

## Healthcare facilities with biophilic design

Kho Teck Puat Hospital and the JurongHealth Campus of Ng Teng Fong General Hospital and Jurong Community Hospital are premised on the idea that designing an environment which connects people to nature can enhance their health and well-being. With biophilic design, the hospitals enable direct contact with nature, have materials and colours representative of nature, as well as spacial features characteristic of the natural environment.



	Kho Teck Puat Hospital	Ng Teng Fong General Hospital and Jurong Community Hospital
Opened in	June 2010	June 2015
Capacity	590-bed	700-bed NTFGH and 400-bed JCH
Cost	\$700 million	\$1 billion
Green area	10,197 sq m	22,600 sq m
Energy savings	33% less energy used than in conventional hospitals	<ul style="list-style-type: none"> <li>• 30% less energy used than in conventional hospitals.</li> <li>• More than \$5 million savings in electricity bills annually (enough to supply 4,448 HDB 5-room flats for 1 year)</li> <li>• Nearly \$100,000 in water savings annually (enough to fill 27 Olympic-sized swimming pools)</li> </ul>



The 953 sq m JurongHealth Mobility Park is an outdoor rehabilitative space which simulates real-life street environments such as pedestrian crossings, walkways with different surfaces, ramps, steps and roadside curbs. The park also includes a sensory garden with herbs and plants – at the height of wheelchair users – to heighten patients' sense of touch, feel and smell.



A waterfall in the central garden courtyard of Kho Teck Puat Hospital.



Planter boxes outside the wards in Kho Teck Puat Hospital.



A bird on a bird-fishing perch in Yishun Pond, adjacent to Kho Teck Puat Hospital.



The healing garden that links the Ng Teng Fong General Hospital Intensive Care/High Dependency Unit with Jurong Community Hospital. Stabilised ICU patients can be wheeled out to enjoy fresh air and greenery.



Planters outside the wards at Jurong Community Hospital.

PHOTOS: NG SOR LUAN, DIOS VINCOY JR STRAITS TIMES GRAPHICS

# Hospitals that seek to heal with nature

### Designs incorporating greenery linked to better mental and physical well-being

Felicia Choo

Bring up her stay at Kho Teck Puat Hospital (KTPH) and one of the first things that former patient Chong Lih Yin remembers is the verdant grounds.

"I felt so relaxed," said the business administrator, 49, who was hospitalised last month for hives. "You don't see such greenery at other hospitals."

The 590-bed general and acute care hospital, which opened in June 2010, stands out for its access to both greenery and water features.

A waterfall that cascades into a central garden courtyard, rooftop gardens and planter boxes along corridors and outside wards provide patients with green views, and the hospital grounds even open out into Yishun Pond.

The hospitals public areas are

also naturally ventilated by louvres on the facade which channel wind throughout the interior while blocking out direct sunlight.

Its biophilic design, which incorporates nature and its representations to improve people's health and well-being, won KTPH the inaugural Stephen R. Kellert Biophilic Design Award last month.

Biophilic design is based on the idea that humans have an inherent need to connect with nature, even in modern settings, and this connection improves their mental and physical well-being.

KTPH, Ng Teng Fong General Hospital (NTFGH) and Jurong Community Hospital are the only hospitals here considered to have an extensive biophilic design, said Professor Lam Khee Poh, dean of the National University of Singapore's School of Design and Environment.

While research has linked green

buildings to positive effects on people's health, more studies are needed to determine the link between biophilic design and patient recovery in healthcare settings, said Prof Lam. But these studies are limited as few hospitals worldwide have such designs, he added.

An often cited research work in the context of healthcare is a 1984 study of patients who had undergone gall bladder surgery in a Pennsylvania hospital in the United States. It found that those who had a window view of trees stayed for a shorter time in the hospital, had less negative observations about their condition noted by nurses, and took fewer strong doses of painkillers than patients whose windows faced a brick wall.

"The general feedback of people who have been engaged in these kinds of buildings and spaces has been very positive, (but) we need to do that in a much more scientific and systematic way," said Prof Lam.

At NTFGH and Jurong Community Hospital, the idea of creating a healthy and healing environment

for patients drove the design process, said Mr Foo Hee Jug, chief executive officer of NTFGH.

Built in June 2015, the hospitals have won several awards for design and environmental sustainability, including the American Institute of Architects Committee on the Environment Top Ten Awards last year.

The hospitals' fan-shaped wards with windows for each patient increase ventilation, with planters providing a green view. There are also 15 gardens, including one for intensive-care unit patients, and ward towers are orientated to optimise day lighting while reducing glare.

Staff are not left out either – a light well provides natural lighting at a relaxation area for backend staff who work in the basement.

Yet, challenges to adopting biophilic design remain, not least as many healthcare institutions are still largely conceptualised as sterile environments, and there are concerns about increased maintenance cost. An increase in pests like insects and the amount of dead leaves, which can clog up drains,

are examples of the problems that some hospitals would rather avoid, said KTPH director of hospital planning Donald Wai.

KTPH sprays neem oil, an organic substance which is not toxic, on the plants so as to deter pests. Mr Wai said: "I feel that the management of each healthcare facility needs to embrace this green philosophy."

"The biophilic environment is not just meant to allow patients to walk about, feel relaxed and to recuperate, but also to make our staff feel that they are in a very calm and relaxing environment."

Prof Lam thinks there is a good chance that biophilic design can have a lasting impact on health.

"To me, it's not so much the cost but what value are you getting out of it. If you invest well, you're going to get the returns many, many Times over."

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