DEPARTMENT OF HEALTH AND HUMAN SERVICES

Presented at:

The 5th CDC-IUHPE Annual Seminar on Cardiovascular Health Promotion and Chronic Disease Prevention

July 25, 2008
Paradise Holiday Resort
Bagamoyo, Tanzania

Comprehensive Approach to Multiple Risk Factor Control

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Conflicts of Interest and Disclaimer Statement

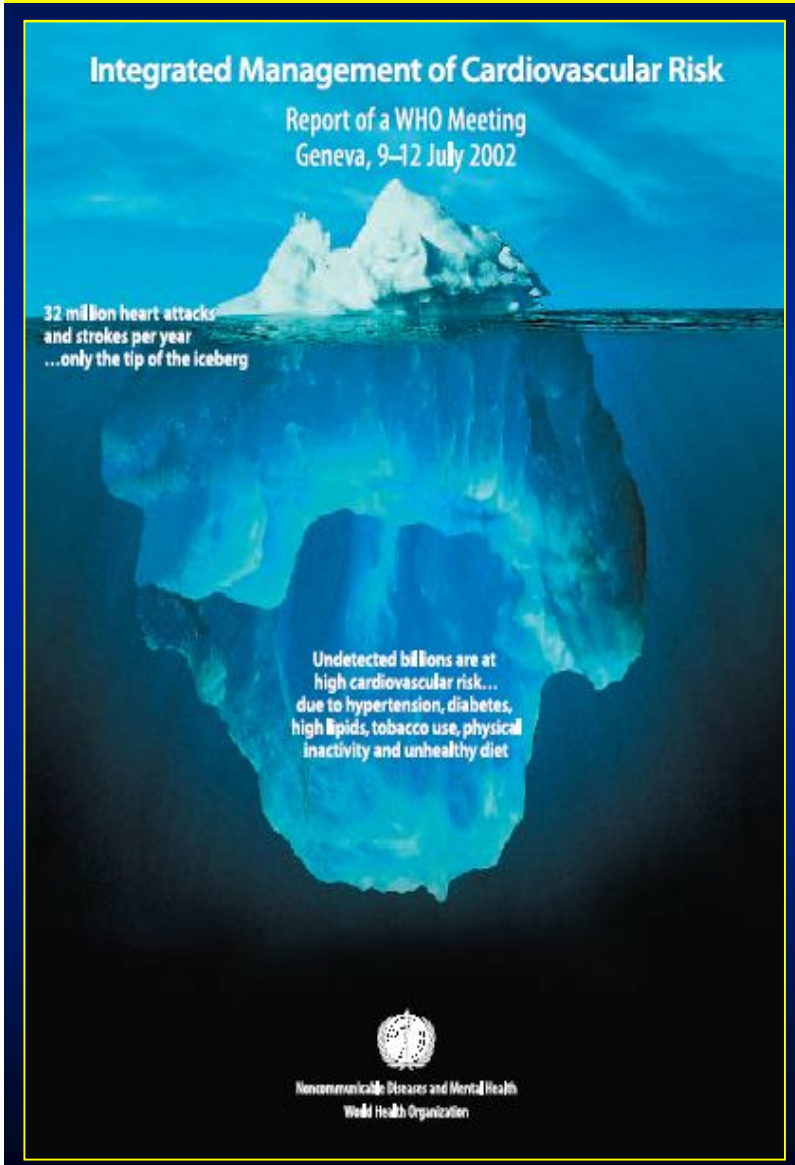
- *Conflicts of interest: None*

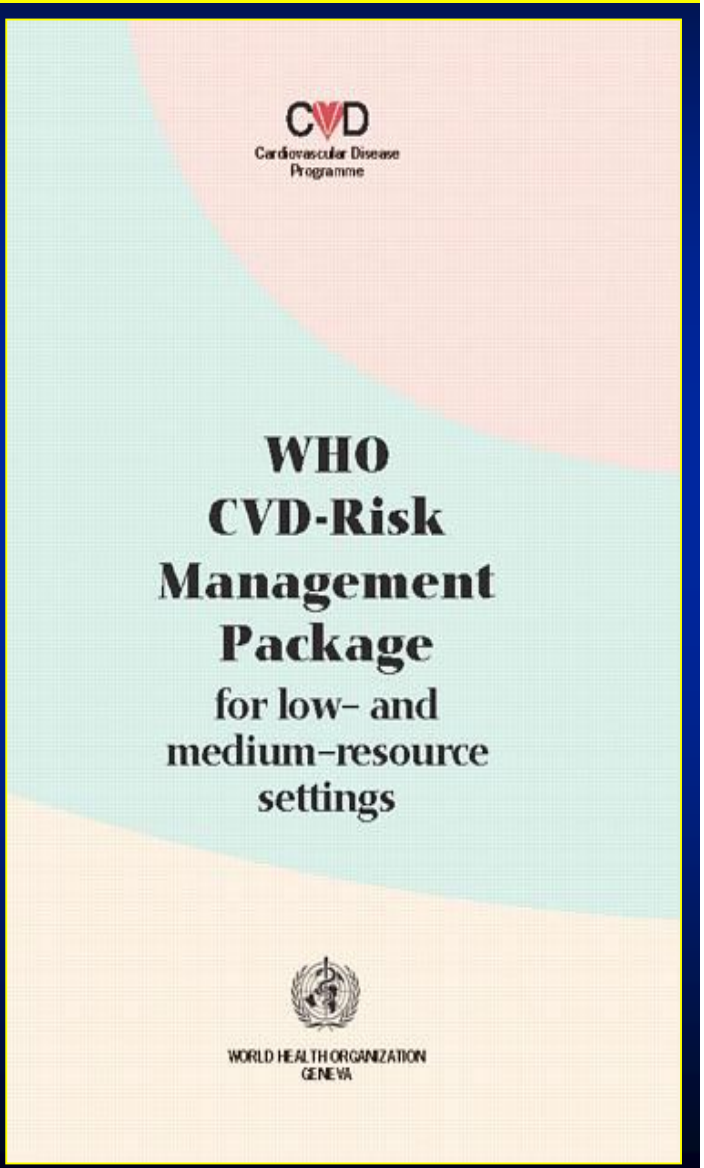
- *Statements made in this presentation do not necessarily represent the views of the CDC.*

OUTLINE

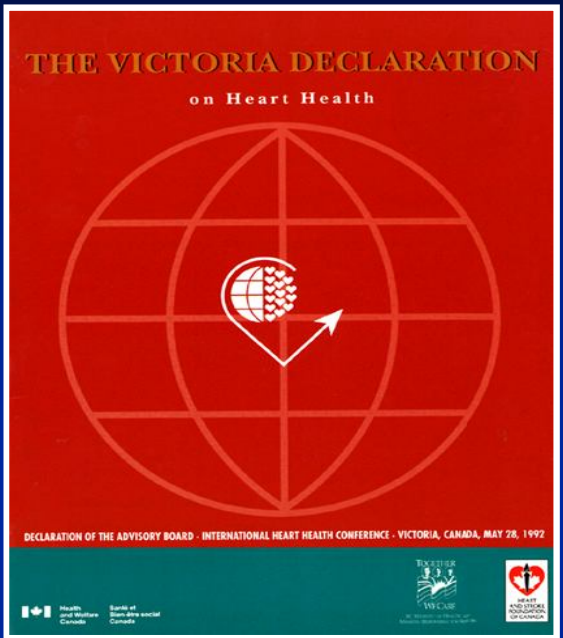
- The concept of risk and risk factors.
- Risk factor control and limitations in current approaches.
- Novel and emerging approaches; their promises and pitfalls.
- Hope and future perspectives.

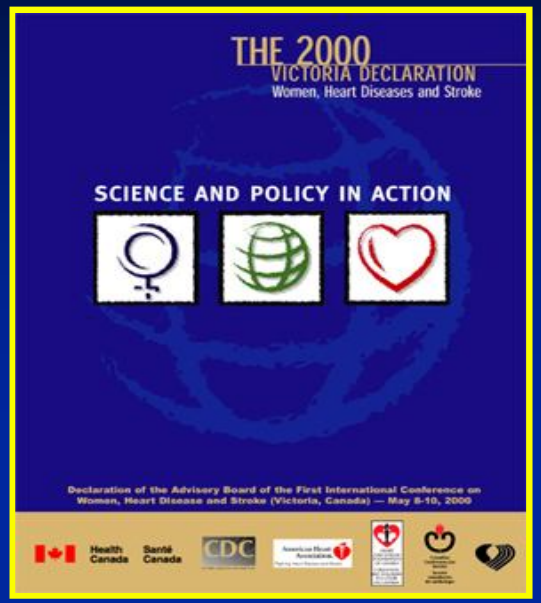
Key Resources

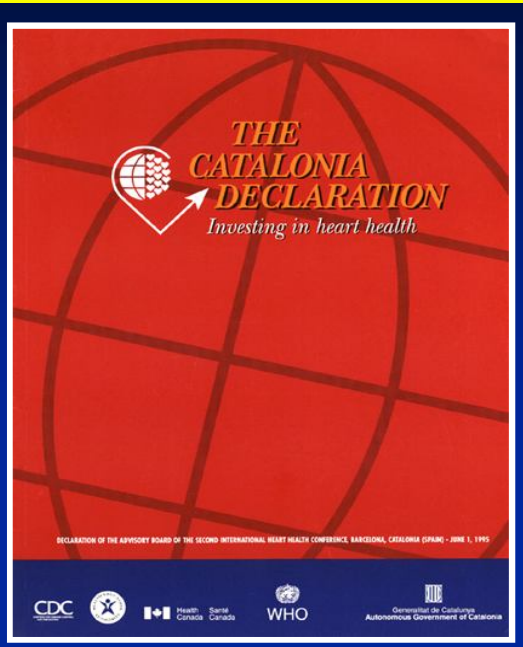


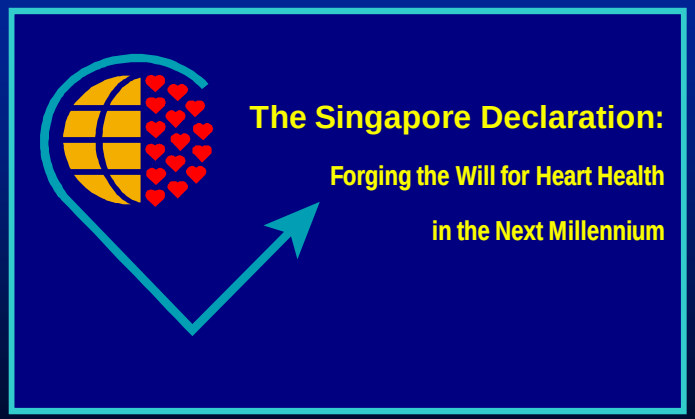


International Declarations on Heart Health







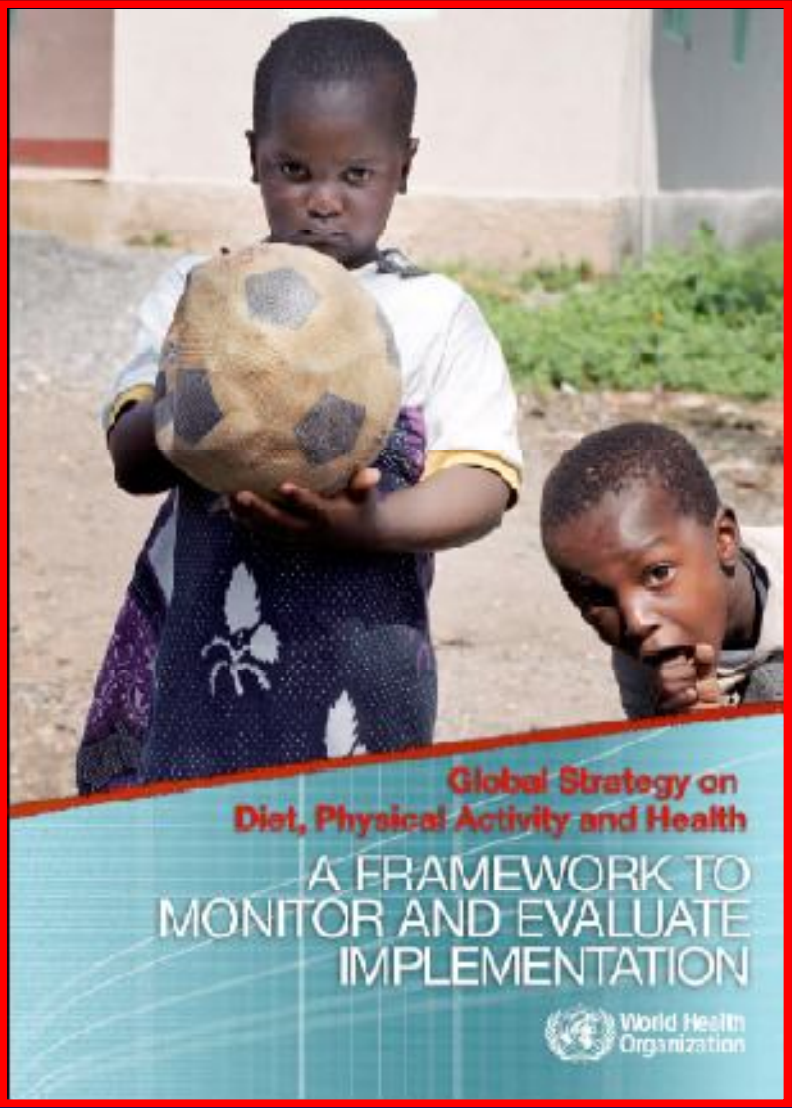


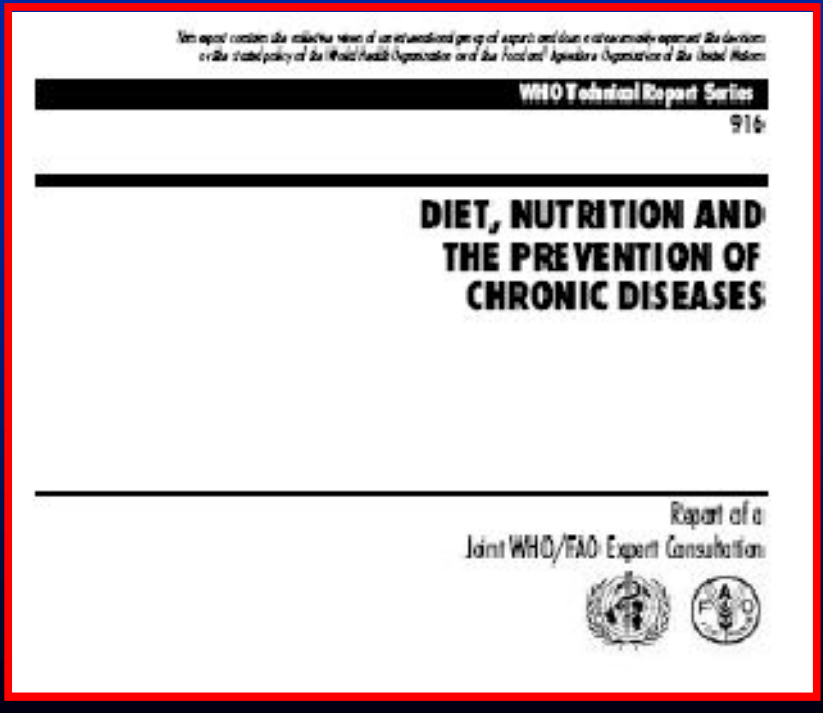
World Health Organization

SIXTY-FIRST WORLD HEALTH ASSEMBLY
Provisional agenda item 11.5

A61/8
18 April 2008

Prevention and control of noncommunicable diseases: implementation of the global strategy




WHO Technical Report Series
916

DIET, NUTRITION AND THE PREVENTION OF CHRONIC DISEASES

Report of a Joint WHO/FAO Expert Consultation

OUTLINE

- The concept of risk and risk factors.
- Risk factor control and limitations in current approaches.
- Novel and emerging approaches; their promises and pitfalls.
- Hope and future perspectives.

Risk Factors and Risk Markers

- Tobacco smoking
- Elevated LDL cholesterol
- Low HDL cholesterol
- High BP
- Diabetes
- Physical inactivity
- Obesity
- Poor diet
- Elevated homocysteine
- Elevated lipoprotein$_{(a)}$
- Low socioeconomic status
- Elevated fibrinogen
- Markers of inflammation
- Psychological factors (e.g. stress, hostility)
- Social breakdown (loss of social support and cohesion

Yusuf et al. Circulation 2001; 104: 2746-2753

Historical Background

- Ischemic heart disease rare in 19th century.
- Epidemic in developed countries by 1930s.
- Causes completely unclear, many believed CVD was part of normal ageing.
- Concepts of risk factors and prevention for CVD not really considered until 1950s.
- By late 1960s evidence of causality for risk factors & CVD considered unequivocal and prevention trials initiated.

Milestones from Framingham Heart Study

- **1960** Cigarette smoking found to increase the risk of heart disease.
- **1961** Cholesterol level, BP level, and ECG abnormalities found to increase CVD risk.
- **1967** Physical activity found to reduce CVD risk and obesity to increase the risk.
- **1970** High blood pressure found to increase stroke risk.

Milestones from Framingham Heart Study

- **1978** Psychosocial factors found to affect heart disease.
- **1988** High levels of HDL cholesterol found to reduce risk of death.
- **1994** Enlarged left ventricle (one of two lower chambers of the heart) shown to increase the risk of stroke.
- **1996** Progression from hypertension to heart failure described.

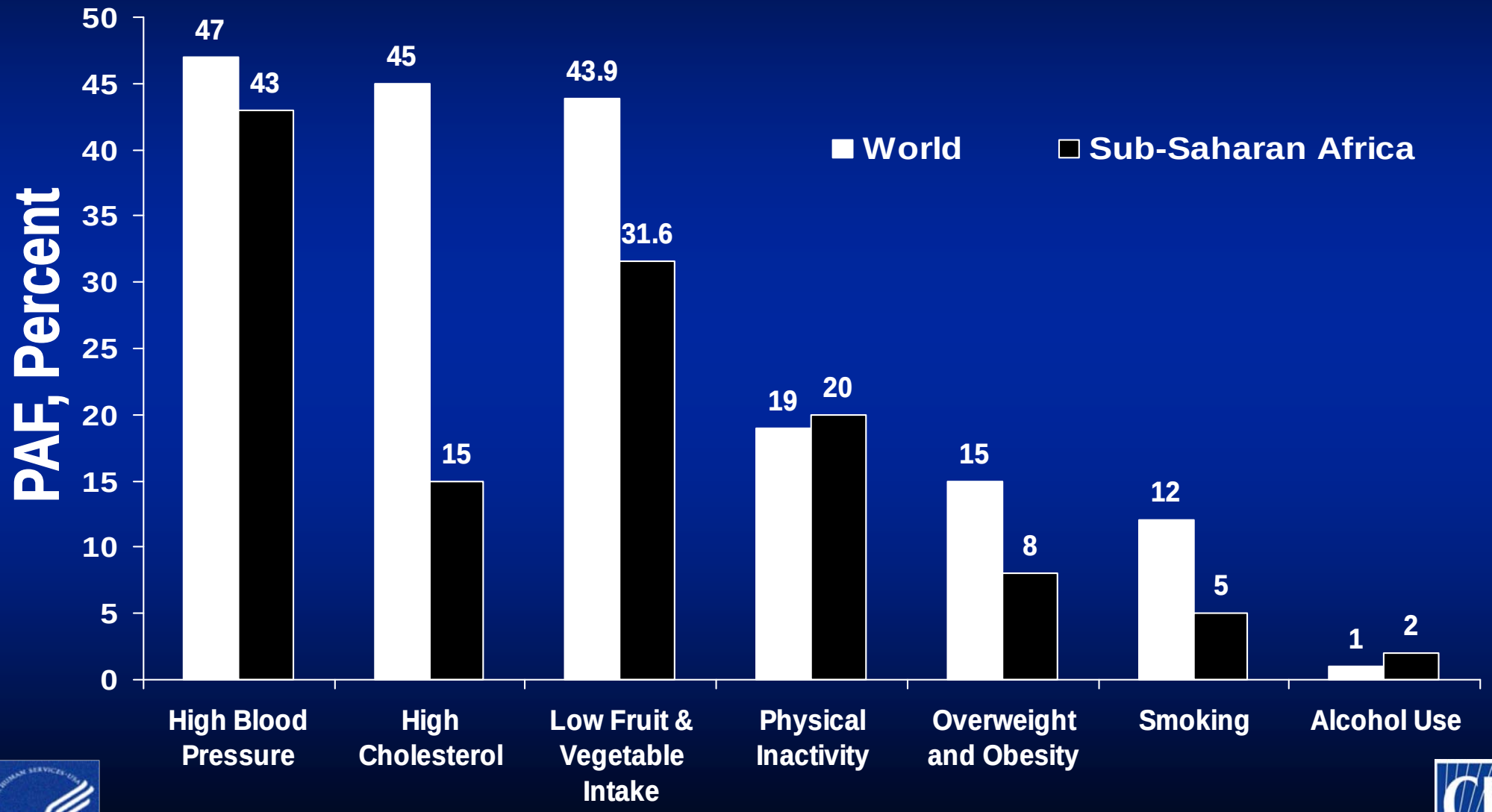
Why Do Risk Factors Matter?

- At population & individual levels:
  - Provide information on risk level.
  - Inform and guide health education and prevention priorities.
  - Guide CVD treatment and control.
  - Determine resource allocation and service organisation priorities.
  - Influence decision-makers.

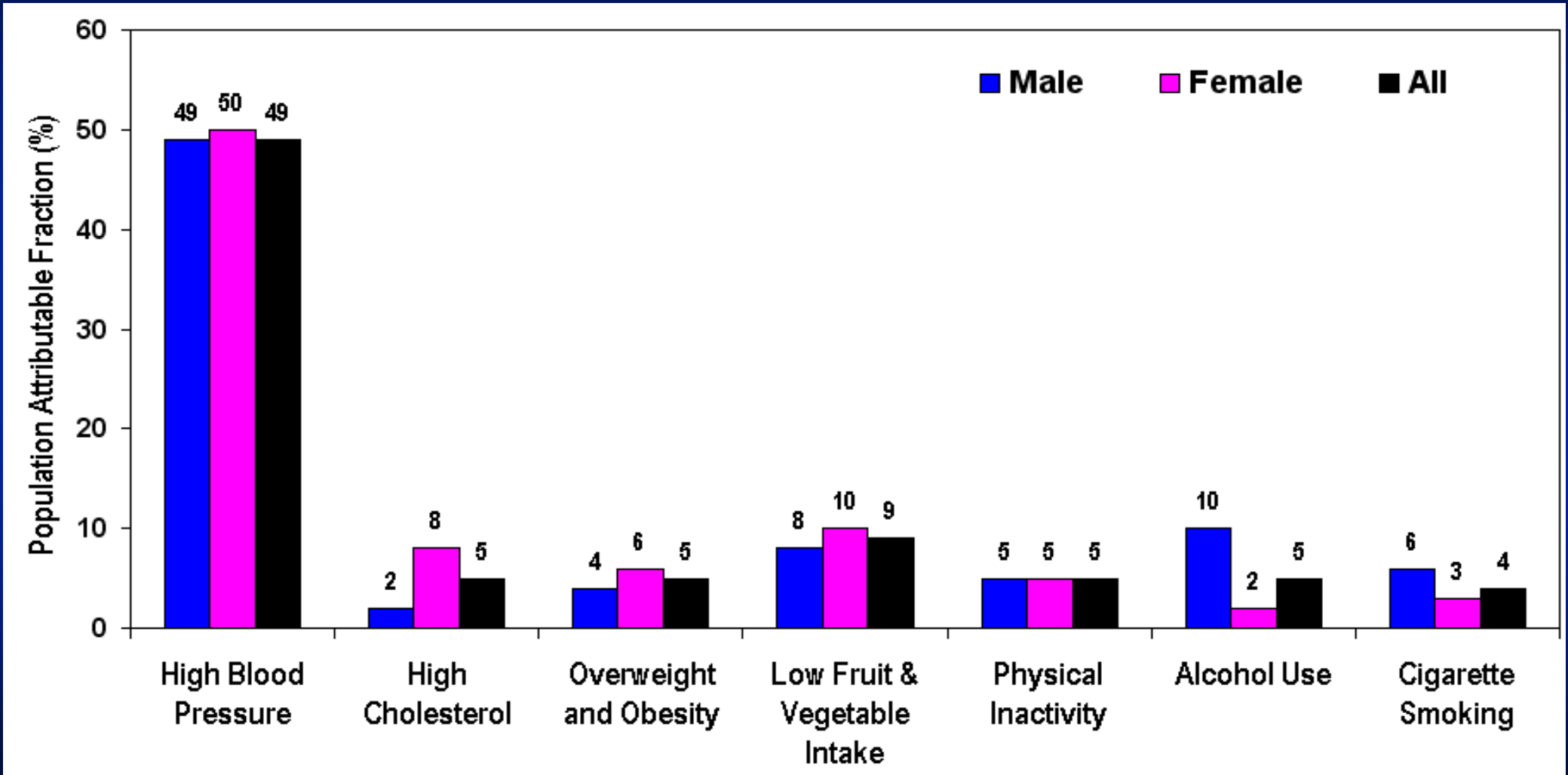
Leading Causes of Disease Burden

Rank	Developing countries: High mortality	Developing countries: Low mortality	Developed countries
1	Underweight	*Alcohol*	*Tobacco*
2	Unsafe sex	Underweight	*Blood pressure*
3	Unsafe water	*Blood pressure*	*Alcohol*
4	Indoor smoke	*Tobacco*	*Cholesterol*
5	Zinc deficiency	*Body mass index*	*Body mass index*
6	Iron deficiency	*Cholesterol*	*Low fruit and vegetable intake*
7	Vitamin A deficiency	Iron deficiency	*Physical inactivity*
8	*Blood pressure*	*Low fruit and vegetable intake*	Illicit drugs
9	*Tobacco*	Indoor smoke from solid fuels	Underweight
10	Cholesterol	Unsafe water	Iron deficiency

Population Attributable Fractions (PAF) for Ischemic Heart Disease



Population Attributable Fraction of Stroke Mortality for Various Risk Factors in Sub-Saharan Africa



Mensah, HEART 2008; Source of data: Ezzati, et al. Global Burden of Disease and Risk Factors, 2006

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- The concept of risk and risk factors.
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Comprehensive Prevention

Spectrum of Preventive Strategies

Mass Strategy

High Risk Strategy

Concepts of Prevention Strategies

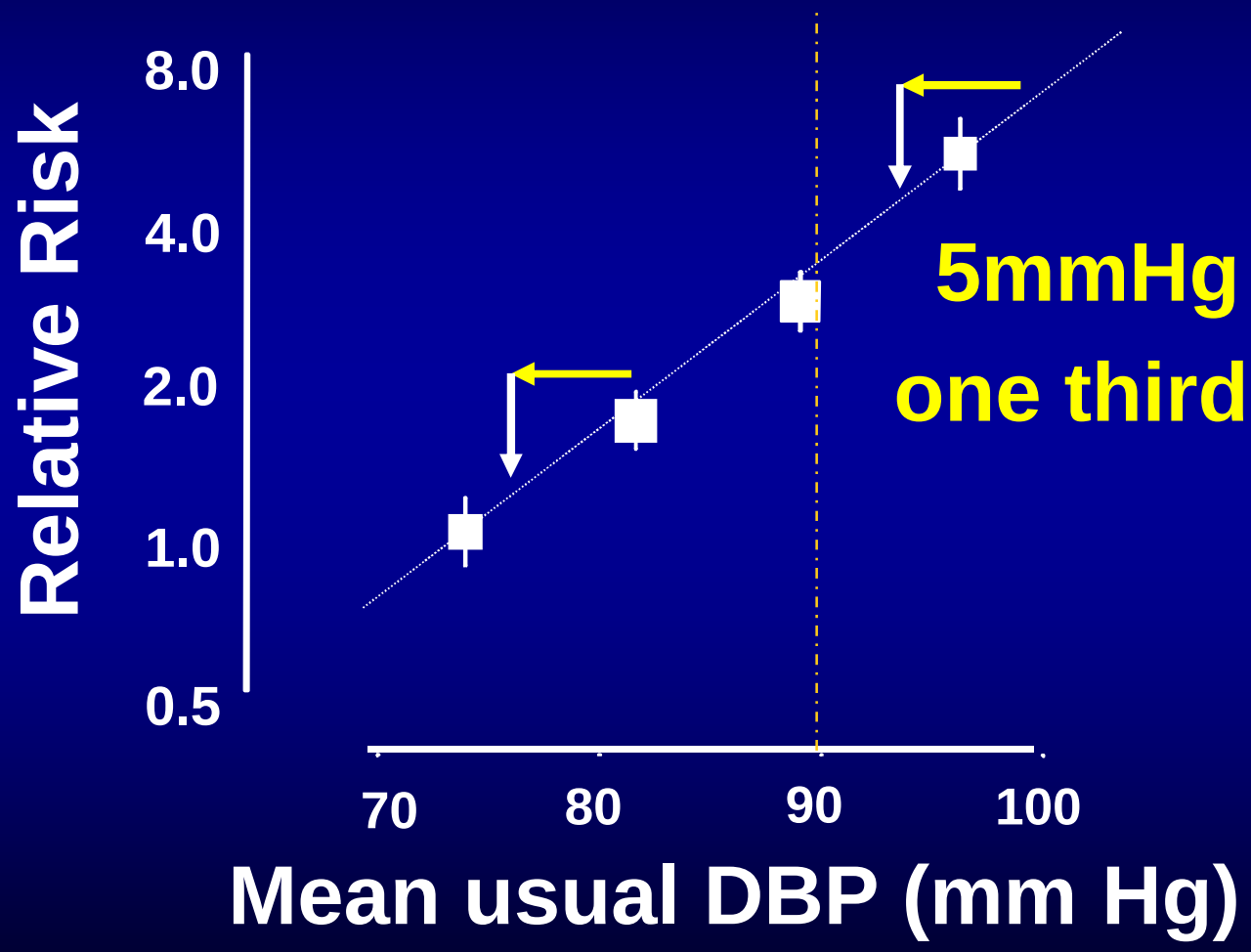
- **Mass strategy: Often, public health model; predominantly population-wide approaches; socio-ecological models.**
- **High risk strategy: Typically, identifies high risk persons for the specific prevention interventions; Often, individual approaches; biomedical model.**

Basic Principles in Risk Factor Control

- No threshold in risk reduction:
  - the lower the level of the risk factors, the lower the risk.
- A given change in a risk factor ↓ risk of disease by a constant proportion of the existing risk regardless of the starting level of the risk factor.

Wald & Law. BMJ. 2003 Jun 28;326(7404):1419.

Expected Effects of BP Lowering



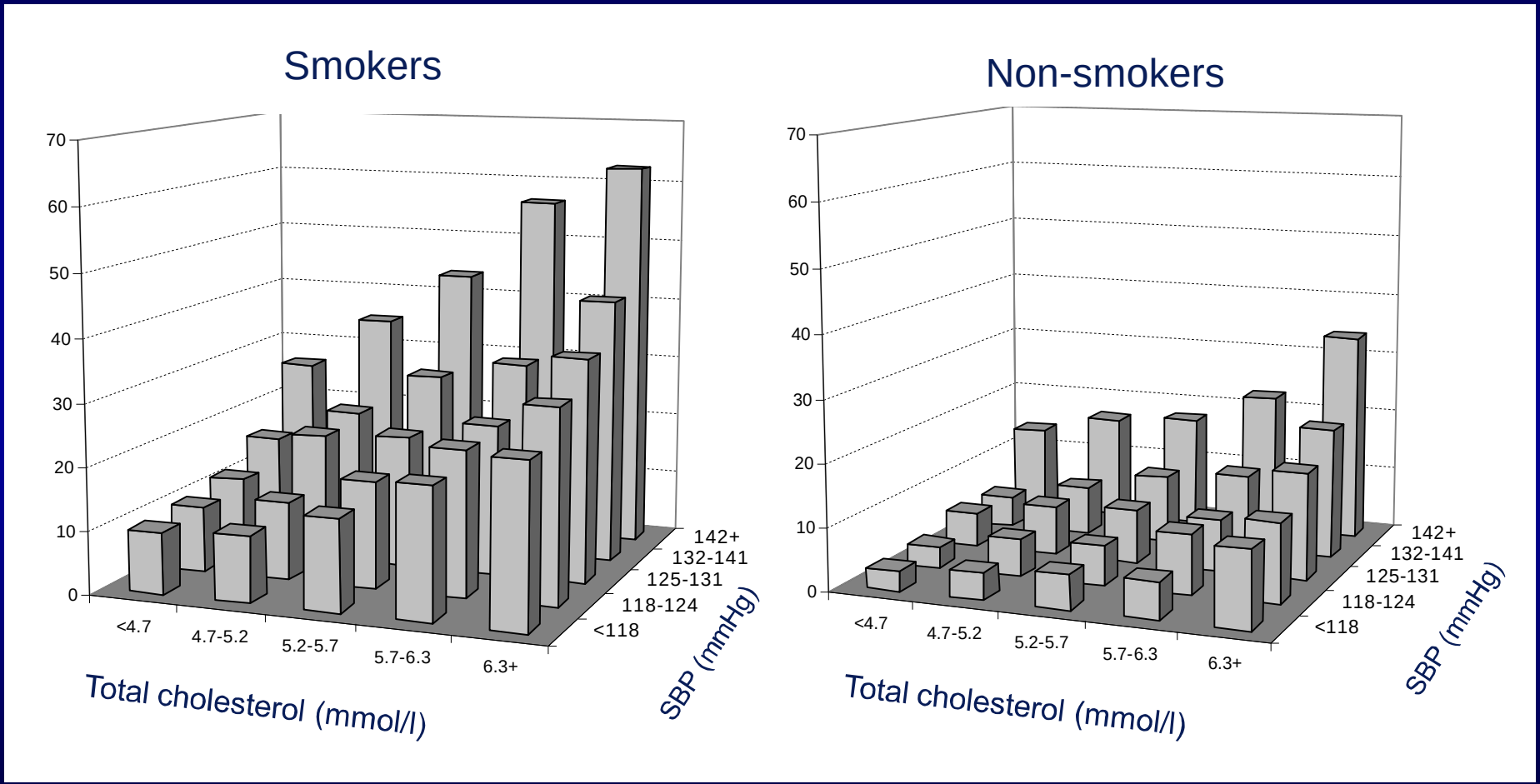
5mmHg lower BP

one third lower risk

Rationale for Comprehensive or Integrated Strategies for Risk Reduction

- Most patients have more than one RF.
- Efficient use of resources and staff.
- Additive effects of risk reduction.
- Convenience for patient and families.
- Potential for reinforcement and improved adherence in the integrated approaches.

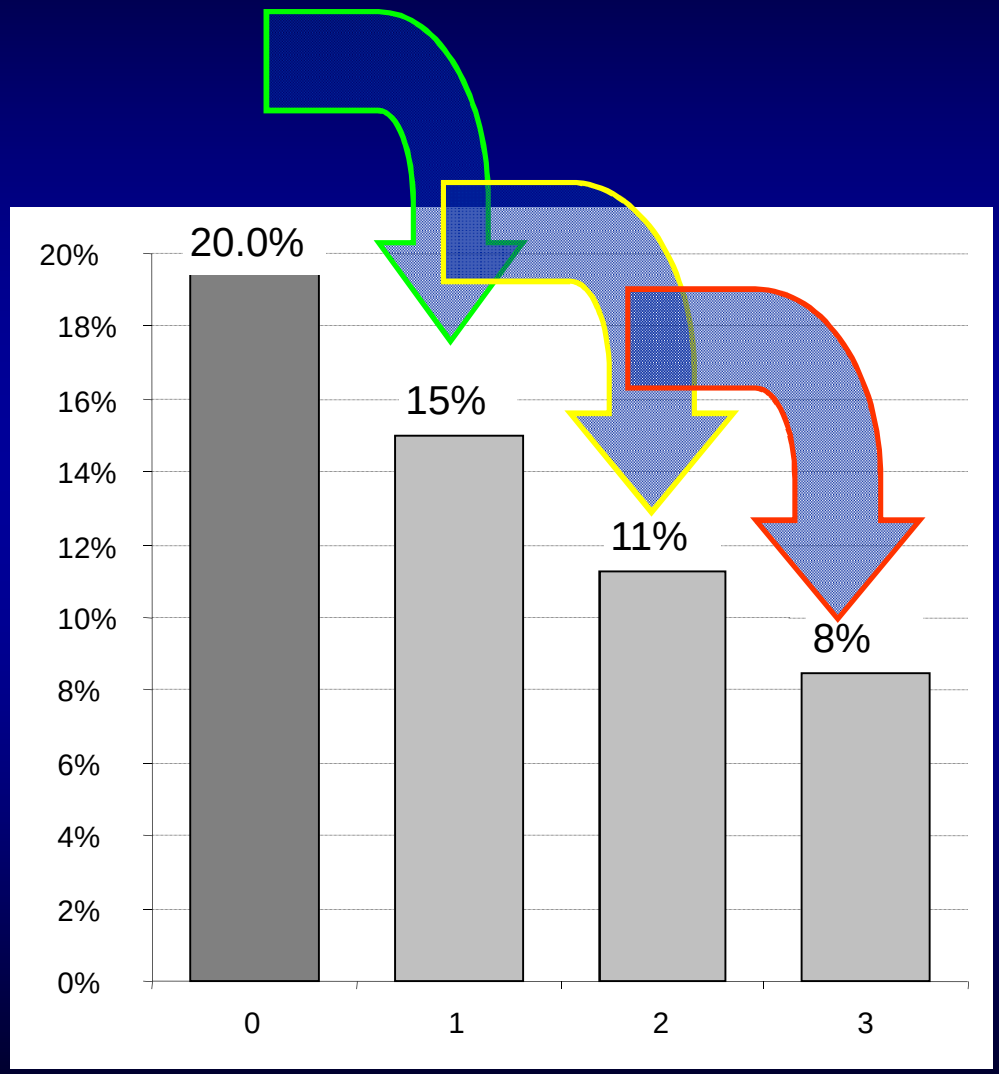
Additive effects of risk factors



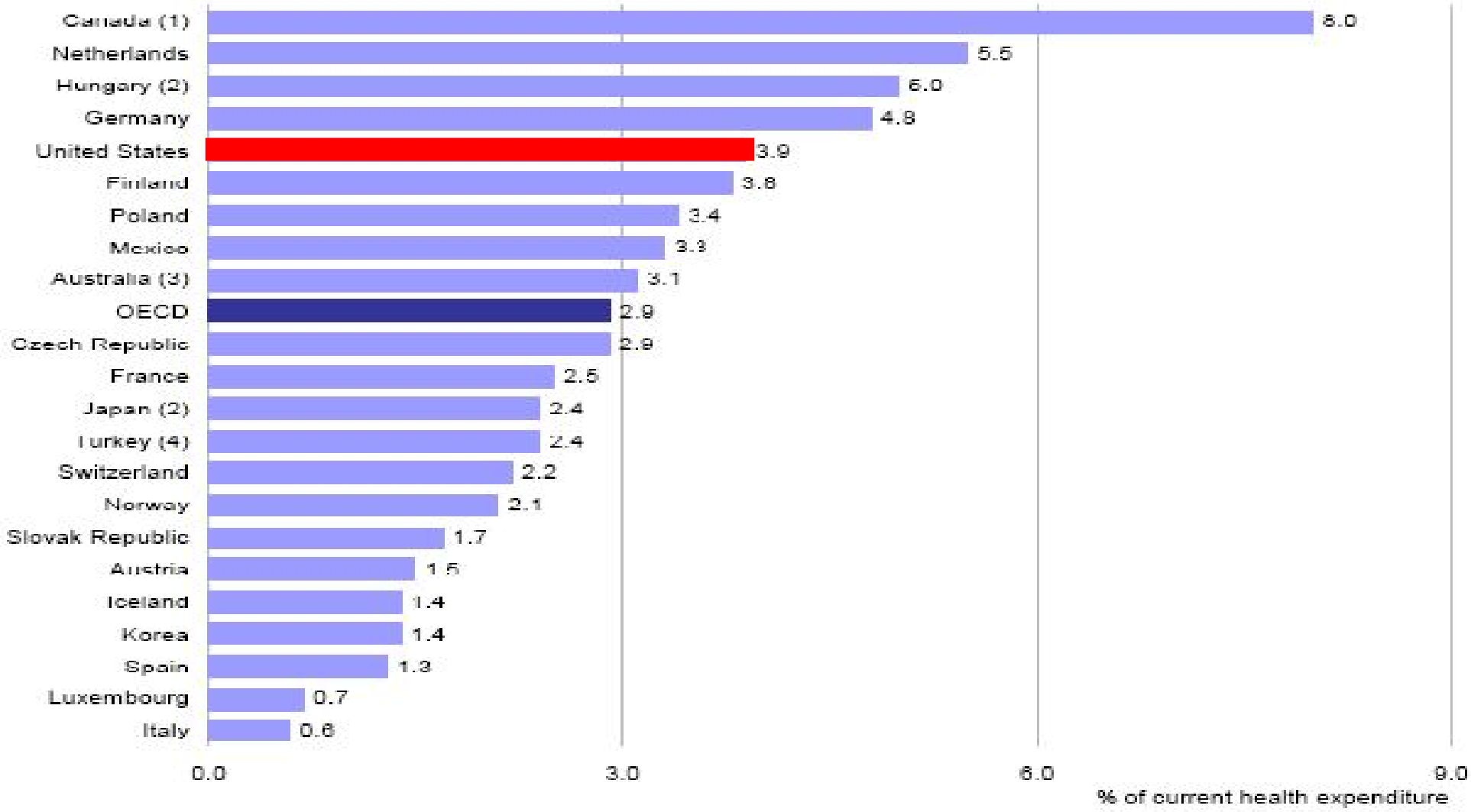
MRFIT Screenees' Cohort

Additive effects of treatments

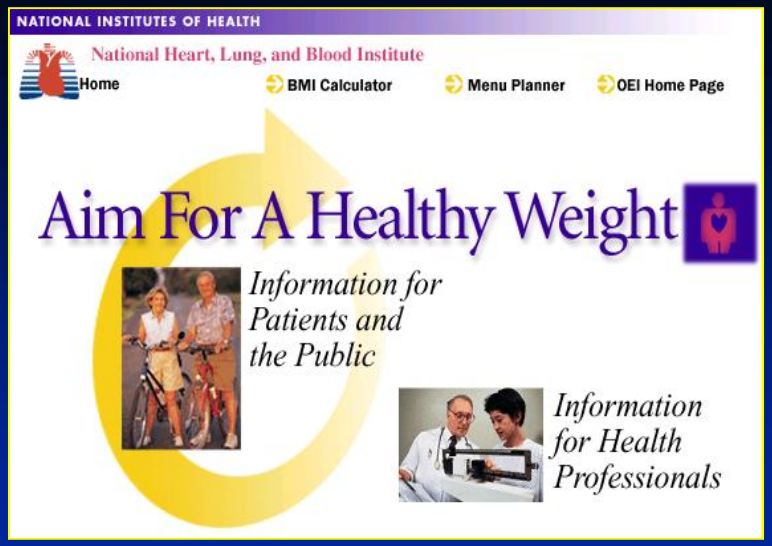
Three successive 25% RR reductions

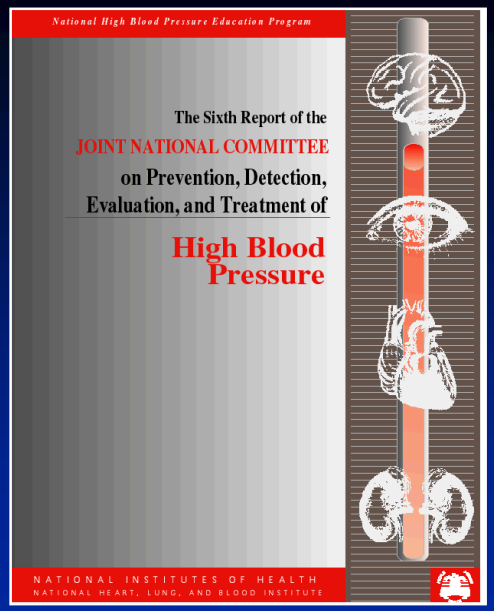


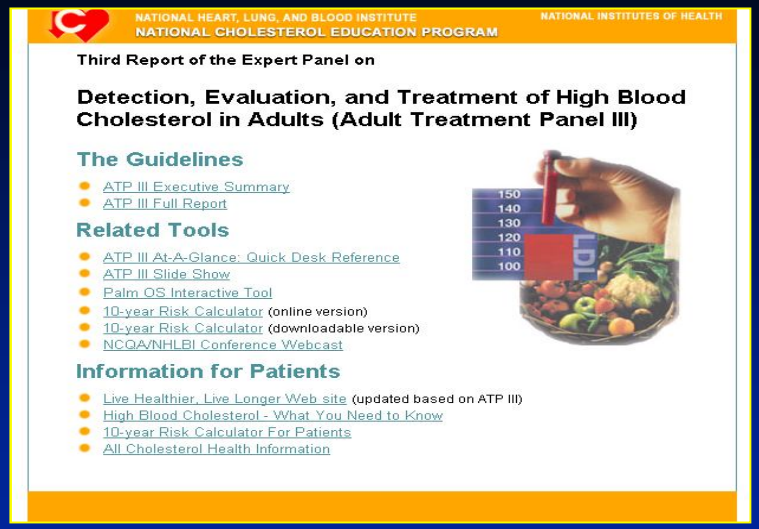
Expenditure on Public Health & Prevention, 2003

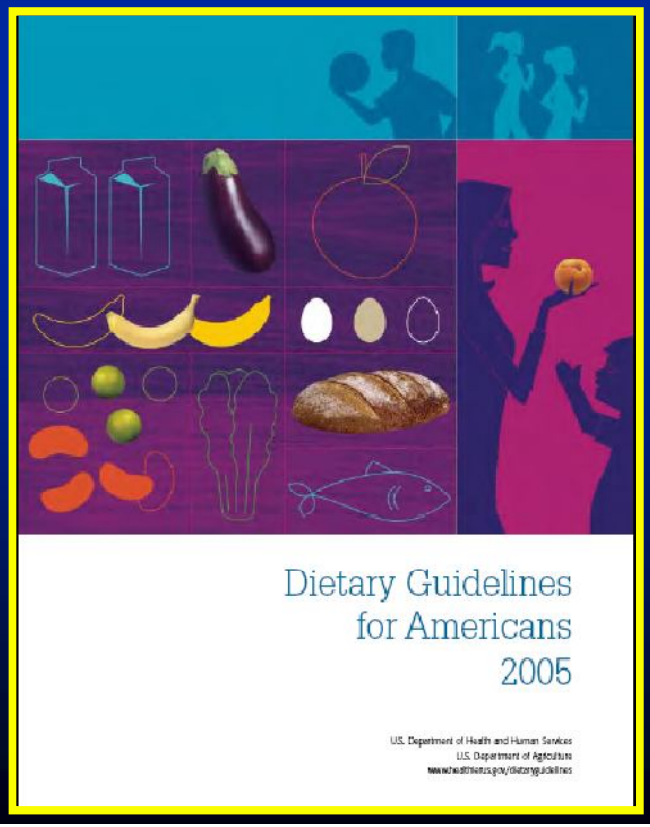


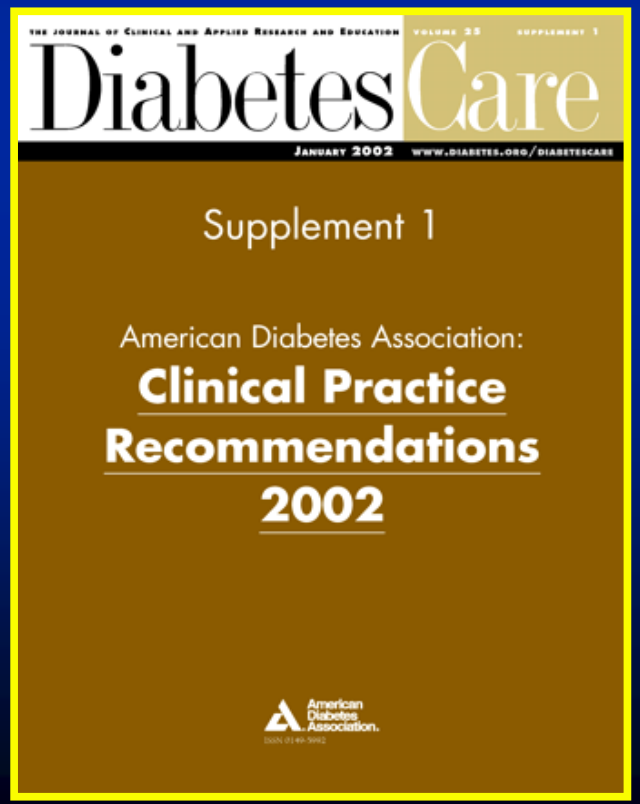
OECD FACTBOOK 2006 – ISBN 92-64-03561-3 – © OECD 2006











- ***Multiple***
- ***Individual***
- ***Guidelines***

National Guideline Clearinghouse
www.guideline.gov

AHRQ

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Your search criteria:

Keyword: *cardiac cardiovascular heart*

Your search found 339 related guidelines, which are listed below by relevance. Use the "Limit Search" button to sort by publication date.

To view a guideline summary, click on a title below.

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Items 1 to 339

22 July, 2008

Characteristics of the three scenarios in the WHO CVD-Risk Management Package

RESOURCE AVAILABILITY	SCENARIO ONE	SCENARIO TWO	SCENARIO THREE
Human resources	Non physician health worker	Medical doctor or specially trained nurse	Medical doctor with access to full specialist care
Equipment	Stethoscope Blood pressure measurement device Measuring tape or weighing scale Optional: test tubes, holder, burner, solution or test strips for checking urine glucose	Stethoscope Blood pressure measurement device Measuring tape or weighing scale Test tubes, holder, burner, solutions or test strips for checking urine glucose and albumin	Stethoscope Blood pressure measurement device Measuring tape or weighing scale Electrocardiograph Ophthalmoscope Urine analysis Blood analysis: fasting blood sugar, electrolytes, creatinine, cholesterol and lipoproteins

Characteristics of the three scenarios in the WHO CVD-Risk Management Package

Generic drugs	Essential: thiazide diuretics Optional: metformin (for refill)	Thiazide diuretics Beta blockers Angiotensin converting enzyme inhibitors Calcium channel blockers (sustained release formulations) (Reserpine and methyldopa if the above antihypertensives are unavailable) Aspirin Metformin (for refill)	Thiazide diuretics Beta blockers Angiotensin converting enzyme inhibitors Calcium channel blockers (sustained release formulations) (Reserpine and methyldopa if the above antihypertensives are unavailable) Aspirin Insulin Metformin Glibenclamide. Statins (if affordable) Angiotensin receptor blocker (if affordable)

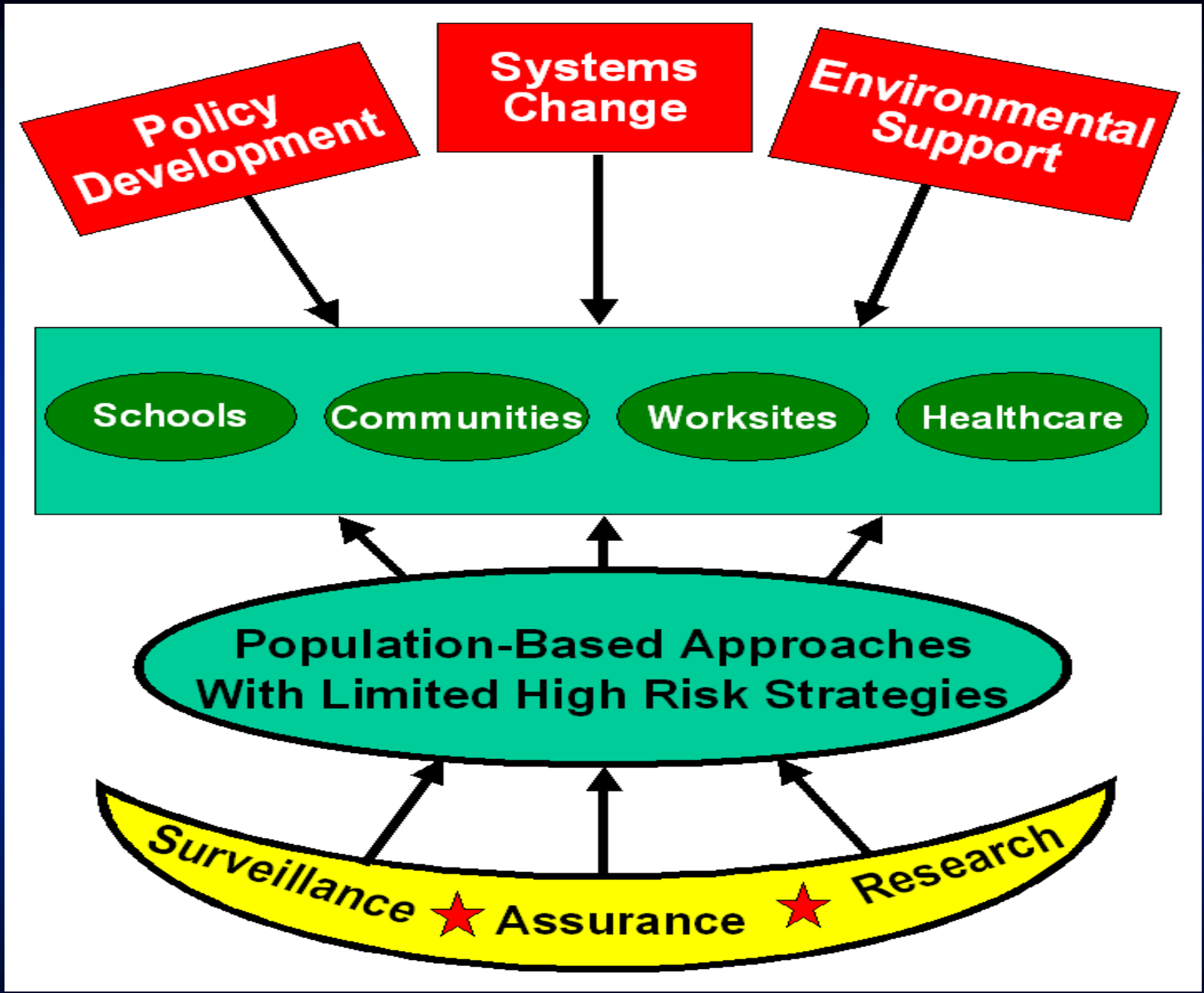
Scenario One

1. Protocol for CVD-Risk Assessment and Management
2. Protocol for counselling on diet and physical activity
3. Protocol for counselling on cessation of tobacco use
4. Patient record card

The health care facility should be tobacco-free and support a tobacco-free environment

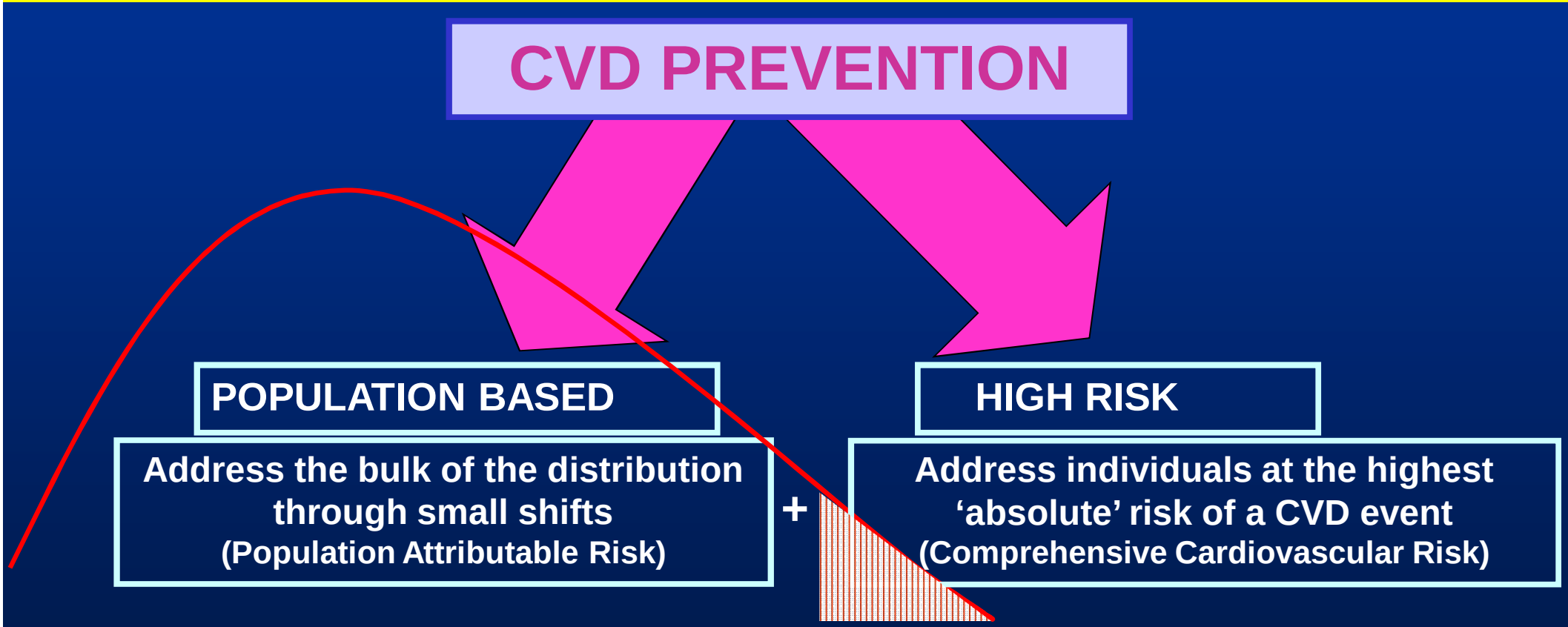
Scenario Three

1. Protocol for CVD-Risk Assessment
2. Protocol for CVD-Risk Management
3. Protocol for CVD-Risk Management in Diabetics
4. Protocol for counselling on diet and physical activity
5. Protocol for counselling on cessation of tobacco use
6. Patient record card



Mensah. Ethn Dis. 2003;13[suppl2]:4-12)

A Comprehensive Approach to Multiple Risk Reduction



Widespread Effect = Large Benefits

High Impact = Cost-Effective use of resources

Modified, courtesy of Dr. Srinath Reddy

OUTLINE

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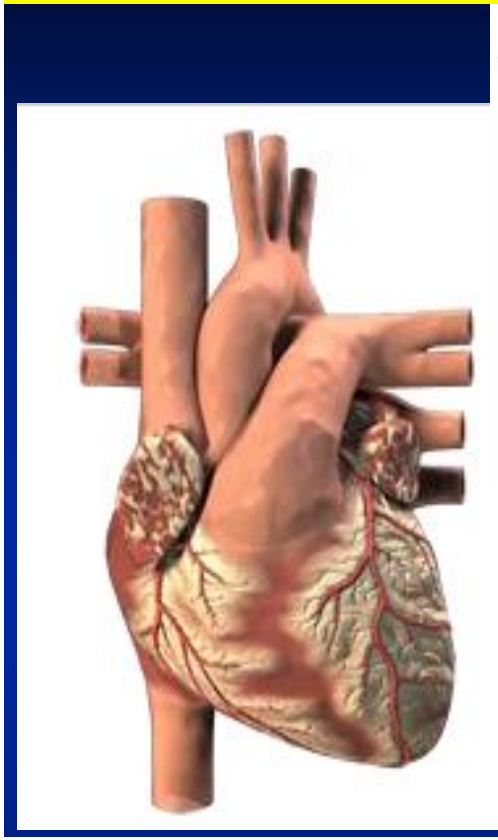
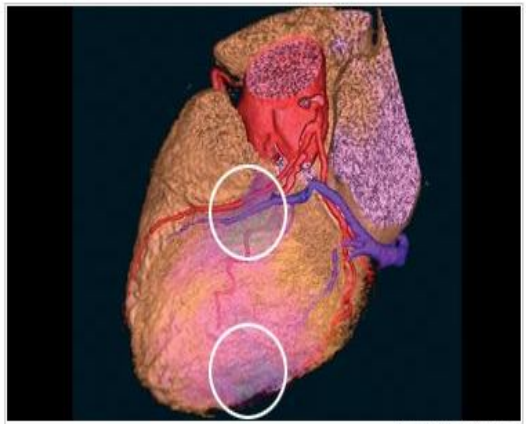
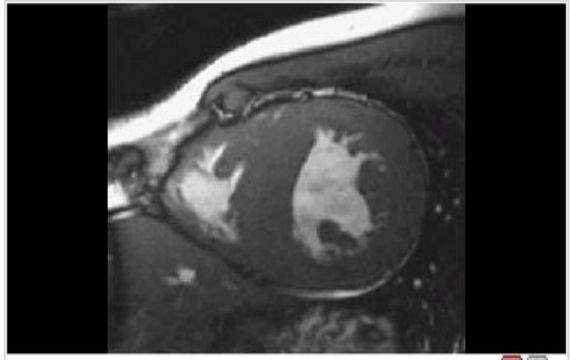
High Tech Scans: Not an African Solution



PET/CT Scan



Magnetic Resonance Imaging (MRI)



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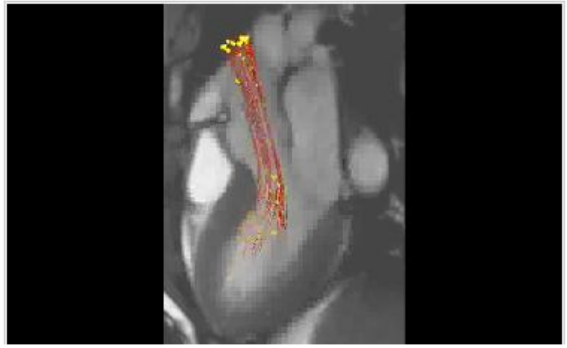
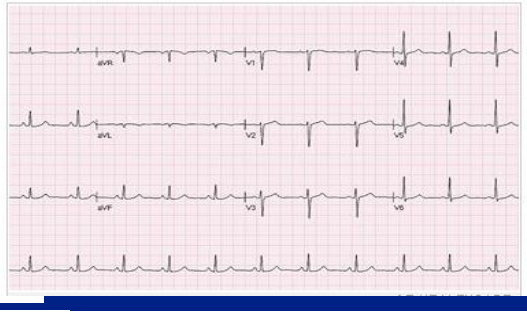
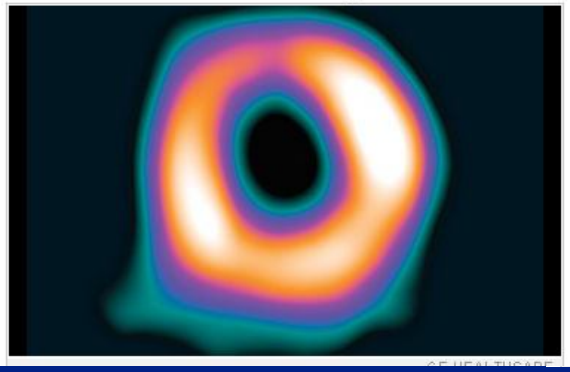


Electrocardiogram (EKG)



Nuclear Stress Testing



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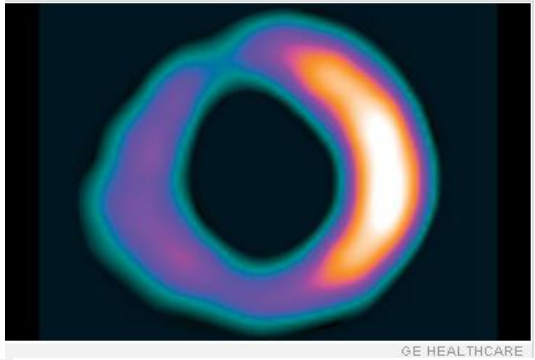

Echocardiogram (Echo)

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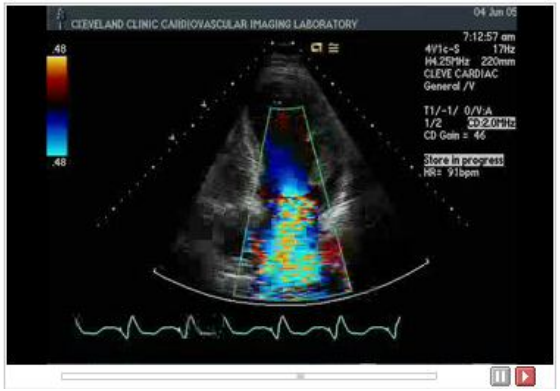
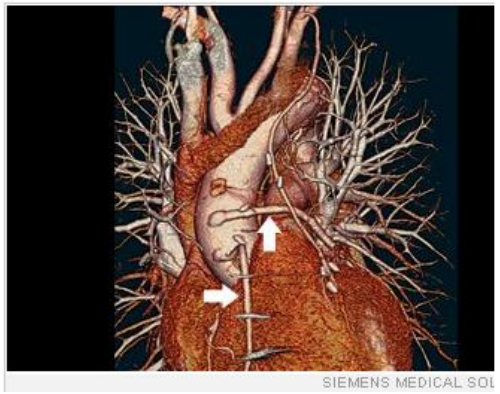
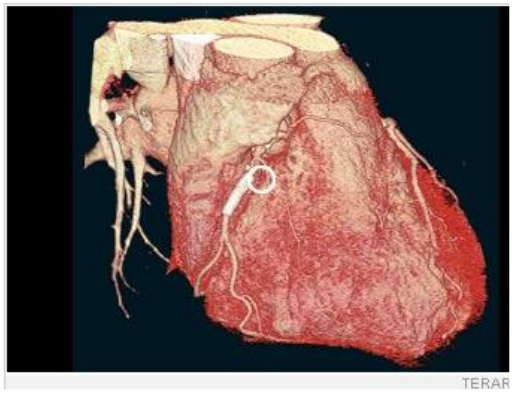


CT Scan



CT Scan



Super Foods for Men and Women

http://www.rd.com/content/openContent.do?contentId=12897

The Polypill Promise

1. Aspirin (81 mg)
2. Statin (standard dose)
3. ACE-Inhibitor (half-dose)
4. Beta-blocker (half-dose)
5. Diuretic (half-dose)
6. Folic acid (standard dose)

Could prevent 80% of CVD events if taken by everyone > age 55

Wald & Law. BMJ. 2003 Jun 28;326(7404):1419.

Polypill: Risk Factors Targeted

- LDL cholesterol
- Blood pressure
- Homocysteine
- Platelet function

Wald & Law. BMJ. 2003 Jun 28;326(7404):1419.

A Strategy to Reduce CVD by > 80%

A single Polypill per day composed of six active ingredients, to be taken, without medical examination, by:

all aged 55 or more; anyone under 55 with a history of CVD; anyone with diabetes or CVD, regardless of age

Wald & Law. BMJ. 2003 Jun 28;326(7404):1419.

The Polymeal Promise

- Wine, fish, dark chocolate, fruits, vegetables, garlic, almonds
- Would reduce CVD events by 76%
- Benefits of Polymeal (persons > age 50)

	Men	Women
—↑ in total life expectancy	6.6	4.8
—↑ in life expectancy (-CVD)	9.0	8.1
—↓ in life expectancy (+CVD)	2.4	3.3

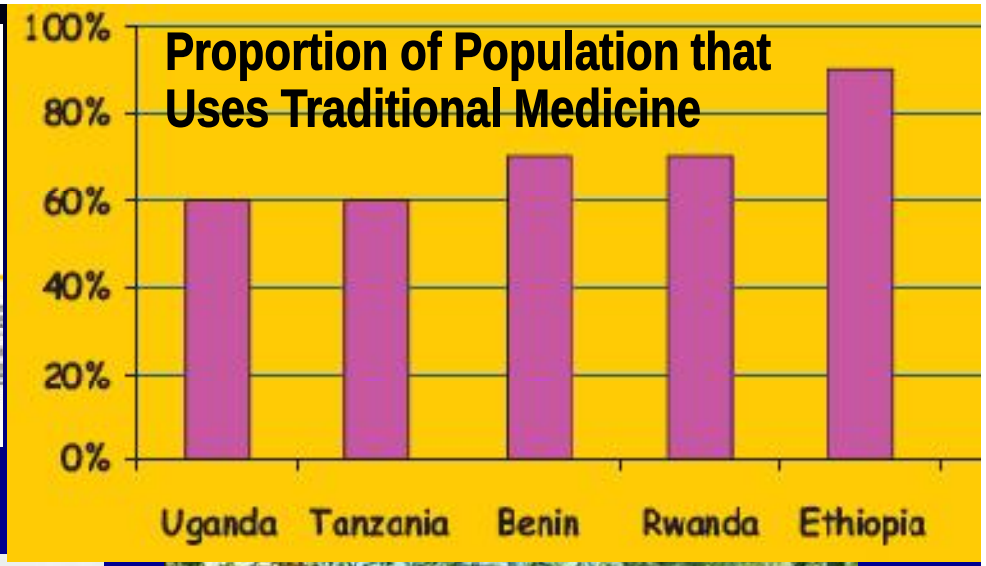
Franco et al. BMJ. 2004 Dec 18;329:1447-50.

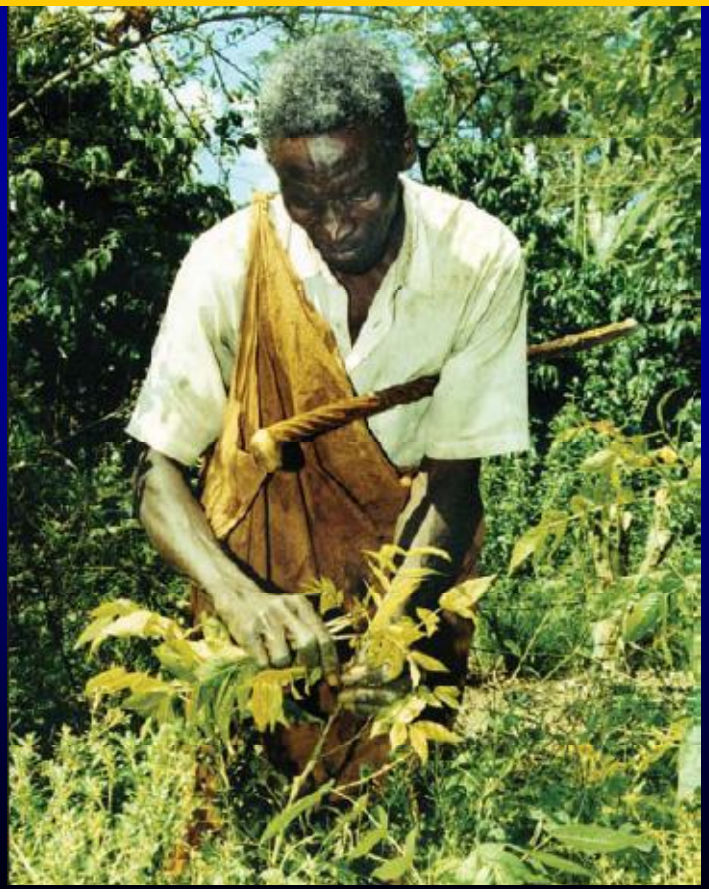
The Polymeal Suggestion

- **For those people earnestly seeking to prevent CVD, the Polypill can be combined with the Polymeal.**
- **"*Redundant cardiologists could be retrained as Polymeal chefs and wine advisers*".**

Franco et al. BMJ. 2004 Dec 18;329:1447-50.

African
HEALTH MONITOR
January – June 2003 • Volume 4, Number 1 • A magazine of the World Health Organization Regional Office for Africa
Traditional Medicine


Proportion of Population that Uses Traditional Medicine
100%
80%
60%
40%
20%
0%
Uganda
Tanzania
Benin
Rwanda
Ethiopia



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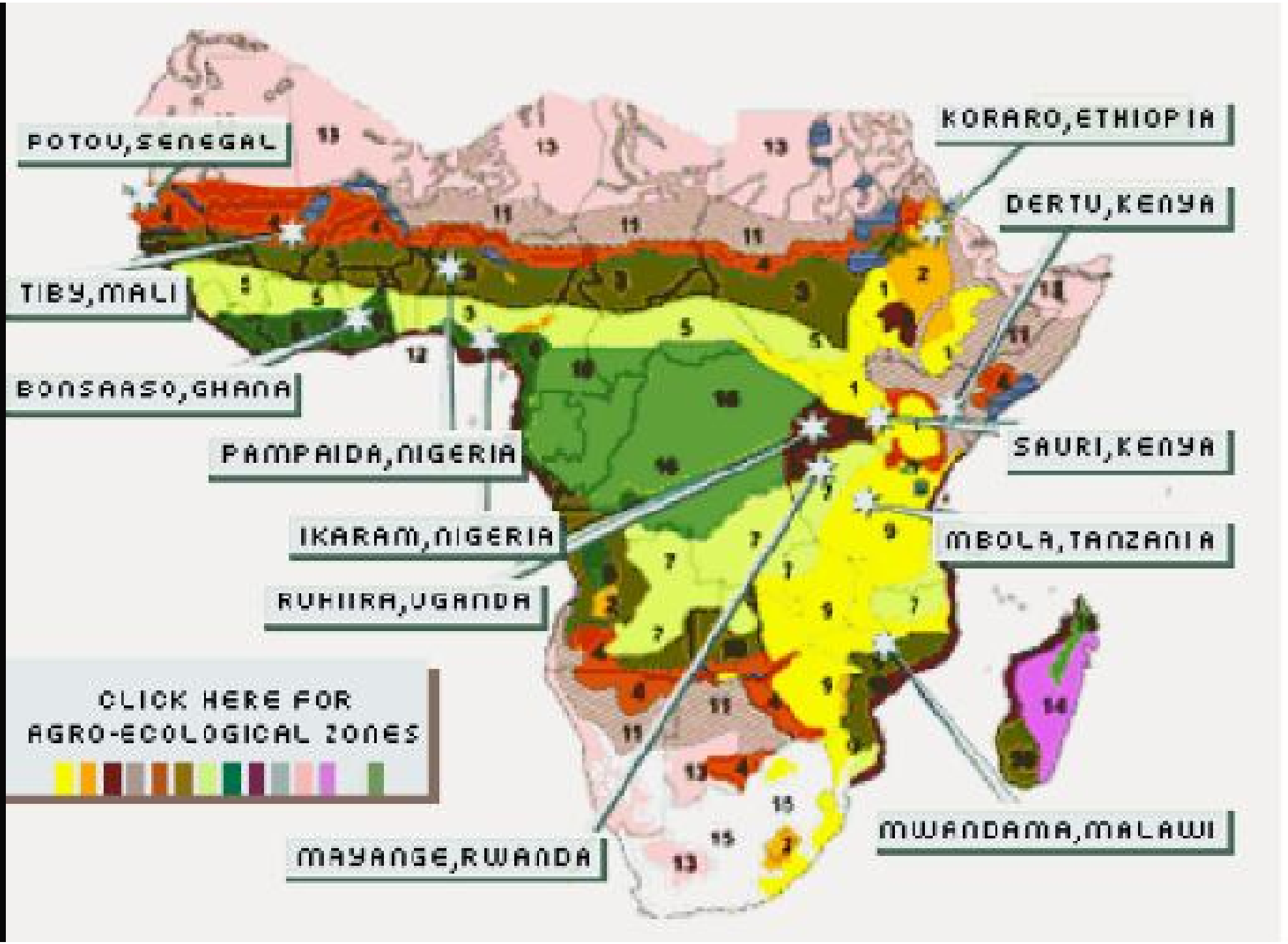
Macroeconomic and Economic Consequences of CVD

The Millennium Villages Project

Ethiopia, Ghana, Kenya, Malawi, Mali, Nigeria, Rwanda, Senegal, Tanzania, and Uganda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MWANDAMA,MALAWI
MAYANGE,RWANDA

A Heart-Healthy & Stroke-Free World

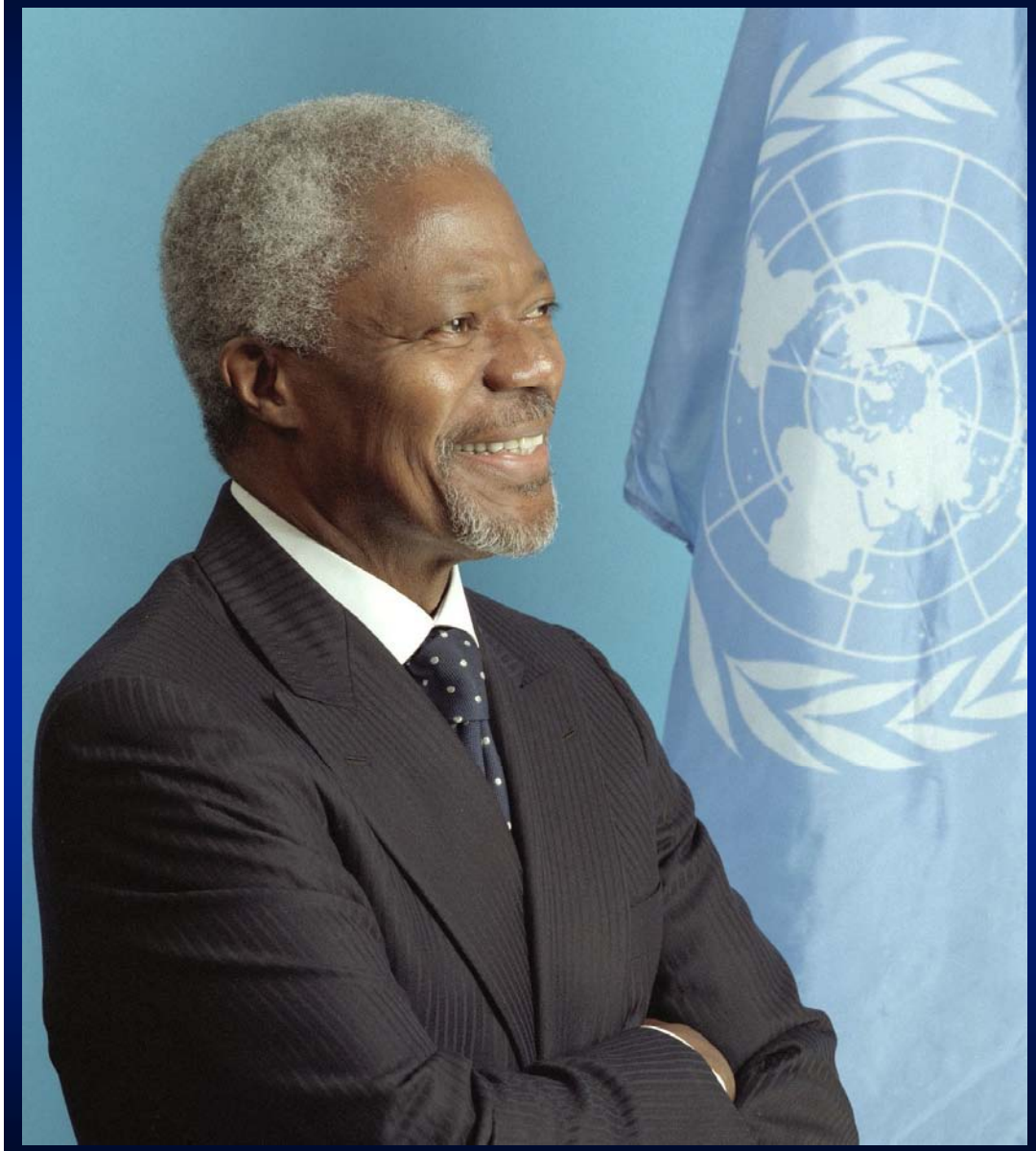
- Work together through partnerships
- Use both high risk approach and the population-based strategies
- Create environments supportive of health promotion & disease prevention
- Use evidence-based policy development and community mobilization

Modified from: O'Connor et al. Ad hoc Working Group of the Conference of Principal Investigators of Heart Health

Key Issues Addressed in a Integrated Program

- *Mortality*
- *Morbidity*
- *Quality of life*
- *Best practices*

Towards a Culture of Prevention



"Today no one disputes that prevention is better and cheaper than reacting to crises after the fact. And yet our political and organizational cultures and practices remain oriented far more towards reaction than prevention."

Kofi Annan, September 9, 1999