

Checklists save lives

A WHO initiative to encourage surgeons across the world to use checklists when they operate on patients was launched last month. Gary Humphreys reports.

"The woman had severe arthritis and she needed a new knee." Dr Atul Gawande, writer, surgeon and Associate Professor at Harvard Medical School, tells the story in the matter-of-fact tone of someone who has seen way too many examples of the error he's about to describe. "She was given an antibiotic and wheeled into the OR [operating room], where she was anaesthetized. The surgeon, for whom a knee replacement was a routine procedure, was about to make the first incision."

But then he was told to stop. A mistake had been made. It wasn't life-threatening, but it would have made it impossible to operate successfully and could have resulted in complications – the kind that, according to the World Alliance for Patient Safety (WAPS), a World Health Organization (WHO) initiative launched in 2004, result in around seven million people disabled every year.

"There are roughly 234 million interventions every year – one intervention for every 25 people on the planet," says Dr Gerald Dziekan, who is WAPS safe surgery project manager in Geneva. "And while there is a clear correlation between economic standing and the number of interventions per capita (for example, in the United Kingdom the ratio is one operation for every eight people) globally speaking, there are no countries without a high rate of mistakes by operating teams."

Whether it's a matter of leaving a sponge inside a patient or failing to ensure sterility, more than 60% of patients worldwide have one of six key safety measures missed during surgery. In the words of Gawande, who leads the work to develop this initiative, "what almost happened to the lady with the bad knee could have happened in Amman or London."

Mistakes occur partly because of developments in surgical procedure and the technology that supports it. "Medicine is becoming more complex,"

says Dr Cyrus Engineer, a member of the WAPS team. "You can have the best of technology, but if you fail to calibrate an instrument that is supposed to tell you the blood sugar level, you are going to get a wrong result which is going to send you down the wrong path."

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Engineer compares the situation faced by operating room teams with that confronting pilots civil and military aviation in the 1930s. "The answer was to introduce checklists," he says, "to break down complex tasks to their component parts, and to ensure that

nothing was left out. It was a process that eventually brought about standardization within the cockpit."

WAPS launched its Second Global Patient Safety Challenge, Safe Surgery Saves Lives, on 25 June in Washington and it does exactly the same thing – introducing checklists into the operating room in the hope that nothing gets forgotten. A simple one-page surgery checklist, developed in consultation with international experts in surgery, anaesthesiology, nursing and patient safety over a period of 18 months, divides surgical procedures into three phases. In the first phase, the period before anaesthesia, a designated checklist coordinator confirms basics such as the patient's identity, the type of procedure planned, and whether or not consent has been given. In the second phase, the period after anaesthesia and before surgical incision, the coordinator reviews issues such as anticipated critical events – blood loss, for example – and makes sure basics such as prophylactic antibiotics have been given within an hour before surgery. In the third phase, which occurs during or immediately after



Surgeons operating on a patient in Mauritius.

Harry Anenden/WHO

wound closure, but before removing the patient from the operating room, the coordinator checks, among other things, that all instruments are accounted for and that pathological specimens have been properly labelled.

The one-page checklist is currently in its first edition, and is being field-tested in eight hospitals in developed and developing countries spread over the six WHO regions, before being disseminated as a part of a set of WHO guidelines. The safe surgery team has also invited input from operating-room professionals through its web page. Information gathered in this way will be used to produce a final surgical safety checklist, which Gawande believes will be ready for wide dissemination to professional organizations by the end of the year.

To those operating-room teams who have expressed doubts about having to shoulder more paperwork, Dziekan says that the checklist doesn't add any additional workload, and it only takes about three minutes to go through. Other worries might be harder to dispel however. Some practitioners have been resistant to anything that, for want of a better term, might cramp their style. As Dr Albert Wu, a senior WAPS team member and a professor at the Johns Hopkins Bloomberg School of Public Health puts it: "Some surgeons believe that a checklist dumbs things down and actually worsens the practice of a really expert practitioner."

“They had failed to make sure that a replacement was available in her size, but, thanks to the checklist, they realized the problem before opening her up ... That surgeon was converted.”

Dr Atul Gawande

Realizing that it is precisely those practitioners who need to be won over, Gawande and the WAPS team have

The image shows the first edition of the WHO Surgical Safety Checklist. It is a one-page form divided into three main sections: 'BEFORE INDUCTION OF ANAESTHESIA', 'BEFORE SKIN INCISION', and 'BEFORE PATIENT LEAVES OPERATING ROOM'. Each section has a 'SIGN IN' or 'SIGN OUT' box. The 'BEFORE INDUCTION OF ANAESTHESIA' section includes items like 'PATIENT HAS CONFIRMED' (identity, site, procedure, consent), 'SITE MARKED/NOT APPLICABLE', 'ANAESTHESIA SAFETY CHECK COMPLETED', 'PULSE OXIMETER ON PATIENT AND FUNCTIONING', and 'DOES PATIENT HAVE A:'. The 'BEFORE SKIN INCISION' section includes 'CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE', 'SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM', 'ANTICIPATED CRITICAL EVENTS', and 'HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?'. The 'BEFORE PATIENT LEAVES OPERATING ROOM' section includes 'NURSE VERBALLY CONFIRMS WITH THE TEAM' and 'SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT'. The form is color-coded: orange for the first section, green for the second, and blue for the third.

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

First edition of WHO's surgical safety check list (available at: http://www.who.int/patientsafety/challenge/safe_surgery/comptest_form/en/index.html).

been focusing on demonstrating its value in settings worldwide and on seeking the endorsement of professional organizations in the hope that this will bring broader acceptance among practitioners. So far, one of the most ringing endorsements has come from the United Kingdom's (UK) National Patient Safety Agency, the Royal Medical Colleges and other professional medical associations in that country. "The UK is the first country to have embraced this concept so broadly," says Gawande, "and by doing so, has established itself as a worldwide leader in the perfection of surgical care."

Other countries with a broad base of professional societies and hospitals to get behind the checklist (including Jordan, Thailand and the USA) while hospitals in China and in countries in Latin America, according to Gawande have already begun using versions of the WHO checklist that they have translated themselves to improve surgery outcomes. Since WHO began seeking endorsements back in February this year, over a hundred societies worldwide in 30 of WHO's 193 Member States have climbed aboard, a result Pauline Philip, the Executive Secretary of WHO's Patient Safety Programme which runs WAPS, considers "a huge success". Meanwhile, Gawande is talking about a potential 250 hospitals using the checklist by the end of this year, and 2500 of them using it by the end of 2009.

Such optimism derives from the stunning results that have already been achieved, most notably in a study conducted by Dr Peter Pronovost – one of the most enthusiastic advocates of the checklist approach – at Johns Hopkins hospital in Baltimore, USA. Pronovost, a critical-care specialist, found that the introduction of a simple five-step checklist reduced the rate of blood-stream infections caused by intravenous lines by two-thirds, while, on average, intensive care units cut their infection rates from nearly 3% of patients treated to zero. During the 18 months of the programme, an estimated 1500 lives were saved in the US state of Michigan alone.

Checklists worked for Michigan and they worked for the lady with the bad knee. Gawande was told the story by the surgeon who had been about to open the lady up, a surgeon who had been opposed to the checklist initiative before that day in the operating room. And what was the problem the checklist procedure revealed? "The hospital was out of artificial knees," Gawande says. "They had failed to make sure that a replacement was available in her size, but, thanks to the checklist, they realized the problem before opening her up. The operation was delayed until the knee prosthetic could be obtained on the same day and the operation continued. That surgeon was converted." WHO hopes there will be millions more like him. ■

WHO

G8 urged to act on food crisis and health

This month the Group of Eight (G8) industrialized nations discuss the growing global food crisis with its dire consequences and will be encouraged to fulfil past commitments, keep health on the international agenda and strengthen health systems. Fiona Fleck reports.

The global food crisis threatens to reverse hard-won gains in public health in developing countries and is already jeopardizing the health of the most vulnerable people in poor countries, particularly pregnant women, children and the elderly.

"A great deal of hard-won progress is at stake," said WHO Director-General Margaret Chan in a speech to the United Nations food summit in Rome last month. "The world already faces an estimated 3.5 million deaths from malnutrition each year. Many more will die as a result of this crisis."

G8 leaders gather on the Japanese island of Hokkaido from 7 to 9 July. This year's host, Prime Minister Yasuo Fukuda, who showed Japan's commitment to addressing the food crisis by attending last month's UN food summit in Rome, has put food security high on the G8 agenda. He and his fellow G8 leaders are also scheduled to discuss other health-related issues, including proposals to strengthen health systems.

Strengthening health systems is a top priority for the World Health Organization (WHO) and the rest of the "H8" health organizations – the Bill & Melinda Gates Foundation; the GAVI Alliance; the Global Fund to Fight AIDS, TB and Malaria; the Joint

United Nations Programme on HIV/AIDS (UNAIDS); the United Nations Population Fund (UNFPA); the United Nations Children's Fund (UNICEF); and the World Bank. In a formal letter sent to the G8 governments on 10 June, the H8 called on the G8 to fulfil past health commitments, keep health on the international agenda and help to strengthen health systems in developing countries.

"The 2008 G8 summit presents an opportunity to protect recent gains, and address areas which lag behind, such as the failure to reduce the number of maternal deaths, improve nutrition and intensify HIV prevention," the letter said.

Health organizations recalled that the last G8 meeting in Japan, in 2000, had helped to establish the Global Fund to Fight AIDS, TB and Malaria and spurred "real and measurable progress" in health, such as "reductions in child deaths, increased access to treatment for HIV, the reversal of the TB epidemic in many countries, progress towards polio eradication, the profound reduction in measles in Africa, success in controlling neglected tropical diseases, and increasing contraceptive use".

"Much remains to be done. In Hokkaido, it will be important for the

G8 to build on what it has started," it said referring to Gleneagles and other commitments, "and support the dramatic scale-up of high-impact interventions to reach the health MDGs by 2015 – a crucial step in the global effort to increase human security. Leaders should commit to new, long-term predictable financing, that is linked to results," the letter said.

For world leaders, the global food crisis presents a new health challenge. Soaring prices of basic foodstuffs, such as rice, maize and wheat, in the last couple of years has had a profound effect on people's health and well-being, and there are signs it will exacerbate undernutrition (under-eating) and malnutrition (bad eating) worldwide. In coming months, poorer populations may be forced to switch to cheaper, less nutritional food. Meanwhile, people in countries that are dependent on food imports, particularly in urban areas, are likely to eat fewer meals. Children may drop out of school earlier to work to earn more to buy food for their families, missing nutritious school dinners.

Combating the food crisis effectively will require substantial pledges from the international community. According to United Nations estimates, governments and other donors would need to spend more than US\$ 15 to US\$ 20 billion every year for several years to ensure adequate food supplies for people across the globe. To feed their populations the United Nations says countries would have to increase food production by 50% by 2030. Otherwise they would be unable to satisfy growing demand.

The United Nations has had difficulty finding funds for its food programmes. The World Food Programme (WFP) had to lobby the international community for several months to raise an additional US\$ 755 million to send food aid to countries in greatest need. In the end, a substantial transfer from Saudi Arabia closed the gap. Its sister organization, the Food and Agriculture Organization is still trying to raise the US\$ 1.7 billion it wants to procure seeds and agricultural assistance to increase food production in poor countries.

WHO officials believe the food price crisis could set back progress in reducing poverty by seven years.



Claire Schofield/WHO

Malnourished child in South Africa.

WHO/P. Viot



Rice, a staple in many countries, is becoming increasingly expensive.

“WHO can, and must, prevent further loss of progress by strengthening health and nutrition responses. This will require a concerted effort to channel national and international efforts, strengthen social safety nets, and monitor the health status of vulnerable populations,” said Dr Eric Laroche, who chairs the WHO Task Force responding to the Food Price crisis.

WHO has identified 21 countries that are already facing high levels of acute and chronic undernutrition: Bangladesh, Burkina Faso, the Central African Republic, Chad, the Comoros, Democratic Republic of the Congo, Eritrea, Ethiopia, India, Lao People's Democratic Republic, Madagascar, Mali, Myanmar, Nepal, the Niger, Nigeria, Pakistan, Somalia, the Sudan, Timor-Leste and Yemen.

“WHO will help countries assess the health and nutrition effect of the global food crisis, as well as to design and implement measures to alleviate its impact among the most vulnerable populations.”

Dr Daniel López-Acuña

WHO is contributing to the work of the High-Level Task Force on the Global Food Crisis led by UN Secretary-General Ban Ki Moon. The Task Force comprising UN agencies and the World Bank aims to promote a unified response to the current food



WHO/P. Viot

Child in China eating rice. The price of rice rose by 46% in 2006 and 2007, according to the Food and Agriculture Organization of the United Nations.

crisis as well as long-term food security challenges. WHO is also helping to monitor the impact of the food crisis on nutrition, health and poverty as well as its effect on the health- and nutrition-related Millennium Development Goals. This work will provide government policy-makers with a sound evidence base, so that they will know how to target the populations that are most in need.

Dr Daniel López-Acuña, Director Recovery and Transition Programmes,

said that WHO will help countries assess the health and nutrition effect of the global food crisis, as well as to design and implement measures to alleviate its impact among the most vulnerable populations.

“It is critical to underscore the human face of the global food crisis, because there is an impact on the levels of nutrition and health to the population, and also it may delay the attainment of the health-related Millennium Development Goals”, López-Acuña said. ■



WHO/P. Viot

Prices of staples at a food market in India. In 2006–2007, the price of vegetable oils increased on average by more than 97%, that of grains by 87%, dairy products by 58% and rice by 46%, according to the Food and Agriculture Organization of the United Nations (source: http://www.fao.org/fileadmin/user_upload/foodclimate/HLCdocs/HLC08-inf-1-E.pdf).

Primary health care the New Zealand way

In the Wairarapa region, in the south-eastern corner of New Zealand's North Island, health officials have struck upon a novel yet effective way to treat often wary members of the local Maori population. Holly Else reports.

Many Maori perceive hospitals and general-practice surgeries as unfriendly environments and can be reluctant to seek health care at these institutions. To combat this, one of the primary health care facilities, the Te Rangimaire clinic, is located on the *marae*, or sacred meeting place, so that Maori feel more at ease. The clinic has two general practitioners, who are well trusted in the Maori community.

The Reverend Marie Collin, a member of the Ngati Kahungunu tribe, one of the largest Maori tribes in the Wairarapa region, speaks glowingly of the clinic at Te Rangimaire *marae*. She said that the service had become so popular that it was necessary to extend the hours and relocate the clinic from an old homestead on the *marae* to larger rooms in a new building housing the *marae's* communal dining room.

"Although the doctor, Cath Becker, is of European ancestry she is culturally sensitive, understands Maori protocol and is well respected by the community. Our *kaumatua* (Maori elders) are very comfortable coming here," says Collin. "The doctor knows how to handle our people and what we do differently."

As an example she cites a relaxed attitude to appointments. "If our people are running late it is no big deal. It's not an issue. People just arrive and take their turn."

Clinics such as the one at Te Rangimaire are the result of a cultural shift in the way health services are delivered to Maori.

Helen Kjestrup, a member of the Primary Health Care Nursing Advisory Committee for the Wairarapa region, is helping develop relations between Maori and the Primary Health Organisation. "It has been slow, but it is happening," she says.

To do this, she attends *hui*, Maori community meetings. Kjestrup believes that establishing health-care clinics in places where the Maori people feel comfortable has improved their access to health care.

New Zealand's primary health care system has undergone dramatic changes since 2000 – changes that government officials say have already improved access to its services for Maori and other groups.

The Wairarapa region, a sparsely populated agricultural valley between the Tararua mountains on the west and the Pacific Ocean on the east, can claim to have successfully implemented many of these changes.

The valley's population is a mix of European, Maori and Pacific Islanders, whose health-care needs vary enormously. The Wairarapa Primary Health Organisation is addressing these demands by working with the different communities to address the disparities in health between the different groups.

"Primary Health Organisations are enormously different beasts," says Joy Cooper, general manager of the Wairarapa District Health Board. "There is a huge variety of styles and sizes."

In Masterton, one of the main towns in the valley, there is a community centre for Pacific Islanders, Cameron Community House, which local general practitioner Dr David Nixon visits for one hour a week. A primary care nurse also visits the centre for four hours a week.

Cameron Community House and Te Rangimaire are just two of the many primary health care services and facilities in the Wairarapa region; others include general-practice surgeries and hospital-based services such as community nursing. Most primary care providers are coordinated by the Wairarapa Primary Health Organisation, which is overseen by the district health board.

The Primary Health Organisations are the local structures for implementing New Zealand's Primary Health Care Strategy that was launched in 2001. The core of the strategy is to reduce health inequalities, engage communities and improve the prevention and management of chronic illnesses.

The strategy was based on the Declaration of Alma-Ata, says Dr Tim Kenealy, a senior lecturer at the Department of General Practice and Primary Care at the University of Auckland.

A series of policy and legislative reforms, which included the primary care strategy, was formulated after a change in national government in 1999. The strategy was developed after it was decided a re-emphasis on primary care could reduce the disease burden and rising costs of secondary care.

In 2002, soon after the launch of the strategy, Primary Health Organisations were established across New Zealand, each responsible for the primary health care in a region or for a group of people, sometimes with a focus on a particular ethnic group.



Dr Cath Becker examines a patient at the Te Rangimaire clinic.

Courtesy of the Wairarapa District Health Board

Today, there are 82 Primary Health Organisations across New Zealand, with an average 94% of the country's population enrolled in one of them. Enrolment rates for Pacific Islanders are well above the average for the total population, but Maori have a lower rate of enrolment, at around 83%.

The Primary Health Organisation helps to coordinate and support the primary health care providers for its enrolled population, bringing together doctors, nurses, Maori health workers, health promotion workers, dieticians, pharmacists, physiotherapists, psychologists and midwives.

"They do not all follow the same blueprint," says Kenealy. Innovation is encouraged, enabling some organizations to customize their services to patients.

This customization is crucial to the success of the Wairarapa Primary Health Organisation, launched in 2004 after two-and-a-half years of preparation. Its arrival has transformed relations between the seven general practices in Masterton, improving communications and fostering cooperation. Previously, the practices had been run as independent businesses. Today, although still run independently, they share information and systems.

An in-house software system enables surgeries to identify high-risk patients; those, for example, who smoke, are overweight or have high blood pressure. The information is used by a team of nurses, who then phone the often reluctant patients to recommend they come in for a check-up.



The Primary Health Organisation has a strong focus on keeping people well and in the community. Cooper uses a metaphor to explain their approach: "We have become much more focused on preventing people from falling off the cliff of poor health by building a fence at the top, rather than providing an ambulance to help people once they have fallen into ill health."

She says that the general practices within the Primary Health Organisation now also concentrate on population health, rather than individual patients. The addition of performance indicators, which measure how each district health board and Primary Health Organisation is performing (immunization rates for example), has helped the health service providers in the Wairarapa region look up from their daily grind to the bigger picture.

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Joy Cooper

Getting the primary health care providers to work together like this "has



Pierre Almasy/WHO

Cardiographic examination of a Maori woman at the Wellington Hospital in 1968.

Furthermore, the system only worked well if you could afford to access primary health care services, a factor that was driving health inequalities. The government hopes that the second key component of the primary care strategy, an approach known as capitation funding, can help to remove this financial barrier.

The government has invested significant new funding in Primary Health Organisations in the form of capitation funding to reduce the cost of accessing general practice services and strengthen primary health care. Under this scheme, the district health board provides funding for each Primary Health Organisation based on the number of people enrolled and not on the number of times the Primary Health Organisation provider sees patients. Similarly, District Health Boards are funded by the government for their resident population "We get a bucket of money based on our demographics," says Cooper.

This system is "intended to provide an incentive to manage population-group risks over time", says Kenealy. He says there is "widespread agree-

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