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POPULATION-BASED AND INDIVIDUAL APPROACHES TO THE PREVENTION AND MANAGEMENT OF DIABETES AND OBESITY

Introduction

1. Obesity and diabetes are affecting the peoples of the Americas at high and increasing rates. National surveys demonstrate that obesity is increasing in prevalence among all age groups; 7% to 12% of children under 5 years old and one-fifth of adolescents are obese,¹ while rates of overweight and obesity among adults approach 60%.^{2,3,4} Obesity is the major modifiable risk factor for diabetes.⁵ The estimated number of people with diabetes in Latin America is expected to increase by more than 50%, from 13.3 million in 2000 to 32.9 million by 2030.⁶ Diabetes and obesity are no longer “diseases of affluence,” and disproportionately affect the poor⁷ and the less educated of

¹ Pan American Health Organization. The WHO Global Strategy on Diet, Physical Activity and Health (DPAS), Implementation Plan for Latin America and the Caribbean 2006-2007. (Unpublished document); 2006.

² Belize, Ministry of Health; Pan American Health Organization. Central American Diabetes Initiative (CAMDI). Survey of Diabetes, Hypertension, and Chronic Disease Risk Factors, Belize City, Belize. Washington, DC: PAHO/WHO; 2007 (In press).

³ Nicaragua, Ministerio de Salud; Pan American Health Organization. Central American Diabetes Initiative (CAMDI). Survey of Diabetes, Hypertension, and Chronic Disease Risk Factors, Managua, Nicaragua. Washington, DC: PAHO/WHO; 2007 (In press).

⁴ El Salvador, Ministry of Public Health; Pan American Health Organization. Central American Diabetes Initiative (CAMDI). Survey of Diabetes, Hypertension, and Chronic Disease Risk Factors, Santa Tecla, El Salvador. Washington, DC: PAHO/WHO; 2007 (In press).

⁵ Astrup A, Finer N. Redefining type 2 diabetes: “diabesity” or “obesity dependent diabetes mellitus” *Obes Rev* 2000;1:57–59.

⁶ Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes. Estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27(5):1047–1053.

⁷ World Health Organization. Preventing Chronic Disease. A Vital Investment. Geneva: World Health Organization; 2005.

the Region.^{8,9} In 2006, Ministers of Health throughout the Americas adopted the Regional Strategy and Plan of Action on an Integrated Approach to the Prevention and Control of Chronic Diseases, including Diet, Physical Activity, and Health (CD47/17, Rev. 1). Given the upward trend in cases of obesity and diabetes in the Americas and armed with the evidence that cost-effective interventions to prevent and manage these conditions exist, the time to prioritize implementation of these actions is now.

Background

2. Overweight in adults is defined as body mass index (BMI) between 25 kg/m² and 29.9 kg/m² and obesity as BMI above 30 kg/m². Research has demonstrated a strong and consistent link between obesity and diabetes; increases in BMI are associated with increased risk for diabetes^{10,11} and abdominal obesity has emerged as a strong predictor of diabetes.¹²

3. Diabetes mellitus is a chronic metabolic disease characterized by elevated blood glucose (hyperglycemia). It is associated with an absolute or relative deficiency in the secretion and/or action of insulin.¹³ There are three main forms of diabetes: type 1, type 2, and gestational diabetes. Type 2 diabetes is the most common and accounts for approximately 85% to 90% of all cases. It is related to modifiable risk factors such as obesity or overweight, physical inactivity, and high-calorie diets of low nutritional value. No breastfeeding or breastfeeding for a short duration during infancy is also associated with increased risk of overweight/obesity and type-2 diabetes compared to breastfeeding for a longer duration¹⁴. Intermediate hyperglycemia, often called prediabetes, is a component of the metabolic syndrome, which is characterized by the presence of prediabetes in conjunction with one other cardiovascular disease (CVD) risk factor (hypertension, upper body obesity or dyslipidemia). Recent estimates reveal that among Latin American and Caribbean countries, the highest prevalence of diabetes has been

⁸ Ragoobirsingh D, Lewis-Fuller E, Morrison E Y St. A. The Jamaican Diabetes Study. A Protocol for the Caribbean. *Diabetes Care* 1995;18(9):1277-1282.

⁹ Barceló A, Peláez M, Rodríguez-Wong L, Pastor-Valero M. The prevalence of diagnosed diabetes among the elderly of seven cities in Latin America and the Caribbean. *J Aging Health* 2006;18(2): 224–239.

¹⁰ Ford ES, Williamson DH, Liu S. Weight change and diabetes incidence: findings from a national cohort of US adults. *American Journal of Epidemiology* 1997;146(3):214-222.

¹¹ Resnich HE, Valsania P, Halter JB, Lin X. Relation of weight gain and weight loss on subsequent diabetes risk in overweight adults. *J Epidemiol Community Health* 2000; 54:596–602.

¹² Meisinger C, Döring A, Thorand B, Heier M, Löwel H. Body fat distribution and risk of type 2 diabetes in the general population: are there differences between men and women? The MONICA/KORA Augsburg Cohort Study. *Am J Clin Nutr* 2006; 84: 483–489.

¹³ World Health Organization. *The Prevention of Diabetes Mellitus and Its Complications*. Geneva: World Health Organization; 2008 (in press).

¹⁴ World Health Organization. *Evidence of the Long-term Effects of Breastfeeding*. Systematic Reviews and Meta-analysis. Geneva: World Health Organization, 2007.

reported in Belize (12.4%) and Mexico (10.7%)¹⁵ with rates of 8% to 10% in Managua, Guatemala City,¹⁶ and Bogotá.¹⁷ The most recent data from the United States^{18,19,20} reported a prevalence of diabetes of 9.3% while it was 15.7% along the US-Mexico border.²¹

4. The burden that diabetes presents to society and to the individual is chiefly associated with increased disability and premature mortality due to complications. Diabetes complications and premature mortality are believed to be exacerbated by poor quality of care. The risk of dying from cardiovascular disease (CVD) and all causes is between two and three times higher among people with diabetes than among their peers without diabetes.^{22,23} After a 20-year duration of diabetes, the frequency of chronic complications in clinical settings of six Latin American²⁴ countries were found to be 48% for retinopathy, 6.7% for blindness, 42% for neuropathy, 1.5% for kidney damage, 6.7% for myocardial infarction (heart attack), 3.3% for stroke and 7.3% for lower limb amputations. Some population groups are at particular risk for complications. For example, studies in Barbados demonstrated a high incidence of lower limb amputations (936 per 10⁵) and a prevalence of retinopathy of 28.5% among blacks.^{25,26} The cost of

¹⁵ Velazquez-Monroy O, Rosas Peralta M, Lara Esqueda A, Pastelin Hernandez G, Sanchez-Castillo C, Attie F, et al. Prevalence and interrelations of noncommunicable chronic diseases and cardiovascular risk factors in Mexico. Final outcomes from the National Health Survey 2000. *Arch Cardiol Mex* 2003; 73(1): 62–77.

¹⁶ Guatemala, Ministerio de Salud; Pan American Health Organization. Central American Diabetes Initiative (CAMDI). Survey of Diabetes, Hypertension, and Chronic Disease Risk Factors, Villanueva, Guatemala. Washington, DC: PAHO/WHO; 2007.

¹⁷ Schargrodsky H, Hernandez-Hernandez R, Marcet Champagne B, Silva H, Vinueza R, Silva Ayçaguer LC, et al. for the CARMELA Study Investigators. CARMELA: Assessment of Cardiovascular Risk in Seven Latin American Cities. *The American Journal of Medicine* 2008;121(1):58-65.

¹⁸ Cowie CC, Rust KF, Byrd-Holt DD, Eberhardt MS, Flegal KM, Engelgau MM, et al. Prevalence of diabetes and impaired fasting glucose in adults in the U.S. population. National Health and Nutrition Examination Survey 1999–2002. *Diabetes Care* 2006;29(6):1263–1268.

¹⁹ National Center for Health Statistics. Health, United States, 2005, with chartbook on trends in the health of Americans. Hyattsville: U.S. Department of Health and Human Services; 2005.

²⁰ Ogden CL, Carroll MD, Curtin LR, McDowell MA, et al. Prevalence of overweight and obesity in the United States, 1999–2004. *JAMA* 2006; 295(13):1549–1555.

²¹ Pan American Health Organization. The U.S.-Mexico border diabetes prevention and control project. First report of results. Available from: <http://www.fep.paho.org/english/publicaciones/Diabetes/Diabetes%20first%20report%20of%20Results.pdf>. Accessed 21 February 2007.

²² Kleinman JC, Donahue RP, Harris MI, Finucane FF, Madans JH, Brock DB. Mortality among diabetics in a national sample. *Am J Epidemiol* 1988;128(2):389-401.

²³ Hennis A, Wu SY, Nemesure B, Li X, Leske MC; Barbados Eye Study Group. Diabetes in a Caribbean population: epidemiological profile and implications. *Int J Epidemiol* 2002;31(1):234-239.

²⁴ Gagliardino JJ, Hera M, Siri F and QUALIDIAB Group. Evaluación de la calidad de la asistencia al paciente diabético en América Latina. *Pan-American Journal of Public Health* 2001; 10(5):309-317.

²⁵ Hennis AJ, Fraser HS, Jonnalagadda R, Fuller J, Chaturvedi N. Explanations for the high risk of diabetes-related amputation in a Caribbean population of black African descent and potential for prevention. *Diabetes Care* 2004;27(11):2636-2641.

²⁶ Leske MC, Wu SY, Hyman L, Li X, Hennis A, Connell AM, Schachat AP. Diabetic retinopathy in a black population: the Barbados Eye Study. *Ophthalmology* 1999;106(10):1893-1899.

health care for people affected by diabetes is between two and three times higher than among peers without diabetes.²⁷ In 2000, the cost of diabetes in the Region was estimated at US\$ 65.2 billion, of which \$10.7 billion were direct costs and \$54.5 billion, indirect costs.^{28,29} In 2006, the cost of diabetes in some countries was reported between 0.4% and 2.3% of GDP.³⁰ While diabetes and its complications are largely preventable, lack of access to quality health care services and lack of knowledge of preventive measures are widespread.

5. The obesity epidemic, which is behind the rise in diabetes, is largely driven by the twin trends of changing dietary patterns and decreasing physical activity. Most countries in the Americas are experiencing a shift in dietary patterns toward increased consumption of energy-dense foods, rich in saturated fat, sugars, and salt. This pattern, coupled with the fact that 30% to 60% of the population does not meet minimum recommended levels of physical activity (e.g., 30 minutes walking per day) contribute in large part to the high rates of overweight and obesity in the Region. Transitions in the environment, rather than declines in knowledge or self-efficacy, are the major contributors to the aforementioned changes in diet and physical activity patterns.^{31,32} A combination of government policies, regional and global market forces, inadequate response to changing demographic patterns, technological advances that precipitate behavior and lifestyle changes, and lack of awareness and action by civil society are key factors leading to the rising epidemics of obesity and diabetes. However, the strong social and environmental determinants of overweight, obesity, and ill health present an apt area for intervention in which an evidence-base exists to guide action.

6. In many countries, obesity and diabetes affect women disproportionately. Gestational diabetes in particular has detrimental consequences for mother and child, increasing the frequency of perinatal morbidity and mortality. In addition, maternal obesity and diabetes have been linked to increased susceptibility for the child to develop diabetes during youth, creating a vicious circle where obesity and diabetes beget more

²⁷ International Diabetes Federation. *The Economic Impact of Diabetes in Diabetes Atlas Third Edition*. Brussels: IDF; 2006.

²⁸ Barceló A, Aedo C, Rajpatak S, Robles S. The cost of diabetes in Latin America and the Caribbean. *Bull World Health Organ* 2003;81(1):19–27.

²⁹ Narayan KMV, Zhang P, Kanaya AM, Williams DE, Engelgau ME, Imperatore G, Ramachandran A. *Diabetes: The Pandemic and Potential Solutions in Disease Control Priorities in Developing Countries*. Second Edition New York: Oxford University Press and the World Bank; 2006.

³⁰ CARICOM. Heads of Government Summit on Non Communicable Disease. Available from: http://www.caricom.org/jsp/community/chronic_non_communicable_diseases/diabetes_hypertension.jsp Accessed 1 May 2008.

³¹ Sallis JF, Certero RB, Ascher W, Henderson KA, Kraft MK, Kerr J. An ecological approach to creating active living communities. *Annu. Rev. Public Health* 2006; 27:297–322.

³² Uauy R, Monteiro CA. The challenge of improving food and nutrition in Latin America. *Food and Nutrition Bulletin* 2004; 25(2): 175-182.

diabetes.³³ Diabetes also has effects on other health conditions; because it impairs immunity, diabetes has been associated with tuberculosis. This association has potential public health implications given the growing epidemic of diabetes.^{34,35} The relationship among diabetes, maternal and newborn morbidity and tuberculosis may have a negative impact on the achievement of the related Millennium Development Goals in many countries of the Region. Furthermore, low birth weight is associated with an increased risk for type 2 diabetes during adulthood.^{36,37} This is an element that may exacerbate the diabetes epidemic in low and middle income countries still struggling with high frequency of low birth weight.

7. The international community recognized the problem of chronic diseases and set the stage with the WHO Global Strategy for the Prevention and Control of Chronic Diseases (WHA53.17, 2000), the Framework Convention for Tobacco Control (WHA56.1, 2003), the Global Strategy on Diet, Physical Activity and Health (WHA57.17, 2004), the Global Strategy for Infant and Young Child Feeding (WHA55.25, 2002), and most recently, the Regional Strategy and Plan of Action on Nutrition in Health and Development, 2006-2015 (CD47/18) and aforementioned Regional Strategy on Chronic Diseases (CD47/17, Rev.1). The United Nations General Assembly recognized the burden of diabetes by adopting a resolution in December 2006 designating World Diabetes Day as a United Nations Day (A/RES/61/225). Over ten years ago, PAHO's Directing Council adopted the Declaration of the Americas on Diabetes (DOTA)³⁸ a landmark document calling for actions to prevent and improve the management of diabetes in conjunction with civil society. Since then, PAHO has collaborated with Central America, the Caribbean, South America and the US-Mexico border in the area of obesity and diabetes, strengthening capacity for surveillance, conducting public awareness campaigns, facilitating quality improvement strategies for chronic care, and creating task forces for specific issues, among other activities. PAHO is also providing assistance and support to several Member States in the creation, implementation, and evaluation of evidence based clinical guidelines for the prevention and control of diabetes, the development and implementation of face to face and internet

³³ Dabelea D, Mayer-Davis EJ, Lamichhane AP, D'Agostino RB Jr, Liese AD, Vehik KS, Venkat Narayan KM, Zeitler P, Hamman RF. Association of Intrauterine Exposure to Maternal Diabetes and Obesity with Type 2 Diabetes in Youth: The SEARCH Case-Control Study. *Diabetes Care* [Epub ahead of print]; 2008.

³⁴ Stevenson CR, Forouhi NG, Roglic G, Williams BG, Lauer JA, Dye C, Unwin N. Diabetes and tuberculosis: the impact of the diabetes epidemic on tuberculosis incidence. *BMC Public Health*. 2007; 7(147):234.

³⁵ Stevenson CR, Critchley JA, Forouhi NG, Roglic G, Williams BG, Dye C, Unwin NC. Diabetes and the risk of tuberculosis: a neglected threat to public health? *Chronic Illness* 2007; 3(3):228-245.

³⁶ Dabelea D, Hanson RL, Bennett PH, Roumain J, Knowler WC, Pettitt DJ. Increasing prevalence of type II diabetes in American Indian children. *Diabetologia* 1998; 41:904-910.

³⁷ Hales CN, Barker DJ, Clark PM, Cox LJ, Fall C, Osmond C, et al. Fetal and infant growth and impaired glucose tolerance at age 64. *BMJ* 1991;303:1019-1022.

³⁸ Pan American Health Organization. 39th Directing Council. Diabetes in the Americas. 23 July 1996 (CD39/19).

based diabetes education training programs for people with diabetes and health professionals, and the development of prevention programs as well as the analysis of policies related to diabetes and obesity. The current proposal prioritizes results-oriented actions that Member States can take, even in resource-constrained settings, to address the challenges of obesity and diabetes.

Analysis: Interventions for the Prevention and Management of Obesity and Diabetes

8. Prevention and management strategies are crucial to turning back the tide on obesity and diabetes. Evidence demonstrates that risks of chronic disease begin in the uterus and continue into old age.³⁹ Therefore, strategies to address the problem at all stages of the life cycle are important, including paying particular attention to obesity and diabetes in women of reproductive age. The frequency of medical care and health expenditures increase notably among those with diabetes as early as eight years before clinical onset.⁴⁰ This means that people at the highest risk for type 2 diabetes are in contact with the health system and can be identified. People with prediabetes have shown an increased risk for diabetes and CVD. Diabetes screening facilities are the opportune identification of such at-risk individuals, or those in the early stages of obesity and diabetes, when non-pharmacological treatment may still be a preferred option. Studies have demonstrated that approximately one-third of people with type 2 diabetes are undiagnosed, and already present complications at the time of diagnosis.

9. Two approaches need to be used to implement prevention strategies: the population-based approach and the individual, high-risk approach. The population-based approach focuses largely on health promotion activities and actions that influence the environment (i.e., physical, social, economic and regulatory). For example, it has been calculated that replacing 2% of the energy from transfat with polyunsaturated fat would reduce the incidence of type 2 diabetes by 40%.⁴¹ Research has also demonstrated that metropolitan public transport systems designed to coordinate with pedestrian walkways or bike paths facilitate the practice of daily physical activity.⁴²

³⁹ World Health Organization. Diet, Nutrition, and the Prevention of Chronic Disease. Report of a Joint WHO/FAO Consultation. WHO Technical Report Series 916. World Health Organization: Geneva; 2003.

⁴⁰ Nichols GA, Glauber HS, Brown JB. Type 2 diabetes: incremental medical care costs during the first 8 years after diagnosis. *Diabetes Care* 2001;23(11):1660-1665.

⁴¹ Willett WC, Koplan JP, Nugent R, Dusenbury 2006.C, Puska P, Gaziano TA. Prevention of Chronic Disease by Means of Diet and Lifestyle Changes. In *Disease Control Priorities in Developing Countries* Second Edition. New York: Oxford University Press and the World Bank; 2006.

⁴² Jacoby ER, Motezuma R, Rice M, Malo M, Crespo C. Transportation, Urban development, and public safety in Latin America: Their importance to public health and an active lifestyle. In *Nutrition and an active life, From knowledge to action*. Scientific and technical publication No. 612. Washington DC: Pan American Health Organization; 2005.

10. The individual approach focuses on high-risk or affected individuals through direct interventions. For primary prevention of obesity and diabetes, the individual approach is based on the replication of randomized trials such as the Diabetes Prevention Program⁴³ (DPP), the Finland Diabetes Program⁴⁴ and the Da Qin Study,^{45,46} which demonstrated that an intensive lifestyle intervention was successful in achieving weight reduction and preventing or delaying the onset of type 2 diabetes in at-risk individuals. Secondary prevention strategies are aimed at decreasing mortality and the prevalence of chronic complications in those who have been diagnosed with diabetes. Data that demonstrate the strength of secondary prevention strategies are widely available. For example, the UK Prospective Diabetes Study indicated that tight blood pressure control in people with type 2 diabetes reduced the risk of developing any end point related to diabetes by 24%.⁴⁷

11. The population and individual approaches are complementary and function best when combined in an integrated manner. Recommended actions for primary and secondary prevention of obesity and diabetes at both levels are found in Table 1. The choice is clear and inaction too risky; it is opportune to prioritize such strategies in the Region.

Proposal for the Prevention and Management of Diabetes and Obesity in the Americas

12. The following approaches are presented along five strategic areas which form the foundation for action to address obesity and diabetes in the Region. These strategies need to be complemented with appropriate mechanisms of financing and policy development to ensure access to care and the necessary resources to address the twin epidemics of obesity and diabetes.

Primary Prevention of Obesity and Diabetes

Population approach

13. Primary prevention at the population level through activities such as health promotion, creation of healthy public policies focused on food, diet and physical activity,

⁴³ Diabetes Prevention Program Research Group, Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine*. 2002; 346: 393-403.

⁴⁴ Laaksonen DE, Lindstrom J, Lakka TA, Eriksson JG, Niskanen L, Wikstrom K, et al. Physical activity in the prevention of type 2 diabetes: the Finnish diabetes prevention study. *Diabetes*. 2005;54:158-165.

⁴⁵ Pan XR, Li GW, Hu YH, Wang JX, Yang WY, An ZX, et al. Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance. The Da Qing IGT and Diabetes Study. *Diabetes Care* 1997;20: 537-544.

⁴⁶ Li G. Annual Meeting of the American Diabetes Association. Abstract Book. In press; 2008.

⁴⁷ UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. *BMJ* 1998;317:703-713.

and creation of healthy environments. Key actions include fiscal/policy incentives for production and consumption of healthy foods, guidelines to regulate the marketing and sale of foods to children and adolescents, wide promotion of fruit and vegetable consumption, the elimination of trans fats in processed foods, workplace wellness initiatives, physical education curricula and healthy feeding programs in schools, urban planning that encourages walking and biking, improved access to recreation and sports through partnerships, and massive education campaigns.

Individual approach

14. Creation and implementation of guidelines for the prevention of obesity and diabetes in primary health care, including meal and exercise plans, or medication if required.

Screening for Diabetes and Prediabetes Including Identification of Overweight or Obesity

Individual approach

15. Identification of people at risk for diabetes (with two or more risk factors for type 2 diabetes (such as a family history of diabetes, high blood pressure, a history of hyperglycemia or gestational diabetes, or overweight) when preventive services are available and enroll those at risk in weight reduction programs or in courses of care for the management of obesity and diabetes.

Improving Management of Obesity and Diabetes

Population approach

16. Standards for care and management of obesity and diabetes should be developed and implemented at the primary care level. The chronic care model is a framework to identify gaps in care with the aim of designing strategies for quality improvement. Adoption of this model at the national level can facilitate improved management. Additionally, the list of essential medicines should include those that are necessary for the management of diabetes, including insulin, metformin and glibenclamide. In settings with more resources available for health, access to medications for lipid and blood pressure reduction and certain diagnostic and treatment procedures are strongly encouraged.

Individual approach

17. The creation of community services within the civil society can provide additional support to people with obesity and diabetes.

Secondary Prevention of Complications

Population approach

18. Strategies include patient and provider education, efforts aimed at smoking cessation, increased physical activity, and healthy eating.

Individual approach

19. A number of clinically proven strategies are available for the secondary prevention of complications.

- CVD: blood sugar control,⁴⁸ blood pressure control, smoking cessation,^{49,50} aspirin treatment,^{51,52} lipid reduction treatment,^{53,54,55,56,57} rennin-angiotensin system (RAS) inhibitors;⁵⁸

⁴⁸ Stratton IM, Adler AI, Neil HA, Matthews DR, Manley SE, Cull CA, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ*. 2000;321:405-12.

⁴⁹ Lotufo PA, Gaziano JM, Chae CU, Ajani UA, Moreno-John G, Buring JE, et al. Diabetes and all-cause and coronary heart disease mortality among US male physicians. *Archives of Internal Medicine*. 2001;161:242-7.

⁵⁰ Manson JE, Colditz GA, Stampfer MJ, Willett WC, Krolewski AS, Rosner B, et al. A prospective study of maturity-onset diabetes mellitus and risk of coronary heart disease and stroke in women. *Archives of Internal Medicine*. 1991;151:1141-7.

⁵¹ ETDRS Investigators. Aspirin effects on mortality and morbidity in patients with diabetes mellitus. Early Treatment Diabetic Retinopathy Study report 14. *JAMA*. 1992;268:1292-300.

⁵² Hansson L, Zanchetti A, Carruthers SG, Dahlof B, Elmfeldt D, Julius S, et al. Effects of intensive blood-pressure lowering and low-dose aspirin in patients with hypertension: principal results of the Hypertension Optimal Treatment (HOT) randomised trial. *Lancet*. 1998;351:1755-62.

⁵³ Colhoun HM, Betteridge DJ, Durrington PN, Hitman GA, Neil HA, Livingstone SJ, et al. Primary prevention of cardiovascular disease with atorvastatin in type 2 diabetes in the Collaborative Atorvastatin Diabetes Study (CARDS): multicentre randomised placebo-controlled trial. *Lancet*. 2004;364:685-96.

⁵⁴ Soedamah-Muthu SS, Colhoun HM, Thomason MJ, Betteridge DJ, Durrington PN, Hitman GA, et al. The effect of atorvastatin on serum lipids, lipoproteins and NMR spectroscopy defined lipoprotein subclasses in type 2 diabetic patients with ischaemic heart disease. *Atherosclerosis*. 2003;167:243-55.

⁵⁵ Heart Protection Study Collaborative G. MRC/BHF Heart Protection Study of cholesterol-lowering with simvastatin in 5963 people with diabetes: a randomised placebo-controlled trial. *Lancet*. 2003;361:2005-16.

⁵⁶ Frick MH, Elo O, Haapa K, Heinonen OP, Heinsalmi P, Helo P, et al. Helsinki Heart Study: primary-prevention trial with gemfibrozil in middle-aged men with dyslipidemia. Safety of treatment, changes in risk factors, and incidence of coronary heart disease. *New England Journal of Medicine*. 1987;317:1237-45.

⁵⁷ Rubins HB, Robins SJ, Collins D, Fye CL, Anderson JW, Elam MB, et al. Gemfibrozil for the secondary prevention of coronary heart disease in men with low levels of high-density lipoprotein cholesterol. *New England Journal of Medicine*. 1999;341:410-8.

- Nephropathy (kidney damage): blood sugar control, blood pressure control and medications including RAS inhibitors^{59,60} angiotensin receptor blocker (ARB), and angiotensin converting enzyme (ACE);⁶¹
- Retinopathy: blood sugar control,^{62,63} blood pressure control,^{47,64} lipid reduction treatment;⁶⁵
- Blindness: annual eye examinations, and prompt treatment of problems in order to minimize visual loss,^{66,67} to include panretinal laser surgery for eyes with advanced proliferative retinopathy and focal laser photocoagulation for eyes with clinically significant vision-threatening macular edema;
- Amputations: foot exam and foot care education.⁶⁸

Surveillance and Monitoring

Population approach

⁵⁸ Brenner BM, Cooper ME, de Zeeuw D, Keane WF, Mitch WE, Parving HH, et al. Effects of losartan on renal and cardiovascular outcomes in patients with type 2 diabetes and nephropathy. *New England Journal of Medicine*. 2001;345:861-9.

⁵⁹ Parving HH, Lehnert H, Brochner-Mortensen J, Gomis R, Andersen S, Arner P, et al. The effect of irbesartan on the development of diabetic nephropathy in patients with type 2 diabetes. *New England Journal of Medicine*. 2001;345:870-8.

⁶⁰ Lewis EJ, Hunsicker LG, Clarke WR, Berl T, Pohl MA, Lewis JB, et al. Renoprotective effect of the angiotensin-receptor antagonist irbesartan in patients with nephropathy due to type 2 diabetes.. *New England Journal of Medicine*. 2001;345:851-60.

⁶¹ Lewis EJ, Hunsicker LG, Bain RP, Rohde RD. The effect of angiotensin-converting-enzyme inhibition on diabetic nephropathy. The Collaborative Study Group. *New England Journal of Medicine*. 1993;329:1456-62.

⁶² Klein R, Klein BE, Moss SE, Davis MD, DeMets DL. Glycosylated hemoglobin predicts the incidence and progression of diabetic retinopathy. *JAMA*. 1988;260:2864-71.

⁶³ Diabetes Control and Complications Trial Research Group. The relationship of glycemic exposure (HbA1c) to the risk of development and progression of retinopathy in the diabetes control and complications trial. *Diabetes*. 1995;44:968-83.

⁶⁴ Matthews DR, Stratton IM, Aldington SJ, Holman RR, Kohner EM, Group UKPDS. Risks of progression of retinopathy and vision loss related to tight blood pressure control in type 2 diabetes mellitus: UKPDS 69. *Archives of Ophthalmology*. 2004;122:1631-40.

⁶⁵ Keech AC, Mitchell P, Summanen PA, O'Day J, Davis TME, Moffitt MS, et al. Effect of fenofibrate on the need for laser treatment for diabetic retinopathy (FIELD study): a randomised controlled trial. *Lancet*. 2007;370:1687-97.

⁶⁶ American Academy of Ophthalmology. Preferred practice pattern: diabetes mellitus: San Francisco: American Academy of Ophthalmology; 2005.

⁶⁷ American Optometric Association, Optometric Clinical Practice guideline: care of the patient with diabetes mellitus. St Louis Missouri: American Optometric Association; 2002.

⁶⁸ Klonoff, D. C., and D. M. Schwartz. An Economic Analysis of Interventions for Diabetes. *Diabetes Care* 2000; 23 (3): 390–404.

20. Various sources of information can be used for the surveillance of diabetes and obesity in populations, including periodical population-based surveys, health service statistics, school-based surveys and routinely collected vital statistics. Several countries of the Americas are currently monitoring risk factors for chronic disease using the Pan American STEPS methodology, which is a simple, standardized method for collecting, analyzing, and disseminating risk factor data.

Action by the Directing Council

21. The Directing Council, after reviewing the information provided, is invited to consider adoption of the resolution recommended by the 142nd Session of the Executive Committee in Resolution CE142.R6 (see Annex C).

Annexes

Table 1. Interventions for Prevention and Management of Obesity, Diabetes and Complications

<p>Natural History of Obesity and Diabetes →</p>	<p>Lack of physical activity & hypercaloric diet ↓ Overweight/ Obesity ↓ Hyper Insulinaemia ↓ Insulin Resistance ↓ Intermediate Hyperglycemia →</p>	<p>Clinical Diabetes and complications: neuropathy, eye disease, blindness, nephropathy, kidney failure, peripheral vascular disease and amputations.</p>
<p>Level of Prevention → Intervention Approach ↓</p>	<p>Primary Prevention</p>	<p>Secondary and tertiary prevention</p>
<p>Individual approach →</p>	<p>Introduce nutrition counseling and physical activity to health services. Information, education and counseling through health services. Incorporate obesity and diabetes prevention into routine preventive health care services. Identification of individuals at-risk for development of obesity or diabetes and enrollment in weight reduction programs.</p>	<p>Introduce nutrition counseling and physical activity to health services. Self management to monitor and control blood sugar. Regular measure and control of blood pressure Yearly lipid profile and lipid control. Dietary and physical activity education to maintaining healthy and blood lipid levels. Self management for foot care. Annual eye exam, and screening for nephropathy. Increase access to essential medicines. Implement program for compliance with prescription medication.</p>
<p>Population based approach →</p>	<p>For food and diet <i>Supply-side interventions:</i> Promote agricultural policies. Elimination of trans-fats. Promote urban agriculture. Improve school feeding programs. Incorporate a health concept in the international food trade. Create incentives for the development of new healthier products. <i>Demand-side interventions:</i> Promote accurate and objective information and education. Develop or update the national food and dietary guidelines. Improve product labeling. Improve relative price of foods. Develop guidelines/regulations for food marketing and advertising to children and adolescents.</p> <p>For physical activity <i>Environmental interventions: Institutional approaches.</i> Promoting physical activity efforts in the workplace. Physical education programs in schools. <i>Environmental interventions: Urban approaches.</i> Transportation and Urban Planning. Recreation and Sports.</p>	<p>Promote daily physical activity and weight control through mass communication and information and mass media campaigns. Policies and physical environments supportive of healthy eating and physical activity. Partnership with food industry. Partnership with recreation and sports associations. Policies and financing/insurance measures to increase access to appropriate package of integrated services in PHC and hospital settings. Monitoring systems for coverage and quality of care based on agreed regional standards. Surveillance of diabetes, obesity and other risk factors.</p>



PAN AMERICAN HEALTH ORGANIZATION
Pan American Sanitary Bureau, Regional Office of the
WORLD HEALTH ORGANIZATION

CD48/5 (Eng.)
 Annex B

ANALYTICAL FORM TO LINK AGENDA ITEM WITH ORGANIZATIONAL AREAS

1. Agenda Item: 4.1	2. Agenda Title: Population-based and Individual Approaches to the Prevention and Management of Diabetes and Obesity						
3. Responsible Unit: HDM							
4. Preparing Officers: Jarbas Barbosa and James Hospedales							
5. List of collaborating centers and national institutions linked to this Agenda item: Centro de Endocrinología Experimental y Aplicada (CENEXA), La Plata, Argentina Instituto Nacional de Endocrinología, Havana, Cuba International Diabetes Center, Minneapolis, Minnesota (USA) Diabetes Translation, Centers for Disease Control and Prevention, Atlanta, Georgia (USA) University of Indiana, Indianapolis, Indiana (USA)							
6. Link between Agenda item and Health Agenda of the Americas: Paragraph 34: We will strengthen cooperation and information exchange in the fight against chronic diseases, as well as emerging and reemerging diseases.							
7. Link between Agenda item and Strategic Plan 2008-2012: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 50%; border-bottom: 1px solid black;">Area of work</th> <th style="text-align: left; width: 50%; border-bottom: 1px solid black;">Expected result</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Strategic Objective 3.0</td> <td style="padding: 5px;">RER 3.1, 3.2, 3.3, 3.5, 3.6,</td> </tr> <tr> <td style="padding: 5px;">Strategic Objective 6.0</td> <td style="padding: 5px;">RER 6.2, 6.3, 6.5,</td> </tr> </tbody> </table>		Area of work	Expected result	Strategic Objective 3.0	RER 3.1, 3.2, 3.3, 3.5, 3.6,	Strategic Objective 6.0	RER 6.2, 6.3, 6.5,
Area of work	Expected result						
Strategic Objective 3.0	RER 3.1, 3.2, 3.3, 3.5, 3.6,						
Strategic Objective 6.0	RER 6.2, 6.3, 6.5,						
8. Best practices in this area and examples from other countries in AMRO: Brazil and Chile are implementing policies for expanded access to secondary prevention of diabetes and other chronic diseases. Mexico screens for diabetes in people at high risk.							
9. Financial implications of Agenda item: The estimated cost of implementing this strategy in the 11 countries is \$3.6 million per biennium.							



PAN AMERICAN HEALTH ORGANIZATION
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142nd SESSION OF THE EXECUTIVE COMMITTEE

Washington, D.C., USA, 23-27 June 2008

CD48/5 (Eng.)
Annex C

ORIGINAL: ENGLISH

RESOLUTION

CE142.R6

POPULATION-BASED AND INDIVIDUAL APPROACHES TO THE PREVENTION AND MANAGEMENT OF DIABETES AND OBESITY

THE 142nd SESSION OF THE EXECUTIVE COMMITTEE,

Having reviewed the report of the Director, *Population and Individual Approaches to the Prevention and Management of Diabetes and Obesity* (Document CE142/9),

RESOLVES:

To recommend that the Directing Council adopt a resolution along the following lines:

THE 48th DIRECTING COUNCIL,

Having reviewed the report of the Director, *Population-based and Individual Approaches to the Prevention and Management of Diabetes and Obesity*, (Document CD48/5);

Noting Resolution CD47.R9 (2006), Regional Strategy and Plan of Action on an Integrated Approach to the Prevention and Control of Chronic Diseases Including Diet, Physical Activity and Health, which called for integrated action to prevent and reduce the

burden of chronic diseases and related risk factors in the Americas; and Resolution CSP26.R15 (2002) on the public health response to chronic diseases, which recognizes the heavy economic and social burden of noncommunicable diseases and calls for increased and coordinated technical cooperation from the Pan American Health Organization;

Considering Resolution WHA57.17, Global Strategy on Diet, Physical Activity, and Health (2004), which emphasizes an integrated approach and intersectoral collaboration to improve diet and increase physical activity;

Taking into account United Nations General Assembly Resolution 61/225, World Diabetes Day (2006), which recognizes diabetes as a chronic, debilitating and costly disease associated with major complications that pose severe risks for families, countries and the entire world and designates 14 November, the current World Diabetes Day, as a United Nations Day to be observed every year beginning in 2007;

Considering Resolution WHA61.23, Prevention and Control of Noncommunicable Diseases: Implementation of the Global Strategy (2008), which urges Member States to strengthen national capacity and increase resources for the prevention and control of chronic diseases;

Cognizant that obesity and diabetes have reached epidemic proportions in the Region and are projected to continue to increase if drastic action is not taken;

Taking note that obesity and diabetes are largely preventable and that scientific evidence and cost-effective interventions are available that combine population-based and individual approaches; and

Recognizing the importance for governments, the private sector, civil society, and the international community of renewing their commitment to the prevention and control of obesity and diabetes,

RESOLVES:

1. To urge Member States to:
 - a) prioritize the prevention of obesity and diabetes and their common risk factors by establishing and/or strengthening policies and programs, integrating them into public and private health systems and working to ensure adequate allocation of resources to carry out such policies and programs;

- b) work to develop public policies that permit healthy lifestyle choices such as healthy eating and greater opportunities for physical activity;
- c) create partnerships and engage with the private sector and civil society so that consumers are better informed, healthy choices are more available, and affordable workplace wellness programs are implemented;
- d) create supportive environments that contribute to the prevention and management of obesity and diabetes through greater opportunities for physical activity and choices for healthier eating, in collaboration with sectors outside the public health sector;
- e) implement the Global Strategy on Diet and Physical Activity and Health and the Regional Strategy and Plan of Action on an Integrated Approach to the Prevention and Control of Chronic Diseases, Including Diet, Physical Activity and Health;
- f) establish incentives and policies that favor the production and consumption of fruits and vegetables;
- g) improve food labeling and public education that facilitates the choice of healthy nutrition;
- h) develop guidelines and policies to promote the responsible marketing of food to children and adolescents;
- i) use the media (i.e. radio, television, print, internet) to implement educational campaigns and disseminate information, including mass media communication;
- j) improve surveillance and monitoring of obesity and diabetes at the population level, in order to advocate for policies and evaluate outcomes;
- k) develop and implement plans and programs to improve the management of obesity and diabetes within the public and private health systems, integrating prevention into care;
- l) reorient health services in the context of primary care to ensure the necessary resources for prevention strategies, including diagnostic media and drugs, for early detection and treatment of preventable or controllable diabetes complications with interventions of proven effectiveness, especially those addressing foot care, ocular health, renal health, glycemia and blood pressure.

2. To request the Director to:
 - (a) develop integrated interventions for the prevention and control of obesity and diabetes, including norms and protocols, focusing on the needs of low-income countries and vulnerable populations throughout the CARMEN network;
 - (b) support Member States in their efforts to strengthen their health information systems to monitor obesity and diabetes and to evaluate the results of related public health interventions;
 - (c) support Member States to strengthen their capacity, including research, means of diagnosis and treatment, as well as the competencies of the health system, for integrated management of obesity and diabetes;
 - (d) develop new or strengthen existing partnerships for resource mobilization, advocacy, and collaborative research related to obesity and diabetes prevention.

(Eighth meeting, 26 June 2008)



PAN AMERICAN HEALTH ORGANIZATION
WORLD HEALTH ORGANIZATION



48th DIRECTING COUNCIL 60th SESSION OF THE REGIONAL COMMITTEE

Washington, D.C., USA, 29 September-3 October 2008

CD48/5 (Eng.)
Annex D

Report on the Financial and Administrative Implications for the Secretariat of the Resolutions Proposed for Adoption by the Directing Council

1. Resolution: Population-based and Individual Approaches to the Prevention and Management of Diabetes and Obesity.

2. Linkage to program budget

Area of work	Expected result
Strategic Objective 3.0	RER 3.1, 3.2, 3.3, 3.5, 3.6,
Strategic Objective 6.0	RER 6.2, 6.3, 6.5,

3. Financial implications

a) **Total estimated cost for implementation over the lifecycle of the resolution (estimated to the nearest US\$ 10,000; including staff and activities):**

\$14,900,000.00 over 7 years

b) **Estimated cost for the biennium 2008-2009 (estimated to the nearest US\$ 10,000; including staff and activities):**

\$4,200,000.00

c) **Of the estimated cost noted in (b) what can be subsumed under existing programmed activities?**

\$660,000.00

4. Administrative implications

a) **Implementation locales (indicate the levels of the Organization at which the work will be undertaken and identify the specific regions, where relevant):**

- PAHO Washington, DC, PAHO/WHO country offices, and CAREC
- Implementation would begin in priority countries, which have the highest rates of obesity and diabetes: Belize, Bolivia, Ecuador, El Paso (Mexico-USA border), Guyana, Haiti, Honduras, Mexico, Nicaragua, Paraguay, Suriname, Trinidad and Tobago

b) **Additional staffing requirements (indicate additional required staff full-time equivalents, noting necessary skills profile):**

2 FTEs: 1 medical officer and 1 office assistant.

c) **Timeframes (indicate broad timeframes for the implementation and evaluation):**

2008-2015 (7 years)