

MEDIA RELEASE
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USING EMERGING TECHNOLOGY TO ADDRESS CLIMATE CHANGE:

Implementing the Hybrid Ventilation System at Ren Ci Hospital

Ren Ci Hospital is excited to share that we have implemented a hybrid ventilation system as part of the extensive renovation of its Community Hospital. We are the first healthcare organisation in Singapore to implement this system. It demonstrates our commitment to use Emerging Technologies to help fulfil our mission of providing inclusive healthcare for quality and meaningful living, manage recovery of patients in an environment of increasing temperatures, while also minimising electricity consumption. The hybrid ventilation system is expected to save 50-60% in electricity as compared to running a traditional air condition system to maintain consistent ambient temperature over the same period.

Challenges from Climate Change

The average temperatures in Singapore have been rising steadily over the years, with the highest daily temperatures ranging between 35°C and 36.2°C in May this year. With climate change, we might see more days with such temperatures.

The typical profile of patients at our Community Hospital are elderly with co-morbidities such as dementia. A significant percentage require the use of walking aides and wheelchairs, and some are even bed-bound. As such, most of our patients spend many hours in bed. Being elderly, their skin is more fragile. When the temperature is too high and sweat is trapped between the bed and their skin, they require more frequent turning to prevent skin break down and to prevent bed sores. High levels of humidity may also affect their skin and prolong their recovery and hospitalisation stays.

Our clinical staff are affected as well. They need to don Personal Protection Equipment (PPE) when there is risk of exposure to bodily fluids during routine care. Should there be an infectious disease outbreak, they may even have to don enhanced PPE in the ward. During hot days, this can be unbearable, affecting their effectiveness in delivering care.

Yet, traditional air condition is not the answer. For one, electricity consumption will rise greatly if we switch over to traditional air condition. For another, the elderly often find the air conditioned climate too cold and dry.

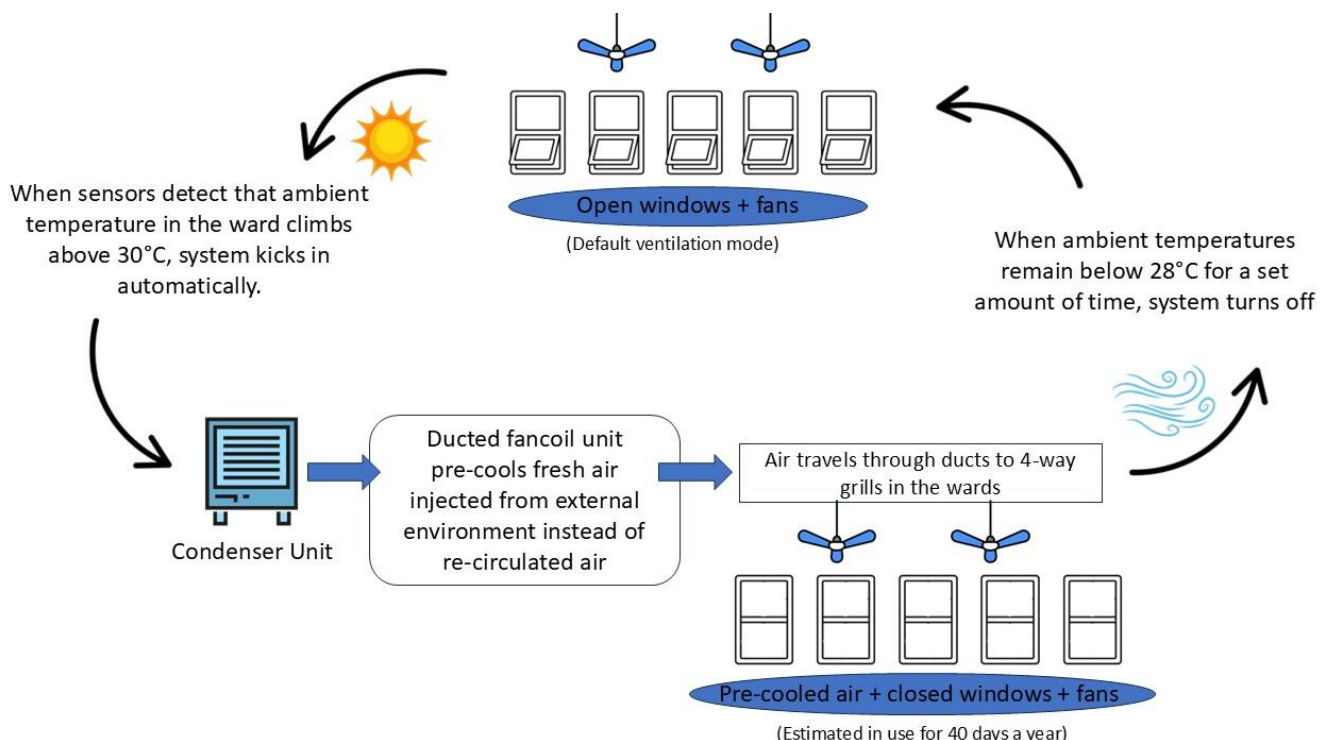
Using Technology to Deliver Best Care

Continuing its strategy of adopting technologies to improve its services to its beneficiaries, Ren Ci decided to take advantage of recent technological advances to implement an Internet of Things (IoT) solution. IoT

is a network of devices, such as sensors and actuators, that are connected together intelligently to exchange data and perform tasks, often without human intervention.

Our Hybrid Ventilation System (HVS) is a good example of an IoT solution. Sensors in our wards monitor temperature and humidity. When the temperature gets too high – which we estimate will happen in about 40 days in a year – the sensor will send signals to interconnected actuators through our edge servers. One set of actuators are attached to the open windows, which will be closed. The other set of actuators will turn on the Outdoor Air Processing Units (OAPU) to pre-cool external air, distribute the cool air evenly throughout the ward, and supplements the air flow with ceiling fans. Together, the temperature in the ward will come down to a more comfortable level.

This intelligent IoT solution combines natural ventilation for most of the time with mechanical ventilation for the hottest days in one system. It has several advantages. First, it makes the environment much more comfortable for the patients by providing a consistent cool temperature. Second, the automated nature of the system requires minimal human intervention to manage, which frees up the staff's attention and time to delivering the best care for the patients. Finally, compared to a full air condition system, the system uses 50-60% less electricity and is a more environmentally sustainable method. The last is yet another element of Ren Ci's sustainability efforts, that also include the installation of solar panels and installation of solar films on the windows that minimise heat and harmful UV rays.



The HVS is not the only technology solution that Ren Ci has implemented. In recent years, we have made good use of Emerging Technology solutions to meet some of the challenges we face in caring for our beneficiaries. Other examples include:

- A smart Geofencing System (SGS), which uses RFID technology to keep residents safe
- Autonomous Mobile Robots (AMRs) to transport heavy loads and free up our staff from some menial tasks such as delivering laundry
- A CARES4WOUNDS artificial intelligence assisted software with 3D image capturing capability helps measure, record, track progress and provide treatment guidance for wounds
- An exoskeleton that assists with gait training for patients with neurological conditions and reduces the therapist manpower required during each rehabilitation session

Positive Reaction to the System

Ultimately, the success of this system is measured by the satisfaction of those who benefit most from it, i.e. our staff and patients. The first fully renovated level has already turned operational on 24 July 2025. Some of our staff and patients have experienced it.

Senior Staff Nurse Pedro Liana Lyn Delos Santos finds the renovated space much more conducive to providing care for the patients.

“The new ventilation system has made a noticeable difference in our daily routines. The temperature in the ward is much more stable and comfortable, especially during the hotter parts of the day or when we have to don personal protective equipment (PPE). It’s reassuring to know that the system adjusts automatically, so we don’t have to worry about switching it on or off. More importantly, the improved airflow and layout help us maintain better infection control, which gives both staff and patients greater peace of mind.”

Other Elements of Ren Ci Community Hospital’s Renovation

Ren Ci Hospital started its design journey for the renovation of the community hospital wards in August 2022 using evidence-based and design thinking approaches to address the following issues:

- Excessive Heat & inadequate ventilation
- Inconducive ward environment
- Insufficient spaces for therapy and psychosocial programmes & activities
- Insufficient conducive staff work areas
- No proper segregation of operational flows during outbreaks of diseases

With Singapore set to become a super aged society, we are seeing more and more elderly patients with dementia. The renovation ensured that more dementia-friendly features were incorporated into the ward environment. We enlarged windows by relocating the toilets, providing an increase in natural lighting that helps our elderly patients improve their circadian rhythm, leading to more restful sleep and improved mental wellbeing. Colours were selected to ensure greater contrast to aid seniors visually.

The new low partitions in ward areas and glass vision panels for isolation rooms and staff counters, also improves line of sight for our care staff, allowing them to attend to patients more promptly.

Additional space has also been carved out for the activity area, making it more conducive for our Rehabilitation and Psychosocial Services staff to conduct activities. Work areas have also increased, enabling our staff to work in greater comfort.

In addition to tackling current challenges, the renovation also aims to future-proof the wards.

“This is a meaningful project,” shared Ms Karen Bek, Chief Operating Officer. “Not only did we improve the work environment for our staff, we also wanted to create a more conducive and comfortable environment for our patients to facilitate their rehabilitation. We ensured that each wing of the ward is self-sufficient, with its own activity area and staff pantry. We added a flexible living space in each wing, which can be converted to a ward bed should we need to expand capacity in the future. Each cubicle in the ward can now also operate as an independent unit and isolated from other cubicles should there be outbreaks of diseases, allowing for care to continue as usual in the non-affected cubicles.”

The design of the wards was awarded the Silver Touchstone Award, by the US-based Center for Health Design.

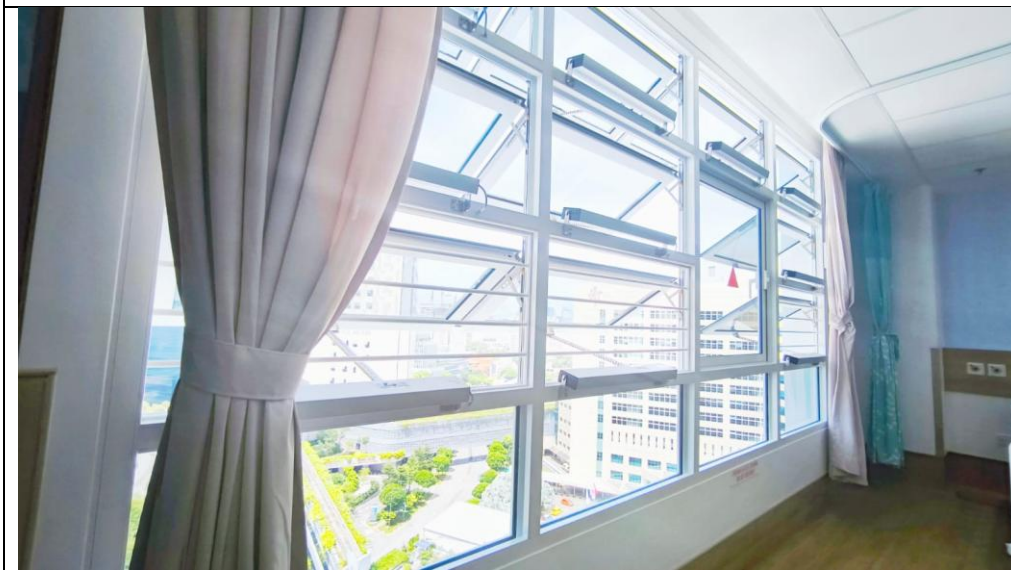
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Representatives from Ren Ci Hospital are available for interview.

Annex 1 – Photographs



Each cubicle can operate as an independent unit should there be an outbreak.



Windows fitted with actuators that can automatically open and shut.



New flexible activity area.

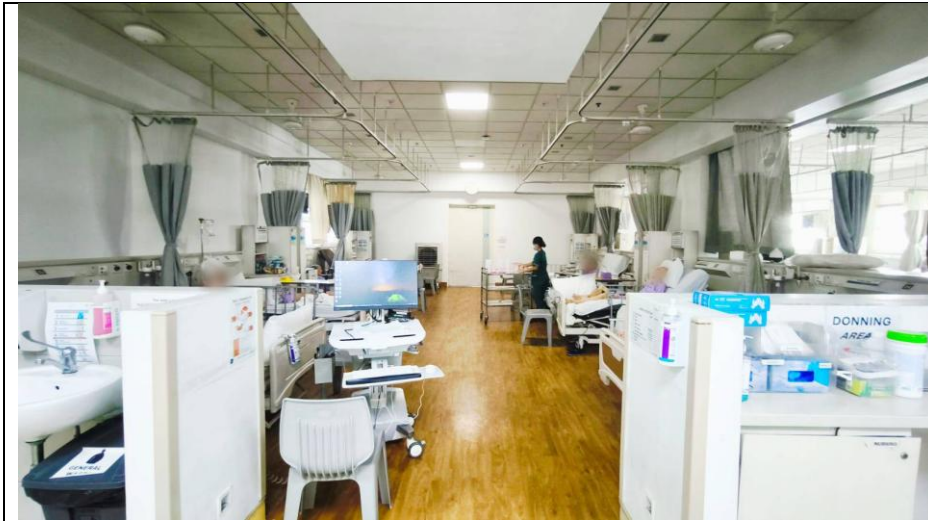


Multiple ducts ensure a more consistent temperature in the ward, compared to spot cooling.



Patient in the newly renovated ward.

Photograph included with consent



Pre-renovation ward
for comparison.

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About Ren Ci Hospital

Established since 1994, Ren Ci Hospital is one of the few charity healthcare institutions in Singapore to provide high quality and affordable medical, nursing and rehabilitative care services for the community, based on the principles of loving kindness and compassion. Ren Ci plays an integral role in supporting the healthcare needs of the elderly through adopting a holistic way of delivering person-centred care.

Today Ren Ci Hospital runs a community hospital, a chronic sick unit, three nursing homes, four Senior Care Centres and one Active Ageing Centre (Care). These facilities are spread throughout Singapore, at Ang Mo Kio, Bukit Batok, Novena and Woodlands. Ren Ci also operates a Learning Academy to upskill the community's capabilities to better care for the elderly.