ability to find what temperature works for them, it can make an enormous difference for sleep quality."

For example, patients with sleep apnea tend to generate a lot of heat, and the ability to select cooler temperatures might help them improve their sleep while at the hospital.

Lighting innovations

Patients will also have the ability to control lighting in their own room, at the bedside, for different areas throughout the space.

Each patient room has multiple zones for lighting, which allows for more personalization, and the ability to limit the lights which need to be turned on for care, decreasing the chance of waking any sleeping patient. Each zone has separate lighting features based on different needs for staff, patients, and family members who might be visiting.

"If a nurse wants to come in at night to check on a patient, they can turn a task light on to quickly check vital signs, without having to turn on all the

lights in the room," Gallagher shares. "Or if a family member is staying with a patient, there are light options to make their visit more comfortable, so they can read or do work while a patient is sleeping, without light interrupting the patient's rest."

Access to natural light through the large windows in each room also has benefits for sleep, as [natural light](#) helps regulate patients' circadian rhythms—the biological process that helps calm down a body for sleep and tells a body when to wake up in the morning.

"The goal for any patient is to have optimized sleep and an optimized circadian rhythm. Your circadian rhythm plays a role in the healing process as it helps you consolidate your sleep, and it helps you get the best sleep you possibly can while you sleep," Veasey explains.

On the other hand, some patients might need darker rooms to nap during the day, and patient controls for lighting and shades can help them keep the room darker for optimized rest. For instance, patients with pulmonary problems typically have a hard time sleeping throughout the night, and may need to take naps during the daytime. Or patients traveling from other time zones can try to stay or gradually move over to the Eastern Time Zone in Philadelphia, with the help of the personalized lighting options in each room.

"I think patients and families will love the patient rooms and how we've designed with their care, and sleep, in mind," Gallagher says. "We personalize medicine and care for patients, so why wouldn't we provide patients with the ability to personalize their room? We think about each patient room as someone's bedroom or personal space while they are with us for care, and this only helps them become more comfortable as they try to heal."

Provided by University of Pennsylvania

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