

SCIENCE

Going beyond patient care

Since 2013, nurses at Tan Tock Seng Hospital have been growing a culture of innovation to design and optimise products that can improve the lives of those under their charge. [Shabana Begum](#) highlights three recent innovations by the nurses.



Senior nurse manager Loh Sok Hiang with a pair of Silver Generation Footwear, which is designed to be light and quick-drying, and comes with anti-slip features. Since late 2019, when the footwear was rolled out, over 900 inpatients and outpatients have bought it. ST PHOTO: NG SOR LUAN

Getting a grip on falls among the elderly

Senior nurse manager Loh Sok Hiang and a group of nurses felt compelled to design suitable, sandal-like footwear after coming across cases of frail elderly patients suffering falls in the wards and bathrooms, largely because they were not wearing proper shoes or sandals.

The footwear they came up with is white, with a reflective strap, so that patients can easily spot them in the dark.

More importantly, the sandal-like footwear is designed to be light, with anti-slip features, as well as quick-drying.

Ms Loh, 44, said that some of the elderly patients were victims of road accidents, and were barefoot when they were admitted to Tan Tock Seng Hospital (TTSH).

While some nurses, over the years, have taken the initiative to

buy proper shoes for their patients, Ms Loh felt more could be done.

Work on the Silver Generation Footwear started in 2016 and, over three years, the nurses worked with a physiotherapist, an occupational therapist and a manufacturing vendor to zero in on the final design.

A critical feature of the footwear is the anti-slip base. "This is very important for the elderly because a main trigger of their fall was that their shoes had soles with little grip," Ms Loh said.

Patients can buy the footwear for \$14.98 from the hospital's pharmacy.

Since late 2019, when the footwear was rolled out, over 900 inpatients and outpatients have bought it.

On top of using the footwear in the wards and bathrooms, some pa-

ANTI-SLIP BASE FOR FOOTWEAR KEY

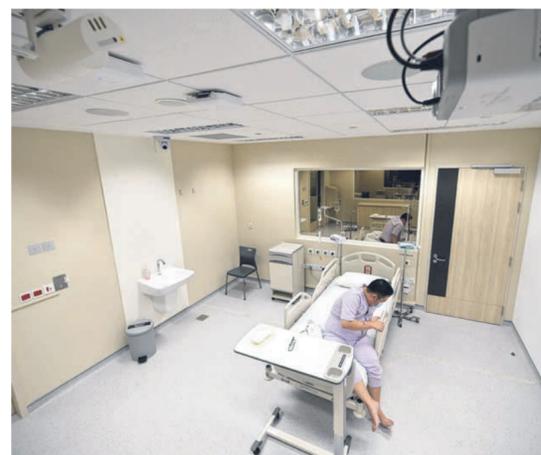
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SENIOR NURSE MANAGER LOH SOK HIANG, on how the footwear helps frail elderly patients who were suffering falls in the wards and bathrooms.

tients use it during their rehabilitation sessions too. So far, no falls have been attributed to the Silver Generation Footwear, said Ms Loh.

nshab@sph.com.sg



As a patient leaves the bed, thermal cameras installed in the patient's room will send an alarm to the nurses' station. There are plans to deploy the system in all single-bed and isolation rooms at TTSH by the year end. ST PHOTO: NG SOR LUAN

AI 'guardians' alert nurses to patients who may be in trouble

Nurses are trialling a bedside alarm system that allows them to respond to patients more quickly by picking up abnormal beeps from medical equipment.

The artificial intelligence (AI) technology can be trained to recognise sounds that could indicate when machines such as non-invasive ventilators are malfunctioning.

It could prevent a situation where a nurse attending to a patient in an isolation room is unaware of a problem with a patient in another room.

The Bedside Alarm Recognition system is being tested in single-bed rooms of various wards at Tan Tock Seng Hospital (TTSH).

It will set off an alarm outside the room if, for example, it hears a beep from an infusion pump that indicates the drugs being administered to the patient are not flowing into the body properly.

The technology picks up only machine sounds, so patients' privacy is not compromised.

It was designed and developed by the hospital's nursing division

and a technology partner.

It is not the only AI-powered device that watches over patients at the hospital.

Thermal cameras installed in the patient's room will send an alarm to the nurses' station when the patient is about to get out of bed.

This can prevent patients from falling because the nurses will reach them before they leave the bed, said Ms Wendy Leong, 41, senior nurse manager at TTSH.

Other common fall prevention tools such as weight-sensing mats on mattresses will be triggered only when patients are out of bed, she noted.

The system, called PreSAGE, was "trained" with more than 11,600 hours of thermal camera data from 80 patients at high risk of falling.

PreSAGE is being used at a ward with 15 single-bed rooms at the hospital. There are plans to deploy the system in all the single-bed and isolation rooms – comprising a total of more than 100 beds – by the end of the year.

Shabana Begum

Recovery from rare tumour gives dad of 3 new lease of life

Jean Iau

The father of three was counting down the days till he could have his stoma bag removed so he could cycle with his young children or take them travelling.

But those plans had to be put on hold after Mr Alvin Pang, 50, found out that his colon cancer had spread to his peritoneum in September 2019.

Devastated by the diagnosis and confused by the anatomical word, the construction engineer told The Straits Times that it was worse than finding out about his cancer initially.

"I didn't know how to move forward. But after some time thinking, I got a grip on myself and started moving forward," said Mr Pang.

It was explained to him that the peritoneum is a thin membrane that lines the abdominal and pelvic cavities. It contains and supports most of the abdominal organs except for some organs, such as the

kidneys and adrenal glands.

Tumours on the peritoneal surface may arise from the lining itself or may have spread from other abdominal organs such as the spleen, intestines, stomach, liver, uterus, ovaries, rectum and bladder.

Mr Pang was referred to the Department of Sarcoma, Peritoneal and Rare Tumours (SPRinT) at the National Cancer Centre Singapore and Singapore General Hospital.

The department was set up in 2019 to offer a one-stop service for patients with sarcomas, peritoneal disease, gastrointestinal and advanced intra-abdominal malignancies, as well as skin cancers, among other rare tumours. It sees more than 700 new cases and performs about 400 operations a year.

Previously regarded as fatal, these tumours can now be treated with treatments including cytoreductive surgery and hyperthermic intraperitoneal chemotherapy.

Head of SPRinT and senior consultant Claramae Chia said: "Diagnosis of sarcoma, peritoneal and rare tumour cases can be challenging as symptoms may be vague and



Construction engineer Alvin Pang was devastated when he found out that his colon cancer had spread to his peritoneum in September 2019. ST PHOTO: GIN TAY

non-specific, and this can lead to delays in treatment or even the wrong treatment."

Associate Professor Chia added: "For example, retro-peritoneal

sarcomas may be completely asymptomatic until they grow to a significant size and, even then, the patient may just feel bloated or that he is putting on weight...

Hence, getting the initial diagnosis is essential."

The diagnosis of a peritoneal tumour for Mrs Trisha Jeanne Pineda came as a shock.

The 35-year-old went to the emergency department at Khoo Teck Puat Hospital when the pain from what she initially thought was menstrual cramps became unbearable. A scan found that her appendix had burst.

After she was treated and discharged, her biopsy results showed she had a rare disease, called pseudomyxoma peritonei, which generally refers to peritoneal tumours that are frequently associated with appendiceal tumours. It was a low-grade tumour and non-cancerous.

Prof Chia, who was Mrs Pineda's doctor, explained to her that during treatment, doctors might have to remove her ovaries if the tumour had spread there.

Pineda was especially difficult for Mrs Pineda to accept as she and her husband, both from the Philippines, had been trying to have children for years.

"When she told us that, I wanted to cry but I was trying to control (myself), because we had been trying to get pregnant and then suddenly we hear about this," said Mrs Pineda, a pharmacy technician.

She then underwent in-vitro fertilisation (IVF) to freeze her eggs before undergoing surgery to remove the tumour in March last year.

Doctors were able to preserve her ovaries during her surgery. Mrs Pineda completed her IVF treat-

ment and is expecting her first child next month.

"I didn't have any knowledge of this kind of tumour. What we are familiar with are only the normal types of cancers," said Mrs Pineda, who hopes that sharing her story will give members of the public an idea of such rare tumours and encourage them to see a doctor if they experience pain.

Mr Pang recalled: "The most dramatic thing was learning that I had to go through another six months and another cycle of chemo – that really had a big impact on me."

During his second cycle of chemotherapy, which was intravenous, he suffered side effects such as cracking skin, sensitivity in his hands and hair loss.

Following chemotherapy and surgery in October last year, doctors finally told Mr Pang there was no sign of cancer.

"After hearing the words, the world seemed so beautiful," he said, adding that he cried when he was given the good news.

He was finally able to go cycling with his children, who are aged between eight and 11.

He said he now sleeps early and exercises regularly.

"Cancer is really no joke, it's very tough. It doesn't just affect me – it affects the family also, because I couldn't do a lot of things with them..."

"I've started to see the world in a different light. Now everything makes me very happy."

jeaniau@sph.com.sg