LIFE STYLE MANAGEMENT
LEARNING FROM LIFE

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Cardiovascular Disease Burden in India

The second most populous country in the world

Total Population: 121 Crore

83.3 crore (68.84%) in Rural India

37.7 crore (31.16%) in Urban India

Total Cardiac Patients: 4.5 Crore

About 40% of the cardiac patients in rural areas have limited facility for diagnosis and treatment.

24.8% between 25-69yrs

Incidence of cardiovascular disease (CVD) has significantly gone up to 24.8% in the age group 25-69 yrs (the most productive population)

52% deaths in < 70yrs

Closely to half (52%) of CVD deaths occur in those < 70 yrs

Comparison of heart disease between US and India

- Heart disease mortality is increasing 5-6% per year in India vs. 2-3% decrease in the US
- People younger than 45 years account for 40% of all CAD in India vs. 10% in the US
- People younger than 45 years account for 40% of all CAD deaths in India vs 2% (1% whites and 4% blacks) in the US.
- CAD death rates among Indian Diaspora younger than 45 years are 5-10 times higher than in compatriots of other ethnic origin
RISK FACTOR FOR CORONARY ARTERY DISEASE
<table>
<thead>
<tr>
<th>Major Risk Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension*</td>
</tr>
<tr>
<td>Cigarette smoking</td>
</tr>
<tr>
<td>Obesity* (body mass index ≥ 30 kg/m²)</td>
</tr>
<tr>
<td>Physical inactivity</td>
</tr>
<tr>
<td>Dyslipidemia*</td>
</tr>
<tr>
<td>Diabetes mellitus*</td>
</tr>
<tr>
<td>Microalbuminuria or estimated GFR &lt; 60 mL/min</td>
</tr>
<tr>
<td>Age (older than 55 for men, 65 for women)</td>
</tr>
<tr>
<td>Family history of premature cardiovascular disease</td>
</tr>
<tr>
<td>(men under age 55 or women under age 65)</td>
</tr>
</tbody>
</table>
Risk Factors that are More Common in Asian Indians and Contributing to the Underestimation of CAD Risk

- Abnormal lipids — 44%
- High lipoprotein(a) — 42%
- Smoking (men)
- Low HDL — 91%
- Metabolic syndrome — 35%/50% (M/F)
- Diabetes — 17%; prediabetes — 63%
- Abdominal obesity — 62%
- Obesity 50% (Indian specific criteria)
- No daily intake of fruits/vegetables — 73%
- Physical inactivity — 94%
- High CRP — 65%
- High homocysteine — 41% to 75%
- Lp- PLA 2

- High fibrinogen and PAI-1
- Air pollution
- Contaminated vegetarianism
- Endogamy and consanguinity
- Early onset of risk factors
- Poor awareness & control of risk factors
- Predisposition for alternative medicine
- Inadequate medical care
- Low health literacy
-Markers of subclinical ASCVD
  ABI
  Exercise testing
  EBCT/MRI
  Carotid IMT
80% of diseases are psycho-somatic—LIFE STYLE DISEASE

- World Health Organisation
Figure 1.3 Quantity of Life versus Quality of Life

**VITAL STATISTICS**

**FIGURE 1.3  Quantity of life versus quality of life.** Years of healthy life as a proportion of life expectancy in the U.S. population.

### Risk stratification of patients with hypertension

<table>
<thead>
<tr>
<th>Stage</th>
<th>Other Risk Factors and Disease History</th>
<th>Blood Pressure (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Stage 1</td>
</tr>
<tr>
<td>I</td>
<td>No other risk factors</td>
<td>Low risk</td>
</tr>
<tr>
<td>II</td>
<td>1-2 risk factors</td>
<td>Medium risk</td>
</tr>
<tr>
<td>III</td>
<td>3 or more risk factors or TOD or Diabetes</td>
<td>High risk</td>
</tr>
<tr>
<td>IV</td>
<td>ACC</td>
<td>Very high risk</td>
</tr>
</tbody>
</table>

- **Stage 1**: SBP 140-159 or DBP 90-99
- **Stage 2**: SBP 160-179 or DBP 100-109
- **Stage 3 (Severe Hypertension)**: SBP >180 or DBP >110

Risk strata (typical 10 year risk of stroke or myocardial infarction): Low risk = Less than 15%
Medium risk = about 15-20% High risk = about 20-30% Very high risk = 30% or more

TOD: Target Organ Damage ; ACC: Associated clinical conditions, including clinical cardiovascular disease or renal disease
Small Decreases Make a Difference: A Reduction of 2 mm Hg Lowers CVD Risk by Up to 10%

Meta-analysis of 61 prospective, observational studies
- 1 million adults
- 12.7 million person-years

Decrease of 2 mm Hg in mean SBP

7% reduction in risk of IHD mortality
10% reduction in risk of stroke mortality

CVD, cardiovascular disease; SBP, systolic blood pressure; IHD, ischemic heart disease.
Risk reduction with anti-hypertensive therapy

<table>
<thead>
<tr>
<th>Event</th>
<th>Reduction in risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular events</td>
<td>16–40%</td>
</tr>
<tr>
<td>Stroke</td>
<td>25–59%</td>
</tr>
<tr>
<td>Coronary events</td>
<td>13–26%</td>
</tr>
<tr>
<td>CCF</td>
<td>51–55%</td>
</tr>
<tr>
<td>Dementia</td>
<td>0–50%</td>
</tr>
</tbody>
</table>
Hypertension management in practice

- In everyday practice, optimal control is only poorly attained\(^1\).

- Only 27% of hypertensives are controlled in the USA, less than 6% in UK, 16% in Canada and less than 13% in Argentina\(^1\).

- In all these cases, monotherapy is prescribed in 60% or more of treated hypertensives\(^1\).

- In patients with blood pressure of about 160/95 mmHg, the usual reduction produced by monotherapy would be about 7-13 mmHg systolic and 4-8 mmHg diastolic\(^1\).

- Clearly, for many patients with hypertension, such reductions in blood pressure would not restore optimal or even non-hypertensive blood pressure levels\(^1\)."

1. Alberto Villamil, MD - Drug therapy: Fixed dose combinations
<table>
<thead>
<tr>
<th>Intervention</th>
<th>Recommendation</th>
<th>Expected systolic blood pressure reduction (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight reduction</td>
<td>Maintain ideal body mass index Below 23 Kg/m2</td>
<td>5-20 mm Hg per 10 kg weight loss</td>
</tr>
<tr>
<td>DASH eating plan</td>
<td>Consume diet rich in fruits, vegetables, low-fat dairy products with reduced content of saturated and total fat.</td>
<td>8-14 mm Hg</td>
</tr>
<tr>
<td>Dietary sodium Restriction</td>
<td>Reduce dietary sodium intake to &lt;6 g salt or &lt; 2.4 g sodium.</td>
<td>2-8 mm Hg</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Engage in regular aerobic physical activity, for example, brisk walking for at least 30 min most days</td>
<td>4-9 mm Hg</td>
</tr>
<tr>
<td>Alcohol moderation</td>
<td>Men&lt;60 ml per day, twice a week. Women&lt;30 ml per day, twice a week. Abstinence is preferred.</td>
<td>2-4 mm Hg</td>
</tr>
<tr>
<td>Tobacco</td>
<td>Total abstinence</td>
<td></td>
</tr>
</tbody>
</table>

DASH= Dietary Approaches to Stop Hypertension
Obesity

- “Excessive fat accumulation in the body to the extent that health and well-being are adversely affected”
Incidence

- 5% of total population affected
- Females > Males
- HIG > LIG
- Urban > Rural
- North > South
- 30% of obesity begins in childhood
- 50-80% of obese children - Obese adults
### Differences in Cut Points for Obesity and Abdominal Obesity for Asian Indians/South Asians and Europids

<table>
<thead>
<tr>
<th>Generalized Obesity</th>
<th>Asian Indians/South Asians</th>
<th>Europids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal weight</td>
<td>BMI 18-22.9</td>
<td>BMI 18.5-24.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>BMI 23-24.9</td>
<td>BMI 25-29.9</td>
</tr>
<tr>
<td>Obesity</td>
<td>BMI &gt; 25</td>
<td>BMI &gt; 30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abdominal Obesity</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>WC ≥ 90cm</td>
<td>WC ≥ 102cm</td>
</tr>
<tr>
<td>Women</td>
<td>WC ≥ 80cm</td>
<td>WC ≥ 88cm</td>
</tr>
</tbody>
</table>

BMI = Body Mass Index, WC = Waist Circumference
MORTALITY Vs. BODY MASS INDEX
(Tsugane et. al. 2002)

Body Mass Index (Wt / sqm.)

Death

0.5 1.0 1.5 2.0 2.5

10 20 30 40
Distribution of fat

The distribution of fat in the body also affects risk.

People who have a high proportion of fat around the central part of the body (‘apple shaped’) have a greater risk of CHD than those who have most of their fat around the hips and thighs (‘pear shaped’).

Men tend to be more ‘apple shaped’ whereas women tend to be more ‘pear shaped’.
What are the impacts of Obesity??

- Social Implications
  - Unfortunately, still an acceptable form of social discrimination

- Medical and Health Implications
  - With BMI > 30
    - 70% increase in coronary artery disease
    - 75% increase in stroke
    - 400% increase in diabetes
    - 55% increase in mortality
How much sooner does obesity give you a heart attack?
Coined by Dr. Francine Kaufman
Diabesity!

- Diabetes + Obesity
- Defined as metabolic dysfunction that ranges from mild blood sugar intolerance to full fledged type 2 diabetes.
Diabetes epidemics

- Over 80% of type 2 DM patients are overweight
Get up n move...
“If we could give every individual the right amount of nourishment, we would have the safest way to health....
“Food alone is the best medicine for all living creatures”.

Taitriya Upanishad

“A good meal ought to begin with hunger”.

French Proverb
<table>
<thead>
<tr>
<th>Food group</th>
<th>Servings</th>
<th>Examples</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole grain products</td>
<td>7–8 per day</td>
<td>Whole wheat bread, pita bread, bagels,</td>
<td>Major source of fibre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cereals, oatmeal</td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td>4–5 per day</td>
<td>Tomatoes, peas, potatoes, carrots, broccoli,</td>
<td>Rich in potassium, magnesium, &amp;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>beans, spinach, cabbage</td>
<td>fibre</td>
</tr>
<tr>
<td>Fruits</td>
<td>4–5 per day</td>
<td>Apples, bananas, grapes, oranges, melons,</td>
<td>Rich in potassium, magnesium, &amp;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>peaches, berries</td>
<td>fibre</td>
</tr>
<tr>
<td>Low-fat/non-fat dairy</td>
<td>2–3 per day</td>
<td>Skimmed milk, low-fat yogurt, non-fat cheese</td>
<td>Major sources of calcium &amp; protein</td>
</tr>
<tr>
<td>food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meats, poultry &amp; fish</td>
<td>≤ 2 per day</td>
<td>Select lean cuts of red meat, avoid frying;</td>
<td>Major sources of protein &amp;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>eat chicken &amp;/or fish instead</td>
<td>magnesium</td>
</tr>
<tr>
<td>Nuts, seeds &amp; legumes</td>
<td>4–5 per week</td>
<td>Almonds, peanuts, walnuts, sunflower seeds,</td>
<td>Major sources of protein,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>kidney beans, lentils</td>
<td>magnesium, potassium, &amp; fibre</td>
</tr>
</tbody>
</table>
Why are portion sizes important?

20 Years Ago

210 Calories

2 hr 20 Minutes

Today

610 Calories

Calorie Difference: 400 Calories

How to burn* 400 calories:
Walk 2 hr 20 Minutes

*Based on 130 pound person
The Traditional Healthy Mediterranean Diet Pyramid

- **Daily physical activity**
- **Daily beverage recommendations**
  - 6 glasses of water
  - Wine in moderation

**Weekly**
- Cheese & yogurt
- Olive oil
- Fish
- Poultry
- Eggs
- Sweets
- Meat

**Monthly**
- Fruits
- Beans, legumes & nuts
- Vegetables
- Bread, pasta, rice, couscous, polenta, other whole grains & potatoes

Daily physical activity

2000 Oldways Preservation & Exchange Trust
Effect of a Modified Mediterranean Diet

- 5 year RCT trial in 605 CHD subjects
- more whole grains
- more fruits, beans, and vegetables
- more fish
- less meat
- skim milk products
- canola oil margarine
Diet Therapy of High Blood Cholesterol

- Trans-Fatty Acids
- Increase LDL Cholesterol and decrease HDL Cholesterol
- Recommendations: Intakes of trans-fatty acids should be as low as possible
Indian diet and contaminated vegetarianism
Sausage the worst form of red meat

A 100 g serving provides 9 g saturated fats, 28 g of fat and 19 g of protein and 749 mg sodium
Fatty acids

2) Unsaturated – these have some hydrogen atoms missing and contain double bonds.

- Monounsaturated – this is where there is one double bond, e.g. oleic acid.

- Polyunsaturated – this is where there are more than one double bond in the compound, e.g. linoleic acid.
Steps for Lowering LDL-C in the Diet

- **Monounsaturated Fats:**
  - Canola, olive and peanut oil
  - Avocado
  - Olives: black and green
  - Nuts: almonds, cashews, peanuts, pecans
  - Sesame seeds
Steps for Lowering LDL-C in the Diet

- **Polyunsaturated Fats**
  - Margarine made with corn, soybean, safflower, sesame oils
  - Tub, squeeze or stick
  - Nuts: walnuts and English
  - Salad dressings
  - Seeds: pumpkin, sunflower
Steps for Lowering LDL-C in the Diet

- **Saturated Fat:**
  - Butter, Coconut & Coconut Oil, Palm Oil
  - Cream, half and half
  - Cream cheese
  - Shortening or lard
  - Sour cream
  - Fat from animal products including milk and meats
### Comparison of Dietary Fats

<table>
<thead>
<tr>
<th>DIETARY FAT</th>
<th>SATURATED FAT</th>
<th>MONOUNSATURATED FAT</th>
<th>POLYUNSATURATED FAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canola oil</td>
<td>7%</td>
<td>21%</td>
<td>11%</td>
</tr>
<tr>
<td>Safflower oil</td>
<td>10%</td>
<td></td>
<td>76%</td>
</tr>
<tr>
<td>Sunflower oil</td>
<td>12%</td>
<td></td>
<td>71%</td>
</tr>
<tr>
<td>Corn oil</td>
<td>13%</td>
<td></td>
<td>57%</td>
</tr>
<tr>
<td>Olive oil</td>
<td>15%</td>
<td>9%</td>
<td>-1%</td>
</tr>
<tr>
<td>Soybean oil</td>
<td>15%</td>
<td></td>
<td>54%</td>
</tr>
<tr>
<td>Peanut oil</td>
<td>19%</td>
<td></td>
<td>33%</td>
</tr>
<tr>
<td>Cottonseed oil</td>
<td>27%</td>
<td></td>
<td>54%</td>
</tr>
<tr>
<td>Lard*</td>
<td>43%</td>
<td></td>
<td>9%</td>
</tr>
<tr>
<td>Beef tallow*</td>
<td>48%</td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>Palm oil</td>
<td>51%</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>Butterfat*</td>
<td>68%</td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>Coconut oil</td>
<td>91%</td>
<td></td>
<td>2%</td>
</tr>
</tbody>
</table>

**Fatty acid content normalized to 100 per cent**

- **Linoleic Acid**
- **Alpha-Linolenic Acid** (An Omega-3 Fatty Acid)

* Cholesterol Content (mg/Tbsp): Lard 12; Beef tallow 14; Butterfat 33. No cholesterol in any vegetable-based oil.

Source: POS Pilot Plant Corporation, Saskatoon, Saskatchewan, Canada June 1994
CVD Risk Reduction with Selected Food Groups

<table>
<thead>
<tr>
<th>Food group</th>
<th>CVD risk reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits and vegetables</td>
<td>15% to 48%</td>
</tr>
<tr>
<td>Nuts</td>
<td>19% to 48%</td>
</tr>
<tr>
<td>Whole grains</td>
<td>32% to 44%</td>
</tr>
<tr>
<td>Total</td>
<td>66% to 85%</td>
</tr>
</tbody>
</table>
The limits of medicine

The Polymeal: a more natural, safer, and probably tastier (than the Polypill) strategy to reduce cardiovascular disease by more than 75%

Oscar H Franco, scientific researcher¹, Luc Bonneux, senior researcher², Chris de Laet, senior researcher¹, Anna Peeters, senior researcher³, Ewout W Steyerberg, associate professor¹, Johan P Mackenbach, professor¹

¹ Department of Public Health, Erasmus MC University Medical Centre Rotterdam, PO Box 1738, 3000 DR Rotterdam, Netherlands, ² Belgian Health Care Knowledge Centre (KCE), Wetstraat 155, B-1040, Brussels, Belgium, ³ Department of Epidemiology and Preventive Medicine, Monash University Central and Eastern Clinical School, Melbourne, Australia
Source: James et al. The dominance of salt in manufactured food in the sodium intake of affluent societies.
Raised blood pressure is the biggest single cause of cardiovascular disease accounting for 62% of strokes and 49% of heart disease.

Strokes and coronary heart disease kill more people around the world than any other cause of death – around 12.7 million people each year.

*It is estimated that reducing salt intake by 6g a day could lead to a 24% reduction in deaths from strokes and an 18% reduction in deaths from coronary heart disease, thus preventing approximately 2.6 million stroke and heart attack deaths each year worldwide.*
Number of People With Diabetes Expected to Double by 2030

In 2011 in India
62.4 million people with diabetes
77.2 million people with prediabetes

*Number in the adult population (≥20 years of age).

ICMR–NDIAB study Diabetologia 2011.
Criteria for Diabetes Diagnosis

A1C ≥ 6.5%*
- Perform in lab using NGSP-certified method and standardized to DCCT assay

OR

FPG ≥ 126 mg/dL (7.0 mmol/L)*
- Fasting defined as no caloric intake for ≥8 hrs

OR

2-hr PG ≥ 200 mg/dL (11.1 mmol/L) during OGGT (75-g)*

OR

Random PG ≥ 200 mg/dL (11.1 mmol/L)
- In persons with symptoms of hyperglycemia or hyperglycemic crisis

*In absence of unequivocal hyperglycemia, result to be confirmed by repeat testing

FPG = fasting plasma glucose; OGGT = oral glucose tolerance test; PG = plasma glucose

At least 50% of persons with diabetes have concomitant hypertension and dyslipidemia

137,745 managed-care enrollees

- Diabetes alone: 10%
- Diabetes + hypertension: 18%
- Diabetes + dyslipidemia: 16%
- Diabetes + hypertension + dyslipidemia: 56%

Type 2 Diabetes: UKPDS

UKPDS: 1% A1C Decrease and Reduced Risk of Complications

- 43% Lower-extremity amputation or fatal peripheral vascular disease†
- 37% Microvascular disease†
- 19% Cataract extraction†
- 16% Heart failure*
- 14% Myocardial infarction†
- 12% Stroke*

Cardiovascular complications

*P<.05; †P<.0001.
UKPDS=United Kingdom Prospective Diabetes Study.
## Treatment Targets in the European Guidelines

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifestyle modification</td>
<td>Structured education</td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>Obligatory</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>&lt; 130/80 mm Hg</td>
</tr>
<tr>
<td>Renal dysf</td>
<td>&lt; 125/75 mm Hg</td>
</tr>
<tr>
<td>HbA1c (DCCT standard)</td>
<td>≤ 6.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>mmol/L</th>
<th>mg/dL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venous plasma glucose</td>
<td>&lt; 6.0</td>
<td>108</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>&lt; 4.5</td>
<td>175</td>
</tr>
<tr>
<td>LDL</td>
<td>&lt; 1.8</td>
<td>70</td>
</tr>
<tr>
<td>HDL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venous plasma glucose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDL</td>
<td>&gt; 1.0</td>
<td>40</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>&lt; 1.7</td>
<td>150</td>
</tr>
</tbody>
</table>

DCCT = Diabetes Control and Complications Trial; HbA1c = glycated hemoglobin; HDL = high-density lipoprotein; LDL = low-density lipoprotein

STENO-2: Lipid-Lowering Therapy Accounted for 70% of Cardiovascular Risk Reduction

Analysis of STENO-2 data based on the risk engine from the UKPDS

<table>
<thead>
<tr>
<th>Lipid</th>
<th>Percent of Total Calculated Risk Reduction in CVD-Related Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipids</td>
<td>78</td>
</tr>
<tr>
<td>HbA1c</td>
<td>17</td>
</tr>
<tr>
<td>Systolic blood pressure</td>
<td>15</td>
</tr>
</tbody>
</table>

DYSLIPIDEMIA
**EPIDEMIOLOGICAL FACTS**

- For every 1% decrease in LDL cholesterol reduces CHD risk by 1%
- Each 1% increase in HDL cholesterol is associated with 2-3% decrease in CHD events
- Every increase of 1 mmol/litre in TG increases risk of CVD by 14% in males and 37% in females
- High cholesterol responsible for 4.5m deaths worldwide – 56% due to CAD & 18% due to stroke
- In Indian population, raised LDL – 37% and low HDL – 55%
- Overall 1/3rd treated patients do not achieve recommended target LDL-C
- Only 20% patients with CAD reach < 100 mg/dl goal
Reduction of CVD Events in JUPITER Trial
Dramatic benefits from rosvastatin 20 mg/d in 17,802 subjects

- 44% reduction in primary end point (P<0.0001)
- 44% reduction in MI (P=0.0002)
- 48% reduction in stroke (p=0.002)
- 46% reduction in arterial revascularization (P<0.0001)
- 41% reduction in hospitalization for unstable angina (P<0.009)
- 47% reduction in stroke, MI or CVD death (P<0.00001)
- 20% reduction in death from any cause (P=0.02)
- 43% reduction in venous thromboembolism (p=0.007).
- 55% reduction in primary end point with LDL-C <70 mg/dl (P<0.0001)
- 65% reduction in primary end point with LDL-C <50 mg/dl (P<0.0001)
2014 NLA guidelines

Table 3  Criteria for ASCVD risk assessment, treatment goals for atherogenic cholesterol, and levels at which to consider drug therapy

<table>
<thead>
<tr>
<th>Risk category</th>
<th>Criteria</th>
<th>Non-HDL-C mg/dL</th>
<th>LDL-C mg/dL</th>
<th>Consider drug therapy</th>
</tr>
</thead>
</table>
| Low           | • 0–1 major ASCVD risk factors  
• Consider other risk indicators, if known | <130         | <100        | ≥190                  |
| Moderate      | • 2 major ASCVD risk factors  
• Consider quantitative risk scoring  
• Consider other risk indicators* | <130         | <100        | ≥160                  |
| High          | • LDL-C ≥190 mg/dL (severe hypercholesterolemia)§  
• Quantitative risk score reaching the high-risk threshold¶ | ≥130         | ≥100        |
| Very high     | • ASCVD  
• Diabetes mellitus (type 1 or 2)  
  o ≥2 other major ASCVD risk factors or  
  o Evidence of end-organ damage¶ | <100         | ≤100        

NLA: Non-HDL-C is a better primary target than LDL-C for dyslipidemia management

For patients with ASCVD or diabetes mellitus, consideration should be given to use of moderate or high-intensity statin therapy, irrespective of baseline atherogenic cholesterol levels.
LET'S SEE... YOU SMOKE, YOU EAT POORLY, YOUR FAMILY HAS A HISTORY OF HIGH CHOLESTEROL... LET ME BRING IN SOMEONE BETTER EQUIPPED TO TELL YOUR FUTURE...
RISK FACTOR CONTROL

● Sensible Life-style Changes
  ➢ Regular Exercise
  ➢ Stress Management
  ➢ No Tobacco
EXERCISE
for Heart & Health
TODAY’s MEN

The shape of things to come

Faulty Lifestyle

2012
Benefits of Regular Exercise in Cardiovascular Risk Factors

- Increase in exercise tolerance
- Reduction in body weight
- Reduction in blood pressure
- Reduction in bad (LDL and total) cholesterol
- Increase in good (HDL) cholesterol
- Increase in insulin sensitivity
“A sudden change in habits is likely to cause immense harm to the body.”

Astanga hridaya
Sutra 3:58
PHYSICAL EXERCISES

“Practise in moderation until they bring about lightness, perspiration, enhanced respiration ....”.

Chapter VII
Carakasamhita
Susruta; Cikitsa 24:80
Exercise American Style
Comparison of Exercise and Antidepressants

Blumenthal JA et al, Arch Intern Med 1999;159:2349

Beck’s Depression Index

Baseline
16 Weeks

Medication
Exercise

- Baseline
- 16 Weeks
10,000 Step Program

- Each add’n 3000 steps/day (½ hr) 15 lb ↓/yr
  15-50% ↓ CHD
- Doesn’t have to be continuous
- Incorporate into daily activities
“Yoga” as a part overall fitness program is useful, when combined with various other exercises

- it helps in management of stress
- postural exercises help improving flexibility and suppleness
- May help in management of certain diseases like backache.
RISK FACTOR CONTROL

➢ Stress Management
“Elimination of diseases depends upon the power of digestion; the power of digestion is the bodily strength; bodily strength is the outcome of the cheerfulness…..”.

Hastivaidyaka
(Science of Medicine for Elephants)
PSYCHO-SOCIAL FACTORS

- Chronic stress $\rightarrow$ $\uparrow$ Inflm
  (MESA Study, Arch Intern Med; 2007)
  - $\uparrow$ CRP – 9%
  - $\uparrow$ IL 6
- $\uparrow$ Vaso constr hormones
  - $\uparrow$ Adr; Nor Adr; Cortisol; Aldosterone
MINOR LIFE STYLE ENGINEERING

- MID DAY NAPS
  (Naska et al, Arch Intern Med 2007)
  - Occ naps - 12% ↓ mort
  - Daily naps - 37% ↓ mort

- MEDITATION & YOGA
  - ↓ BPr
  - ↓ Ins Res
  - ↓ Cardiac autonomic activity
  (Paul – Labrador et al, Arch Intern Med 2006)
  (Dusek et al, Med Sci Monit 2006)
RISK FACTOR CONTROL

- Sensible Life-style Changes
  - Prudent Diet
  - Regular Exercise
  - Weight/Obesity Control
  - Stress Management
  - No Tobacco
CIGARETTE SMOKING, CARDIOVASCULAR DISEASE RISK, AND IMPLEMENTATION STRATEGIES FOR SMOKING CESSION
Facts ?

100% of human beings are born as non-smokers...
Smoking and Nicotine

Other toxins in tobacco smoke, not nicotine, are responsible for majority of adverse health effects

>4000 different chemicals

Tar, carbon monoxide, irritants, and oxidant gases

>40 carcinogens

The main adverse effect of nicotine from tobacco is addiction, which sustains tobacco use

Nicotine dependence leads to continued exposure to toxins in tobacco smoke
Quit smoking

If you smoke or use tobacco, quit. Smoking can damage and tighten blood vessels and raise your risk for CAD.

You also should avoid exposure to secondhand smoke.
Long-term health benefits of Giving up Tobacco

- 1 Year
  - Risk of coronary artery disease is $\frac{1}{2}$ that of a smoker

“No more heaviness in my chest in the morning"
Long-term health benefits of Giving up Tobacco

5 Years

- Lung cancer death rate ↓ by 1/2
- Risk of stroke = as non-smoker
- Risk of cancer of mouth, throat, esophagus, bladder, kidney and pancreas ↓.

In addition:

- Quitting can dramatically improve chronic illnesses (diabetes, asthma or kidney failure)
Smoking: Mortality

33.5% of smoking-related deaths are cardiovascular-related

Male smokers die an average of 13.2 years earlier than male nonsmokers

Female smokers die an average of 14.5 years earlier than female nonsmokers

Cigarette smoking results in a two- to threefold risk of dying from CHD

Surgeon General’s Health Consequences of Smoking, 2004. CDC/NCHS.
Which lifestyle would you choose?
“Medicines are nothing in themselves if not properly used, but the very hands of god if employed with reason and prudence”.

Herophilus (Floruit-300 BC)
Prime contributors for the decline in CVD

- CABG and PTCA contributed only 5% of the CAD mortality decline in the US, Finland and Ireland— a disappointingly small contribution considering the large financial resources allocated for coronary interventions.

- Improvements in treatment explain less than half the mortality decline.

- Nearly two-third of deaths due to CVD are due to three major risk factors- high cholesterol, high blood pressure and smoking.

Unal B, Am J Public Health;2005;95:103
## Six Strategies to reduce Your Risk of a First or Second Heart Attack

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Change in status</th>
<th>Decrease in Heart Disease Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarette smoking</td>
<td>Stop smoking</td>
<td>50%</td>
</tr>
<tr>
<td>Body weight</td>
<td>Maintain ideal weight and waist size</td>
<td>35-55%</td>
</tr>
<tr>
<td>Physical activity</td>
<td>30 minutes of daily walking</td>
<td>35-55%</td>
</tr>
<tr>
<td>Healthy diet</td>
<td>Five or more servings (one-half of the plate) of fruits and vegetables</td>
<td>66-85%</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>10 mm Hg decrease in systolic BP pressure</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42%↓ stroke</td>
</tr>
<tr>
<td>LDL cholesterol</td>
<td>100 mg/dl decrease with statins</td>
<td>50%</td>
</tr>
<tr>
<td><strong>All six changes!</strong></td>
<td></td>
<td>90-95%!</td>
</tr>
</tbody>
</table>

Enas EA. www.cadiresearch.org
## “ABCS” indicators of Million Hearts’ Goal

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
<th>Base line</th>
<th>2017 goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>Use in people with high CVD risk</td>
<td>47%</td>
<td>65%</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Controlled to targets</td>
<td>46%</td>
<td>65%</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Controlled to targets</td>
<td>33%</td>
<td>65%</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>Decrease population of smokers</td>
<td>19%</td>
<td>17%</td>
</tr>
<tr>
<td>Sodium</td>
<td>Decrease average intake</td>
<td>3.5 g/d</td>
<td>20% reduction</td>
</tr>
<tr>
<td>Trans fat</td>
<td>Decrease in fat consumption</td>
<td>1% of calories</td>
<td>50% reduction</td>
</tr>
</tbody>
</table>
Remember!!

Health Management is free and enjoyable
But disease management is very costly and painful
Thank You
MY SUGGESTION

- PERIODIC HEALTH MANDATORY
- YOGA & EXERCISE PROGRAMME
- CANTEEN SERVICES
- FIXED MEAL TIMES
- WELLNESS TEACHING
- FAMILY TEACHING
- BASIC HEALTH FACILITIES
Doubts about cholesterol as late as 1989
THRIVE!!!

IF YOU CAN’T TAKE IT WITH YOU
STAY LONGER.

Marc Jaffe, MD, Kaiser Permanente 2011
PHASE = Eleven Evidence-based Recommendations, Treatments, & Tx Goals

Four Lifestyle Behaviors
- Healthy Diet
- Exercise
- Weight Control
- Smoking Cessation

Four Affordable & Effective Preventive Medications
- Aspirin
- Statin
- Angiotensin Converting Enzyme Inhibitor
- +/- Beta Blocker

Three Cardiovascular Control Goals
- LDL control
- BP control
- Glucose control

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# Impact of Lifestyle Changes

<table>
<thead>
<tr>
<th>Lifestyle Change</th>
<th>Risk Reduction for CV Events</th>
<th>Number Needed to Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco Cessation</td>
<td>↓36%</td>
<td>12&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>↓20-24%</td>
<td>37-46 in 3-5 yrs&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Healthy Eating</td>
<td>↓10-75%</td>
<td>12-93 in 2-3 yrs&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Weight Management</td>
<td></td>
<td>Improves multiple risk factors</td>
</tr>
</tbody>
</table>


©Copyright 2011 The Permanente Medical Group
### Secondary CAD Prevention: 4 Proven Drug Therapies

<table>
<thead>
<tr>
<th>Drug Therapy</th>
<th>Risk Reduction in CV Events</th>
<th>Number Needed to Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antiplatelet</td>
<td>22%</td>
<td>41 in 2 yrs¹</td>
</tr>
<tr>
<td>Statin</td>
<td>28-37%</td>
<td>28-40 in 3-5 yrs²</td>
</tr>
<tr>
<td>ACE inhibitor</td>
<td>23%</td>
<td>27 in 4 yrs³</td>
</tr>
<tr>
<td>Beta Blocker</td>
<td>24%</td>
<td>56 in 1-2 yrs⁴</td>
</tr>
</tbody>
</table>


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# Impact of Meeting CV Goals

<table>
<thead>
<tr>
<th>Risk Reduction in CV Events</th>
<th>Number Needed to Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL &lt; 100</td>
<td>16%</td>
</tr>
<tr>
<td>BP &lt; 139/89</td>
<td>25%</td>
</tr>
<tr>
<td>A1C &lt; 9</td>
<td>18% but no change in mortality</td>
</tr>
</tbody>
</table>


©Copyright 2011 The Permanente Medical Group
## Medication Recommendations for people with DM Depends on their Age

<table>
<thead>
<tr>
<th>Age</th>
<th>What and Why</th>
<th>Typical Daily Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aspirin advised if ≥ 1 RF</td>
<td>Aspirin 81 mg</td>
</tr>
<tr>
<td></td>
<td>or if 10 year risk &gt; 10%</td>
<td></td>
</tr>
<tr>
<td>60F</td>
<td>Statin beneficial in HPS</td>
<td>Simvastatin 40 mg</td>
</tr>
<tr>
<td>55</td>
<td>ACEI beneficial in HOPE</td>
<td>Lisinopril 20 mg</td>
</tr>
</tbody>
</table>

Summary of Revisions: Summary of Revisions for the 2010 Clinical Practice Recommendations. Diabetes Care January 2010 33:S


## Diet Therapy of High Blood Cholesterol

### Healthy Heart Diet vs. Therapeutic Lifestyle Change Diet (TLC)

<table>
<thead>
<tr>
<th>Healthy Heart Diet</th>
<th>Therapeutic Lifestyle Change Diet (TLC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-10% calories from saturated fat</td>
<td>&lt;7% calories from saturated fat</td>
</tr>
<tr>
<td>20 - 35% calories from fat</td>
<td>20-35% calories from fat</td>
</tr>
<tr>
<td>&lt;300 mg. cholesterol</td>
<td>&lt;200 mg. cholesterol</td>
</tr>
<tr>
<td>5-10% of energy from PUFA</td>
<td>5-10% of energy from PUFA</td>
</tr>
<tr>
<td>Up to 20% MUFA</td>
<td>Up to 20% MUFA</td>
</tr>
<tr>
<td>Calories to maintain IBW</td>
<td>Calories to maintain IBW</td>
</tr>
</tbody>
</table>
Dietary Issues Requiring Further Research

- Elevated levels of homocysteine
- Elevated homocysteine levels *may* be present in 15% of Americans.
Steps for Lowering LDL-C in the Diet

- Eggs:
  - <300 mg. cholesterol: ≤ 4 yolks/wk
  - < 200 mg. Cholesterol: ≤ 2 yolks/wk
Guidelines for Selecting & Preparing Foods

● Milk and Milk Products:
  ➣ 2-3 servings/day
Steps for Lowering LDL-C in the Diet

- **Fats, oils:**
  - \( \leq 6-8 \) tsp./day
Steps for Lowering LDL-C in the Diet

- **Plant Sterols and Stanols:**

- Natural substances derived from wood, vegetables, vegetable oils and other plants - sitosterol and sitostanol
Steps for Lowering LDL-C in the Diet

- **Meat, Fish and Poultry**
  - Select lean meat and poultry
    - $\leq 6$ oz/day for Step I diet and $\leq 5$ oz/day for Step II
  - Eat fish on a weekly basis
Steps for Lowering LDL-C in the Diet

- **Breads and Cereals:**
  - 6-11 servings/day
- Low fat crackers
- Tortillas
- Hot and cold cereals excepts granola or meusli
Steps for Lowering LDL-C in the Diet

- **Vegetables:**
  - ➡ 3-5 servings per day

- **Fruits**
  - ➡ 2-4 servings per day

- Use sweets and modified fat desserts in moderation
Reading The Label

- **Extra Lean**
  \[<5 \text{ g total fat, } 2 \text{ g saturated fat, and } 95 \text{ mg cholesterol}\]

- **Lean**
  \[<10 \text{ g total fat, } 4 \text{ g saturated fat and } 95 \text{ mg cholesterol}\]
Guidelines for Selecting & Preparing Foods

- Try reducing fat by 1/4 to 1/3 in baked products. E.g. if recipe calls for 1 cup oil, try 2/3 C.
- In casseroles and main dishes, cut back or eliminate the fat.
- Sauté or stir fry with very little fat or use water, wine, or broth.
- Chill soups, gravies and stews and skim off hardened fat before serving.
## Average MET Levels and Caloric Costs for Common Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>METs</th>
<th>Calories/Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking 2.0 mph</td>
<td>2.5</td>
<td>175</td>
</tr>
<tr>
<td>Walking 3.0 mph</td>
<td>3.5</td>
<td>245</td>
</tr>
<tr>
<td>Golf (with cart)</td>
<td>2.5</td>
<td>175</td>
</tr>
<tr>
<td>Golf (without cart)</td>
<td>4.9</td>
<td>340</td>
</tr>
<tr>
<td>Calisthenics (no weights)</td>
<td>4.0</td>
<td>280</td>
</tr>
<tr>
<td>Gardening</td>
<td>4.4</td>
<td>310</td>
</tr>
<tr>
<td>Cycling (leisurely)</td>
<td>4.0</td>
<td>280</td>
</tr>
<tr>
<td>Cycling (moderately)</td>
<td>5.7</td>
<td>400</td>
</tr>
<tr>
<td>Swimming (slowly)</td>
<td>4.5</td>
<td>315</td>
</tr>
<tr>
<td>Swimming (fast)</td>
<td>7.0</td>
<td>490</td>
</tr>
<tr>
<td>Climbing hills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No load</td>
<td>6.9</td>
<td>480</td>
</tr>
<tr>
<td>With 5 kg load</td>
<td>7.5</td>
<td>525</td>
</tr>
<tr>
<td>Tennis (singles)</td>
<td>7.5</td>
<td>525</td>
</tr>
<tr>
<td>Tennis (doubles)</td>
<td>6.0</td>
<td>420</td>
</tr>
<tr>
<td>Running (10 min mile)</td>
<td>10.2</td>
<td>710</td>
</tr>
<tr>
<td>Running (7.5 min/mile)</td>
<td>13.2</td>
<td>930</td>
</tr>
</tbody>
</table>
Recommendation for Physical Activity
From THE CDC/ACSM Consensus Statement And Surgeon General's Report

Every American adult should participate in 30 minutes or more of moderate intensity activity on most, and preferably all, days of the week.

- Moderate activities: comparable to walking briskly at about 3 to 4 miles per hour; may include wide variety of occupational or recreational activities, including yard work, household tasks, cycling, swimming, etc.

- Thirty minutes of moderate activity daily equates to 600 to 1200 calories of energy expended per week.
Estimation of Exercise Intensity Using Heart Rate Reserve

Maximal heart rate - resting heart rate) $\times$ desired exercise intensity + resting heart rate

<table>
<thead>
<tr>
<th>Example</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximal heart rate</td>
<td>= 150 beats/min</td>
</tr>
<tr>
<td>- Resting heart rate</td>
<td>= 70 beats/min</td>
</tr>
<tr>
<td></td>
<td>= 80 beats/min</td>
</tr>
<tr>
<td>X Desired intensity</td>
<td>= 60% (0.60)</td>
</tr>
<tr>
<td></td>
<td>= 48 beats/min</td>
</tr>
<tr>
<td>+ Resting heart rate</td>
<td>= 70 beats/min</td>
</tr>
<tr>
<td>= Training heart rate</td>
<td>118 beats/min</td>
</tr>
</tbody>
</table>

A reasonable training heart rate for this individual would be 115 to 120 beats/min
Avoid three things

- Hurry
- Worry
- Curry

DISEASE
Why is eating “fast food” similar to smoking 2 cigarettes?

Egg McMuffin, Sausage McMuffin, 2 Hash Browns

Vogel RA et al, Am J Cardiol 1997;79:350
<table>
<thead>
<tr>
<th>Food</th>
<th>Calories</th>
<th>Trans Fatty Acids (g)</th>
<th>Saturated Fatty Acids (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburger (7 oz)</td>
<td>660</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>McDonalds chicken McNuggets (9 oz)</td>
<td>510</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Burger King chicken sandwich (8 oz)</td>
<td>610</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Burger King fries (6 oz King size)</td>
<td>540</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Starbucks cinnamon scone (5 oz)</td>
<td>530</td>
<td>3</td>
<td>13</td>
</tr>
</tbody>
</table>

(Data compiled from Nutrition Action Health Letter, June 1999)
# Diabetes and CVD

Impact of Increasing HbA1c from the UKPDS

<table>
<thead>
<tr>
<th>Event</th>
<th>% Rise in HR per 1% Elevation of HbA1c</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal and nonfatal MI</td>
<td>14%</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Amputation/death from PVD</td>
<td>43%</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Fatal and nonfatal stroke</td>
<td>12%</td>
<td>&lt; .035</td>
</tr>
<tr>
<td>Heart failure</td>
<td>16%</td>
<td>&lt; .021</td>
</tr>
</tbody>
</table>

HR = hazard ratio; MI = myocardial infarction; PVD = peripheral vascular disease

VEGETABLES

- Water based vegetables such as cucumber, carrot, tomatoes, spinach, bell pepper---prevent urine from being acidic. Eating these foods assist your body “s ability to release heat specially in summer

- Say no cold liquid in summers –lead to constriction of blood vessels & decrease heat loss. Extremely cold food & liquids are known to interfere body” natural cooling mechanism , digestion ,sweating. Digestion of heavy food depletes level of water resulting in fatigue, poor concentration , light headed ness & decreased metabolism.

- Oil contains fat , producing thermal effect & increases its temperatue.eating too much spicy food in summers also generates heat in body
A meta-analysis of studies involving 209,413 persons: relationship between wine & beer consumption and risk for fatal and non-fatal vascular events

The relative risk for vascular endpoints among wine drinkers was 0.68 (CI, 0.59-0.77) relative to non-drinkers
Thomas Jefferson: “Wine of long habit has become indispensable to my health”, “I think it is a great error to consider a heavy tax on wine as a tax on luxury. On the contrary, it is a tax on the health of our citizens”
In 1992, Renauld and DeLongeril: the French Paradox, enhancing an interest in wine worldwide

Mortality rate for CHD in France was paradoxical and unexpectedly lower than other industrialized countries such as the USA and the UK, despite similarly high dietary intake of saturated fat
- The untoward effects of saturated fats are counteracted by the intake of wine

- Serum concentrations of HDL-C were seen, however, to be no higher in France than other European countries
• Louis Pasteur, French biologist: “Wine is the most healthful and hygienic of beverages”

• William Heberden’s classic description of angina pectoris in 1786 included the statement: “Wine and spirituous liquors afford considerable relief” and postulated that alcohol was a coronary vasodilator
Anderson: addition of a potent antioxidant to a regimen of aggressive lipid lowering produced enhanced endothelial-dependent vasodilatation

(Red wine, de-alcoholized red wine, purple grape juice)
• Leikert & colleagues: increase in endothelial nitric oxide synthase (eNOS) enhanced transcription of the eNOS gene in human endothelial cells exposed to alcohol-free red wine polyphenol extract

• This effect may not be common to all red wines

• French red wines, not German red wines increase endothelial nitric oxide mRNA protein
- Endothelin-1 (ET-1): a potent vasoconstrictor

- Khan & associates: a concentration dependent inhibition of ET-1 from a cabernet sauvignon wine
One investigator suggested:

- Differences in grape variety
- Regions of production
- Cultivation
- Method of post fermentation processing

may be important variables for health benefits
Effect of red wine on vessel wall remodeling including:

- Neointimal hyperplasia
- Monocyte recruitment & adhesion to the endothelium
- Inhibition of intracellular adhesion molecules
- Foam cell accumulation
- Smooth muscle cell (SMC) proliferation and migration
- Abnormal expression of intracellular tissue factor
Feng & colleagues: a significant reduction in Monocyte Chemotactic Protein (MCP-1) expression and reduced neointimal thickening in rabbits fed a high cholesterol diet with red wine after balloon injury.
**Results:**

- Monthly and weekly intake of wine was significantly associated with a lower risk of dementia.

- The effect of alcohol on risk of dementia did not differ between men & women.
Authors’ Conclusions:

- Even among heavy drinkers (>15 drinks/wk in men & >8 drinks/wk in women), alcohol consumption is not linked with increased risk of CHF.

- When consumed in moderation (8-14 drinks/wk in men & 3-7 drinks/wk in women), alcohol may have a protective effect & a lower hazard ratio compared to less than one drink/wk.
It is prudent for physicians to discuss the harmful effects of alcohol with their patients while at the same time, not discourage a potentially healthy practice of wine in moderation (eg, with meals)
GOOD
From 1960 to 2001, prevalence of Coronary Artery Disease (CAD) increased from –

- 3% to 10% in urban India
- 2% to 4% in rural India
## Clinical Identification of the Metabolic Syndrome (NCEP)

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Abdominal Obesity</th>
<th>Waist Circumference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>&gt; 102 cm</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>&gt; 88 cm</td>
<td></td>
</tr>
<tr>
<td>TG</td>
<td>≥ 150 mg/dl</td>
<td></td>
</tr>
<tr>
<td>HDL-C Men</td>
<td>&lt; 40 mg/dl</td>
<td></td>
</tr>
<tr>
<td>HDL-C Women</td>
<td>&lt; 50 mg/dl</td>
<td></td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>≥ 130 / 85 mmHg</td>
<td></td>
</tr>
<tr>
<td>Fasting Blood Glucose</td>
<td>≥ 110 mg/dl</td>
<td></td>
</tr>
</tbody>
</table>

* ≥ 3 or more than 3 Risk Factors comprise Metabolic Syndrome.
<table>
<thead>
<tr>
<th>Disease</th>
<th>% Attributable to hypertension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial infarctions</td>
<td>30–40%</td>
</tr>
<tr>
<td>Strokes</td>
<td>30–40%</td>
</tr>
<tr>
<td>Heart failure</td>
<td>Up to 50%</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>Up to 50%</td>
</tr>
<tr>
<td>Renal failure</td>
<td>25–30%</td>
</tr>
</tbody>
</table>
Hypertension Affects Target Organs

Hypertension

- Angina pectoris
- Unstable angina
- Myocardial infarction
- Sudden death
- Heart failure

- TIA
- Ischemic stroke
- Hemorrhagic stroke

- Renovascular disease
- Renal failure

- Claudication
- Aneurysm
- Critical limb ischemia
<table>
<thead>
<tr>
<th>Hypertension with Co-morbidities</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; Line</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; Line</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt; line</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-black Patients: &lt; 60 yrs</td>
<td>A&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Add C or D</td>
<td>A+C+D</td>
</tr>
<tr>
<td>Black Africans/asian Patients</td>
<td>C or D</td>
<td>Add A (or add other 1&lt;sup&gt;st&lt;/sup&gt; line)</td>
<td>A+C+D</td>
</tr>
<tr>
<td>non-black Patients: ≥ 60 yrs</td>
<td>C or D</td>
<td>Add A ( C/D if A used 1st)</td>
<td>A+C+D</td>
</tr>
<tr>
<td>HT and diabetes</td>
<td>A</td>
<td>Add C or D</td>
<td>Add alternative 2&lt;sup&gt;nd&lt;/sup&gt; drug (D/C)</td>
</tr>
<tr>
<td>HT and CKD</td>
<td>A</td>
<td>Add C or D</td>
<td>Add alternative 2&lt;sup&gt;nd&lt;/sup&gt; drug (D/C)</td>
</tr>
<tr>
<td>HT and clinical CAD&lt;sup&gt;d&lt;/sup&gt;</td>
<td>A+B</td>
<td>Add C or D</td>
<td>Add alternative 2&lt;sup&gt;nd&lt;/sup&gt; drug (D/C)</td>
</tr>
<tr>
<td>HT and stroke&lt;sup&gt;e&lt;/sup&gt;</td>
<td>A</td>
<td>Add D or C</td>
<td>Add alternative 2&lt;sup&gt;nd&lt;/sup&gt; drug (D/C)</td>
</tr>
<tr>
<td>HT and heart failure</td>
<td>Should usually receive an A+B +D + Spironolactone regardless of BP. A DHP-CCB can be added if needed for BP control.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>d</sup> If history of MI, Beta-blocker and ARB/or ACE inhibitor are indicated regardless of BP.

<sup>e</sup> If using a diuretic, there is good evidence for indapamide A: ARB or ACEI, B: Beta blocker, C: CCB, D: Thiazide Diuretics

DHP: Dihydropyridine, CAD: Coronary Artery Disease  CKD: Chronic Kidney Disease  J Hypertens 2014; 32:3-15
Associations

Morbid Obesity

- Cancer
- Asthma
- Depression
- Coronary Heart Disease
- NASH
- Arthritis
- Gall stone
- Sleep Apnea
Fatty acids

Unsaturated fats are normally liquid at room temperature, are usually of a vegetable origin, and are commonly known as oils.

Olive oil is an example of an oil predominately containing monounsaturated fat.

Sunflower oil is an example of a polyunsaturated fat.
Fatty acids

Fatty acids can be divided into two groups:

1) Saturated – these have the hydrogen atoms they can hold and all are single chemical bonds, e.g. stearic acid.
Mortality rate is doubled in individuals with diabetes

### Glycemic Targets for Adults With Diabetes

<table>
<thead>
<tr>
<th>A1C</th>
<th>&lt;7.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preprandial capillary PG</td>
<td>70-130 mg/dL (3.9-7.2 mmol/L)</td>
</tr>
<tr>
<td>Peak postprandial capillary PG</td>
<td>&lt;180 mg/dL (&lt;10.0 mmol/L)*</td>
</tr>
</tbody>
</table>

More or less stringent targets may be appropriate for individual patients if achieved without significant hypoglycemia or adverse events.

**Individualize targets based on:**
- Age/life expectancy
- Comorbid conditions
- Diabetes duration
- Hypoglycemia status
- Individual patient considerations
- Known CVD/advanced microvascular complications

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Targets shown are for nonpregnant adults.

*Postprandial glucose measurements should be made 1-2 h after the beginning of the meal.

CVD=cardiovascular disease; PG=plasma glucose.

Should glycemia be given more or less priority versus lipids and blood pressure?

**Various evidence based guidelines recommends:**

Aggressively manage hyperglycemia, dyslipidemia and hypertension with the same intensity to obtain the best patient outcome.

Glycemic control = Lipid-lowering = Antihypertensive

Relationship Between Cholesterol and CHD Risk: Epidemiologic Trials

Multiple Risk Factor Intervention Trial (MRFIT) (n=361,662)

Framingham Study (n=5209)

1% reduction in total cholesterol resulted in a 2% decrease in CHD risk

Each 1% increase in total cholesterol level is associated with a 2% increase in CHD risk

Antioxidants in fruits & Vegetables

- Beta Carotene: In orange (carrot, orange, papaya etc.)
- Lutin: In green leafy vegetable
- Lycopin: In red and orange: tomato, watermelon, guava, chiku etc.
- Selenium: rice, wheat, nuts, seeds of fruits etc.
- Vitamin A: orange, carrot, mango, paneer, curd
- Vitamin C: fish, amla, guava, grain, lemon
- Vitamin E: soyabin, broccoli, Patal, mango, guava etc.
CARDIOPROTECTIVE EFFECTS OF NUTS

- CHD lower in Seventh Day Adventists who consumed nuts (> 5 days/week)
- Fats in nuts (mostly PUFA, MUFA) ↓ serum cholesterol, improve platelet function
- High fiber, plant sterols ↓ Tc
- Arginine may ↑ EDRF activity
- Magnesium - Cardioprotective
- Tocopherols - Antioxidants
"In Vino veritas: In wine is truth", old latin saying

"In water you see your own face, but in wine the heart of its garden", ancient Egyptian proverb
- Red wines, unlike white wines, are high in concentrations of these substances and age gracefully.

- Derived from the skins and seeds of red wine grapes.

- Moderate wine consumption increases measurable plasma antioxidant activity, and inhibits the oxidation of LDL-C.
• “In Vino veritas: In wine is truth”, old latin saying

• "In water you see your own face, but in wine the heart of its garden”, ancient Egyptian proverb
Beyond the French Paradox: The Impact of Moderate Beverage Alcohol & Wine Consumption in the Prevention of Cardiovascular Disease

Cardiology Clinics, Volume 21.

- “Telling people to avoid any alcohol consumption, because of the potential dangers of heavy use may not be in the best health interest of the public”
Summary

- Alcohol beverages, particularly red wine, when consumed in moderation reduce the risk of acute CVD and death.

- The mechanism for alcohol beverage benefit is complex; includes an independent benefit of ethyl alcohol.
Alcohol (Pros & Cons)
A critical effect on hemostasis at levels of moderate alcohol intake:

- Decrease in platelet reactivity and aggregability in humans

- Dramatic and significant decrease in intravascular platelet deposition in a normal laminar flow state and high shear flow states across a stenotic atherosclerotic lesion
Moderate red wine consumption has anti-inflammatory properties and is associated with a lowered level of CRP.

In a study of 2008 men & women, ages 18-88 years, alcohol consumption showed a U-shaped association with mean values of CRP.
"People who experienced chronic anxiety, long period of sadness and pessimism, unremitting tension or incessant hostility, relentless cynicism or suspiciousness were found to have double the risk of disease— including asthma, arthritis, headaches, peptic ulcers and heart disease”

-- Daniel Goleman in his book *Emotional Intelligence*
ALCOHOL

“It has long been recognised that the problem relate not to the use of a bad thing, but to the abuse of a good thing.”

Abraham Lincoln
Hippocrates illustrated the value of wine as a medicine. “Wine is vital to a healthy diet”

Paracelsus, a German physician of the 16th century: “Whether wine is a nourishment, medicine or poison is a matter of dosage”
History of Alcohol & Health

- Through the ages, alcohol, particularly wine: elixir for better health

- Ancient societies:
  - Evidence of wine consumption in moderation.
  - Earliest wine consumers: better nourished and less prone to sickness

- Judaic records: “Wine is at the head of all medicines” & “Where wine is lacking, drugs are necessary”
ALCOHOL

“Razor-Sharp Double-Edged Sword”

O’Keefe et al, JACC, 2007
ALCOHOL & ALL CAUSE MORTALITY

(DiCastelnuovo et al, Arch Intern Med, 2006)
ALCOHOL & HEART

Moderate Alcohol

- Women - 1 drink/day
- Men - 2 drinks/day

Drink

- 375ml beer = 150ml Wine = 45ml spirit = 15 gm ethanol

Biology of Alcohol & Wine

- Mechanism of CVD risk reduction for alcohol drinkers caused by significant rise in HDL-C
- At least 50% of the benefit has been attributed to HDL-C rise
Effect of a single alcohol beverage on the bleeding time, a sensitive measure of platelet function, is increased and lengthened, when consumed with aspirin or within thirty six hours after aspirin ingestion.
Alcohol & Wine in Vascular Biology

- Wine is a rich source of flavonoid phenolics such as resveratrol

- Substances giving wine its astringency and bitterness and are the foundation of long aging since they are effective antioxidants
- Resveratrol (a red wine polyphenol):

  ➡️ Inhibits a number of (PMN) functions considered to contribute to the pathogenesis and evolution of acute and chronic CHD:

  ➡️ Inhibiting toxic reactive oxygen species produced by activated PMNs, B-glucuronidase and elastase release, proteolytic enzymes responsible for acute vascular damage
- Resveratrol: also inhibits the production of 5-

lipooxygenase derived metabolites which are chemotactic for neutrophils, esinophils and monocytes

➤ Blunting the inflammatory response of neutrophil aggregation, degranulation and superoxide production
• Whitehead: 18% increase in serum antioxidant capacity in subjects who drank 300 mL of red wine, compared with a 4% increase for the same amount of white wine

• Reduces hsCRP
Soluble fibre

Soluble fibre is a type of dietary fibre (NSP) which is found in foods such as oats, vegetables and beans.

It has been shown to reduce blood cholesterol levels and therefore may reduce the risk of CHD.
Diet Therapy of High Blood Cholesterol

- Soluble Fiber
- 10-20 g/day