



The Rise & Rise of Diabetes: Tackling a Global and Asian Crisis

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Study: Cost of diabetes to S'pore to soar beyond \$2.5b

Cost estimates for 2050; 42% spent on medical bills, the rest from productivity-related losses

Salma Khalik
Senior Health Correspondent

Diabetes cost Singapore more than \$1 billion in 2010. This is expected to soar beyond \$2.5 billion by 2050, said a team of academics who published the first ever article to predict the cost of this disease in Singapore.

The article in Europe's BMC Public Health journal, published online in February, said 42 per cent of the cost comes from medical treatment while the rest is due to indirect productivity-related losses.

According to the Ministry of Health, 11.3 per cent of adults aged 18 to 69 years in 2010 were diabetic, with those above 60 even aware they had the disease.

Uncontrolled diabetes is a major cause of kidney failure, blindness and amputations in Singapore. It is

also a major contributor to heart attacks and stroke.

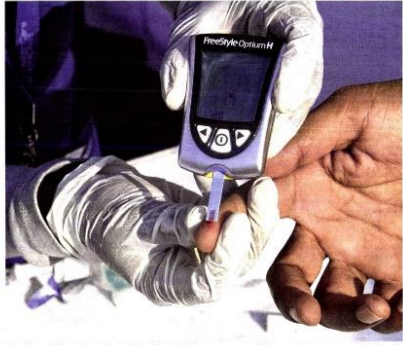
The authors from the National University of Singapore and University of Southern California estimated that the cost per working-age person as a result of their having diabetes was \$7,679 in 2010.

They predict it would go up to \$10,596 per diabetic person by 2050, with indirect costs rising to account for 65 per cent of this figure.

The authors said trends indicate that diabetes is increasingly hitting people at younger ages in Asia, with Singapore being an exception.

The study said fatality among people aged 20 to 39 years in "the most affluent" on the total cost per patient in 2050. Another major factor influencing cost estimates was wages will be higher by then.

Another trend is that Asians are currently more at risk of getting diabetes than people of other races,



The authors of the study said trends indicate that diabetes is increasingly hitting people at younger ages in Asia, with Singapore being no exception. PHOTO: AGENCE FRANCE-PRESSE

the authors added.

Dr Lee Chung Horn, a diabetes specialist in private practice, said this is partly genetic and partly lifestyle. As Asians have become richer, people "bought into the unhealthy Western lifestyle", leading to higher rates of obesity and diabetes, he said.

The article said that these factors "may have strong implications for overall economic growth and employment".

Already in 2010, the cost of diabetes was equal to 0.35 per cent of Singapore's GDP - or almost 10 per cent of healthcare spending.

It said, "Even in our conservative scenario, diabetes has imposed a significant economic burden on the national healthcare system and will continue to do so in the next four decades."

The team plans to continue its research to make its cost estimation more accurate and to help policy-

makers determine the effectiveness of public health interventions to slow the rise of diabetes.

The article pointed out that preventing diabetes was important not just to the healthcare sector, but also to employers as diabetes could affect workers' productivity, and to policymakers who will bear the "hidden" costs in the future.

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THURSDAY APRIL 14, 2016

MOH to wage war on diabetes

Measures include promoting healthy living and getting more people to go for screening

Salma Khalik
Senior Health Correspondent

The Ministry of Health has declared war on diabetes, describing it as one of the biggest drains on the healthcare system here.

In outlining how the Government intends to battle the disease, Health Minister Gan Kim Yong revealed in Parliament that four Singaporeans lose a limb or appendage daily because of

complications from diabetes.

Dealing with diabetes is already costing more than \$1 billion a year, he said during the debate on his ministry's budget yesterday.

"Left undetected, untreated or poorly managed, diabetes can lead to heart disease, stroke, kidney failure, blindness and amputations," he warned.

Of the over 400,000 diabetics in Singapore today, one in three does not even know he has the disease.

Of those who do know, one in

three has poor control over his blood sugar levels. If nothing is done, things will get worse, with one out of every three people here - more than a million - getting diabetes.

"Therefore, I am declaring war on diabetes," Mr Gan said.

"We want to help Singaporeans live life free from diabetes and, for those with the disease, to help them control their condition to prevent deterioration."

Mr Gan will co-chair a new Diabetes Prevention and Care Taskforce with Acting Education Minister Ng Chee Meng that will include people from the public and private sectors, as well as patient advocacy and caregiver groups.

This "war" will start with the young. Minister of State for Health Lam Pin Min said it is worrying that children and young people are getting increasingly overweight.

"Childhood obesity is likely to persist and progress into adulthood," he said. Such individuals are at higher risk of getting chronic diseases like diabetes and hypertension.

"It is important for us to work upstream to lay strong foundations for our young to lead healthier and more productive lives, starting from those as young as two years old," said Dr Lam.

He will jointly lead an inter-agency NurtureSG Taskforce with Minister of State for Education Janil

Puthucheary in this effort.

Senior Minister of State for Health Amy Khor's Women's Health Committee will help women with gestational diabetes prevent birth complications and tackle higher risk of diabetes in the child.

Studies show four in five babies born to women with uncontrolled gestational diabetes will likely become obese or diabetic.

Minister of State for Health Chee Hong Tat will work with the community to promote healthy living and reduce the prevalence of diabetes.

He will try to get more people to screen for diabetes, and strengthen the follow-up treatment for those

TODAY

THURSDAY, 14 APRIL 2016

OVER 400,000 S'POREANS AFFLICTED

Government declares war on diabetes

Multi-year plan to tackle areas such as early screening and better disease management

LAURA PHILOMIN
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SINGAPORE - With one-third of Singaporeans likely to have diabetes in their lifetime - a disease that already costs working-age adults \$81 billion a year collectively - the Government has launched a "war on diabetes".

The national strategy will span several years, and areas to be tackled range from promoting good eating habits and exercise to children, to encouraging early screening and better disease management.

A new taskforce, chaired by Health

● CONTINUED ON PAGE 8



PHOTO: COMFORTDELGRO

Lifestyle change helped cabby fight disease

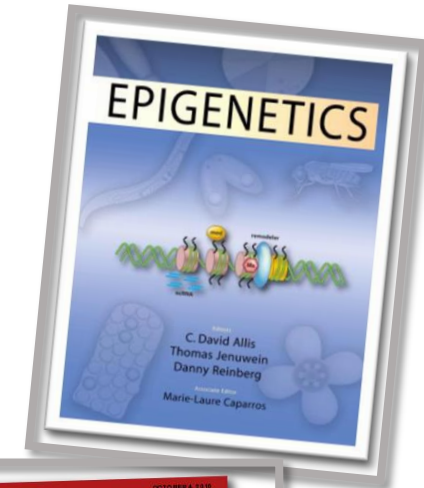
When I was first diagnosed, I was a little shocked and frightened. I met a friend who said, 'You have to take diabetes medicine every day', so I decided to change my lifestyle and try not to become dependent on medicine.

Mr Song Hee Pheow
TAXI DRIVER WITH COMFORTDELGRO ON HIS REACTION WHEN HE RECEIVED THE NEWS HE HAD DIABETES, WITH HIS HEALTH COACH'S ADVICE AND DOCTOR'S ENCOURAGEMENT, THE TAXI DRIVER BEGAN A NEW FITNESS REGIMEN, SUCH AS DOING SIMPLE STRETCHING EXERCISES USING A STRETCH BAND.

HOT NEWS • 8

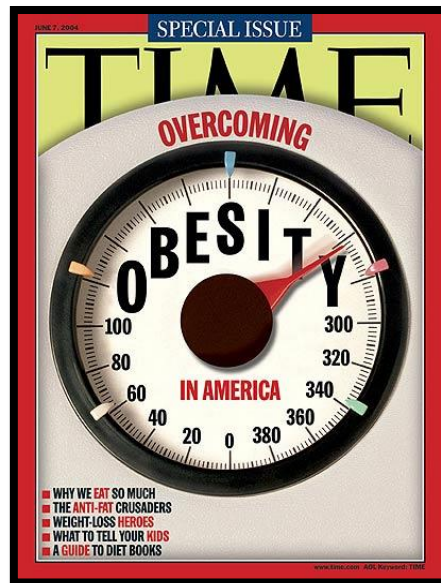
The Type 2 Diabetes Epidemic

- Predicting the epidemic of type 2 diabetes
- Global patterns & Asian statistics on type 2 diabetes & data on the epidemic
- What are the drivers of the diabetes epidemic
- Famines & epigenetics – early life influences/exposures: a new paradigm for prevention?
- The implications for Asian nations and individuals

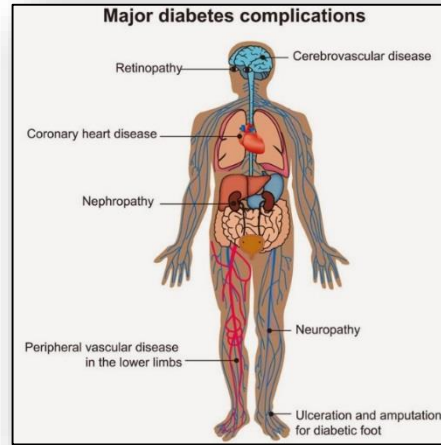


DIABESITY

"The twin epidemics of obesity and diabetes represent the biggest public health challenge of the 21st century"



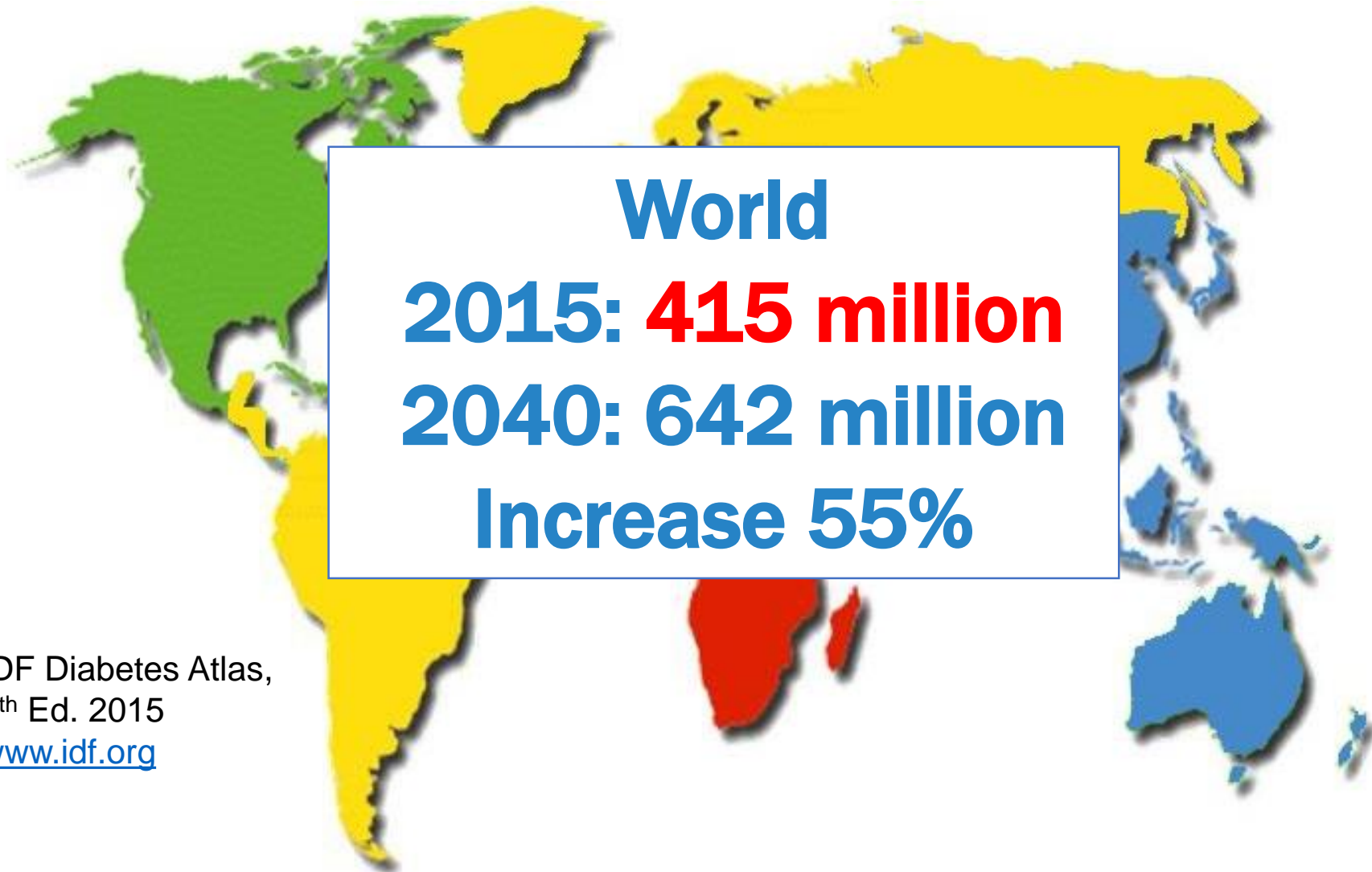
Diabetes: A Complicated Disease!!



Diabetes is now the leading single cause of..



Global Projections for the Diabetes Epidemic: 2015-2040 (millions)

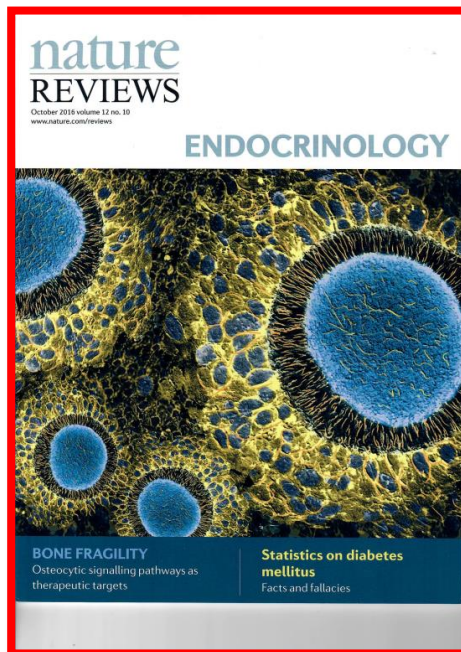


IDF Diabetes Atlas,
7th Ed. 2015
www.idf.org



- For many countries without national data, the IDF relies on extrapolating data from other nations with similar demography to obtain a result.
- It is not possible to obtain an exact picture of the global or Asian burden. Many developing nations do not have national data.
- In an attempt to get around this problem, WHO developed its STEPS programme. This has its own serious limitations - differences in methodology and diagnostic criteria make comparisons very difficult.
 - FPG alone underestimates diabetes by >25%.

• IT IS MORE LIKELY THAT THE IDF FIGURES ARE UNDERESTIMATES.



PERSPECTIVES

OPINION

Diabetes mellitus statistics on prevalence and mortality: facts and fallacies

Paul Zimmet, K. George Alberti, Dianna J. Magliano and Peter H. Bennett

Abstract | Diabetes mellitus is one of the most important public health challenges of the twenty-first century. Until the past decade, it has been seriously underrated as a global health threat. Major gaps exist in efforts to comprehend the burden nationally and globally, especially in developing nations, due to a lack of accurate data for monitoring and surveillance. Early attempts to obtain accurate data, discussed in this article, seem to have been cast aside so, at present, these needs remain unmet. Existing international efforts to assemble information fall far short of requirements. Current estimates are imprecise, only providing a rough picture, and probably underestimate the disease burden. The methodologies that are currently used, and that are discussed in this Perspectives article, are inadequate for providing a complete and accurate assessment of the prevalence of diabetes mellitus. International consensus on uniform standards and criteria for reporting national data on diabetes mellitus prevalence as well as for common complications of diabetes mellitus and mortality need to be developed.

the UN General Assembly made a political declaration on the prevention and control of NCDs⁷, which was followed by a call by the World Health Assembly to reduce avoidable mortality from NCDs by 25% by 2025 (REF. 8). Although these calls were welcomed, the practicalities of attaining such targets are fraught with difficulties — including that of defining diabetes mellitus, its complications and prediabetes to enable estimation of the burden of T2DM and its complications both nationally and globally.

Historical view — definitions

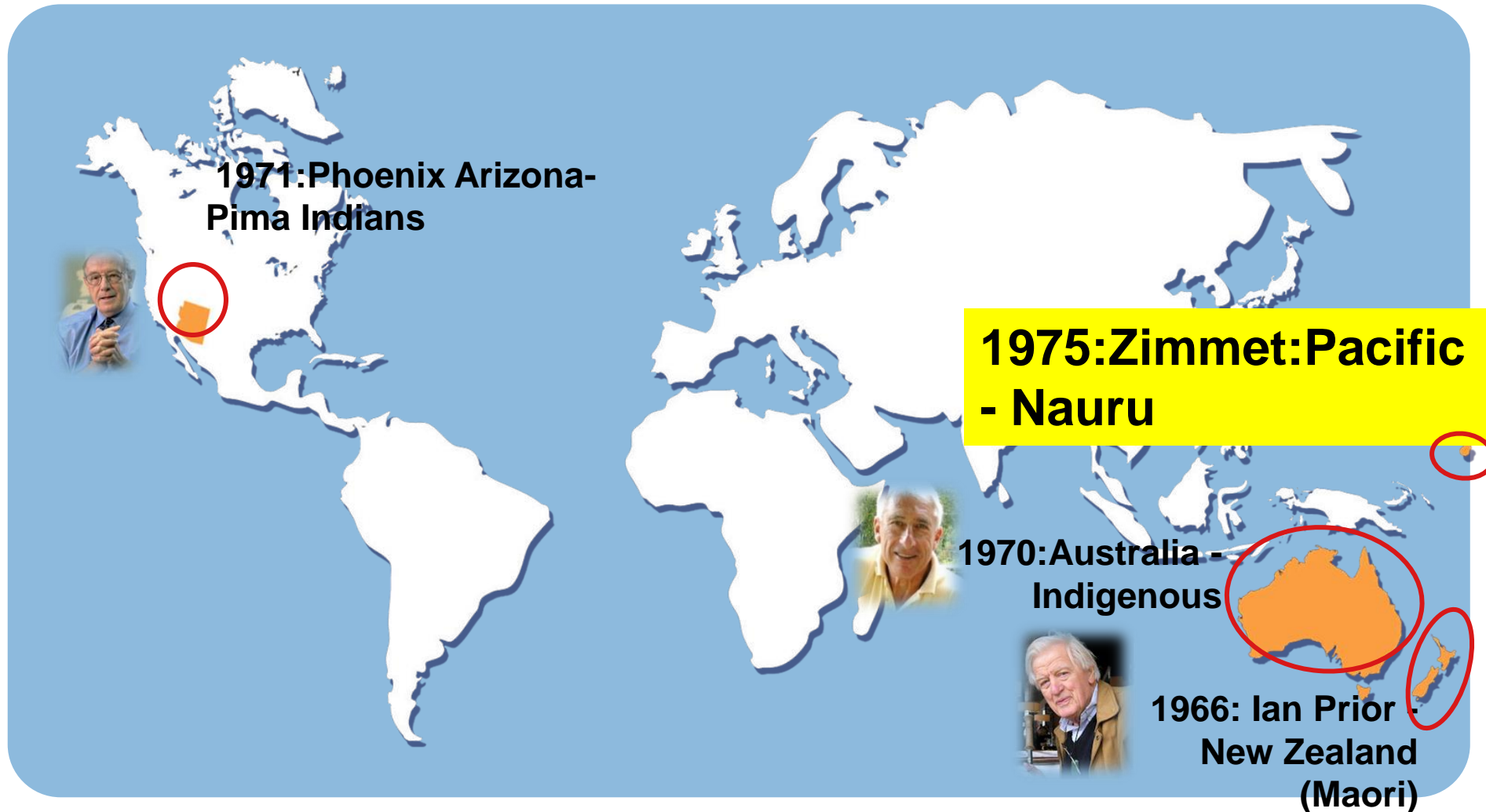
Published in 1978, the late Kelly West's book 'Epidemiology of Diabetes and its Vascular Lesions' (REF. 9) provided the impetus for increased attention to the epidemiology of diabetes mellitus and the need to define internationally accepted diagnostic criteria. This book foresaw the emergence of epidemiology as a major area of diabetes mellitus research — diabetes mellitus epidemiology was coming of age. West's book brought together almost all the contributions (clinical and population-based) on the subject of diabetes mellitus epidemiology up to that time. In particular, it highlighted the many gaps in our knowledge, particularly the difficulties



THE EARLY SIGNS

Type 2 Diabetes in the
Pacific and Indian Oceans

A Diabetes Epidemic evolving in the Pacific Region -1966 -1975



Nauru: Setting a World Record for Diabetes:1975



The High Prevalence of Diabetes Mellitus on a Central Pacific Island

P. Zimmet, P. Taft, A. Guinea, W. Guthrie, and K. Thoma

Dept. of Metabolic Medicine and Epidemiology, Southern Memorial Hospital, and Ewen Downie Metabolic Unit, Alfred Hospital, Melbourne, Australia

Table 1. Classification of glucose tolerance of study population based on history of known diabetes or 2-h plasma glucose after 75 g oral glucose load

Category	No.	% of population studied
Normal	120	54.3
Borderline	25	11.3
Diabetic	76	34.4
Total	221	100.0

Western Killer in Paradise

The Melbourne Age, May 1992

A Western killer let loose in paradise

PARADISE — also known as the South Pacific — has palm trees, white beaches, smiling black islanders, peace, pleasure, and no tomorrow. But there will be a tomorrow, and it's looking bad in Paradise. In the past 10 years, many of those smiling people have lost their feet, gone blind, become obese, got heart disease and many kinds of cancers, and have died prematurely. Diabetes, possibly the greatest hidden killer in the world, has hit the South Pacific. Professor Paul Zimmet, director of the Lions International Diabetes Institute in

A Melbourne doctor, known as the "Captain Cook of diabetes" travels the Pacific treating and teaching islanders about one of their most common illnesses.
ANNA KING MURDOCH
reports.

started to get high rates of diabetes, and that



Professor Paul Zimmet: "... heading for a global epidemic of diabetes."

agenda until the coup, when a lot of doctors left the country."

Ten years ago, the Lions International Diabetes Institute became the first World Health Organisation Collaborating Centre for Diabetes. "We're still the only one in the Southern Hemisphere, but there are about 20 now in the Northern Hemisphere."

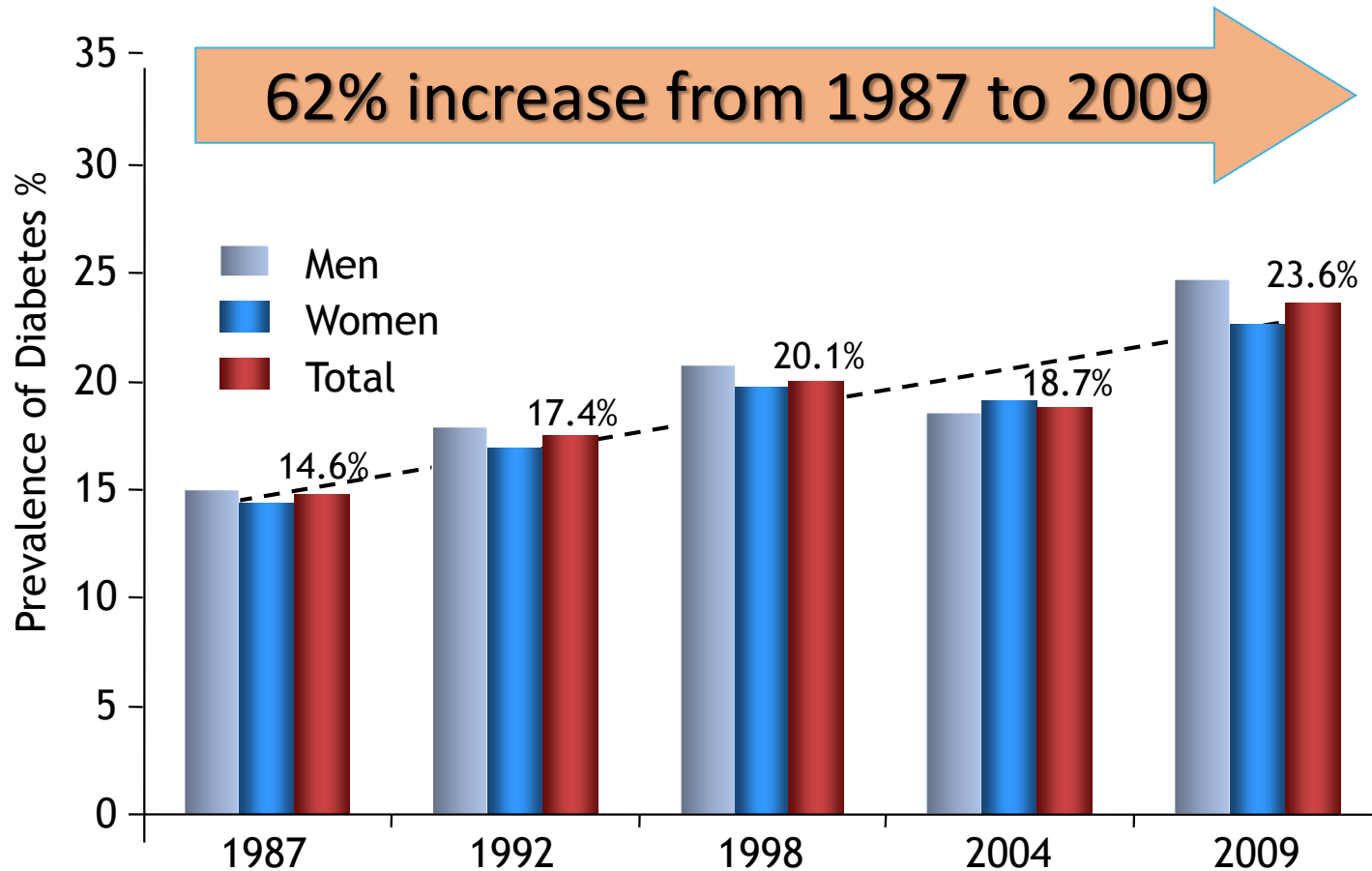
The institute, which is Paul Zimmet's major achievement, nearly closed down its research activities at the end of last year because of lack of funds. For 12 years it had received money from the National Institute of Health in Washington, but last year the supply stopped as American research funds

The Mauritius Diabetes Study

- ▶ 1.6 million people
- ▶ Ethnically diverse: Asian Indians, Blacks (Creoles) & Chinese
- ▶ These 3 ethnic groups constitute two thirds of the global population & especially China and India
- ▶ Studies: 1987, 1992, 1998, 2004, 2009 & 2015



The “Rise & Rise” of Diabetes in Mauritius:1987-2009



Standardised to 2008 population structure of Mauritius

WORLD'S MOST POPULATED COUNTRIES

- 
1. CHINA
 2. INDIA
 3. DIABETES
 4. USA
 5. BRAZIL

INTERNATIONAL Herald Tribune

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ihf.com

THURSDAY, SEPTEMBER 14, 2006

India increasingly crippled by 'the sugar disease'

By N.R. Kleinfield

MADRAS, India: There are many ways to understand diabetes in this choking city of automakers and software companies, where the disease seems as commonplace as saris.

One way is through the story of P. Ganam, 50, a proper woman reduced to fake gold.

Her husband, K. Palayam, had diabetes do its corrosive job on him: Ulcers bore into both feet and cost him a leg. To pay for his care in a country where health insurance is rare, Ganam sold all her cherished jewelry. Gold, as she saw it, swapped for life.

She was asked about the necklaces and bracelets she was now wearing — worthless impostors, as it turned out.

"Diabetes," she said, "has the gold."

And now, Ganam, the scaffolding of her hard-won middle-class existence already undone, has diabetes too.

In its hushed but unrelenting manner, Type 2 diabetes is engulfing India, swallowing up the legs and jewels of those comfortable enough to put on weight in a country better known for famine.

Here, juxtaposed alongside the stick-thin poverty, the malaria and the AIDS, the number of diabetics now totals around 35 million, and counting.

The future looks only more ominous as India hurtles into the present, modernizing and urbanizing. Even more of its 1.1 billion people seem destined to become heavier and more vulnerable to Type 2 diabetes, a disease of high blood sugar brought on by obesity, inactivity and genes, often culminating in blindness, amputations and heart failure.

In 20 years, projections are that there may be a staggering 75 million Indian diabetics.

Obesity and inactivity lead to diabetes

"Diabetes, unfortunately, you pay for it," said Ramachandran, the M.V. Hospital in Madras.

For decades, been the "rich man" for industrialized countries. But as the sugar called, has penetrated and other developed countries, it has trespassed deep into the lush developing world.

In Italy or Germany, diabetes is on the rise. In Cambodia and Myanmar, industrialization and modernization have taken hold faster. For the world,

at the point, according to the United Nations, where more people are overweight than undernourished.

Diabetes does not convey the ghastly despair of AIDS or other killers. But more people worldwide now die from chronic diseases like diabetes than from communicable diseases. And the World Health Organization expects that of the more than 350 million diabetics projected in 2025, three-fourths will inhabit the third world.

"I'm concerned for virtually every country where there's modernization going on, because of the diabetes that follows," said Dr. Paul Zimmet, the director of the International Diabetes Institute in Melbourne, Australia. "I'm fearful of the resources ever being available to address it."

India and China are already home to more diabetics than any other country. Prevalence among adults in India is es-

spotted decades ago when immigrant Indians who were settled in Western countries got diabetes at levels dwarf-

"I'm concerned for virtually every country where there's modernization going on and because of the diabetes that follows..... I'm fearful of the resources ever being available to address it." it

lions of children with too little to eat.

But there is another way to see it: through its newfound excesses and expanding middle and upper classes. In a changing India, it seems to go this way: Make good money and get cars, get houses, get meals out, get diabetes.

Obesity and diabetes stand almost as joint totems of success. Last year, for instance, the MW fast-food and ice cream restaurant in Madras proclaimed a promotion: "Overweight? Congratulations."

The limited-time deal afforded diners savings equal to 50 percent of their weight in kilograms. The heaviest arrival lugged in 135 kilograms, or 297 pounds, and ate lustily at 67.5 percent off.

Too much food has pernicious implications for a people with a genetic susceptibility to diabetes, possibly the byproduct of ancestral genes developed to hoard fat during cycles of feast and famine. This vulnerability was first

sions — birthdays, office parties, mourning observances — and during any visit to someone's home, a signal of how welcome the visitors are and that God is present.

In the United States, an inverse correlation persists between income and diabetes. Since fattening food is cheap, the poor become heavier than the rich, and they exercise less and receive inferior health care. In India, the disease tends to directly track income.

"Jokingly in talks," said Dr. V. Mohan, chairman of the Diabetes Specialities Centre, a local hospital. "I say you haven't made it in society until you get a touch of diabetes."

The New York Times

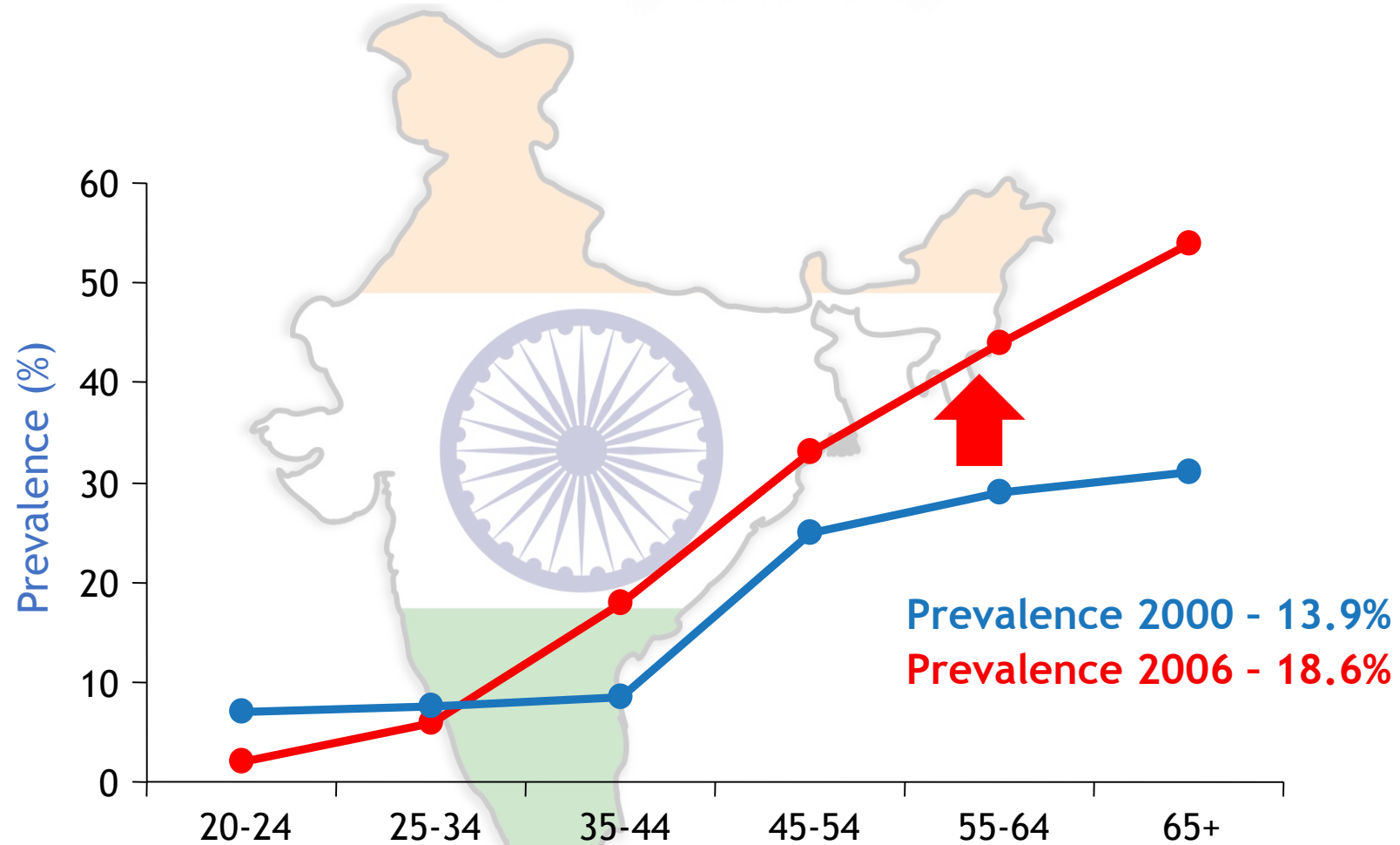
ihf.com/asia

Photographs with commentary on the sweet shops and "sugar hospitals" in urban India.

Coca-colonization in Jaipur, India



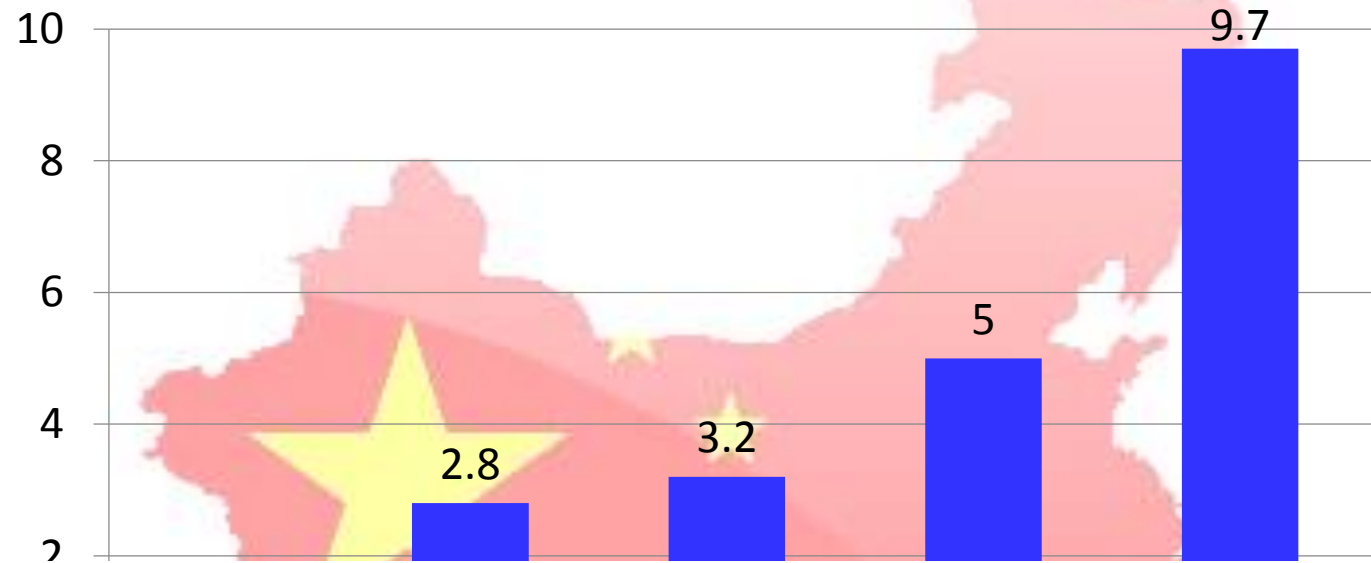
Secular change in diabetes prevalence in urban India (Chennai)



“Coca-colonization” in China



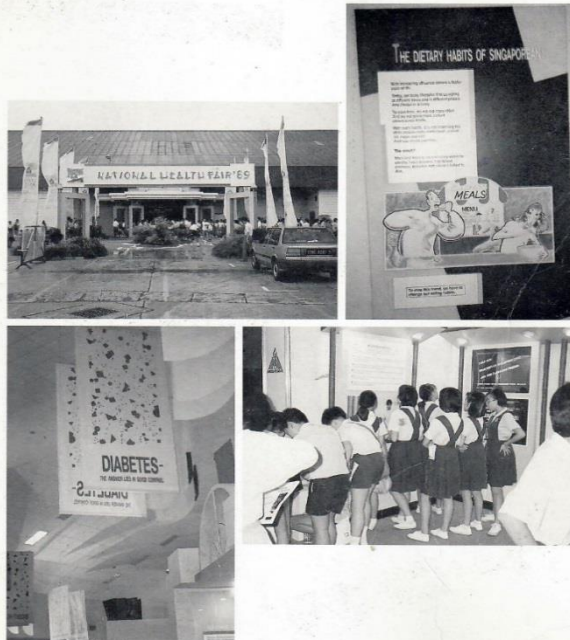
Changes in Prevalence of Diabetes: China (1980-2009)



Now >120 million people with
diabetes

REPORT TO MINISTRY OF HEALTH
SINGAPORE

“DIABETES MELLITUS”



D INTERNATIONAL
DIABETES INSTITUTE

A WHO Collaborating Centre
for Diabetes and Health
Promotion



Melbourne, Australia, March 1990

THE STRAITS TIMES

144 PAGES IN SIX PARTS • MICA (P) 093/03/2005 THURSDAY, NOVEMBER 24 2005 SINGAPORE PRESS HOLDINGS PUBLICATION ESTABLISHED 1845 • 80 CENTS

» UPFRONT

Not-so-sweet truths about diabetes



By SALMA KHALIK
Health Correspondent

YOU may have diabetes and not even know it. That is one awful truth about this disease in Singapore.

About 160,000 people here do not know that they have diabetes because they have never checked. About one in 10 adults here has the disease, double the world average.

Another 450,000 are on the verge of getting it, and over the next eight years, just over a third of them will become diabetic.

So one in four adults here either has diabetes or risks getting it — an epidemic, no less, and adding to Singapore's dubious achievement of having Asia's worst rate of diabetes.

Another awful truth: Few people seem to care too much. "A pervasive attitude is that this disease is not much to worry about. It is not as scary, painful or life-altering as falling ill with cancer or having a heart attack.

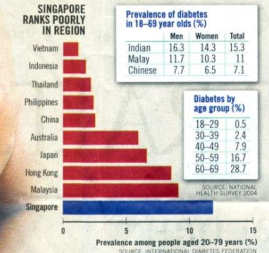
Besides, diabetes is blamed directly for only 3 per cent of deaths.

Now experts are saying the truth is that diabetes might well be the world's No. 1 killer but it has gone hidden from view because patients succumb to other illnesses. It is responsible for many cases of heart attacks, strokes, kidney failure, loss of limbs and blindness.

Two to three diabetes die of heart attacks or strokes. Worse, they are hit younger and these attacks are more likely to be fatal than in people free of diabetes.

Other diabetes may succumb to some cancers or kidney failure. They are also more susceptible to serious infections and can die of pneumonia or septicaemia, blood poisoning. As for pain and suffering, surgeons in Singapore surpris-

Diabetes might well be the world's No. 1 killer but it has gone hidden from view because patients succumb to other illnesses. It is responsible for many cases of heart attacks, strokes, kidney failure, loss of limbs and blindness. Worse, it now hits the young.



Not-so-sweet truths about diabetes

take two legs every day because of diabetes.

Diabetes is also the leading cause of blindness here.

Yet a national health survey last year found that more than one in four diabetes receiving medical treatment had unacceptably high blood glucose levels.

Dr Daphne Khoo, head of endocrinology at Singapore General Hospital, sometimes despairs. "Diabetics need to either change their lifestyles with diet and exercise, or use insulin," she says. "Some refuse to do either."

Insulin, which helps the body absorb glucose from the blood, is given as an injection one or more times a day. This puts many diabetics off.

The trouble with diabetes is that initially, the sick person feels no pain and displays no obvious symptoms. Many only find out when things go seriously wrong.

This was what happened to property agent Aida Abdul Wahab's parents. Her father discovered he had diabetes when a boil on his foot would not heal. But he found

out too late and died at the age of 50 of a heart attack.

Her mother, Madam Ramlih Ali, checked and found that she too was diabetic. She was 58 when she died of septicaemia.

Diabetes often runs in families, and both Madam Aida, 42, and her brother Rahmat, 43, found that they had it too. So has Madam Aida's husband, Mr Asman Mohd Kamal, 43.

Since finding out they have been put on medication, have to watch what they eat and exercise.

Dr Khoo says: "You can't do anything about your genes, but you can watch your weight. Losing 5 to 7 per cent of your weight and exercising regularly can decrease risk of diabetes."

There are two types of diabetes. Type 1, or juvenile diabetes, often affects children and young adults whose bodies do not produce insulin.

Type 2, the more common form, usually affects older people and the overweight. It is often linked to unhealthy lifestyles, but genetics mat-

ters too. Among the races here, Indians are more likely to get diabetes, followed by Malays, then Chinese.

Doctors at a regional diabetes conference in Bangkok last month speculated that the culprit for Singapore's huge diabetic population is its rapid economic progress.

Having a maid to do the housework, a car to drive around in and rich food — all encourage obesity and diabetes.

"We have engineered physical activity out of our lives," said Professor Paul Zimmet of Australia's Monash University.

But the news is not all bad. People can control or even prevent diabetes by exercising and eating properly.

Diabetics are urged to do 150 minutes of exercise a week. That amount of exercise can also halve a person's risk of getting diabetes.

It takes a simple blood test costing about \$30 at any doctor's clinic or \$12 at a polyclinic to check for diabetes.

The good news is: The disease can be kept under control and diabetics can lead normal lives.

Diabetes occurs when the body has problems absorbing glucose, which comes from food. Eating smaller but more frequent meals avoids sending large amounts of glucose into the blood.

Muscle cells absorb the most glucose. When you exercise, these cells take in more glucose and keep the glucose level down.

The downside about keeping this illness under control is that patients must display determination and will power.

As Madam Aida has found, it is not easy. Her blood glucose level has come down, but has yet to reach the healthy level where her risk of complications like heart attack will be on par with everyone else.

Her weakness is chocolate. And she blames her busy work schedule for not exercising enough.

Her husband is more conscientious and more successful. Determined to beat the disease, they have enrolled in Fair Sir Polytechnic's special programme for diabetics.

They are monitored more closely, have longer consultations with doctors, are counselled by nurses, and pay more — \$18 rather than just \$8 per visit.

Mr Asman loves it when the nurses call him a "champ" every time his glucose level goes down a bit.

Dr Khoo says diabetics need the constant reminder that they have to stay well controlled to keep the risk of complications down.

"They can have fats, sweets and alcohol, but only as special treats," she adds.

The experts are unanimous on one thing: A country like Singapore needs to bring diabetes under control or worse is to come.

Already, it is attacking more younger people. If this goes uncontrolled, more diabetes will be felled by complications when they are only in their 30s or 40s.

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DIABETES IN SINGAPORE: 2004 TO 2010*

SINGAPORE	2004	Sample size not provided	National survey; Age: 18-69 years	FPG \geq 7.8 mmol/l or 2h PG \geq 11.1 mmol/l	8.2
	2010 †			FPG \geq 7.8 mmol/l or 2h PG \geq 11.1 mmol/l	11.3

*Singapore Ministry of Health. Disease Burden. Diabetes prevalence in Singapore [Internet], 2015. Available from https://www.moh.gov.sg/content/moh_web/home/statistics/Health_Facts_Singapore/Disease_Burden.html. Accessed 12 April 2015

DIABETES IN MALAYSIA



Nation Home > News > Nation

Friday, 8 April 2016 | MYT 11:20 AM

Hilmi: Alarming increase in diabetes among Malaysians

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KUALA LUMPUR: The diabetes situation in Malaysia is worrying as about 3.5 million or 17.5 per cent of its citizens aged 18 years and above had the disease.

Deputy Health Minister Datuk Seri Dr Hilmi Yahya said that based on the National Health and Morbidity Survey 2015, more than half or 9.2 per cent were unaware that they were diabetic.

"In 2011, there were 15.2 per cent diabetic patients compared with 11.6 per cent in 2006... showing an increase in the number of cases each year," he said at a press conference after officiating at the National-Level World Health Day celebration, here, Thursday.

Diabetes In Malaysia: 2006 to 2013*

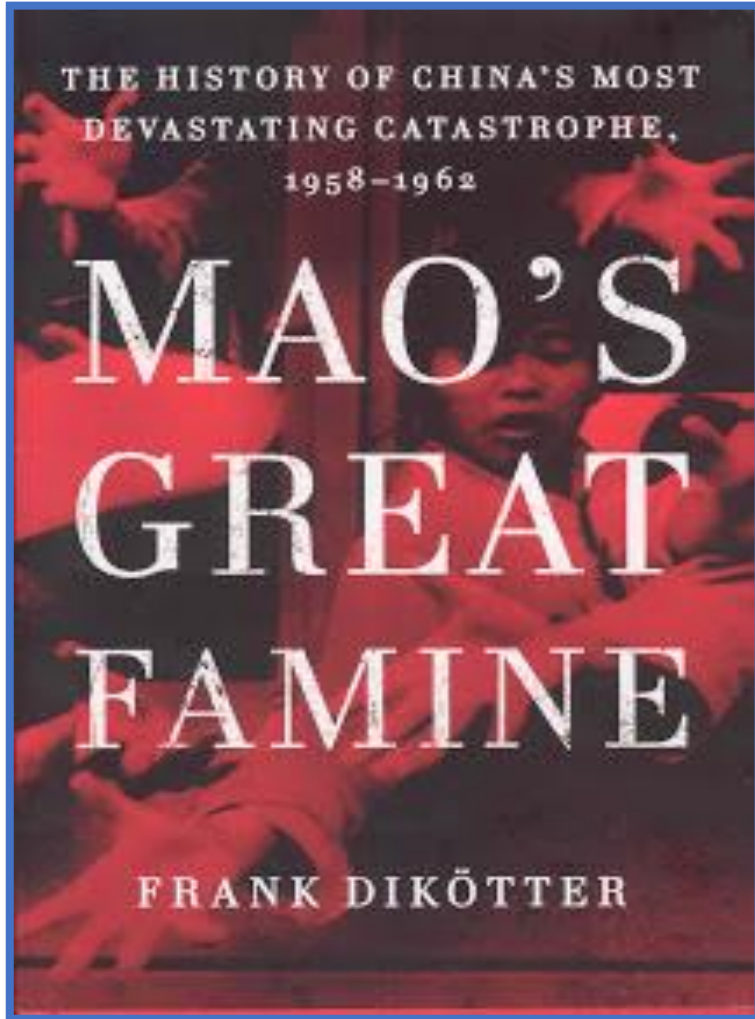
	2006	34539	Malaysian National Health Morbidity Survey III; age ≥ 18 years	FPG ≥ 7.1 mmol/l or known diabetic	11.6
	2013	4341	Two-stage stratified	HbA1c >	22.9
CONCLUSION: This study recorded an overall diabetes prevalence of 22.6%, almost a twofold increase from 11.6% reported in 2006.					

*Wan Nazaimoon WM, Md Isa SH, Wan Mohamad WB, et al. Prevalence of diabetes in Malaysia and usefulness of HbA1c as a diagnostic criterion. Diabet Med 2013;30:825–828

DIABETES IN KOREA: 2005-2012

Republic of Korea	2005	4628	The Korea National Health and Nutrition Examination Survey Age \geq 30 years	FPG \geq 7.0 mmol/l and/or history of diabetes	9.1
	2007-2009	13512	National Health Survey Age \geq 30 years	FPG \geq 7.0 mmol/l	9.9
	2011-2012	14330		FPG \geq 7.0 mmol/l	10.1

The Chinese Famine: 1958 - 1962



- Exposure to the Chinese famine during foetal life or infancy was associated with an increased risk of diabetes in adulthood.
- This associations was stronger among subjects with a Western dietary pattern or who were overweight in adulthood.

Diabetes in Cambodia: 30 years after Pol Pot (1975 -1979)



Diabetes and associated disorders in Cambodia: two epidemiological surveys

Hilary King, Lim Keuky, Serey Seng, Touch Khun, Gajka Roglic, Michel Pinget

Summary

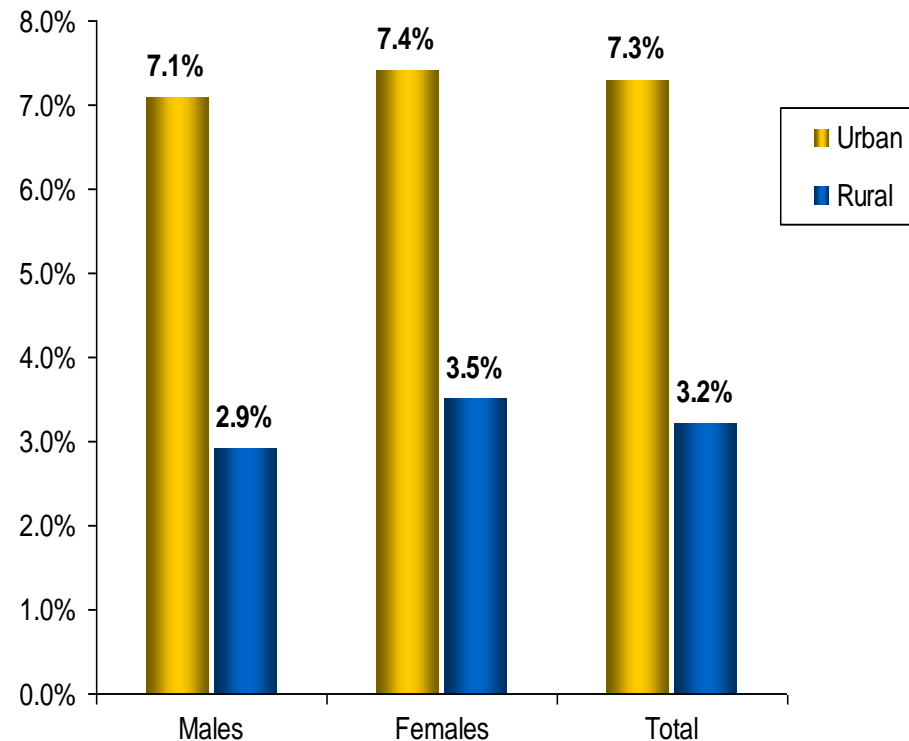
Background The Asia-Pacific region is thought to be severely affected by diabetes. However, reliable, standardised data on prevalence and characteristics of glucose intolerance in Asian populations remain sparse. We describe the results of two field surveys undertaken in Cambodia in 2004.

Methods 2246 randomly selected adults aged 25 years and older were examined in two communities, one rural (Siemreap) and one semi-urban (Kampong Cham). The diagnosis of diabetes and impaired glucose tolerance was based on 2-h blood glucose estimation using criteria recommended by the latest report of a WHO Expert Group. Blood pressure, anthropometry, habitual diet, and other relevant characteristics were also recorded.

Findings Prevalence of diabetes was 5% in Siemreap and 11% in Kampong Cham. Prevalence of impaired glucose tolerance was 10% in Siemreap and 15% in Kampong Cham. About two-thirds of all cases of diabetes were undiagnosed before the survey. Prevalence of hypertension was 12% at Siemreap and 25% at Kampong Cham. People in Kampong Cham had higher estimates of central obesity than those in Siemreap.

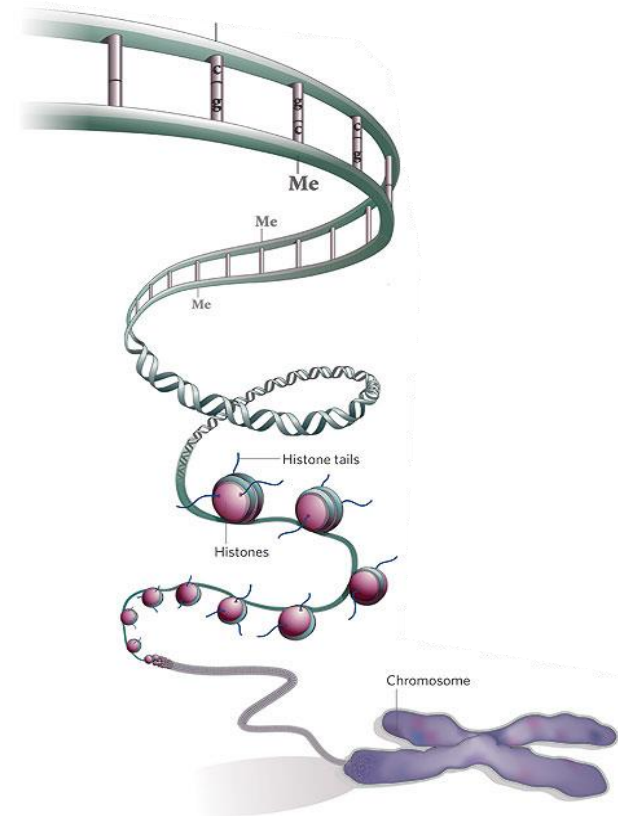
Interpretation Diabetes and hypertension are not uncommon in Cambodia. A quarter of all adults in the chosen suburban community had some degree of glucose intolerance. Since Cambodian society is relatively poor, and lifestyle is fairly traditional by international standards, these findings are unexpected.

Lancet 2005; 366: 1633-39
Centre Européen d'Etude du Diabète, 67200 Strasbourg, France (H King MD),
Prof M Pinget MD; Cambodian Diabetes Association, Phnom Penh, Cambodia (L Keuky PhD),
S Seng MD, T Khun MD; and Department of Chronic Diseases and Health Promotion, World Health Organization, Geneva, Switzerland (G Roglic MD)
Correspondence to: Prof Michel Pinget association-ceed@wanadoo.fr



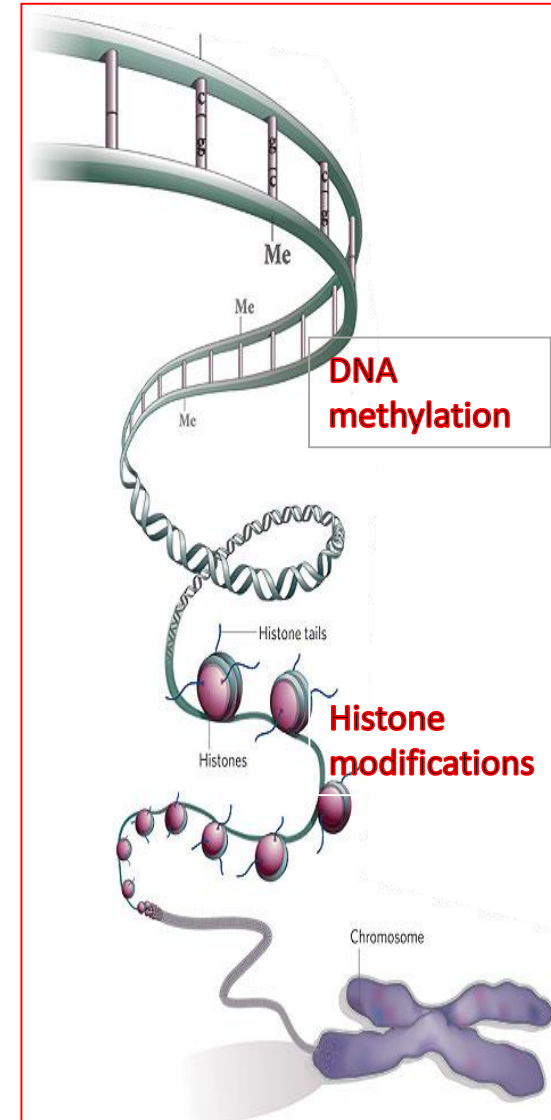
GENES OR EPIGENES?

PRE-PROGRAMMING FOR DIABETES *IN UTERO*

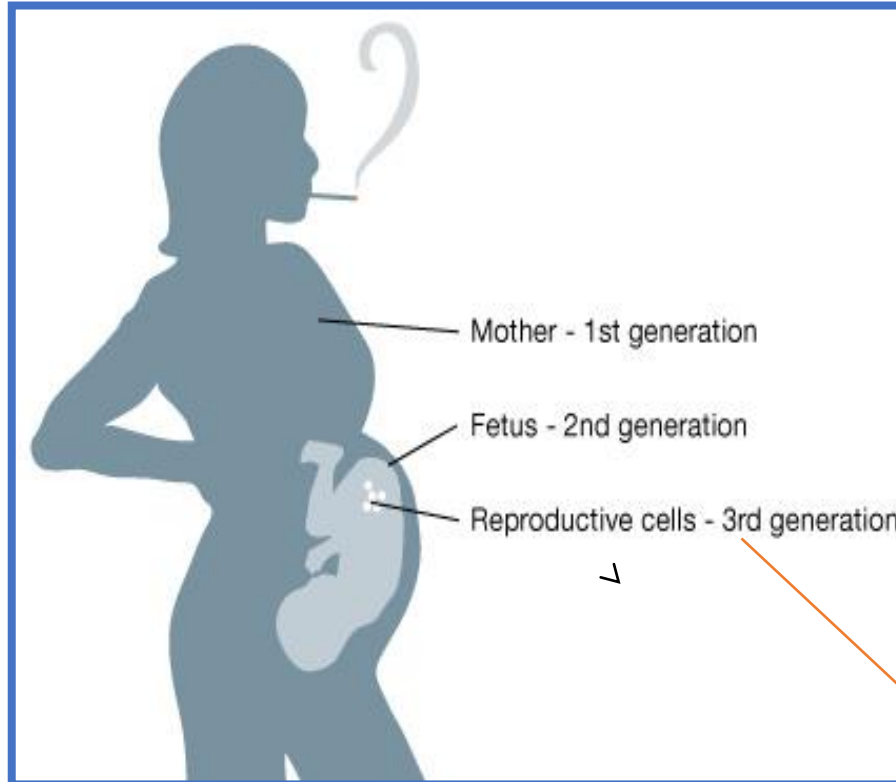


EPIGENETICS

- Changes in gene expression that occur independent of changes in the genomic sequence
- A range of environmental factors including nutrition, chronic illness eg diabetes, alcohol and smoking have been shown to affect gene expression.
- This epigenetic modification occurs by two main mechanisms: methylation of DNA or histone modification



FOETAL PROGRAMMING & INTERGENERATIONAL RISK



Smoking
Alcohol
Malnutrition
Under-nutrition
Stress
Hypertension
Type 2 & Gestational Diabetes

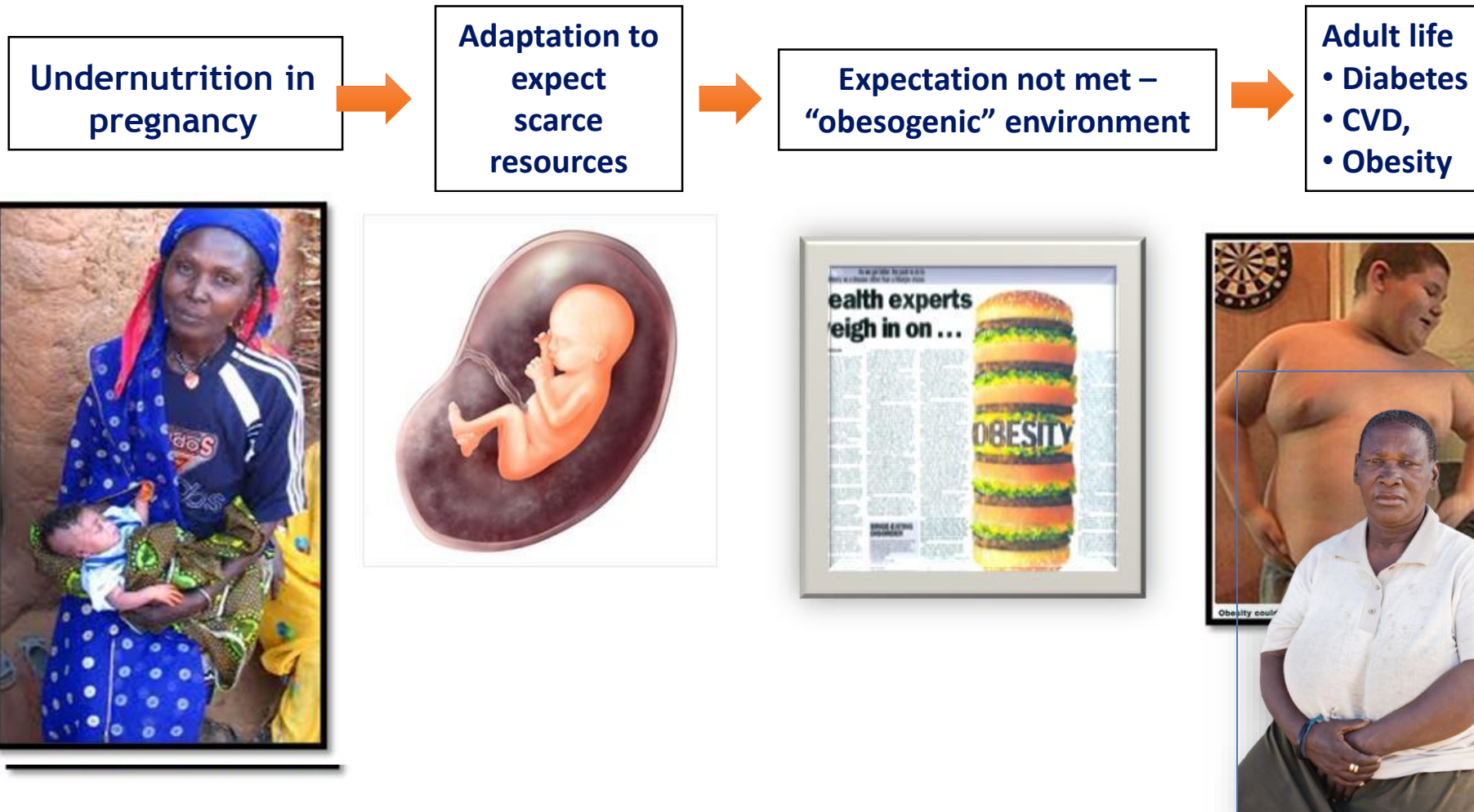
Experimental animal studies... these effects persist through many generations – risk is **Intergenerational**

The Global Epidemic of Type 2 diabetes: Famines, Feast & Epigenetics

- Global diabetes: The greatest epidemic in human history?
- The growing awareness of the early life determinants of chronic disease eg type 2 diabetes
- Is type 2 diabetes predominantly an interaction between lifestyle & genes – the current paradigm?
- Famines - determinants of type 2 diabetes & other NCDs?
- Prevention of type 2 diabetes – relevance of epigenetics and mismatch



MISMATCH: THE RELEVANCE FOR PREVENTION OF TYPE 2 DIABETES



The Implications for Asia:

- Most national predictions are underestimates
- There is a large burden from undiagnosed type 2 diabetes
- Tackling the epidemic means more emphasis on parental, particularly maternal, & child health
- There is still a lot we do not understand about the drivers of diabetes in Asian populations
- Prevention can reduce future socio-economic costs and the burden of complications.
- **Prevention is a priority!!**



IMPLICATIONS FOR ASIA


Diabetes: The looming public health crises threatening to take down China's health care system




China's hospitals are not equipped for the coming floods of patients.

(Reuters/Kim Kyung-Hoon)

A HEALTHIER MALAYSIA?



Fit for life



No escaping lifestyle disease

Even in the interior regions of Sarawak, chronic diseases such as high blood pressure and diabetes are not uncommon. >3

10 Nation



All in good fun: (From left) Kua, Kan and Dr Hilmi striking a pose for photographers at the FitForLife Penang 2016 fair.

More M'sians going for healthy lifestyle

Visitors throng fair to check out fitness deals

By TAN SIN CHOW, CHRISTOPHER TAN, CAVINIA LIM and R. SEKARAN
north@thestar.com.my

GEORGE TOWN: Health and wellness continue to be on the minds of Malaysians, as the FitForLife fair, which is being held in Penang for the second time, shows.

On the second day of the three-day affair, even more turned up at the SPICE Arena to check out deals at the various booths, receive advice and attend talks and activities – all for a healthy lifestyle.

Deputy Health Minister Datuk Seri Dr Hilmi Yahaya, who launched the event yesterday, said he was happy to see more and more Malaysians indulging in various forms of physical activity and exercise, as evidenced by the increasing number of walks, runs and cycling events all over the country throughout the year.

"I would like to congratulate Star Media Group and Great Eastern Life on their efforts to create a platform to encourage all Malaysians to live healthier, better and longer lives.

"FitForLife is now a household name among Malaysians," he added.

Dr Hilmi took a tour of the fair accompanied by Great Eastern Life Assurance executive vice-president and chief marketing officer Nicholas Kua and Star Media Group chief operating officer Calvin Kan.

Kua said they always believed FitForLife fair, which started in Kuala Lumpur five years ago, was the right platform to engage consumers in living great and getting fit.

He said it is vital for them to make



Big crowd: Even more visitors turned up on the second day of the fair.

the 9.5km FitForLife Fun Run at 7.30am.

Early birds to the fair stand to win 500 goodie bags from Star Media Group while 200 members who flash their Live Great card and complete a fun exercise will enjoy complimentary cold-pressed juices courtesy of Great Eastern.

Experts will be on hand to share ideas of leading better and healthier lives in a series of Live Great Talks.

This year's theme Get Fit Live Great! is to inspire Malaysians to lead a healthy lifestyle and adopt a holistic approach that includes phys



Star Fit For Life
GET FIT. LIVE GREAT!

14 - 16 October 2016
Fri & Sat 110am - 7pm | Sun 9am - 7pm
SPICE Arena IPICAL, Penang

A BOOK A DAY
Reading is one of the most effective ways to stimulate the brain and enhance cognitive ability. Cognitive exercise must occur so that the brain can continue to grow.

Log on to livegreat.greasternlife.com for more health and wellness tips.

THE WAR ON DIABETES: SINGAPORE 2016





Gov.sg

21 hrs ·

Like Page

The Ministry of Health declares war on diabetes to help Singaporeans live their lives free from disease, and help those suffering from it to control their condition – starting with promoting a healthy lifestyle and reducing obesity rates. Also at the top of MOH's priorities: promoting healthy lifestyle among youth and ensuring that our seniors live well, age well and leave well.



gov.sg | War on Diabetes: Highlights from MOH's COS Speeches

The Ministry of Health's Budget initiatives this year will aim to achieve Better Health, Better Care, and a Better Life for all S'poreans. MOH declares war on diabetes,...

GOV.SG

Like Comment Share



Budget 2016

Committee of Supply Debate

Fostering a more Caring Society

Ministry of Health

Highlights

- New polyclinics will be opened in Jurong West, Punggol and Bukit Panjang, and new primary care facility will open in Sembawang by 2020
- Community Networks for Seniors announced at Budget 2016 to support successful ageing for seniors in each community
- Agency for Care Effectiveness (ACE) set up to expand capacity in evaluating clinical and cost effectiveness of health technologies
- Government declaring **war on diabetes**, and aims to help Singaporeans live life free from diabetes and help those with the disease to control their condition
- Government to launch National Seniors' Health Programme that will deliver a set of programmes on health issues important to seniors in the community
- New National Silver Academy set up to enable seniors to pursue learning in diverse areas according to their interests
- Government to pilot new initiatives under new Home and Community Care Masterplan to better support seniors to age at home
- Government will develop the NurtureSG Plan to tackle preventable risk factors for the youths
- Government calls on Singaporeans to stick with a regular family doctor

The Ministry of Health's Budget initiatives this year will aim to achieve Better Health, Better Care, and a Better Life for all S'poreans. MOH declares **war on diabetes**, launching a slew of initiatives to help Singaporeans live their lives free from diabetes, and help those with the disease to control their condition. Also at the top of MOH's priorities: promoting healthy lifestyle among youth and ensuring that our seniors live well, age well and leave well.

Acknowledgements

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Mauritius

Sudhir Kowlessur

Pierrot Chitson

N Gopee

V Pauvaday

The Diabetes Epidemic: Future Implications for Asia

- The rise of type 2 diabetes in South Asia is estimated to be more than 150% between 2000 and 2035. The Asia-Pacific, the world's most populous region, has more than 138.2 million people with diabetes, and this may rise to 201.8 million by 2035.
- Although ageing, urbanization, and associated lifestyle changes are the major determinants for the rapid increase, an adverse intrauterine environment and the resulting epigenetic changes could also contribute in many developing countries.
- More than 60% of the people with diabetes live in Asia, with almost one-half in China and India combined.
- The scenario, a virtual tsunami of diabetes, poses huge social and economic problems to most nations in Asia and could impede national and, indeed, global development.
- Unless drastic steps are taken through national prevention programs to curb the escalating trends, the social, economic, and health care challenges are likely to be insurmountable

The Diabetes Epidemic: Future Implications for Asia

The scenario, a virtual tsunami of diabetes, poses huge social and economic problems to most nations in Asia and could impede national and, indeed, global development



THE END