CHRONIC DISEASES
An International Epidemic

Prof K Srinath Reddy
President, Public Health Foundation of India
President, World Heart Federation
GBD 2010

Mortality

• Total = 52.8 Million Deaths
  NCDs = 34.5 Million

• Communicable, Maternal, Neonatal and Nutritional causes = 24.9%
  (Down From 34.1% in 1990)

• Non-Communicable Diseases = 65.3%
  (Up From 57% in 1990)
<table>
<thead>
<tr>
<th>1990 Mean rank (95% UI)</th>
<th>2010 Mean rank (95% UI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 (1-1)</td>
<td>1 Ischemic heart disease</td>
</tr>
<tr>
<td>2.0 (2-2)</td>
<td>2 Stroke</td>
</tr>
<tr>
<td>3.0 (3-4)</td>
<td>3 Lung cancer</td>
</tr>
<tr>
<td>4.0 (4-5)</td>
<td>4 COPD</td>
</tr>
<tr>
<td>5.0 (4-6)</td>
<td>5 Lower respiratory infections</td>
</tr>
<tr>
<td>6.2 (6-7)</td>
<td>6 Colorectal cancer</td>
</tr>
<tr>
<td>7.0 (6-9)</td>
<td>7 Stomach cancer</td>
</tr>
<tr>
<td>8.9 (8-11)</td>
<td>8 Other cardio &amp; circulatory</td>
</tr>
<tr>
<td>9.0 (8-13)</td>
<td>9 Road injury</td>
</tr>
<tr>
<td>9.8 (7-14)</td>
<td>10 Self-harm</td>
</tr>
<tr>
<td>10.6 (8-13)</td>
<td>11 Cirrhosis</td>
</tr>
<tr>
<td>12.5 (11-14)</td>
<td>12 Diabetes</td>
</tr>
<tr>
<td>21.2 (15-24)</td>
<td>22 Alzheimer's disease</td>
</tr>
</tbody>
</table>

http://www.healthmetricsandevaluation.org/gbd/visualizations/gbd-arrow-diagram
## Causes of death (GBD 2010)
### Developing Countries

<table>
<thead>
<tr>
<th>1990 Mean rank (95% UI)</th>
<th>2010 Mean rank (95% UI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 (1-2)</td>
<td>1 Stroke</td>
</tr>
<tr>
<td>1.9 (1-3)</td>
<td>2 Ischemic heart disease</td>
</tr>
<tr>
<td>3.0 (2-4)</td>
<td>3 COPD</td>
</tr>
<tr>
<td>4.0 (3-5)</td>
<td>4 Lower respiratory infections</td>
</tr>
<tr>
<td>4.9 (4-5)</td>
<td>5 Diarrheal diseases</td>
</tr>
<tr>
<td>6.1 (6-7)</td>
<td>6 Tuberculosis</td>
</tr>
<tr>
<td>7.2 (7-8)</td>
<td>7 Preterm birth complications</td>
</tr>
<tr>
<td>8.3 (7-10)</td>
<td>8 Malaria</td>
</tr>
<tr>
<td>9.1 (8-11)</td>
<td>9 Protein-energy malnutrition</td>
</tr>
<tr>
<td>10.8 (9-14)</td>
<td>10 Road injury</td>
</tr>
<tr>
<td>17.0 (14-21)</td>
<td>12 Preterm birth complications</td>
</tr>
<tr>
<td>32.2 (26-38)</td>
<td>17 Protein-energy malnutrition</td>
</tr>
<tr>
<td>17.0 (14-21)</td>
<td>17 Diabetes</td>
</tr>
</tbody>
</table>

[http://www.healthmetricsandevaluation.org/gbd/visualizations/gbd-arrow-diagram](http://www.healthmetricsandevaluation.org/gbd/visualizations/gbd-arrow-diagram)
NCDs are the single biggest cause of death

Total number of deaths in the world

- 5.8 M (above the age of 60)
- 26.0 M (above the age of 60)
- 9.0 M (below the age of 60)
- 18.0 M

35 million (60% of all deaths)

Legend:
- Group III - Injuries
- Group II - Other deaths from noncommunicable diseases
- Group II - Premature deaths from noncommunicable diseases (below the age of 60), which are preventable
- Group I - Communicable diseases, maternal, perinatal and nutritional conditions
CHINA: proportional mortality (% of total deaths, all ages, 2010)

- Communicable, maternal, perinatal and nutritional conditions: 7%
- Injuries: 10%
- Other NCDs: 7%
- Diabetes: 2%
- Respiratory diseases: 15%
- Cancers: 21%
- CVD: 38%

NCD's = 83% of all deaths

http://www.who.int/nmh/countries/chn_en.pdf
INDIA: proportional mortality (% of total deaths, all ages, 2010)

NCD’s = 53% of all deaths

http://www.who.int/nmh/countries/ind_en.pdf
NCDs & ECONOMIC DEVELOPMENT (HIC vs LMIC)

Proportional Mortality Is Higher in HIC

Absolute Mortality Is Higher in LMIC

BUT

Age Standardised Mortality Rates Are Also Higher In LMIC!
Cardiovascular disease
(Age-standardized death rate per 100 000, males)

Yach D., 2009
More people die from heart diseases and strokes in the poorest developing countries than in the richest industrialized countries.

**Estimated deaths from cardiovascular diseases (2004)**

- **2004**
  - Low income countries: 2.4 m
  - Lower middle-income countries: 2.6 m
  - Upper middle-income countries: 3.0 m
  - High income countries: 3.8 m
  - Total: 5.1 m

- **2015**
  - Low income countries: 2.6 m
  - Lower middle-income countries: 3.4 m
  - Upper middle-income countries: 6.1 m
  - High income countries: 3.8 m
  - Total: 7.3 m

- **2030**
  - Low income countries: 2.6 m
  - Lower middle-income countries: 3.8 m
  - Upper middle-income countries: 6.1 m
  - High income countries: 8.2 m
  - Total: 9.0 m
Global Burden of Cancer

14 million new cases in 2012; expected to rise to 22 million cases in next two decades

More than 60% of the world’s total cases occur in Africa, Asia, and Central and South America, and these regions account for about 70% of the world’s cancer deaths

Total annual economic cost of cancer in 2010 was estimated at approximately US$ 1.16 trillion

World Cancer Report; 2014
Is NCD an issue for poor countries? YES!

![Bar chart showing NCD death rates in selected countries]

**Figure 2:** NCD death rates in people aged 15–69 years, by World Bank income groups, 2008

NCD = non-communicable disease.

The Rising NCD Challenge In Developing Regions Including Younger Populations

<table>
<thead>
<tr>
<th>Region</th>
<th>All ages, percent</th>
<th>Ages 15–59, percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-income countries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>85% (+4%)</td>
<td>65% (+1%)</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>76% (+12%)</td>
<td>62% (+11%)</td>
</tr>
<tr>
<td>Latin America and the</td>
<td>72% (+13%)</td>
<td>57% (+3%)</td>
</tr>
<tr>
<td>Caribbean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle East and North</td>
<td>69% (+12%)</td>
<td>62% (+5%)</td>
</tr>
<tr>
<td>Africa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Asia</td>
<td>51% (+39%)</td>
<td>53% (+17%)</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>28% (+64%)</td>
<td>28% (+44%)</td>
</tr>
</tbody>
</table>

Deaths from NCDs as a share of total deaths, 2008–2030*

Source: World Bank, 2011
GLOBAL VARIATION IN STROKE AND CHD

- Stroke burden disproportionately higher in China, Africa and South America
- CHD mortality higher in Middle East, North America, Australia and much of Europe
- Lower national income was associated with higher relative mortality and burden of disease from stroke.
- Diabetes mellitus and mean serum cholesterol associated with higher relative burden of CHD, even after adjustment for national income

Kim AS, Johnston C. Circulation, 2011
Why are different countries showing different patterns of CVD?

- Rise/Fall of Mortality Rates
- CHD/Stroke As Dominant CVD
<table>
<thead>
<tr>
<th>Stage I</th>
<th>Stage II</th>
<th>Stage III</th>
<th>Stage IV</th>
<th>Stage V</th>
<th>Stage VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of Pestilence and Famine</td>
<td>Age of Receding Pandemics</td>
<td>Age of ‘Man Made’ Degenerative Diseases</td>
<td>Age of Delayed Degenerative Diseases</td>
<td>Age of Social Upheaval and Health Regression</td>
<td>Era of Environmental Degradation</td>
</tr>
</tbody>
</table>

- Sub Saharan Africa
- Rural India
- Urban India
- Latin America
- Russia
- Eastern Europe

HIGH BLOOD PRESSURE

HEMORRAGIC STROKE
HYPERTENSIVE HEART FAILURE
THROMBOTIC STROKE
CORONARY HEART DISEASE

OTHER RISK FACTORS
(↑ Lipids; Smoking; Diabetes)
VALUE?

- Health Transition Model Provides An Evolving Perspective Instead Of A Limited Cross-Sectional View
- It Helps To Anticipate The Epidemic And Provide A Proactive Preventive Response

BUT

- It Is Dominated By Proportional Mortality And Ignores Age Standardised Mortality Rates
- It Is Not Likely To Be A Simple Linear Model. Complex Systems Are Non-Linear
### Transitions That Shape Public Health

<table>
<thead>
<tr>
<th>1. Demographic</th>
<th>5. Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Epidemiologic</td>
<td>6. Energy</td>
</tr>
<tr>
<td>3. Urban</td>
<td>7. Biological, Ecological</td>
</tr>
<tr>
<td></td>
<td>9. Democratic</td>
</tr>
</tbody>
</table>

“Do we not always find the diseases of the populace traceable to defects in society?”

“If disease is an expression of individual life under unfavorable circumstances, then epidemics must be indicative of mass disturbances.”

- Rudolf Virchow
DETERMINANTS

- Demographic Shifts (Aging)
- Urbanization
- Industrialisation
- Globalization (Marketing)
- Education
- Culture (Beliefs)
- Poverty (Access to Health)
- Built Environment (Barrier/Enabler)

Vectors: Tobacco; Unhealthy Food; Alcohol
Global Challenge of NCDs

APATHY (2000) → ATTENTION (2011) → ACTION ?
MYTHS DISPELLED; EVIDENCE AUGMENTED
NOW IS THE TIME FOR ACTION

- NCDs are **NOT** the problem of only rich countries
- NCDs are **NOT** the problem of only the elderly
- NCDs also impose a huge economic burden in all regions of the world
- Risk factors of NCDs are rising across the world. To contain them is...
POTENTIALLY PRODUCTIVE YEARS OF LIFE LOST DUE TO CARDIOVASCULAR DEATHS (AGE GROUP : 35-64 YEARS)

In Millions

- India: 9.2 (2000), 17.9 (2030)
- China: 6.7 (2000), 10.5 (2030)
- Russia: 3.3 (2000), 3.2 (2030)
- USA: 1.6 (2000), 2.0 (2030)

The World Bank Stand on NCDs (1999)

Article Title: The burden of disease among the global poor
Authors: Gwatkin DR, Guillot M, Heuveline P
Publication: Lancet 1999; 354: 586-89
Method: Comparison of disease burdens in the richest 20% and poorest 20%

“A faster decline in communicable diseases would decrease the poor-rich gap in 2020, but under an accelerated rate of overall decline in non-communicable diseases, the poor-rich gap would widen”
“To what extent do NCDs affect the poor? The answer depends to some extent on the country and the indicator of the NCD burden that is considered. However, in all countries and by any metric, NCDs account for a large enough share of the disease burden of the poor to merit a serious policy response.”
At household level, noncommunicable diseases are affecting the poorest people in developing countries disproportionately.

**Poverty at household level**

- **Globalization**
  - Urbanization
  - Population ageing

**Populations in low- and middle-income countries**

- Increased exposure to common modifiable risk factors:
  - Unhealthy diets
  - Physical inactivity
  - Tobacco use
  - Harmful use of alcohol

- **Noncommunicable diseases:**
  - Cardiovascular diseases
  - Cancers
  - Diabetes
  - Chronic respiratory diseases

- Limited access to effective and equitable health-care services which respond to the needs of people with noncommunicable diseases

- **Loss of household income from unhealthy behaviours**

- **Loss of household income from poor physical status**

- **Loss of household income from high cost of health care**

- 14 million people die prematurely each year in developing countries from noncommunicable diseases

**Poverty contributes to noncommunicable diseases and noncommunicable diseases contribute to poverty**
NCDs: Economic Impact

NCDs accounted for five of the six top causes of economic loss in 2008

- Heart disease: $752bn
- Stroke: $298bn
- Diabetes: $204bn

NCDs cost developing countries between 0.02% to 6.77% of GDP; this economic burden is more than that caused by Malaria (1960’s) or AIDS (1990’s) - IOM Report 2010

NCDs will lead to a loss of 30 Trillion Dollars globally up to 2030 representing 48% of global GDP in 2010; with mental health added loss rises to 47 trillion dollars – Harvard + WEF Study 2011
NCDs are the third largest global risk in terms of likelihood and the fourth largest global risk in terms of economic severity.

"A problem neither the developed world nor the developing world can afford" (WEF Global Risk 2010 Report)
UN-WHO Targets For NCDs

25 by 25

- Raised blood pressure: 25% reduction
- Salt/sodium intake: 30% reduction
- Tobacco use: 30% reduction
- Physical inactivity: 10% reduction
- Harmful use of alcohol: 10% reduction
- Premature mortality from NCDs: 25% reduction
- Drug therapy and counseling: 50%
- Medicines and technologies: 80%
- Harmful use of alcohol: 10% reduction
- Physical inactivity: 10% reduction
- Salt/sodium intake: 30% reduction
- Tobacco use: 30% reduction
- Diabetes/obesity: 0% change
- Premature mortality from NCDs: 25% reduction

Most are related to risk factors of NCDs
### Risk Factors

(Top Contributors to DALYs)

1. High Blood Pressure
2. Smoking (excluding SHS)
3. Alcohol Use
4. Household Air Pollution
5. Low Fruit
6. High Body Mass Index
7. High Fasting Plasma Glucose
8. Childhood Underweight
9. Ambient PM Pollution
10. Physical Inactivity

**Diet & Physical Inactivity Cluster**

Responsible For

Largest Global Disease Burden

Lancet 2012
RISK FACTORS FOR NCDs

(Ezzati & Riboli, NEJM 2013)
RISK FACTOR CHANGE: EZZATI ESTIMATES (1980-2008)

Blood Pressure

- Fell in North America, Australasia, Western Europe
- Rose in Oceania, East Africa, South Asia, South East Asia (and West African Women)
- SBP is currently highest in low and middle income countries

Changes in socio-economic structures underlie the physical activity-nutrition transition

- **Shift from preindustrial agrarian economy to industrialization**
  - Less active physical activity for individuals (sedentary habits)
  - Higher availability of cheap processed foods (high fat, high sugar)

- **Profound changes in household technology** *(leads to less PA)*
  - Food availability: canning, refrigeration, freezing, radiation, packaging
  - Food preparation: fossil fuels, electricity, appliances (cooker, mixers)

- **Dramatic shift in leisure activities for adults and children**
  - Time spent for viewing television, computers (sedentary habits)
  - Images/marketing brought to each household (alters consumption)

  “Pedestrian-hostile, activity-discouraging, fast food-intensive environment”

Snack imports from the United States into Central America, 1989-2006

Source: FAO 2007
RISK FACTOR CHANGE: EZZATI ESTIMATES (1980-2008)

Cholesterol

- Fall in Australasia, North America, Western Europe, Central and Eastern Europe
- Increase in East and South East Asia and Pacific
- Highest in high income countries
- Lowest in Sub-Saharan Africa

Mean Plasma Cholesterol Values in China

mg/dl

## The “TOP 10”

### Top 10: Countries/territories of number of people with diabetes (20-79 years), 2011 and 2030

<table>
<thead>
<tr>
<th>COUNTRY /TERRITORY</th>
<th>2011 MILLIONS</th>
<th>2030 MILLIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 China</td>
<td>90.0</td>
<td>129.7</td>
</tr>
<tr>
<td>2 India</td>
<td>61.3</td>
<td>101.2</td>
</tr>
<tr>
<td>3 United States of America</td>
<td>23.7</td>
<td>29.6</td>
</tr>
<tr>
<td>4 Russian Federation</td>
<td>12.6</td>
<td>19.6</td>
</tr>
<tr>
<td>5 Brazil</td>
<td>12.4</td>
<td>16.8</td>
</tr>
<tr>
<td>6 Japan</td>
<td>10.7</td>
<td>16.4</td>
</tr>
<tr>
<td>7 Mexico</td>
<td>10.3</td>
<td>14.1</td>
</tr>
<tr>
<td>8 Bangladesh</td>
<td>8.4</td>
<td>12.4</td>
</tr>
<tr>
<td>9 Egypt</td>
<td>7.3</td>
<td>11.8</td>
</tr>
<tr>
<td>10 Indonesia</td>
<td>7.3</td>
<td>11.4</td>
</tr>
</tbody>
</table>
EVOLUTION OF HOMO ROTUNDUS!
Changes in the Prevalence (%) of Overweight and Obesity in Mexican Adults

Source: Barquera et al; 2009
Obesity: Ezzati Estimates

- Globally: 10 % of men were obese in 2008
  4.8% in 1980

- Globally: 14 % of women were obese in 2008
  7.9 % in 1980

- Pacific islands has the highest mean BMI
  Men: 34; Women: 35

- Lowest mean BMI among DR Congo Men (19.9)
  and Bangladesh Women (20.5)

- USA
  - highest average BMI among high-income countries,
  - most rapid increase in BMI in the last 30 yrs
  - Increase in 1 BMI point per decade

Finucane et al., Lancet 2011; 377: 557–67
Low birth weight and its consequences

- Rebound Adiposity
- Hypertension
- Coronary heart disease
- Atherosclerosis
- Stroke
- Type II Diabetes
- Insulin resistance
- Adult lung function
- ? Cancer
Risk factors: tobacco use on the rise in developing countries

Cumulative tobacco-related deaths, 2005–2030

Does Ethnicity Matter?

While ethnic comparison studies do suggest that some ethnic groups are at a higher risk of manifesting CHD (e.g.; South Asians) or Stroke (East Asians; Africans),

MIGRANT STUDIES SUGGEST THAT ENVIRONMENT IS THE DOMINANT FACTOR IN THE EXPRESSION OF RISK
INTERHEART Study

• About 90% of CHD Risk ("PAR") can be explained by 9 Risk Factors:
  • Smoking
  • Diabetes
  • Hypertension
  • Abdominal Obesity
  • Psychosocial Factors
  • Fruits & Vegetables
  • Exercise
  • Alcohol
  • Apo B/Apo A1 ratio

THE TASK BEFORE US

To Telescope The Transition

Stage I       Stage II       Stage III       Stage IV       ?

Avoid /Abbreviate the Stage of Mid-Life Death and Disability
Address the bulk of the distribution through small shifts (Population Attributable Risk)

Address the individuals at the highest ‘absolute’ risk of a CVD event (Comprehensive Cardiovascular Risk)

Widespread Effect = Large Benefits

High Impact = Cost-Effective use of resources
% Decline in CHD Deaths Attributed to Interventions

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Interventions</th>
<th>Risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>England-Wales 81-00</td>
<td>44%</td>
<td>56%</td>
</tr>
<tr>
<td>New Zealand 82-93</td>
<td>48%</td>
<td>52%</td>
</tr>
<tr>
<td>Scotland 75-94</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>USA Hunink 80-90</td>
<td>43%</td>
<td>57%</td>
</tr>
<tr>
<td>Holland Bots 78-85</td>
<td>46%</td>
<td>44%</td>
</tr>
<tr>
<td>USA Goldman 68-76</td>
<td>40%</td>
<td>54%</td>
</tr>
<tr>
<td>New Zealand Beaglehole 74-81</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>Finland Vartiainen 72-92</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>Iceland Sigfusson 68-88</td>
<td>25%</td>
<td>75%</td>
</tr>
</tbody>
</table>

Power of Policy

- Modifies social and economic determinants of behaviours
  - Influences how people Eat, Smoke, Drink, Move
- Creates enabling environment to initiate & maintain behaviour change in communities and individuals
- Can impact on multiple risk factors simultaneously
- Reduces population risk in short time
- Cost effective
- Relatively easy to implement
- Has intergenerational benefit
### POWER OF POLICY FOR CHRONIC DISEASE PREVENTION

#### TOBACCO

<table>
<thead>
<tr>
<th>Evidence is available from many countries (including LMIC) that</th>
<th>Taxation</th>
<th>Ad Bans</th>
<th>Smoke Free Policies</th>
<th>Health Warnings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ARE EFFECTIVE</strong></td>
<td></td>
<td></td>
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</tbody>
</table>

48.1% of mortality averted in UK (1981-2000) is attributable to reduced smoking

*(Unal B et al. Circulation 2004)*
# Smoke Free Policies and Myocardial Infarction (MI)

<table>
<thead>
<tr>
<th>Study and location</th>
<th>% decrease in MI admission rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sargent et al, 2004, Helena, USA</td>
<td>40</td>
</tr>
<tr>
<td>Bartecchi et al, 2006, Pueblo, USA</td>
<td>27</td>
</tr>
<tr>
<td>Barone–Adesi et al, 2006, Piedmont, Italy</td>
<td>11</td>
</tr>
<tr>
<td>Seo et al, 2007, Monroe, Indiana, USA</td>
<td>29</td>
</tr>
<tr>
<td>Khuder et al, 2007, Bowling Green, Ohio, USA</td>
<td>47</td>
</tr>
<tr>
<td>Juster et al, 2007, New York, USA</td>
<td>8</td>
</tr>
<tr>
<td>Lemstra et al, 2008, Saskatoon, Canada</td>
<td>13</td>
</tr>
<tr>
<td>Cesaroni et al, 2008, Rome, Italy</td>
<td>8</td>
</tr>
<tr>
<td>Pell et al, 2008, Scotland</td>
<td>17</td>
</tr>
<tr>
<td>Edwards et al, 2008, New Zealand</td>
<td>No change</td>
</tr>
<tr>
<td>Vasseli et al, 2008, Four regions of Italy</td>
<td>13</td>
</tr>
<tr>
<td>CDC, 2009, Pueblo, USA</td>
<td>41</td>
</tr>
<tr>
<td>Meyers et al., 2009, Meta-analysis</td>
<td>17</td>
</tr>
</tbody>
</table>
“Triple-Halve-Double”; Tripling of cigarette prices halved the consumption and doubled the inflation adjusted Government revenue.

POWER OF POLICY FOR CHRONIC DISEASE PREVENTION

DIET

• Evidence of preventive potential of policy interventions available from
  - Mauritius (Price of Edible Oils)
  - Poland (Import of F-V and Healthy Fats)
  - Finland (Farming; Marketing; Community Education)

New Initiatives

• Food Labeling
• Reduced Salt in Processed Foods
• Ban on Trans-Fats
• Advertising Restrictions
Mauritius

- CVD & risk factors
- Intensive national CVD intervention programme to reduce risk factors
  - extensive mass media
  - fiscal & legislative measures
  - diverse settings: community, school & workplace

Government intervention: Subsidized cooking oil

(unsaturated) Soya bean oil instead of (saturated) fat rich palm oil

- Adult mean total cholesterol level decreased during 1987-1992 from 5.5 to 4.7 mmol/l (↓15%)

Dietary Change and CHD Mortality in Poland

Zatonski W et al., BMJ 1998;316:1047-51

Graph showing the change in CHD mortality and the consumption of butter, vegetable fat and oils, exotic fruit, and fat (kg/pers/yr) from 1985 to 1994.

- CHD mortality remains relatively stable until 1991, then shows a gradual increase.
- Butter consumption decreases significantly from 1985 to 1994.
- Vegetable fat and oils show a slight increase from 1985 to 1991, then decrease sharply after 1991.
- Exotic fruit consumption (imported) increases steadily from 1985 to 1994.
- Fat (kg/pers/yr) consumption remains relatively stable until 1993, then shows a slight decrease.

Source: Zatonski W et al., BMJ 1998;316:1047-51
Policy Measures (Usually) Do Not Cost The Government Money

- Tobacco Taxes
- Ad Bans
- Public Smoking Bans
- Regulation of Processed Food (eg., Salt, Trans Fats)
- Food Labeling
Access to Drugs

36 country WHO study:

- Availability of CVD (atenolol, captopril, hydrochlorothiazide, losartan, nifedipine) drugs varied considerably across countries

- Overall availability was poor-
  26% in public sector, 57% private sector

- Cost fluctuation between countries, with patient prices generally higher than international references prices

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<td><strong>1.</strong></td>
<td>Enhancing capacity for generic substitution</td>
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<td><strong>2.</strong></td>
<td>Expediting generic availability by overcoming legal barriers related to patents licenses</td>
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<td><strong>3.</strong></td>
<td>Optimizing local procurement practices in the public sector</td>
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<td><strong>4.</strong></td>
<td>Broadening global procurement via third-party price negotiations</td>
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<td><strong>5.</strong></td>
<td>Engaging the private sector to differentially price CVD medicines in LMICs</td>
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<td><strong>6.</strong></td>
<td>Regulating retail mark-ups in the supply chain</td>
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<td><strong>7.</strong></td>
<td>Eliminating tariffs on medicines</td>
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<td><strong>8.</strong></td>
<td>Developing a fixed-dose combination (FDC) for CVD (the ‘Polypill’)</td>
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MOVING BEYOND NCDs

CCI = Chronic Conditions & Injuries
Health Systems Strengthening
Universal Health Coverage
Sustainable Development (post 2015)

Global action on NCDs calls for stronger partnerships and wider arena of action
RISK CASCADE OF NCDs

GLOBAL — NATIONAL — COMMUNITY — FAMILY — INDIVIDUAL

Development
*(stage and speed)*

Distribution
*(equity)*

Demand-Supply
*(trade)*

Perceptions
*(cultural)*

Priorities
*(socio-economic)*

Pathways
*(availability, access)*

Beliefs
Behaviours
Biology
HEALTH BEYOND HEALTH CARE

“Health leaps out of Science and draws nourishment from the Society around it”

- Gunnar Myrdal
(Swedish Economist, Nobel Laureate)

POLICIES AND PROGRAMMES IN

• Finance • Water • Sanitation • Agriculture • Food Processing
• Education • Rural Development • Urban Design • Transport
• Communications • Trade • Environment

NEED TO BECOME SENSITIVE AND RESPONSIVE TO PUBLIC HEALTH CONCERNS!
POLICY APPROACHES (Global; National; Local)

- Financial
- Legal
- Regulatory
- Trade

Environment To Enable Individuals To Make and Maintain Healthy Choices

INDIVIDUAL

FAMILY

NEIGHBORHOOD, COMMUNITY

Enhancement of Knowledge, Motivation, and Skills of Individuals

Media
Community Interventions
Settings Based

HEALTH COMMUNICATION

DETERMINANTS

- Globalization
- Demographic Change
- Social Determinants
- Health Inequities
- Behavioral Risk
- Education
- Cultural and Social Norms

HEALTH CARE DELIVERY

- Health Workforce
- Drugs & Technologies
- Quality of Care
- Access to Care
- Systems Infrastructure
- Preventive, Diagnostic, Therapeutic, Rehabilitative Services