

SINGAPORE'S WAR ON DIABETES

BACKGROUND

1. Diabetes is a serious health concern in Singapore. One in three Singaporeans is at risk of developing diabetes in their lifetime¹. Today, there are over 450,000 Singaporeans living with diabetes². This number is projected to rise to close to 1 million by 2050³, if nothing is done.

2. Diabetes and its related complications, such as ischemic heart disease and stroke, account for 14% of Singapore's total disability-adjusted life years (DALYs), making it the third largest contributor to overall disease burden⁴.

3. One in three cases of diabetes remains undiagnosed⁵. Of those with known diabetes, one in three cases has poor control of their condition⁵. This increases the risk of developing serious complications, such as heart disease, stroke, kidney failure, blindness and lower limb amputations. In Singapore,

- 2 in 3 (66%)⁶ new kidney failure cases had diabetes;
- 1 in 2 (50%)⁶ who had a heart attack had co-existing diabetes;
- 2 in 5 (40%)⁶ who had stroke had co-existing diabetes;
- 7 in 11 people (64%)⁷ at risk of blindness had co-existing diabetes;
- 9 in 10 people (90%)⁷ who had a lower limb amputation had co-existing diabetes.

4. The cost burden of diabetes, including loss to productivity, is anticipated to double from S\$940 million in 2014 to S\$1.8 billion in 2050⁸.

WAR ON DIABETES

5. The Ministry of Health (MOH) launched a War on Diabetes (WoD) in 2016, in response to the significant health and societal burden posed by diabetes, and established the national Diabetes Prevention and Care Taskforce ("Taskforce") to spearhead a whole-of-nation initiative to tackle diabetes. The vision of the Taskforce

¹ NUS Saw Swee Hock School of Public Health; SCs and PRs aged 18 years and above. Prevalence derived using total resident population as denominator and individual-based micro-simulations incorporating demographic, obesity trends, ethnicity, and genetic factors.

² Extrapolated by applying National Health Survey (NHS) 2010 total (known and unknown) DM prevalence onto the total Singapore resident population in 2015. We have assumed that the 2015 DM prevalence is the same as that observed in NHS 2010.

³ NUS Saw Swee Hock School of Public Health; SCs and PRs aged 18 years and above.

⁴ Singapore Burden Of Disease (SBOD) Study, 2010. Cardiovascular diseases and Cancer are the top two contributors to overall disease burden, accounting for 20% and 19%, respectively, of total DALYs.

⁵ MOH Administrative Data.

⁶ National Registry of Diseases Office (NRDO), 2016. Singapore Citizens & Permanent Residents.

⁷ MOH Administrative Data.

⁸ MOH Administrative Data.

is to create a supportive environment for people in Singapore to lead lives free from diabetes, and for those with diabetes to manage the condition well.

- 6. The key strategic thrusts in the WoD to achieve the vision of the Taskforce are:
 - i. **Healthy Living**
Encouraging healthy eating and regular physical activity.
 - ii. **Early Detection and Intervention**
Promoting regular, age-appropriate screening and strengthening follow-up to facilitate early detection and intervention.
 - iii. **Better Disease Management**
Preventing complications and equipping patients for self-care, with the support of a regular family doctor.
- 7. These key thrusts are underpinned by the following cross-cutting enablers:
 - a. **Public Education and Stakeholder Engagement**
Rallying whole-of-society effort to fight diabetes, and engaging relevant stakeholders from healthcare institutions, grassroots organisations, academia and research, and industry.
 - b. **Data and Analytics, Technology & Research**
To derive insights into diabetes and its complications, and help shape a supportive environment for positive change.

KEY INITIATIVES

(i) Healthy Living

8. The Health Promotion Board (HPB) aims to tackle the modifiable risk factors of unhealthy diets and inadequate physical activity, so as to reduce obesity and incidence of diabetes and other related co-morbidities.

Healthy Eating

9. HPB’s food strategy aims to increase availability and access to healthier foods and beverages both in and out of homes, including in workplaces, schools and the community.

(A) Eating out

10. The Health Promotion Board (HPB)’s **Healthier Dining Programme (HDP)** was introduced in 2014 to make healthier dining options more pervasive and accessible by

partnering with F&B operators to offer lower-calorie options (500 calories or less) and dishes that use healthier ingredients such as wholegrains, healthier cooking oils, fruits and vegetables as part of their permanent core menu offerings. In December 2016, the HDP was expanded into mass meal settings, specifically hawker centres and coffee shops, to further increase the availability of healthier options when Singaporeans dine out, making healthy eating more accessible and affordable. The HDP's visual identifier at stalls also helps nudge consumers to order healthier options.

11. The **Healthier Catering Policy** came into effect in April 2017 to demonstrate a whole-of-government commitment to make healthier catering the new norm in government-organised functions and events. Under the policy, caterers must comply with HPB's healthier catering guidelines and use healthier cooking oils, include wholegrains in staple dishes (e.g. rice/ noodles), provide fresh fruits and plain water, limit the number of deep-fried items and serve sugar on the side for coffee and tea. This measure forms part of HPB's comprehensive efforts to encourage healthier eating as a norm outside the home, in our community and workplaces. The policy has also been adopted at public healthcare clusters, offsite catering events such as hotel functions, government training courses, uniformed services cookhouses and school hostels.

12. As an extension of the Healthier Catering Policy, the **Healthier Drinks Policy** was established to make healthier, lower-sugar drinks the default in government premises. From May 2018, all pre-packaged drinks in government premises must meet the Healthier Choice Symbol (HCS)'s "lower in sugar" guidelines⁹, while freshly-prepared hot coffee/tea/malted drinks must be served with no added sugar (sugar may be served at the side). To ensure a level playing field, these requirements apply to all settings including vending machines, retail stores, F&B outlets, meeting rooms and drinks procured by agencies for staff pantries. This policy covers all government offices, premises used for government business transactions, as well as government premises which promote health and wellbeing (e.g. parks, sport facilities, community centres) and/or have an educational role for children and youth (e.g. Polytechnics, libraries). The industry has been supportive of the new policy, with some companies going a step further to reformulate and reduce the sugar level of their drinks in order to continue selling their drinks on government premises.

(B) Eating in

13. The **Healthier Choice Symbol (HCS)** is a visual identifier that makes it easier for consumers to identify healthier packaged food products. Products labelled with the HCS contain less sugar, saturated fat, trans-fat or salt, or are higher in calcium, or wholegrains than regular products within the same category. In support of the WoD, HCS guidelines were revised and the "Low Glycemic Index" claim under the HCS

⁹ HPB's Healthier Choice Symbol (HCS) is a label on packaged food products which indicate that they are healthier options, and this helps consumers make informed food choices when grocery shopping.

programme was expanded from the cereals category to also include convenience meals and legumes, nuts and seeds categories, to encourage more food innovation to widen the range of HCS products. HPB is also actively working with supermarket chains to increase the variety of HCS house brand products, as house brand products are typically more affordable than premium brand products. Currently, the HCS Programme has a variety of house brand products across the major retailers, ranging from oats, brown rice, and bread to eggs and oil.

(C) Healthier Meals in Schools and Pre-Schools

14. Healthy eating habits are best cultivated early as lifelong dietary preferences and habits are formed at a young age. In view of this, HPB has partnered the Ministry of Education (MOE) to serve healthier foods and drinks in mainstream primary and secondary schools as of December 2017. All pre-schools licensed under the Early Childhood Development Agency (ECDA) are not allowed to serve sweetened/sugary drinks, with the exception of milk, since 1 January 2018. Cooks and canteen vendors receive hands-on culinary training from nutritionists and chefs to help them prepare tasty and healthier food.

(D) Partnering industry to develop Healthier Ingredients, Foods and Beverages

15. HPB's **Healthier Ingredient Development Scheme (HIDS)** aims to build the food sector's capabilities to undertake innovations in healthier food development, in order to improve the nutritional quality of food ingredients consumed in the food services sector. In July 2017, MOH announced that it would invest S\$20 million over 3 years to incentivise food ingredient manufacturers and suppliers to develop better quality and greater varieties of healthier cooking oils and staples such as rice and noodles, and to promote their adoption among F&B businesses and consumers. The HIDS promotes co-funding support for activities such as research, product development, marketing & publicity, and trade promotions. The HIDS has now been extended to spur industry reformulation efforts to reduce the sugar content of high-sugar foods and drinks, such as sugar-sweetened beverages (SSBs), desserts as well as sauces.

16. HPB has engaged beverage manufacturers to reduce the sugar level of SSBs sold in Singapore. In August 2017, the top seven industry leaders (including Coca-Cola, Nestle and PepsiCo) **committed to a maximum sugar content of 12% for all of their drinks sold in Singapore by 2020**, representing a total saving of 300,000 kg of sugar consumed per year. In addition, many are also actively reformulating to reduce sugar content in drinks across their portfolio, to cater to the increasing demand for lower-sugar beverages from consumers. The Taskforce is studying measures on how to encourage further reductions in sugar consumption in Singapore, learning from the experiences of other countries.

Physical Activity

17. HPB works with both public and private agencies to conduct programmes to encourage Singapore residents to become more physically active. Singapore's first broad-based nation-wide steps movement, the **National Steps Challenge (NSC)TM**, aims to get people to "move more and sit less" by clocking steps to get rewards when they reach different physical activity milestones, leveraging smartphone and wearable technology. Approximately 70% of participants in the NSC who started off "insufficiently active" have been walking more, post-challenge. The NSC has drawn more than half a million participants over its two editions. To sustain participants' interest and to motivate Singaporeans to adopt a more active lifestyle, HPB introduced new features such as the inaugural Community Challenge in the third season of the Challenge.

18. HPB will continue to encourage Singapore residents to pick up a sport or leisure time physical activity by **making group workout sessions and physical activity programmes more accessible and pervasive across community and workplace settings**. Popular programmes include Sunrise in the City (SITC), Sundays @ The Park (SATP), Fitness@Work and Community Physical Activity Programmes (CPAP).

19. HPB has **increased opportunities for physical activities in pre-schools, mainstream schools and Institutes of Higher Learning (IHLs)**, to make healthy living more convenient and accessible to students. Under the **FunXplore** (for pre-schoolers) and **Active Kids Programme** (for primary school students), overweight or severely overweight children are supported to inculcate positive lifestyle habits, so as to enable them to achieve a healthier weight. Other efforts include enhancing pre-schools licensing regulations for childcare centres to include provisions for minimum levels of physical activity, as well as introducing a "train-the-trainer" pilot model in IHLs to identify and train students as in-house instructors, to generate interest in physical activity through peer influence.

20. Outside of the school curriculum, HPB has worked with public agencies such as SportSG to initiate and pilot the **Active Family programme**, where fun activities were introduced in parks, recreational centres and open spaces to encourage parents and their children to engage in physical activity. This increases opportunity for physical activity and encourages parent-child bonding time.

(ii) Screening and Follow-Up

21. The **Screen for Life (SFL)** programme is a national screening programme driven and implemented by HPB, which provides the recommended population level screening tests. Under the SFL, Singapore residents (Singapore Citizens & Permanent Residents) are offered age- and gender-appropriate health screening tests at participating General Practitioner (GP) clinics and polyclinics. SFL offers screening and follow-up services for cardiovascular risk conditions (obesity, diabetes, hypertension,

hyperlipidaemia) and selected cancers (breast, cervical and colorectal). From September 2017, MOH and HPB enhanced screening subsidies to benefit all Singaporeans, such that all eligible Singaporeans¹⁰ can access subsidised screening and follow-up consultation at participating GP clinics at a low, fixed fee. Eligible Singaporeans pay S\$5 for a screening visit and consultation for the first follow-up visit (if a follow-up consultation is required), while Community Health Assist Scheme (CHAS)¹¹ cardholders pay \$2, and Pioneers¹² do not have to pay.

22. The current SFL recommendation is for those aged 40 years and above to go for diabetes screening once every 3 years. However, age is not the only risk factor for diabetes, and some below 40 years old may also be at risk of diabetes due to other factors. Hence, MOH rolled out the **Diabetes Risk Assessment (DRA)** tool in September 2017 with the aim of identifying younger adults aged 18 – 39 years who are at higher risk of undiagnosed diabetes, and encourage them to go for screening and follow-up. The tool also serves to raise awareness of diabetes and the importance of adopting healthy lifestyle habits (such as having a healthy diet and regular physical activity) among young adults. The DRA is an evidence-based, self-administered questionnaire consisting of 8 questions on age, gender, family history of diabetes, body mass index (BMI), history of hypertension and gestational diabetes mellitus (GDM), physical activity and nutrition¹³. Subsidised cardiovascular risk screening and follow up at CHAS GP clinics is available for individuals assessed to be at higher risk, as part of a 3-year pilot under the SFL scheme.

23. To improve post-screening follow-up, we have adopted a multi-pronged approach:

- Residents with abnormal screening results are contacted by phone, either through tele-care nurses, HPB's health screening providers, or tele-care Health Ambassadors, to encourage them to see a doctor.
- Residents may be referred to HPB's "Take Charge Programme", which equips individuals to better manage their chronic condition(s) through lifestyle changes, or to one of HPB's Community Health Posts (CHP), which serve to increase accessibility to regular health coaching and lifestyle follow-up post-screening for residents. For pre-diabetics, HPB offers a 12-week structured Diabetes Prevention Programme (DPP) that comprises a series of nutrition workshops

¹⁰ Eligible Singaporeans refers to those who received a SFL invitation letter from HPB to go for health screening at participating clinics.

¹¹ The Community Health Assist Scheme (CHAS) was introduced in 2012. It enables Singapore Citizens from lower-to-middle income households, as well as all Pioneers, to receive subsidies for medical and dental care at participating GP and dental clinics.

¹² Pioneers refers to Singapore Citizens who were aged 65 years and above in 2014. Pioneers are entitled to healthcare benefits for life.

¹³ The optional questions on physical activity and consumption of sugary beverages are not used to compute one's risk assessment score. They were included to help individuals take stock of their lifestyle habits, which can contribute to the risk of developing diabetes over time.

and exercise sessions, and also facilitates participants' lifestyle changes of participants through a goal setting component and monthly text message nudges.

- In April 2017, HPB launched a complementary personal health management module on the HealthHub Track (mobile app) to prevent diabetes. With this, pre-diabetics can self-monitor physical activity levels, their diet, and manage their conditions.

24. In Singapore, it is estimated that 1 in 5 pregnancies are complicated by GDM¹⁴. Women with GDM are at an increased risk of complications during pregnancy (e.g. the development of high blood pressure) and at delivery (due to the baby growing too large and requiring surgical delivery via caesarean section). They are also at increased risk of GDM in subsequent pregnancies, and Type 2 diabetes later in life. In Singapore, two-thirds of mothers who have GDM go on to develop diabetes later in life. To identify pregnant women with GDM early so that they can receive the appropriate clinical management and follow-up, MOH **extended routine GDM screening to all pregnant women at public healthcare institutions** with maternity services, marking a shift from previous guidelines where only pregnant women assessed to be at high risk of GDM were screened.

(iii) Better Disease Management

25. The control of diabetes, and prevention or delay of complications, can be enhanced through equipping patients for self-care and the holistic management of diabetes patients by their regular family doctor. The long-term goal is for all patients with diabetes to have care anchored by their regular family doctor in the community as far as possible, with various services coordinated within primary care, and integrated care arrangements with specialists and hospitals where needed. As part of primary care transformation, MOH is enhancing our primary care's capacity and capability in chronic disease management through ongoing initiatives such as (i) **subsidising Family Medicine training** to develop more Family Physicians to helm more complex chronic care, including diabetes, in primary care, (ii) developing **Primary Care Networks (PCNs)** to organise GPs into virtual networks that support more holistic and team based care; and (iii) providing access to support services such as diabetic eye and foot screening, and nurse counselling, at **Community Health Centres (CHCs)**.

26. To better equip primary care doctors to manage patients with pre-diabetes and diabetes, the Agency for Care Effectiveness issued three **Appropriate Care Guides (ACGs)** on:

- Oral glucose-lowering agents in Type 2 diabetes mellitus – An update

¹⁴ Growing Up in Singapore Towards Healthy Outcomes (GUSTO) Study.

- Managing pre-diabetes – A growing health concern
- Initiating basal insulin in Type 2 diabetes mellitus

27. MOH has launched key flagship programmes to prevent and retard diabetes-related complications, such as eye and kidney diseases. MOH introduced a national programme called **Holistic Approach for Lowering and Tracking Chronic Kidney Disease (HALT-CKD)** with the aim of slowing down the rate of CKD deterioration, and reducing the current rising trend of kidney failure rate. Besides optimising the doses of kidney-protective medication doses, HALT-CKD also seeks to identify and control other risk factors that contribute to kidney function deterioration, such as blood pressure and blood sugar control. HALT-CKD is currently being implemented across all polyclinics in Singapore. With the HALT-CKD programme and other prevention efforts to promote healthier lifestyles, regular screening and better management of diabetes, we aim to reduce the current rising trend of kidney failure.

28. Under the **Singapore Integrated Diabetic Retinopathy Programme (SiDRP)**, the Singapore National Eye Centre (SNEC) and National Healthcare Group Eye Institute (NHGEI) have collaborated with the polyclinics to support the provision of diabetic retinopathy screening for diabetic patients. The programme allows transmission of retinal images from the polyclinics to trained image graders at SNEC and NHGEI. Patients noted to have diabetic retinopathy or other retinal conditions requiring specialist care will be referred to the Specialist Outpatient Clinics accordingly.

29. Diabetes is the most common cause of non-traumatic lower extremity amputations (LEAs). Singapore has a higher rate of diabetes-related LEAs compared to OECD countries. In 2015, about 180 diabetes-related major LEAs¹⁵ were performed for every 100,000 adult Singaporeans with diabetes, compared to the OECD average of 60¹⁶. To address this, MOH is **setting up the National Diabetic Foot Workgroup to develop a national strategy aimed at reducing diabetes-related LEAs**. The workgroup will (i) review the organisation and provision of diabetic foot services at the national level; (ii) make recommendations on national care guidelines; and (iii) review roles and training needs of healthcare professionals involved in diabetic foot care.

30. MOH is also developing a **Patient Empowerment (PE) for Self-Care Framework** to help Singaporeans with diabetes initiate and sustain lifestyle changes, and improve treatment adherence for better disease management, with the support of healthcare professionals, community-based providers, and other forms of social support. A key component of this framework will be the development of curricula and materials designed for patients, caregivers and the public. They will cover topics such as healthy eating habits and exercise.

¹⁵ Major LEA refers to the surgical removal of lower limb, including leg or foot, as defined in Organisation for Economic Co-operation and Development (OECD)'s Health at a Glance, 2015.

¹⁶ OECD's Health at a Glance, 2015.

31. Early diagnosis and better management of pre-diabetes will reduce the risk of developing Type 2 diabetes and other diabetes-related chronic diseases and complications. To better support pre-diabetic patients in identifying and managing their conditions, MOH **extended the Chronic Disease Management Programme (CDMP)¹⁷ and CHAS Chronic¹⁸ coverage to include pre-diabetes as an extension of the scope of diabetes** from June 2018. Individuals with existing pre-diabetes, as well as those who are found to be pre-diabetic during health screenings, will be eligible for Medisave¹⁹ use under CDMP as a result of the expansion, thus helping patients defray their out-of-pocket costs. Eligible patients can also enjoy CHAS Chronic subsidies for pre-diabetes management at CHAS clinics.

32. Some diabetics need to regularly monitor their blood glucose and need to purchase various consumables, such as lancets and test strips, which can be costly in the long run. As part of the WoD, MOH has now **extended CDMP coverage to include consumables for blood glucose self-monitoring, namely lancets and test strips, for patients on insulin.**

33. MOH and Integrated Health Information Systems (IHiS) are jointly developing a **National Diabetes Database (NDD)**, to better support diabetes care. The NDD will consolidate data from multiple databases in our healthcare institutions and the National Electronic Health Record (NEHR)²⁰. The NDD will support clinical decision-making, and allow MOH to monitor and evaluate the impact of its policies and programmes on diabetes prevalence, health outcomes and healthcare utilisation.

(a) PUBLIC EDUCATION AND STAKEHOLDER ENGAGEMENT

34. HPB's public education campaign – "**Let's BEAT Diabetes**" was launched in September 2016. It emphasises that the War on Diabetes must be fought not only at the community level, but also at an individual level. As encapsulated in the acronym '**BEAT**', all individuals are encouraged to **B**e Aware, **E**at Right, **A**dopt an Active Lifestyle, and **T**ake Control, to fight diabetes together as a nation. This slogan was widely marketed, together with a publicity campaign, which aimed to promote public

¹⁷ The Chronic Disease Management Programme (CDMP) was introduced in 2006 to improve care for persons with chronic disease, and to increase the affordability of chronic disease management costs in the outpatient settings for patients. Under CDMP, patients can draw on their Medisave or their family member's Medisave to pay for management of their chronic diseases, reducing out-of-pocket payments for outpatient treatment at both primary care and specialist settings.

¹⁸ For patients with chronic conditions (such as diabetes), CHAS complements the CDMP, which allows Medisave to be used for outpatient treatment (for the same set of chronic conditions) covered under CHAS. Besides enjoying CHAS subsidies for treatment of their chronic conditions, patients can also tap on Medisave to defray part of the cost of these treatments.

¹⁹ Medisave is a national medical savings scheme which helps individuals put aside part of their monthly income into their Medisave Accounts to meet their future personal or immediate family member's hospitalisation, day surgery and certain outpatient expenses.

²⁰ The National Electronic Health Record (NEHR) is a secure system that collects summary patient health records across different healthcare providers. This enables authorised healthcare professionals to have a holistic picture of a patient's healthcare history.

awareness about diabetes, through a variety of platforms, such as television commercials, outdoor advertisements, and digital media.

35. HPB also developed a **structured public education package on diabetes prevention** for community partners, including grassroots organisations, Voluntary Welfare Organisations (VWOs), temples and mosques. These support packages (comprising easy-to-understand, bite-sized information on the key pillars of diabetes prevention and management, as well as healthier recipes and diabetes tip-sheets) help engage residents in their communities during events or activities, in the fight against diabetes.

36. MOH, in collaboration with the Institute of Policy Studies (IPS), conducted a new form of engagement under the auspices of the Taskforce, called the **Citizens' Jury (CJ)**. The CJ is a form of deliberative engagement that involves the community in the decision-making process on an issue of significance to them. A total of 76 participants were recruited for the CJ, and included individuals with diabetes, caregivers to diabetic patients, healthcare providers, as well as individuals who neither had nor knew others with diabetes. Participants discussed ideas, reached a consensus on recommendations they developed, and presented a consolidated report to MOH at the end of the engagement exercise. Recommendations from the CJ are being considered by the Taskforce for potential implementation, and will feed into our ongoing efforts in the WoD.

(b) DATA AND ANALYTICS, TECHNOLOGY AND RESEARCH

37. MOH has identified **diabetes as one of our priority R&D focus areas**. MOH has a variety of grant schemes to encourage and support the spectrum of diabetes research activities, from upstream biomedical research to downstream Translational Clinical Research and Health Services Research. MOH is working closely with the research community to study areas such as better prevention measures against diabetes, major factors that contribute to the rapidly rising incidence of diabetes in Singapore and ways to delay or prevent progression to diabetes-related complications.

MINISTRY OF HEALTH, SINGAPORE

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