Dealing with healthcare challenges on the horizon.

Living in an era of better nutrition, improved sanitation as well as greater access to a range of antibiotics and vaccines, it’s easy to take health for granted. Had you been born around two centuries ago, even if you survived war, famine or unfortunate accidents, you would probably have kicked the bucket by the time you were 30 to 40 years old because you’d contracted some form of infectious disease.

Today, the average life expectancy at birth hovers around 72 years, but this longevity brings with it a new set of challenges. Chronic ailments such as stroke, diabetes, cardiovascular disease and cancer now top the list of medical conditions afflicting billions worldwide, and this number is likely to be revised upwards as global populations age. A perfect storm for healthcare is on the horizon, and governments, working with medical professionals, are mobilising to avoid the potentially disastrous consequences of a breakdown in healthcare systems already under strain.

But rather than depend solely on the medical profession to deal with the burden of healthcare, it is crucial to motivate people to live responsible, healthy lives, said Professor Pang Weng Sun, Vice-Dean (Clinical Affairs) at NTU’s Lee Kong Chian School of Medicine (LKCMedicine).

“No amount of diabetes medicines is going to help if a diabetic person doesn’t manage his or her diet. And muscle wasting will occur if one doesn’t exercise,” he noted. “Very often, it’s not about the availability of treatments, but about compliance and lifestyle changes.”
Where East meets West

As the Deputy Group Chief Executive Officer (Population Health) of the National Healthcare Group, Prof Pang knows very well the need to prepare for the silver tsunami and its associated effects. "We shouldn't see ageing as a problem, but as an expected change as society evolves," he said, taking a matter-of-fact approach to the issue.

Prof Pang noted that better drugs have been invaluable in the management and treatment of several chronic conditions, thus highlighting the need for sustained investment in research and development. In the case of wear and tear of body parts, advances in medical implants such as hip and knee replacements have allowed people to function better even in old age, he explained.

Complementing this Western approach to maintaining health is traditional Chinese medicine (TCM), which has seen a surge in popularity beyond China in recent years. "We are seeing more non-Chinese patients and a more diverse group of individuals ranging from babies to the elderly who are open to receiving TCM treatment," said Ms Tjoe Yan Yin, a senior physician at NTU’s Chinese Medicine Clinic and a Class of 2010 alumna of NTU’s School of Biological Sciences.

Used carefully and under specific circumstances, TCM could help improve a patient’s quality of life, said Ms Tjoe, citing the example of how TCM treatments may be used in cancer patients who are recovering from surgery, chemotherapy or radiotherapy. Importantly, rather than replace Western medicine completely, TCM could be woven into the broader context of patient care, albeit with close monitoring and consultation with practitioners from both backgrounds.

Innovation station

Technology can also have a significant impact on healthcare. As ageing populations face the increased prospect of frailty or impairment of physical function, innovations in medical...
“With technology such as the EsoGLOVE, rehabilitation can even be carried out in the comfort of patients’ homes.”

— Ms Jane Wang (MAE/2009), Co-founder and CEO, Roceso Technologies

robotics can be a boon for physiotherapy and rehabilitation. Pushing the frontiers of medical robotics is Ms Jane Wang (MAE/2009), Co-founder and CEO of Roceso Technologies, a firm that specialises in the development of soft robotic exoskeleton technologies for rehabilitation and assistance. The key word here is ‘soft’.

“Hard robotics are generally advantageous in terms of precision and control. However, they have drawbacks when it comes to comfortability, weight, safety and flexibility,” said Ms Wang. “These limitations can be overcome with soft pneumatic actuators—in essence, elastic materials with variable stiffness along their lengths, through which air is pumped to generate movement.”

Soft pneumatic actuators are used in Roceso Technologies’ flagship product—the EsoGLOVE, a soft robotic glove designed to help patients regain hand functionality after experiencing a neurological disorder such as stroke. “The EsoGLOVE is one of the lightest and most portable hand rehabilitation devices in the market. The light weight enables patients to perform functional task trainings with adjustable level of assistance from the robot,” Ms Wang explained. “Because the device is portable, patients can undergo rehabilitation in the comfort of their own homes.” The invention has been registered for use in the US, and Ms Wang’s team is working towards securing regulatory approvals in Singapore and the EU.

Meanwhile, on the TCM front, robots are also being used to perform clinical massages known as tuina. The Emma robot—an acronym for Expert Manipulative Massage Automation—was developed by AiTreat, a start-up incubated by NTU. Specialising in back and knee massages, Emma has been deployed at NovaHealth TCM clinic, working hand-in-hand with a physician and a massage therapist to help relieve patients’ aches and pains. Clearly, even medical practices once deemed traditional are evolving with the times, adopting technology to improve productivity and patient outcomes.

CARE BEYOND THE CLINIC

But better drugs and novel medical technologies will not be enough to cater to the healthcare needs of an ageing population. “In addressing care of the elderly, we also need to build community social networks to support them. We will never have enough nursing homes, and indeed, many older people prefer to stay in their own homes. So, we need to build systems to enable that to take place and create elder-friendly environments to help maintain them in the community,” said Prof Pang.

This would entail changes to housing design, community spaces and transportation systems. For example, housing units may come with built-in motion sensors for monitoring the activity of the elderly in their homes, or more ramps may be needed for wheelchair-friendly access in neighbourhoods and transport hubs.

Employment policies may also need to be revised or updated. “Unless we delay the retirement age and create job opportunities for older people, the burden of care will lie on younger persons,” Prof Pang added. Furthermore, at the grassroots level, initiatives to encourage a more caring community can go a long way towards achieving the ideal of allowing the elderly to age in place.

“Today, we rely on family members or domestic helpers to look after the frail elderly. What we hope to see, and indeed we are seeing more of, are ‘young olds’ who are still active and independent, playing a role in supporting ‘old olds’ who may be less independent,” said Prof Pang.

Therefore, dealing with the healthcare needs of the future will require a holistic approach, involving cooperation across all levels of society. The goal is to “Live long and prosper”, to borrow the Vulcan salutation from the science fiction series Star Trek, and with adequate planning and preparation, society has a chance to transform that phrase from aspiration to reality.