Care beyond childbirth: A life-long approach to gestational diabetes

NUH's new postpartum service brings obstetrics, endocrinology and community care together to help mothers manage gestational diabetes and reduce their lifelong risk of type 2 diabetes.

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One in six pregnancies is affected by gestational diabetes mellitus (GDM) — a condition that temporarily raises blood sugar during pregnancy but can cast a long shadow over a woman's health. The rate is higher in Singapore, with one in five expectant mothers developing the condition. What many don't know is that GDM significantly increases the risk of developing type 2 diabetes later in life, with half of affected women developing it within a decade.

To help women safeguard their health beyond pregnancy, the National University Hospital (NUH) has launched a dedicated postpartum gestational diabetes service — a holistic, multidisciplinary programme that follows them from diagnosis through the postpartum years. It brings together specialists from obstetrics, endocrinology and dietetics with close coordination between hospital and community care. Its goal is to close a critical gap in women's health by tackling GDM and preventing diabetes before it develops.

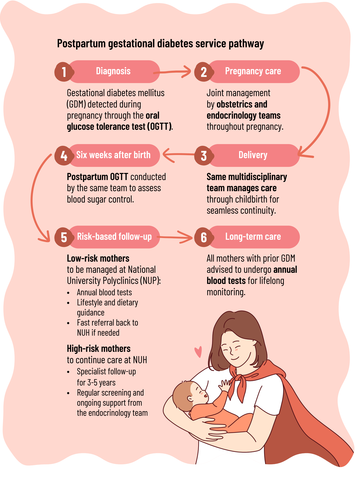
The hidden risk after pregnancy

Women who develop gestational diabetes face a stark reality: their lifetime risk of type 2 diabetes increases by up to 70 per cent, with the danger peaking three to six years after childbirth. Despite these alarming statistics, most of them in Singapore see their care taper off after the standard six-week post-delivery glucose test, leaving early warning signs of poor blood sugar control undetected.

"GDM doesn't end at delivery," explains Dr Eng Pei Chia, Consultant, Division of Endocrinology, Department of Medicine, NUH, who leads the postpartum service. "Although many women with GDM are relatively young, their long-term risks are real. Women with GDM face increased lifetime risks of diabetes, heart disease and fatty liver."

A new model of continuous care

Since October 2023, NUH's new postpartum service has supported nearly 400 mothers through a comprehensive and coordinated pathway.



Supporting mothers beyond delivery

Through the new service, every mother with gestational diabetes receives continued support that extends beyond the delivery room. An experienced team of endocrinologists, obstetricians and dietitians will work closely with each mother to restore their metabolic health and confidence to manage long-term wellness. The care goes beyond routine check-ups and monitoring. They receive practical, personalised guidance on diet, exercise and sustainable lifestyle habits that lower their future diabetes risk.

For 40-year-old Mdm Cheryl Goh, being diagnosed with GDM during her second pregnancy came as a shock.

"I was in total disbelief. I even went back to retake my oral glucose tolerance test because I just couldn't imagine I would have gestational diabetes, especially when I didn't have it for my first pregnancy," she recalls.

With the support of her healthcare team, Mdm Goh learned to include more slow-release carbohydrates into her meals, reduced refined sugar and incorporated light exercise such as brisk walking and weight training despite the challenges that came with motherhood. "The hardest part was staying consistent with two young children. Having a supportive healthcare team checking in and explaining my condition made it easier and less overwhelming," she says.

Such follow-up proves essential, as about 40 per cent of mothers in the NUH programme continue to experience poor blood sugar control after delivery. Regular monitoring helps identify those at higher risk early and keeps them engaged in long-term care.

Protecting health across generations

The service's impact extends beyond individual mothers. Adjunct Associate Professor Khoo Chin Meng, Head and Senior Consultant, Division of Endocrinology, Department of Medicine, NUH, emphasises the broader benefits: "By supporting women to make sustainable lifestyle changes through personalised routines, diet and exercise, we can help them maintain good health and stay diabetes-free for as long as possible. This isn't just about the mothers, but also about protecting their families and future generations."

"With global rates of GDM rising by more than 30 per cent in the past two decades, it is important that we prioritise women's health after birth," adds Dr Eng. "When we provide sustained postpartum care for mothers, their children benefit too — through healthier homes and a reduced risk of diabetes across generations."

NUH's Appropriate Care programme enhances patient-centred care

Through the programme, clinicians streamline care delivery to prioritise and improve the comfort, safety and outcomes for patients.

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At the National University Hospital (NUH), patient-centred care is being re-examined with fresh lens. Doctors and nurses are asking a simple question: *Does every test, procedure or prescription truly benefit the patient?*

From fewer blood glucose finger pricks to a gentler approach to end-of-life care, to deprescribing medications which do not add benefit to patients' health, NUH is rethinking long-established routines to focus on what genuinely improves health, comfort and dignity. It is resulting in a shift that is changing our culture of care, one conversation, and one patient at a time.

This philosophy underpins NUH's Appropriate Care (Apt Care) programme, part of a wider, national value-based care movement: Appropriate and Value-Based Care (AVBC). It aims to deliver evidence-based, patient-centred care that maximises health outcomes while using healthcare resources sustainably.

Smarter glucose testing

When 48-year-old Mr Noor was admitted to NUH for a heart stent procedure, he anticipated the usual routine: four daily finger pricks to check his blood sugar. But after his condition stabilised, nurses reviewed his readings and reduced testing to twice daily.

It was a small change that made a big difference — less discomfort, better rest and lower costs.

The adjustment exemplifies NUH's new workflow for inpatient blood glucose monitoring, a key initiative under the Apt Care programme. Led by Dr Ada Teo, Associate Consultant, Division of Endocrinology, Department of Medicine, NUH, the team introduced clear criteria to guide nurses in safely reducing tests for clinically stable patients.

> *"This initiative is a true win-win," says Dr Teo. "By focusing on the right frequency of glucose testing, we can still rely on meaningful data to make informed assessments for our patients' care plans. Patients who participated reported an improved treatment experience, as it reduced discomfort, pain, and their out-of-pocket costs."*

Over just three months, 87 patients had their average daily glucose checks halved from four to two, without any increase in the rates of hypoglycaemia or hyperglycaemia.

The initiative also empowered nurses to take a more active role in decision-making. A survey found that 85 per cent of nurses involved felt confident implementing the new workflow, and 87 per cent said they felt empowered to reduce unnecessary testing.

> *"Introducing a clear, evidence-based workflow helps to minimise unnecessary monitoring, allowing for a more appropriate distribution of resources to facilitate patient-centred care," Dr Teo adds.*

Improving end-of-life care

For patients nearing the end of life, more treatment does not always equate to better care. Doctors, nurses, and pharmacists at NUH are working together to help terminally ill cancer patients live their final days with less discomfort and greater dignity.

Also under the Apt Care programme, NUH and the National University Cancer Institute, Singapore (NCIS) introduced an end-of-life care pathway that focuses on reducing unnecessary medication and procedures. Each plan is tailored to what matters most to the patient — comfort and quality of life.

Since its launch in October 2024, 108 patients have taken part in the programme. On average, each patient received three fewer oral medications, underwent fewer routine vital-sign checks, and was spared dozens of finger-prick blood glucose tests. Many also needed fewer outpatient appointments, easing the burden of travel, and treatment costs.

> *"Patients have reported less pain and discomfort as a result of cutting down on non-essential procedures," says Adjunct Associate Professor Samuel Ow, Senior Consultant, Department of Haematology-Oncology, NCIS, who leads the project. "By limiting consultations to only key ones, patients gain more time to spend meaningfully with their loved ones."*
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> *The benefits have extended to staff as well. Streamlining procedures freed up time for clinical teams to focus on patients' most pressing needs. "Our nurses have reported greater job satisfaction from being empowered to customise care plans that truly prioritise the needs and well-being of our end-of-life patients," Adj A/Prof Ow adds.*

A forward-looking approach

Beyond these initiatives, the Apt Care philosophy is taking root across NUH. Working with partners across NUHS, NUH is reducing duplicative tests such as glycated haemoglobin (HbA1c), minimising inappropriate or redundant medications and consolidating multiple appointments where possible.

> *While similar efforts have existed in pockets for years, the Apt Care framework represents a coordinated, hospital-wide effort to formalise and accelerate meaningful change. "This initiative is more than a series of pilots," says Adjunct Associate Professor Adrian Kee, Head and Senior Consultant, Division of Respiratory & Critical Care Medicine, Department of Medicine, NUH, and Senior Consultant, NCIS, who co-leads the programme. "It brings together doctors, nurses, and pharmacists to embed appropriate evidence-based practices into daily care."*

> *Adjunct Associate Professor Amelia Santosa, Head and Senior Consultant, Division of Rheumatology and Allergy, Department of Medicine, another co-lead, added that the approach is increasingly essential as Singapore's population greys. "With more patients managing multiple chronic conditions, purposeful consolidation of tests, medications and appointments is vital," she said. "Our ultimate goal is to deliver care that is clinically effective and focused on patient-defined outcomes, while promoting greater healthcare value for everyone — patients, families, and staff alike."*

New imaging centre gives cancer detection and research a shot in the arm

A total-body PET/CT scanner at the new Molecular Imaging and Theranostics Centre at NUH offers markedly improved detection sensitivity, enabling shorter scan times, lower radiation exposure and more precise cancer detection.

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Until recently, patients at the National University Hospital (NUH) undergoing a positron emission tomography/computed tomography (PET/CT) scan — one of the key tools in cancer diagnosis — would spend up to 15 minutes lying still as the scanner captured their body in segments. Each pause and reposition added time, patient discomfort, and additional exposure to radiation.

That experience has changed. Powered by a total-body PET/CT system, the hospital's newly launched Molecular Imaging and Theranostic Centre now enables scans that are faster, clearer, and more comfortable for patients. The system also advances research that could transform how diseases such as cancer are detected and treated.

Established together with the Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine), the new integrated facility is located at the NUH Medical Centre. It represents a transformative leap forward in precision oncology imaging and radioligand therapy, where diagnosis is informed by a deeper, more comprehensive view of the human body, and treatment can be targeted based on the identification of specific molecular targets in the cancer.

Faster, safer and more accurate scans

The new total-body PET/CT system captures the whole body in a single, continuous motion without any pauses nor repeated repositioning. The process takes less than five minutes and uses up to 80 per cent less radiation than before.

The improvement goes beyond just convenience. The scanner's heightened sensitivity — about eight times that of conventional systems — produces sharper, more detailed images that can reveal minute lesions and early changes in disease activity. Such clarity helps clinicians plan treatments with greater confidence and monitor how patients respond over time.

"Total-body PET/CT allows us to capture the whole body in a single bed scan with unmatched clarity," says Professor Khong Pek Lan, Head and Senior Consultant, Department of Diagnostic Imaging, NUH. "Patients benefit from faster, safer and more precise diagnoses, while our clinicians can harness these insights to explore innovative therapies more effectively. This is a step forward in personalised medicine."

The system's broader field of view of more than one metre — more than four times that of conventional scanners — allows the whole body to be imaged at the same time. This reduces scan time and hence increases scanning capacity — up to six patients an hour — reducing waiting times and improving overall workflow at the Centre.

Table 1: Differences between total-body and conventional PET/CT

Feature	Total-body PET/CT	Conventional PET/CT	What it means for patients
Scan duration	< 5 minutes	8–15 minutes	Quicker, less tiring scans
Throughput	Up to 6 patients / hour	About 3 patients / hour	Shorter waiting times
Radiation exposure	Up to 80 % lower	3.5–5 mSv	Safer for repeat imaging
Sensitivity	≈ 8 × higher	-	More precise detection of early disease
Patient positioning	Single continuous motion	Multiple stops and repositions	More comfort and ease

From imaging to precision oncology

Modern cancer care is increasingly driven by precision — tailoring diagnosis and treatment to the biology of each patient's disease.

Radioligand therapy is an emerging technique that uses the same molecular target to both detect and treat cancer with radioactive isotopes. First, doctors inject a small amount of radioactive tracer that highlights specific molecular cancer targets on scans. If detected, the cancerous cells can then be treated by delivering targeted radiation that destroys them while sparing healthy tissue.

With the total-body PET/CT system, researchers can now observe how these tracers travel through the body in real time, revealing how drugs are distributed and how patients respond to therapy over time. These insights are invaluable for designing more effective treatments and refining existing ones.

To strengthen collaboration in this growing field, NUH, NUS Medicine and Siemens Healthineers have signed a Memorandum of Understanding to advance clinical diagnostics, translational research, and technological innovation. The partnership strives to enhance Singapore's capabilities in molecular imaging and theranostics, positioning the city-state as a regional hub in precision medicine.

"Our research focuses on developing more specific and effective radioactive tracers for cancer diagnosis and treatment," says Prof Khong, sharing a glimpse into the work now taking place at the Centre. "The new Centre allows us to bridge discovery and clinical care more seamlessly than ever before."

From the NICU to the ward: Redesigning care for better outcomes

Healthcare professionals at NUH are transforming how care is delivered — advancing infection control, care efficiency, and sustainability across the hospital.

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At the National University Hospital (NUH), the strive for excellence guides how teams improve patient outcomes across disciplines and departments. Two projects launched last year show how practical innovation, when grounded in clinical need, can deliver tangible impact for patients and staff alike. One transformed the neonatal intensive care unit (NICU) into Singapore's first "water-less" environment to prevent infections in premature babies. The other redesigned the care pathway for cellulitis, a common bacterial skin infection, to help patients recover faster and ease the hospital load.

Both initiatives were recognised at the 2025 Hospital Management Asia (HMA) Awards. But their real impact lies in how they have transformed everyday patient care at NUH.

A water-less model for safer neonatal care

Late-onset gram-negative sepsis is a known risk in neonatal intensive care, especially for premature infants. At NUH, a small number of cases prompted the neonatology team to review environmental contributors, including water-borne bacterial sources within the NICU.

Rather than costly plumbing replacements, the team thought about ways to change the environment. The "Water-Less ICU" project, implemented across the NICU by 2024, eliminated tap water from routine workflows. Alcohol-based hand rubs replaced hand washing at sinks, ultraviolet sterilisers instead of steam sterilisers were used to sterilise milk bottles. All non-essential sinks close to patient care areas were also removed. In addition, staff received targeted training to ensure smooth adaptation to the new protocols.

Within a year, the rate of late-onset sepsis among very low birth weight infants fell by half, while sink-related bacterial contamination dropped by 80 per cent. Acceptance among staff members was also strong, with hand hygiene compliance using alcohol-based hand rubs exceeding 90 per cent. The initiative has since gained international recognition, and hospitals overseas are exploring similar models.

> *"This project challenged long-held assumptions about infection control," says Dr Low Jia Ming, Neonatal Consultant, Department of Neonatology, Khoo Teck Puat – National University Children's Medical Institute[1], NUH. "By redesigning our infrastructure and hand hygiene strategies, we reduced infection risks and made our processes more sustainable for the long term."*

Beyond infection control, the water-less model also brought operational benefits, including reduced maintenance and lower water consumption — a step towards environmentally responsible healthcare.

[1] KTP-NUCMI is part of the National University Centre for Women and Children (NUWoC), a national university specialist centre that aims to empower women, children and their families to lead healthier lives.

Streamlining care for faster recovery

While one team focused on preventing infections in newborns, another set out to improve recovery and efficiency for adult patients. At the Division of Infectious Diseases, clinicians reviewed how cellulitis — a bacterial infection of the skin and underlying tissue — was being managed.

Their analysis revealed that almost half of patients admitted with uncomplicated cellulitis stayed longer than three days, even when they were stable enough for early discharge. Delays were often caused by routine but unnecessary blood cultures, extended intravenous antibiotic use. Another common cause was limited awareness among patients on follow-up options, which range from NUHS@Home to outpatient antibiotic services.

Launched in October 2024, the "Optimising Care for Patients with Cellulitis" project addressed these gaps through education, clearer discharge protocols and closer coordination across care teams. Appropriate blood culture ordering rose drastically from 6 per cent to 98 per cent, and the proportion of patients discharged within three days increased from 48 per cent to more than 80 per cent. Each patient saved about S$1,000 in hospital costs on average, with higher satisfaction scores and no compromise in clinical quality.

> *"As a university hospital, we see every improvement as a learning opportunity," says Dr Nicholas Ngiam, Associate Consultant, Division of Infectious Diseases, Department of Medicine, NUH. "This project shows how better systems and evidence-based adjustments can improve care and make a profound difference to patients."*

Plans are now underway to extend the approach to other wards such as the Emergency Medicine Department and encompass more conditions like pneumonia.

New partnership brings hope to cancer and orthopaedic patients

The National University Hospital teams up with Ruijin Hospital to establish the Singapore-Shanghai Medical Innovation Centre to jointly advance clinical innovation and expand treatment options for patients.

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Meaningful progress in healthcare begins with collaboration — when clinicians, scientists and institutions move beyond silos to solve difficult problems. For a university hospital like the National University Hospital (NUH), partnerships have long been part of how care is strengthened and how new ideas move from bench to bedside.

This commitment was recently reinforced with the launch of the Singapore-Shanghai Medical Innovation Centre (SSMIC), a joint initiative between NUH and Ruijin Hospital, Shanghai Jiao Tong University School of Medicine (RJH). Announced at the 6th Singapore-Shanghai Comprehensive Cooperation Council meeting, SSMIC builds on an earlier agreement signed by both hospitals to deepen clinical collaboration and exchange expertise.

Co-chaired by Professor Aymeric Lim, Chief Executive Officer of NUH, and Professor Ning Guang, President of Ruijin Hospital, the SSMIC serves as a shared platform for co-developing proof-of-concept methodologies, medical technologies and translational research.

> *"The collaboration with RJH marks a significant step forward for academic medicine in Asia," says Prof Lim. "The SSMIC represents a deep and enduring partnership between the two hospitals. Together, we will create a shared pathway to bring advanced medical technologies and novel care models already in late-stage development into clinical practice."*

Advancing care through shared strengths

In its first phase, the Centre will concentrate on two priority tracks where both hospitals bring complementary strengths: cell and gene therapy, and 3D printing in orthopaedics. The focus reflects areas where collaboration can accelerate clinical validation and open new treatment pathways for patients with limited options.

In cell and gene therapy, clinicians from NUH and Ruijin Hospital will jointly evaluate a novel Chimeric Antigen Receptor (CAR) T-cell therapy through clinical trials. CAR-T therapy involves re-engineering a patient's own immune cells so they can recognise and destroy cancer cells bearing specific surface markers. While the approach has shown promise internationally, access remains limited and outcomes vary depending on disease type and prior treatments. The joint clinical trials aim to determine how this therapy could be adapted, validated and made accessible for patients who have not responded to standard cancer treatments. A shared trial framework allows both teams to pool clinical insights and refine protocols more quickly, ensuring that evidence gathered is robust and applicable to real-world care.

Orthopaedics is a second area where collaboration can unlock tangible gains. Surgeons from both institutions will study how advanced 3D printing can improve the precision of musculoskeletal tumour surgery and the reconstruction that follows. This includes the development of patient-specific tumour prostheses — custom implants shaped to fit complex anatomical defects — as well as 3D-printed scaffolds that encourage bone growth after large tumours are removed. These technologies are especially relevant for patients with rare or aggressive tumours, where conventional implants may not provide an optimal fit or long-term stability. The combination of engineering expertise, surgical experience and shared research protocols from both teams enable them to refine workflows that can improve recovery and functional outcomes.

A model for international collaboration

These two projects form the Centre's first steps in a sustained pipeline of collaborative work. It will be a long-term platform for clinicians, researchers and technical specialists to exchange ideas, test early-stage concepts and adapt promising innovations for clinical use. NUH and RJH will continue to identify areas where joint expertise can address unmet clinical needs, build new capabilities and offer patients more options across a wider range of conditions.

> *"Our aim is simple and clear: to accelerate innovations that serve patients, strengthen our healthcare systems, and uphold our collective responsibility to improve human health across our region," says Prof Lim. "This collaboration advances not only science, but the public good. I am proud of the teams who made this possible and I look forward to the impact we will create together."*

When shingles strike: More than just a rash

A painful condition caused by the same virus behind chickenpox, shingles can lead to lasting nerve pain, and in some cases, heart complications.

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When 66-year-old Kiki Law (not her real name) noticed small blisters around her lips, she thought little of them. Perhaps a mild allergy, she figured. By the next day, pain shot from her neck to her head, and she could barely hear on one side. The diagnosis came as a surprise: shingles — a reactivation of the chickenpox virus she had as a child.

> *For 78-year-old Linda Giam, it began as a tingling sensation on her leg and a rough patch of skin which looked like a rash. Within hours, a line of blisters appeared. "Although I developed a line of small blisters, I didn't feel any pain," she recalls, "I didn't know about shingles before this and didn't know anyone who had it."*

These stories are not uncommon. Each year, an estimated 30,000 people in Singapore develop shingles, a condition that mostly affects older adults. Yet, many remain unaware of its potentially serious consequences.

> *"Many patients mistake the early signs for minor skin irritation or allergies," says Professor Tan Huay Cheem, Senior Consultant, Department of Cardiology, National University Heart Centre, Singapore. "By the time the rash appears, the infection is already well underway. And what many don't realise is that shingles can sometimes affect more than the skin — it can also raise the risk of heart attack and stroke."*

What exactly is shingles?

Shingles, or herpes zoster, stems from the varicella-zoster virus — the same culprit behind chickenpox. After a person recovers from chickenpox, the virus does not leave the body. Instead, it lies dormant in nerve cells for decades. When the immune system weakens with age or illness, the virus can reactivate, travelling along the nerves to the skin and causing a painful rash.

Early symptoms may appear days before the rash does. Some experience tingling, burning or sharp, needle-like pain on one side of the body or face. The rash then appears as small clusters of fluid-filled blisters, often forming a stripe or band. Over the next week or two, these blisters crust and heal, though discomfort can persist. In some cases, fever, fatigue and headaches accompany the rash.

Prompt treatment can reduce the severity and duration of symptoms. Antiviral medication is most effective when started within three days of the shingles rash appearing, which helps to limit viral activity and prevent complications. Pain relief and topical creams may also be prescribed to ease discomfort while the skin heals.

When shingles affects more than the skin

While most recover fully, some may develop postherpetic neuralgia — a condition causing persistent nerve pain that lingers for months or even years after the rash has healed. The pain, described as burning or stabbing, can disrupt sleep and daily activities. Shingles that occurs near the eyes or ears can also lead to complications such as vision or hearing loss, facial paralysis or inflammation of the brain.

> *"Shingles is more common in those above 50, and the risk rises as the body's immune response declines with age," explains Prof Tan. "It can also occur in people with weakened immunity, such as those with diabetes, cancer or who are on immunosuppressive medications."*

More recently, research has shown that shingles can affect heart health. The infection triggers a systemic inflammatory response that can injure blood vessels and disrupt circulation, raising cardiovascular risks significantly. Within the first week of a shingles episode, the risk of heart attack increases by about 68 per cent, while the risk of stroke jumps by 78 per cent within a month. These elevated risks can persist for up to a year, with persistent pain and psychological stress further straining the cardiovascular system through blood pressure fluctuations.

> *"The virus can directly or indirectly damage the heart muscle, potentially leading to inflammation or heart failure in severe cases," Prof Tan warns. "For older adults or those with pre-existing heart disease, shingles can pose a serious but often overlooked threat."*

> *A common misconception is that shingles only occurs in people who once had chickenpox. While that is true — the virus reactivates from a past infection — Prof Tan notes that even those vaccinated against chickenpox can still develop shingles later in life. "The virus, whether from natural infection or vaccination, remains in the body. It can reactivate when your immune defences weaken," he explains.*

Shingles can be prevented

As shingles has no cure, prevention remains the best safeguard especially for older adults and those with chronic illnesses. Vaccination significantly reduces the likelihood of developing shingles and its complications, from persistent nerve pain to life-threatening cardiovascular events.

In Singapore, the Shingrix vaccine is the only shingles vaccine approved by the Health Sciences Authority. It is a recombinant vaccine, meaning it contains a purified viral protein rather than a live virus, making it safe even for those with weakened immune systems. Clinical studies show over 90 per cent effectiveness in preventing shingles in adults over 50, with protection remaining strong for at least a decade. The two-dose regimen, administered two to six months apart, provides comprehensive coverage.

The Ministry of Health (MOH) now subsidises up to 75 per cent of vaccination costs for eligible citizens and permanent residents, bringing expenses down to approximately S$75 to S$300 per course for Singaporeans. From 2026, MediSave can be used to further offset vaccination costs.

> *Even those who have had shingles are advised to get vaccinated, as reccurrence affects up to 10 per cent of cases. "Having shingles once does not guarantee lifetime immunity," notes Prof Tan. "Vaccination is highly effective in boosting the body's immunity and providing long-term protection against shingles."*