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More than one in nine patients here catch a bug while hospitalised. Half the patients in hospital are on at least one antimicrobial, the umbrella term for antibiotics, antifungal and antiviral medication. These are the key results of the first national study that points out areas where hospitals can improve on patient care. Senior health correspondent [Salma Khalik](#) reports the findings.

## Hospital patients at risk of catching an infection

Patients warded in a hospital – public or private – have a high risk of catching a bug during their stay.

A comprehensive study from July 2015 to February 2016 involving 5,415 adult patients in 13 acute hospitals here found that 11.9 per cent – or more than one in nine – caught an infection while being treated for other conditions.

While most of these infections were mild to moderate, there were some that could be severe, possibly even fatal, and came on top of whatever medical problems patients were already being treated for.

About one in four of those affected had an infection in their bloodstream, while a similar number had pneumonia. Of greater concern is that 7 per cent of healthcare-associated infections (HAIs) were caused by bacteria resistant to conventional antibiotics.

"That means we have to use more toxic and less effective antibiotics," said Associate Professor Hsu Li Yang, who heads the Infectious Diseases Programme at the Saw Swee Hock School of Public Health and was a member of the study team.

Most of those who caught a "super-bug" in hospital were infected with methicillin-resistant *Staphylococcus aureus* (MRSA).

The study, commissioned by the Ministry of Health (MOH), which provided a \$1 million grant, was the first of its kind carried out here.

A follow-up study will be carried out next year.

A ministry spokesman said: "Further research is necessary to understand the causes and cost of healthcare-associated infections and antimicrobial use in Singapore."

The MOH spokesman noted that the ministry has been tracking hospital-acquired MRSA over the past five years. The incidence rate has fallen from 0.84 per 10,000 patient days in 2013 to 0.38 last year.

She added that the ministry has been working closely with hospitals since 2009 to reduce the spread of resistant bugs.

The study findings were published in *Clinical Infectious Diseases*, a leading journal on infectious diseases, last year.

The article noted that HAIs increase the cost of healthcare. In the United States, the estimated annual cost of treating just five major HAIs was close to US\$10 billion (S\$13.7 billion) in 2012. There are no figures for Singapore.

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Some of the bugs causing the infections here could have been brought in by the patient but had lain dormant until the person's immune system was breached.

Prof Hsu said a common reason for a breach is the use of catheters, since these allow the bug to bypass the body's usual protections.

The study found that half of urinary tract infections, a quarter of hospital-acquired pneumonia and a fifth of bloodstream infections were linked to the use of devices.

It noted: "This represents a key target intervention area for reducing the HAI prevalence in Singapore, as device-associated HAIs are considered to be largely preventable."

Older men in hospital for surgery were identified as the group at highest risk of getting an infection during their stay.

Overall, surgery patients face 1.8 times the risk of other patients, and men had a 1.5 times higher risk of infection than women.

The paper said the 11.9 per cent HAI rate here is higher than the 6 per cent in Europe and about 9 per cent in other South-east Asian countries. But it cautioned that the higher rate here might be due to a different mix of patients.

Singapore has an ageing population. Older people tend to have multiple illnesses that reduce their resistance to bugs.

The risk of an HAI is lower in the private sector, with less than 9 per cent of patients affected, compared with slightly more than 12 per cent in the eight participating public hospitals.

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## Doctors too trigger-happy with antimicrobials?

Doctors appear to be a bit too trigger-happy when it comes to giving patients antibiotics.

A study conducted in 2015 and 2016 found that at any one time, more than half the patients in acute hospitals were on one or more antimicrobials – an umbrella term for drugs, including antibiotics, that destroy micro-organisms.

Not all patients on antimicrobials had infections; some received the drug as a precaution against infection.

The government-funded study, spanning 13 public and private hospitals, found the use of antimicrobials here "surprisingly high".

It was much higher in the five private hospitals in the study than in the public sector. Two in three of their patients were on at least one antimicrobial, while 7 per cent had been prescribed three or more.

Associate Professor Hsu Li Yang, head of the Infectious Diseases Programme at the Saw Swee Hock School of Public Health and a member of the study team, said: "One in two is an astoundingly high number." A more reasonable level – one

seen in European hospitals – would be one in three hospitalised patients on such drugs.

In some cases, antimicrobials were given to patients who had no infections, but as a precaution. This is standard for patients in hospital for surgery as they are 1.8 times more likely to get an infection than other patients.

But keeping them on antimicrobials for more than 24 hours was not only "non-evidence-based practice" but "may be associated with increased surgical site infection risk", the researchers noted.

Dr Kalisvar Marimuthu, a senior consultant at the National Centre for Infectious Diseases and the study's principal investigator, said inappropriate use is not good for the body. "Antibiotics kill millions of good bacteria in our gut. We have been rearing these since childhood. It will take time to build them up again," he said. "Antibiotics should not be given unless absolutely necessary."

Of the patients on antimicrobials, 22 per cent were on two different types while 4 per cent were on

three or more.

The study also found that "a large number of patients" who had fever but no other symptoms were on antibiotics. The researchers suggested reducing such "unnecessary antibiotic prescriptions".

They pointed out that a high use of antimicrobials is known to increase resistance to the bugs.

They suggested that "reducing inappropriate antimicrobial prescribing practices may curb the development of antimicrobial resistance".

The researchers also noted that the increasing emergence of resistant bugs is of global concern, since the number of new antimicrobials being developed is dwindling.

All public hospitals have antimicrobial stewardship programmes that aim to ensure the correct use of these medications. But they did not exist in private hospitals here when the study was conducted in 2015 and 2016.

A spokesman for the Parkway group, which runs Mount Elizabeth, Gleneagles, Mount Elizabeth Novena and Parkway East hospitals, said this programme was introduced in February this year.

Raffles Hospital has also introduced a similar programme.

A Health Ministry spokesman said Singapore has a National Antimicrobial Resistance Control Committee to monitor the use of antimicrobials and resistant infection rates.

## Study involved 5,415 patients

The study – the first of its kind carried out here – was commissioned by the Ministry of Health, which provided a \$1 million grant.

It involved 5,415 patients – patients in every single bed, including in intensive care, in eight public and five private hospitals. Together, they accounted for more than 86 per cent of acute care beds in the country in 2014.

Children under 18 were excluded.

The data was collected by a team of five research assistants led by an infectious diseases physician and an infection diseases pharmacist.

Findings of infections were not just based on a doctor's assessment but also verified clinically, such as with blood tests or X-rays.

The term "healthcare-associated infection" (HAI) was applied only if symptoms such as fever or high white blood cell count emerged from the third day of the hospital stay. There were certain exceptions, such as patients who were re-admitted to hospital within a short period.

The study, which was carried out between July 2015 and February 2016, found that 11.9 per cent of patients had an HAI and that more than half were on one or more antimicrobials.

The findings were published in *Clinical Infectious Diseases*, a leading journal on infectious diseases, last year.

## One in 10 globally catches bug while in hospital: WHO

The World Health Organisation (WHO) estimates that hundreds of millions of patients around the world are affected by healthcare-associated infection (HAI).

HAI, it said on its website, results in "prolonged hospital stays, long-term disability, increased resistance of micro-organisms to antimicrobials, massive additional costs for health systems, high costs for patients and their family, and unnecessary deaths".

But the true global burden "remains unknown because of the difficulty in gathering reliable data".

The WHO said most countries lack surveillance systems for HAI. The lack of uniform criteria for HAI makes comparisons difficult too.

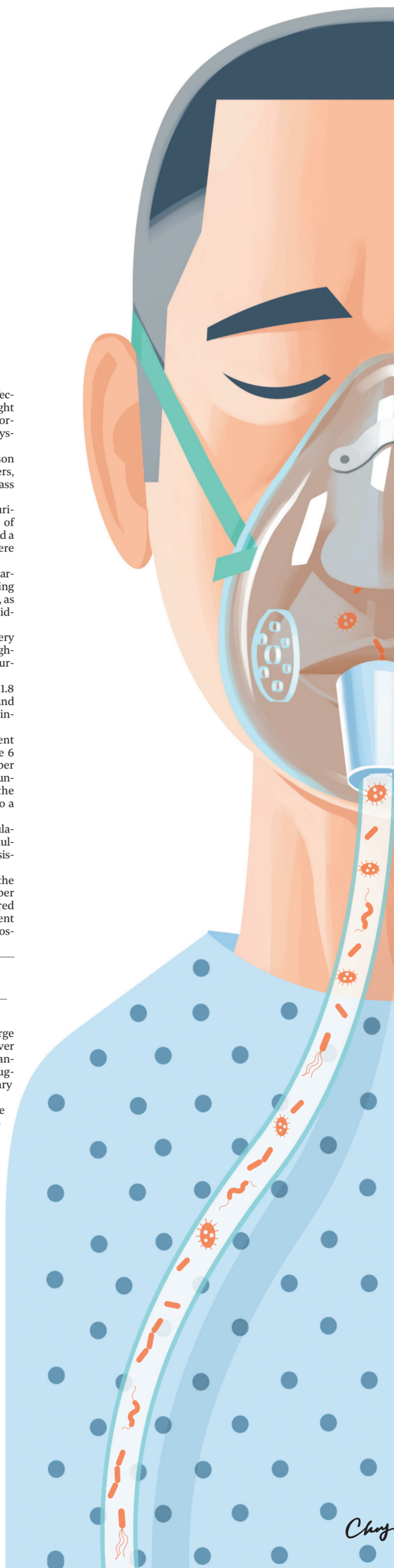
It estimates that one in 10 patients worldwide would catch a bug while in hospital.

A spokesman for the Ministry of Health said only a few countries have attempted national studies such as the one Singapore conducted.

But since methodology and patient population would be different, it does not make sense to compare Singapore's results with theirs, the spokesman said.

She added: "The intent of the study is to determine the local baseline prevalence of healthcare-associated infections and antimicrobial use in Singapore acute-care hospitals, as well as to identify priority areas for intervention."

"The findings of the study are meant to help hospitals prioritise interventions and the subsequent study will provide a better understanding of the causes and cost of healthcare-associated infections and antimicrobial use in Singapore."



Choy