Recommendations of the Second Indo-US Health Summit on Prevention and Control of Cardiovascular Disease among Asian Indians

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INTRODUCTION

Asian Indians, those living in India and also the Diasporas, have one of the highest rates of coronary artery disease (CAD) in the world[1,2]. Among urban Indians the prevalence of CAD is as high as 10-12%[1]. The CAD among Indians is usually more advanced at the time of presentation compared to whites or other Asians[3]. The overall social and economic impact of the disease is much greater because the CAD in Asian Indians affects a younger and working population[4]. While the mortality and morbidity from CAD has been declining in the western world, it has been climbing among the Indian population. Both established and novel risk factors and a possible genetic predisposition in part due to lipoprotein(a) [Lp(a)] excess and higher prevalence of diabetes appear to significantly contribute to this epidemic[5,6]. The effects of established as well as novel risk factors are multiplicative not just additive, the total being more than the sum of parts.

Management strategies for controlling and treating CAD would require aggressive individual, societal and governmental (policy and regulatory) interventions. Asian Indians would also require specific lower cut-offs and stricter targets for treatment of various CAD risk factors than is currently recommended for western populations. To this end, the Second Indo-US Healthcare Summit was held in New Delhi, India on January 3 and 4, 2009. The participants included representatives (members) from several professional entities including the American Association of Physicians of Indian origin (AAPI), Indian Medical Association (IMA), Medical Council of India (MCI), Cardiology Society of India (CSI), Indian College of Cardiology (ICC), Association of Physicians of India (API), Diabetes Foundation India, and Public Health Foundation of India. The faculty addressed issues and challenges for the prevention and control of cardiovascular disease (CVD) among Indians and updated the recommendations of the First Summit held in 2007[7]. Summary of the deliberations and recommendations by the Second Indo-US Health summit expert panel on CVD are presented in this document.

Essentially, the Asian Indians are in double jeopardy from nature and nurture; nature, among other things, being the genetically-determined excess of insulin resistance, diabetes, Lp(a) excess and nurture being an ever-increasing unhealthy lifestyle associated with rising affluence, urbanization and mechanization[8]. The nurture represents the adverse impact of the modifiable risk factors related to lifestyle such as smoking, hypertension, atherogenic diet, physical inactivity, abdominal obesity and diabetes that become markedly magnified in those with genetic

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predisposition[8]. This synergy between nature and nurture appears to sufficiently explain the high rate of CAD among Asian Indians, who often have otherwise lower prevalence of traditional risk factors. Thus, the potential explanations for the ongoing epidemic of CAD in India include:

(1) Poor awareness and control of CVD risk factors such as high blood pressure, dyslipidemia and diabetes;
(2) Urbanization of rural areas and large scale migration of rural population to urban areas;
(3) Dyslipidemia, particularly high non-HDL cholesterol, Apo B/Apo A ratio and total to HDL cholesterol ratio;
(4) Low HDL cholesterol and small dense dysfunctional HDL;
(5) Increase in sedentary life style;
(6) Increase in obesity, particularly abdominal obesity;
(7) Increase in metabolic syndrome and diabetes;
(8) Inadequate consumption of fruits and vegetables;
(9) Preponderance of atherogenic diets including fried foods, processed foods, fast foods, that are high in calories, saturated fat and trans fat;
(10) Increased consumption of foods high in glycemic index (high glycemic load);
(11) Tobacco consumption;
(12) Genetic predisposition due to insulin resistance and Lp(a) excess[4,9]. The evolution of risk factor prevalence in the developing countries such as India is shown in Figure 1.

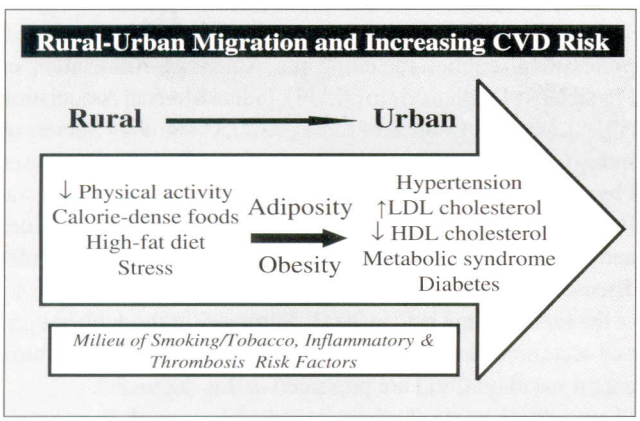

Figure 1: A broad societal hypothesis explaining increasing cardiovascular disease risk in developing countries such as India.

THE INDO-US HEALTHCARE SUMMIT RECOMMENDATIONS

The Indo-US Healthcare Summit concluded with two broad sets of recommendations: (i) specific recommendations directed at CVD and (ii) general recommendations applicable to chronic disease prevention.

SPECIFIC RECOMMENDATIONS

1. Modified CAD Risk Calculation for Asian Indians (The risk is "Two-fold" greater)

In order to accommodate the 'excess risk" and thus determine the CAD risk more adequately among the Asian Indians, one must multiply the 10-year risk of CAD by a factor of two, when using American risk prediction algorithms such the Framingham Risk Score or European risk prediction algorithm such as SCORE (the Systematic Coronary Risk Evaluation), except in UK or other countries, where specific guidelines for Asian Indians are already in place. This recommendation is based on the results of prospective studies that have shown a 1.4 to 2.2 fold risk of dying from CAD from any combination of traditional risk factors, diabetes, and metabolic syndrome among Indians compared with whites[6,10]. It is also in agreement with those of several international agencies including World Health Organization (WHO), International Diabetic Federation, British Heart Foundation, South Asian Heart Foundation, European Society of Cardiology (ESC), American Heart Association (AHA), AAPI, and Australian and New Zealand Guideline committees[11-15]. In the UK and Europe, the calculated 10-year Framingham risk for CAD is multiplied by a factor of 1.4 for south Asian males, so that individuals with a calculated Framingham risk score of 14%,(multiplied by 1.4), will meet the 20% threshold qualifying them for primary prevention interventions e.g. lipid-lowering therapy as opposed to whites who need to achieve a score of 20%[16]. Accordingly, the summit recommends no further modifications for South Asians in Europe; for all others, the risk should be multiplied by a factor of 2.

2. Stricter Treatment Targets and Modified Thresholds for Initiating Intervention

Many expert bodies have lowered the threshold of treatment initiation and treatment target recently[16-18]. To reduce the "disproportionately high" risk of CAD in Asian Indians, treatments in general have to be even more aggressive and should begin at a lower threshold than is recommended for western populations[19,20]. One must, therefore, lower the threshold for initiating intervention and treatment goals by 10% for risk factors in general, by 20% for total cholesterol level, and by 30 mg/dl for LDL levels[4]. The specific cut points for selected risk factors specific to the Indian population are shown in Table 1.

3. Universal Screening for CAD Risk Factors

Universal screening of all Indians by age 18 across the board or at the earliest opportunity thereafter is strongly recommended for the purpose of early detection of high-risk individuals. The screening should document the following:

- Name, age, gender and general health history.

- Family history of premature CVD or diabetes.
- History of tobacco use (cigarettes, beedies, smokeless tobacco and passive smoking).
- Dietary history with focus on intakes of saturated fat, trans fat, salt, fruits, vegetables and sugar.
- Personal history of CVD.
- Blood pressure.
- Height, body weight, BMI and waist circumference.
- Blood sugar and diabetes status and the Indian diabetic score[21] or FINRISK Score.
- Fasting lipid profile (total cholesterol, triglyceride, HDL, calculated non-HDL cholesterol and LDL-cholesterol levels).
- Evaluation for metabolic syndrome using South Asian Modified-NCEP Criteria[22].
- Extent of physical activity (sedentary, physically active, athletic etc.).

Table 1: *Recommended thresholds of intervention and treatment goals for Asian Indians for selected risk factors.*

Parameters	Desirable levels for Asian Indians
Waist circumference	<80 cm (<31 inches) for women <90 cm (<36 inches) for men
Body Mass Index	<23 kg/m^2 for men and women
Blood pressure	<130/85 mm Hg <120/80 mm Hg for those with diabetes and heart failure
Total cholesterol	<160 mg/dl
LDL-cholesterol	<100 mg/dl <70 mg/dl for people with CAD or diabetes *
Non-HDL-cholesterol	<130 mg/dl <100 mg/dl for people with CAD or diabetes*
Triglycerides	<150 mg/dl
HDL-cholesterol	>40 mg/dl (men); >50 mg/dl (women)
Hemoglobin A1C	<7.0%
Lipoprotein(a)	<20 mg/dl (if accurate and reliable measurements are available)
* considered very high risk, especially if both conditions coexist	

Table 2: *Classification of risk level in Asian Indians*[25]

Risk Status	Criteria
High Risk	• Established CVD - Coronary heart disease -Cerebrovascular disease - Peripheral arterial disease - Abdominal aortic aneurysm • End-stage or chronic renal disease • Diabetes mellitus type 1 and 2 • Metabolic syndrome • 10-Year Framingham global risk ≥10% (or 14 in Europe)
At Risk	• ≥1 major risk factors for CVD, including: ○ Cigarette/beedi smoking ○ Poor or unhealthy diet ○ Physical inactivity ○ Obesity, especially abdominal adiposity ○ Male age >25 or female age >35 years of age ○ Family history of premature CVD (<55 years of age in male relative and <65 years of age in female relative) ○ Hypertension ○ Dyslipidemia (see table 1) • Evidence of subclinical vascular disease (e.g. coronary calcification or carotid atherosclerosis) • Poor exercise capacity on treadmill test (<5 METS) and/or • Abnormal heart rate recovery after stopping exercise
Low Risk	• A healthy lifestyle, with no risk factors

Table 2 provides the various risk factors that qualify for high risk and at-risk status in Asian Indians. Individuals found to have mildly abnormal level of risk factors should receive lifestyle modification. Those with markedly abnormal levels need to be referred to a physician for further evaluation and management. Since Asian Indians develop clinical CAD at a young age, male age >25 (instead of >45) or female age >35 (instead of >45) may be considered a risk factor. A person is considered physically inactive or sedentary lifestyle if he or she engages in <150 minutes of physical activity per week.

4. Early Identification of Asian Indians at High Risk for CAD

Those who have ≥2 risk factors or metabolic syndrome are considered high risk individuals. Most but not all experts agree that metabolic syndrome identifies individuals who are generally at low short-term (10-year) risk for CVD but at very high lifetime risk of CVD and diabetes (type 2), but more importantly, respond well to intensive life style modification[22]. It is important to recognize that the US National Cholesterol Education Program (NCEP) criteria may under-estimate the prevalence of metabolic syndrome by up to 50%[22]. The South Asian Modified NCEP criteria for metabolic syndrome substitutes the waist circumference cut points shown above (>90 cm for men and >80 cm for women) in the NCEP criteria and is more appropriate for Asian Indians (Table 3)[14,22].

Table 3: *Modified US National Cholesterol Education Program (NCEP) Criteria for South Asians*[14,22]

Abdominal obesity (as measured by waist circumference)	>90 cm in men >80cm in women
Triglycerides*	>150 mg/dL in men and women
HDL-C *	<40 mg/dl in men <50 mg/dl in women
Fasting blood glucose*	>100 mg/dl in men and women
Blood pressure *	≥130/≥85 mm Hg in men and women
*Or on therapy Any 3 of the above qualifies for diagnosis; Note that abdominal obesity is not obligatory	

Persons who have evidence of significant subclinical atherosclerosis as evidenced by carotid atherosclerosis, or significant coronary artery calcification score (>300-400) are also categorized as high risk[23,24]. Since elevated levels of Lp(a) and homocysteine are particularly common among Asian Indians with premature CAD, abnormal levels of these emerging risk factors can also be counted in determining the risk status[22]. High risk individuals require more aggressive treatment to achieve the lower treatment target for dyslipidemia and hypertension as described earlier. Those who have diabetes, CAD or CVD are considered very high risk requiring even stricter or lower goals (Table 1). A scheme for categorization of Indians into high risk, at risk and optimal risk is drawn up patterned after American

College of Cardiology/ American Heart Association (ACC/AHA) guidelines for CAD prevention in women (Table-2)[25].

5. Promotion of Primary Prevention in High-Risk Persons

Aggressive primary prevention is critical in preventing the development of CVD in those who are in high-risk category with the four key objectives: (i) control of dyslipidemia, (ii) control of blood pressure, (iii) control of blood sugar, diabetes and metabolic syndrome through intense lifestyle modification and medications if necessary and (iv) avoidance of all tobacco products and passive exposure to tobacco. Overall, there are three main categories of preventive interventions (Table 4). They can be categorized into lifestyle interventions, behavioral and biological interventions, and preventive drug interventions.

Table 4: Categories of preventive interventions as cornerstone of risk reduction

Type of Intervention	Examples
Lifestyle interventions	• Cessation of cigarette smoking, beedies, chewing tobacco • Physical activity • Cardioprotective life style • Dietary changes • Weight maintenance/reduction • Use of fish oils (omega-3 polyunsaturated fatty acids) • Diagnosis and management of depression
Major risk factor interventions	• Hypertension • Dyslipidemia o LDL-C and non-HDL-C lowering o Raising HDL-C o Triglycerides lowering o Lipoprotein(a) lowering • Diabetes mellitus
Preventive drug interventions	• Aspirin • Beta-blockers • Statins • Angiotensin converting enzyme inhibitors. • Angiotensin receptor blockers if ACE intolerant • Folic acid for hyperhomocysteinemia (no evidence of benefit) • Hormone replacement therapy (no evidence of benefit). • Anti-oxidant supplements (No evidence of benefit, possible harm)

6. Aggressive Lipid-Lowering Therapy with Statins or Combination Agents

Statin medications are safe and highly effective with a 25% to 60% reduction in LDL-cholesterol (LDL-C) and non-HDL cholesterol (non-HDL-C) achievable at maximum doses (atorvastatin 80 mg or rosuvastatin 40 mg /day)[26-33]. Recently, the results of the "Justification for the Use of Statins in Primary Prevention: an Intervention Trial Evaluating Rosuvastatin" (JUPITER trial) were published[34]. This study evaluated the safety, efficacy and outcomes of aggressively lowering LDL-C by 50% in 17,802 persons. The baseline LDL-C was within the normal range, i.e. under 130 mg/dl, and the patients were treated with 20 mg of rosuvastain per day as part of primary prevention strategy for the patients who otherwise would not currently qualify for lipid-lowering therapy. Among those randomized to rosuvastatin, there was a 50% reduction in LDL-C from 108 mg/dl down to 55 mg/dl. Approximately 50% of the treated participants achieved the LDL-C of <55 mg/dl and 25% achieved LDL-C under 44 mg/dl. The study was terminated 3 years early because of strongly favorable results, i.e., a highly significant 44%, reduction in the primary end point ($p<0.0001$). The results of the JUPITER study further support the recommendations of this report for aggressive treatment of dyslipidemia to reduce the risk of CAD for persons at high risk.

Lowering of LDL-C with statins reduces the risk of CAD by 30% to 45%[20,27,34-36]. Many statins have been approved for use in children as young as 8 years of age in the USA, when lifestyle measures alone fail to achieve the LDL-C goals[37-39]. Non-HDL-C reflects cholesterol concentration in all the atherogenic lipoprotein particles and is a better predictor of CAD than LDL-C alone, especially when the triglycerides levels are also elevated[40-44]. It is often not appreciated that the residual risk after LDL-C lowering therapy is still as high as 55% to 70%, possibly due to the concomitant presence of low HDL-C and other lipid and non-lipid abnormalities[8]. Statin-niacin combination therapy has been shown to reduce the risk of CAD by 60% to 90% and may be particularly beneficial among Asian Indians who have multiple lipid abnormalities[8,45]. (Rule of Thumb according to AHA: Reduction of LDL-C by 1% reduces CAD risk by 1%; Also Raising HDL-C by 1% would reduce risk by 1.8 or 2%)

7. Aggressive Implementation of Secondary Prevention of CVD

Secondary prevention measures need to be aggressively implemented with optimal use of cardiac rehabilitation and medications such as aspirin, ACE inhibitors, beta-blockers, and statins, as recommended by ACC/AHA[46]. A modified version for Indians is presented in Tables 5 and 6.

GENERAL RECOMMENDATIONS

These recommendations are applicable to all Asian Indians regardless of the presence or absence of CAD and/or various risk factors. This is particularly true for those with diabetes, a chronic disease, inextricably intertwined with CAD and shares common risk factors. The recommendations include the following:

1) **Promotion of Primordial, Primary and Secondary Prevention** by the government, medical community, public, industry and the media. Primordial prevention is aimed at preventing the development of risk factors with the following 4 key objectives: (i) avoidance of smoking and other tobacco products; (ii) avoidance of obesity; (iii) daily regular physical activity and (iv) prudent or cardioprotective diet. Adherence to the primordial prevention will reduce the

Table 5: *Thresholds and goals for secondary prevention for patients with established coronary and other vascular diseases for Asian Indians (Modified from AHA/ACC Recommendations)*[51]

Goals	Intervention recommendation
SMOKING TOBACCO PRODUCTS	
▪ Complete cessation. ▪ No exposure to environmental tobacco smoke	▪ Ask about tobacco use status at every visit and advise every tobacco user to quit. Assess the tobacco user's willingness to quit. ▪ Assist by counselling and developing a plan for quitting. ▪ Urge avoidance of exposure to environmental tobacco smoke at work and home.
BLOOD PRESSURE CONTROL	
• <130/85 mm Hg or • <120/80 mm Hg if patient has CHD, diabetes or chronic kidney disease	• Initiate or maintain lifestyle modification—weight control; increased physical activity; alcohol moderation; sodium reduction; and emphasis on increased consumption of fresh fruits, vegetables, and low-fat dairy products. • For patients with blood pressure ≥130/85 mm Hg (or ≥120/80 mm Hg for individuals with chronic kidney disease or diabetes): o As tolerated, add blood pressure medication, treating initially with β-blockers and/or ACE inhibitors, with addition of other drugs such as thiazides as needed to achieve goal blood pressure. o As per physician's discretion
LIPID MANAGEMENT	
• Assess fasting lipid profile in all patients, during hospitalization for those with an acute cardiovascular or coronary event. • Initiate lipid-lowering medication [statins] before discharge according to the following schedule: ▪ LDL-C <100 mg/dL preferably <70 mg/dl. If lower, to reduce by 30% of baseline. ▪ If triglycerides are ≥200 mg/dL, non-HDL-C should be <100 mg/dL	▪ Start dietary therapy. Reduce intake of saturated fats (to <7% of total calories), trans-fatty acids, and cholesterol (to <200 mg/d). ▪ Promote daily physical activity and weight management. ▪ Encourage increased consumption of omega-3 fatty acids in the form of fish or in capsule form (1 g/d) for risk reduction. For treatment of elevated triglycerides, higher doses are usually necessary for risk reduction. ▪ Start statins in all patients ▪ Therapeutic options to reduce non-HDL-C are: o More intense LDL-C–lowering therapy [increasing statin dose], or o Niacin (after LDL-C–lowering therapy) , or o Fibrate therapy (after LDL-C–lowering therapy)
PHYSICAL ACTIVITY	
For all patients: ▪ Encourage 30 to 60 minutes of moderate-intensity aerobic activity, such as brisk walking, on most, preferably all, days of the week ▪ An increase in daily lifestyle activities (eg, walking breaks at work, gardening, household work).	▪ For all patients, assess risk with a physical activity history and clinical status to guide prescription. ▪ 30 minutes, 7 days per week (minimum 5 days per week) ▪ Encourage resistance training 2 days per week. ▪ Moderation needed for high-risk patients (eg. recent acute coronary syndrome or revascularization, heart failure).
WEIGHT MANAGEMENT	
▪ Body mass index: 18.5 to 23 kg/m2 ▪ Waist circumference: men <90cm, women <80cm	▪ Assess body mass index and waist circumference on each visit and consistently encourage weight maintenance/reduction through an appropriate balance of physical activity, caloric intake, and behavioral programs to achieve and maintain target body mass index . ▪ If waist circumference (measured horizontally at the iliac crest) is ≥80 cm in women and ≥90cm in men, initiate lifestyle changes and consider treatment strategies for metabolic syndrome as indicated. ▪ The initial goal of weight loss therapy should be to reduce body weight by approximately 10% from baseline. With success, further weight loss can be attempted through further assessment.
DIABETES MANAGEMENT	
▪ HbA 1C <7%	▪ Initiate lifestyle and pharmacotherapy to achieve near normal Hb A1C . ▪ Begin vigorous modification of other risk factors (eg, physical activity, weight management, blood pressure control, and cholesterol management as recommended above). ▪ Coordinate diabetes care with patient's primary care physician or endocrinologist.

Table 6: Recommended Guidelines For Pharmacotherapy.

ANTIPLATELET AGENTS/ ANTICOAGULANTS:

- Start aspirin 75 to 162 mg/d and continue indefinitely in all patients unless contraindicated.
- Start and continue clopidogrel 75 mg/d in combination with aspirin for up to 12 months in patients after acute coronary syndrome or percutaneous coronary intervention with stent placement. In patients with a DES continue dual anti platelet therapy indefinitely.
- Manage warfarin to international normalized ratio = 2.0 to 3.0 for paroxysmal or chronic atrial fibrillation or flutter and in post–myocardial infarction patients when clinically indicated (eg. atrial fibrillation, left ventricular thrombus).
- Use of warfarin in conjunction with aspirin and/or clopidogrel is associated with increased risk of bleeding and should be monitored closely.

RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM BLOCKERS:

ACE inhibitors:

- Start and continue indefinitely in all patients with left ventricular ejection fraction ≤40% and in those with hypertension, diabetes or chronic kidney disease, unless contraindicated.
- Consider for all other patients.
- Among lower-risk patients with normal left ventricular ejection fraction in whom cardiovascular risk factors are well controlled and revascularization has been performed, use of ACE inhibitors may be considered optional.

Angiotensin receptor blockers:

- Use in patients who are intolerant of ACE inhibitors and have heart failure or have had a myocardial infarction with left ventricular ejection fraction ≤40%.
- Consider in other patients who are ACE inhibitor intolerant.
- Consider use in combination with ACE inhibitors in systolic-dysfunction heart failure.

Aldosterone blockade:

- Use in post–MI patients, without significant renal dysfunction or hyperkalemia, who are already receiving therapeutic doses of an ACE inhibitor and ß-blocker, have a left ventricular ejection fraction ≤40% and have either diabetes or heart failure.

β-BLOCKERS:

- Start and continue indefinitely in all patients who have had myocardial infarction, acute coronary syndrome or left ventricular dysfunction with or without heart failure symptoms, unless contraindicated.
- Consider chronic therapy for all other patients with coronary or other vascular disease or diabetes unless contraindicated.

rates of development of the risk factors in the first place, and will help avoid the need for primary prevention which is directed at controlling existing risk factors such as obesity, tobacco use, hypertension, diabetes and dyslipidemia (any lipid abnormality).

2) **Tobacco Cessation and Control**[47]
   - Widespread enforcement of existing anti-smoking laws, and the new Ban on Smoking in All Public Places in India passed in 2008.
   - Enforcement of the ban on smoking at work places and penalties for those who break the laws.
   - Increase in the tax on tobacco products to discourage consumption.
   - Widespread promotion of anti-tobacco campaign.
   - Ban on tobacco advertising and sponsorship.
3) **Promotion of Regular Physical Activity/Exercise**[14]
   - Physical inactivity should be avoided as far as far as possible.
   - Inactive people should start slow and gradually increase physical activity.

- In general, a total of 60 minutes of physical activity is recommended every day. This includes aerobic activity, work-related activity and muscle strengthening activity.
- Those who are overweight or obese, require 60-to-120 minutes or more of physical activity per day to achieve weight optimization in addition. (Rule of Thumb: Each "1 hour" of exercise increases the life expectancy by "2 hours"as per AHA).
- There is a dose-response relationship between physical activity and health; greater benefit is achieved by exceeding the minimum recommendations.
- Physical activity can be accumulated throughout the day in blocks as short as 10 minutes.
- Brisk walking (walking at an intensity wherein an individual finds speaking difficult but not impossible) is preferred initial mode of exercise and this does not require any special training or equipment.
- Physical education should be given greater emphasis in schools and colleges. Special emphasis is needed in a structured setting that should include "all" students in their elementary and middle school years.
- Exercise facilities and time for exercise should be made available at workplace to encourage physical activity.
- Encourage construction and use of foot-paths & bicycle-paths in urban areas.
- Yoga can be part of the physical activity especially for those who have high level of stress.

4) Appropriate Weight Management[14]

- Caloric intake should balance the caloric expenditure to achieve and maintain healthy weight and waist size. (The "CICO" principle: "Calories In ≤ Calories Out")
- Disseminate the Asian (Indian) specific BMI cut point for overweight (BMI >23 kg/m^2) and obesity (BMI >25 kg/m^2) to both the public and medical community.
- Widely disseminate the gender specific "Asian (Indian)" waist circumference cut points). (Rule of Thumb: Waist Circumference ≤ ½ Height)
- Encourage all Indians to achieve and maintain optimum BMI (<23 kg/m^2) and waist size (<90 cm for men and <80 cm for women).

5) Adoption of a Healthy Diet [48,49]

- Reduce the intake of fried foods, processed foods, soft drinks containing calories, and other unhealthy foods; and increase in the use of healthy foods.
- Increase the intake of fruits & vegetables (at least 500 gm per day), legumes and whole grain foods (Prudent diet or DASH diet).
- Limit the daily intake of total fat to 25-35% of calories, and saturated fat to <7% of the calories, by limiting the use of butter, ghee, full-fat dairy products, trans-fats, and tropical oils (palm oil and coconut oil).
- Increase the intake of mono-unsaturated fats up to 20%.
- Reduce the intake of trans-fats to the minimum.
- Avoid fried food and other sources of trans-fats.
- Reduce the glycemic load by cutting down on the carbohydrates, especially refined carbohydrates. This is particularly important for those with high triglyceride level, metabolic syndrome, pre-diabetes and diabetes.
- Reduce the intake of salt to <2300 mg sodium (one teaspoon of salt) per day.
- Moderation in the consumption of nuts, lean meat and fish.
- Encourage modification of "school lunches" to healthier lunches incorporating fruits, greens, dairy products and sources of protein. High caloric soft drinks should be replaced by low-fat dairy products, energy and protein drinks.
- Avoid alcohol by those with family history of alcoholism or personal history of inability to control the intake and those with high triglyceride levels, or high blood pressure.
- Those who drink alcohol should limit the amount to no more than one drink/day for women and two drinks a day for men. One alcoholic drink equals 45 ml of any alcoholic spirit (80% proof) or 12 oz of beer.
- Do not initiate alcohol for primary or secondary prevention of heart disease, since the risk from alcoholism and accidents may outweigh the benefits in most segments of the society.

6) Development of Governmental Policy to Reduce CAD and Risk Factors

- Develop government policies and programs to arrest and reverse the epidemic of CAD and diabetes with the focus on primordial and primary prevention.
- Promote anti-smoking education to public through organized programs and media and enforce the current legislation that is already on the books.
- Mandate food labeling including portion size, calories, total fat, saturated fat, trans-fat, protein, carbohydrates, sodium, sugar and fiber.
- Develop a food pyramid specific for Indians, using commonly used Indian foods and vegetables.
- Promote healthy nutrition and consider subsidies for producing and distributing healthy foods.
- Promote and facilitate physical activity in all walks of life- schools, work places and other community settings.
- Make medications available and affordable (by providing subsidies or distribution through various

institutions).

- Promote medication coverage under insurance plans to ensure greater adherence to prescribed medications.
- Create culturally sensitive health education materials and translate them into local languages.
- Implement changes in urban design to promote physical activity.

7) **Inclusion of Industry and Private Organizations as Stakeholders**

- Include medication coverage under health benefits.
- Promote physical activity at work places.
- Enforce the recently passed laws to ban smoking at work places.
- Make healthy foods available at work sites.
- Reduce salt content and trans fat content in the processed food.
- Increase opportunities and incentives for physical activity in community and work settings.
- Increase opportunities for physical activity in community and work settings (e.g. the provision of incentives to employers who offer appropriate recreational facilities or physical activity opportunities).

8) **Development of Health-Related School Programs**[50]

- Include health education with focus on primordial prevention in the school curriculum.
- Promote physical activity and other measures outlined in primordial prevention.
- Foster healthy lifestyles and behaviors in schools.
- Improve education in prevention and nutrition in schools.
- Promote daily physical activity, healthy nutrition and smoke-free campuses.

9) **Emphasis on Preventive Health Education for Health Care Providers**

- Provide education to public and health care professionals to remove myths about various diseases including CAD and diabetes.
- Develop a mechanism for continued medical education (CME) programs for cardiologists, general physicians and general practitioners about advances in cardiovascular and other forms of therapy.
- Promote health education to general public including the prevention of CAD through media, health camps, public lectures, news letters and journals etc.
- Educate Indians about the risk of obesity, particularly abdominal obesity and benefits of weight reduction.
- Encouraging clinicians to use global risk-assessment tools.
- Make physicians aware of the guidelines as they are developed and disseminated, particularly those pertaining to Asian Indians.
- Persuade the cardiologists and primary care physicians to be medical champions and community leaders in the preventive efforts.
- Establish systems to address the multi-level contexts that influence the development and maintenance of prevention-related health behaviors.
- Develop mechanisms for the systematic integration of social, health, governmental and policy-level factors with grass-root level approaches.
- Encourage hospitals and health care systems to develop and provide preventive cardiology services and systems for the community.
- Create and certify preventive CAD specialists who can train the practitioners and paramedics in strategies of prevention and health promotion.

10) **Promotion of Research in the Field of Prevention and Health Promotion**

- Research promotion is an important key to progress. Governmental policies should facilitate and promote research specific to Asian Indians. Some of the specific recommendations are as follows:
  - ♦ Support intensive research to determine which strategies are most effective in promoting healthy lifestyles.
  - ♦ Study the adherence to CAD prevention in various communities, health care organizations and by providers and patients in a variety of clinical care settings.
  - ♦ Promote studies that translate efficacy-research into effectiveness-trials and community-based demonstration projects in ethnically, geographically and economically diverse groups.
  - ♦ Conduct studies to examine the biases, selection problems, unrealistic expectations and mechanisms that result in study outcomes failing to translate into real-world outcomes (type I and type II errors).
  - ♦ Facilitate research into understanding the barriers associated with adherence to guidelines at the community, health care provider and patient levels.
  - ♦ Conduct studies of various risk-factor interventions, including the manner in which interventions should be prioritized with regard to the psychosocial state of the patient (e.g. stage of change and motivation).
  - ♦ Gain increased understanding of the extent of each, patient and provider beliefs, cultural diversities, expectations and preferences influence provider-patient communication.
  - ♦ Place special focus on vulnerable groups, including the economically disadvantaged, the elderly and

women.
    - Study the efficacy of policy and legal changes in reducing CAD risk factors (e.g., tobacco taxes and mandated school-based physical education programs).
- Increase research regarding the cost-effectiveness of CAD prevention.
- Conduct further research to resolve measurement issues. This applies not only to measurement of medication-taking behavior but also to the ability to monitor and verify behavior in other areas such as smoking, diet and physical activity.
- Develop research proposals that aim to survey the attitudes, beliefs and behavioral changes of practicing cardiologists and those in training that are used to foster the development of plans for changes in cardiovascular training programs.
- Initiate "Preventive Cardiology Awards" to physicians to foster preventive research, training and clinical care for the current generation.

11) Involvement of Media and Social Marketing

- Provide the media with clear and unambiguous health promotion information that they can disseminate.
- Select and involve "national figures" and "role models" for promotional campaigns.
- Develop "health related" public sitcoms and TV programs.

CONCLUSIONS

In order to reverse the tide of the rising CAD epidemic in Asian Indians, the time is right for the development and implementation of the population-specific aggressive preventive strategies in India as outlined in this document. To be effective, this should be enforced at multiple levels-Individual, societal, governmental and the specialty societies or professional association levels. While the challenge appears overwhelming, the opportunities for intervention are abundant. It will be of paramount importance to aim for the stricter goals and specific thresholds for various risk factors for the Asian Indians as outlined in this document for all levels of prevention - primordial, primary or secondary. The principal strategy must include interventions not only to detect and treat CAD aggressively and early with proven medications and lifestyle changes (secondary prevention) or control the risk factors that have already developed without yet manifest CAD (primary prevention), but also to prevent the development of risk factors in the first place (primordial prevention). We should continue to strive to improve the quality of care to match and surpass the current professional standards through continuing education and research. Furthermore, we should rapidly develop and institute public policies, involve private sector, consistently follow through and above all, measure the success as we go forward and implement the lessons learned in the process. The time is here and now for all the stakeholders to implement the recommendations outlined in this Indo-US Healthcare Summit Report without wasting a moment to restrain and reverse the rapidly escalating epidemic of CAD which India can ill afford at this time of unprecedented growth.

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