Cardiovascular Disease in CKD
WHO Perspectives

Dr A. Alwan
<table>
<thead>
<tr>
<th>Non-communicable diseases</th>
<th>Causative risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tobacco use</td>
</tr>
<tr>
<td>Heart disease and stroke</td>
<td>✔</td>
</tr>
<tr>
<td>Diabetes</td>
<td>✔</td>
</tr>
<tr>
<td>Cancer</td>
<td>✔</td>
</tr>
<tr>
<td>Chronic lung disease</td>
<td>✔</td>
</tr>
</tbody>
</table>
Noncommunicable Diseases (NCDs)

- NCDs are the single biggest cause of death. A large proportion of deaths are premature.
- NCDs are preventable, there are cost effective solutions that are affordable to all countries.
- Most NCDs share common risk factors and an integrated prevention strategy is essential.
- Health systems in developing countries are overwhelmed with the increasing magnitude but demands for technical support remains largely unanswered.
- NCDs are a serious development problem and there is a window of opportunity to act now.
NCDs are the single biggest cause of death. 9 million people die every year at young age.

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)

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
90% of premature deaths from NCDs occur in developing countries

**Annual number of deaths in the world**

<table>
<thead>
<tr>
<th>Group I – Communicable diseases, maternal, perinatal and nutritional conditions</th>
<th>Group II – Premature deaths from noncommunicable diseases (below the age of 60), which are preventable</th>
<th>Group II – Other deaths from noncommunicable diseases</th>
<th>Group III - Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-income countries</td>
<td>13.6M</td>
<td>3.7M</td>
<td>6.8M</td>
</tr>
<tr>
<td>Lower middle-income</td>
<td>3.0M</td>
<td>3.3M</td>
<td>2.3M</td>
</tr>
<tr>
<td>Upper middle-income</td>
<td>1.1M</td>
<td>10.2M</td>
<td></td>
</tr>
<tr>
<td>High-income countries</td>
<td>0.9M</td>
<td>5.9M</td>
<td></td>
</tr>
</tbody>
</table>

- **Annual number of deaths in the world**
  - 25 million
  - 20 million
  - 15 million
  - 10 million
## Leading causes of attributable global mortality (2004)

<table>
<thead>
<tr>
<th>Cause</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High blood pressure</td>
<td>12.8</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>8.7</td>
</tr>
<tr>
<td>High blood glucose</td>
<td>5.8</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>5.5</td>
</tr>
<tr>
<td>Overweight and obesity</td>
<td>4.8</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>4.5</td>
</tr>
<tr>
<td>Unsafe sex</td>
<td>4.0</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>3.8</td>
</tr>
<tr>
<td>Childhood underweight</td>
<td>3.8</td>
</tr>
<tr>
<td>Indoor smoke from solid fuels</td>
<td>3.3</td>
</tr>
</tbody>
</table>

59 million total global deaths in 2004
## Top causes of death in the poorest countries include NCDs

<table>
<thead>
<tr>
<th>Low-income countries</th>
<th>Middle-income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lower respiratory infections</td>
<td>1. Stroke and cerebrovascular disease</td>
</tr>
<tr>
<td>2. Coronary heart disease</td>
<td>2. Coronary heart disease</td>
</tr>
<tr>
<td>3. Diarrhoeal diseases</td>
<td>3. Chronic pulmonary disease</td>
</tr>
<tr>
<td>4. HIV/AIDS</td>
<td>4. Lower respiratory infection</td>
</tr>
<tr>
<td>5. Stroke and cerebrovascular disease</td>
<td>5. Trachea, bronchus, lung cancers</td>
</tr>
<tr>
<td>6. Chronic pulmonary disease</td>
<td>6. Road traffic accidents</td>
</tr>
<tr>
<td>7. Tuberculosis</td>
<td>7. Hypertensive heart disease</td>
</tr>
</tbody>
</table>
The top-10 countries reported to have the highest diabetes prevalence are countries in developing regions of the world.

<table>
<thead>
<tr>
<th>COUNTRY/TERRITORY</th>
<th>2010 PREVALENCE (%)</th>
<th>COUNTRY/TERRITORY</th>
<th>2010 PREVALENCE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Nauru</td>
<td>30.9</td>
<td>1 Nauru</td>
<td>33.4</td>
</tr>
<tr>
<td>2 United Arab Emirates</td>
<td>18.7</td>
<td>2 United Arab Emirates</td>
<td>21.4</td>
</tr>
<tr>
<td>3 Saudi Arabia</td>
<td>16.8</td>
<td>3 Mauritius</td>
<td>19.8</td>
</tr>
<tr>
<td>4 Mauritius</td>
<td>16.2</td>
<td>4 Saudi Arabia</td>
<td>18.9</td>
</tr>
<tr>
<td>5 Bahrain</td>
<td>15.4</td>
<td>5 Réunion</td>
<td>18.1</td>
</tr>
<tr>
<td>6 Réunion</td>
<td>15.3</td>
<td>6 Bahrain</td>
<td>17.3</td>
</tr>
<tr>
<td>7 Kuwait</td>
<td>14.6</td>
<td>7 Kuwait</td>
<td>16.9</td>
</tr>
<tr>
<td>8 Oman</td>
<td>13.4</td>
<td>8 Tonga</td>
<td>15.7</td>
</tr>
<tr>
<td>9 Tonga</td>
<td>13.4</td>
<td>9 Oman</td>
<td>14.9</td>
</tr>
<tr>
<td>10 Malaysia</td>
<td>11.6</td>
<td>10 Malaysia</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Includes only countries/territories where surveys with glucose testing were undertaken for that country/territory comparative prevalence.

Source: International Diabetes Federation's Diabetes Atlas
RISING PREVALENCE OF DIABETES IN URBAN INDIA
Chennai Urban Rural Epidemiology Study [CURES] is compared with other studies conducted on representative population of Chennai city

Within a span of 14 years, the prevalence of diabetes increased by 72.3%

Mohan V et al, CURES, Diabetologia, 2006

<table>
<thead>
<tr>
<th>Geographical regions (WHO classification)</th>
<th>2005</th>
<th>2006-2015 (cumulative)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total deaths (millions)</td>
<td>NCD deaths (millions)</td>
</tr>
<tr>
<td>Africa</td>
<td>10.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Americas</td>
<td>6.2</td>
<td>4.8</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>4.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Europe</td>
<td>9.8</td>
<td>8.5</td>
</tr>
<tr>
<td>South-East Asia</td>
<td>14.7</td>
<td>8.0</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>12.4</td>
<td>9.7</td>
</tr>
<tr>
<td></td>
<td>58.2</td>
<td>35.7</td>
</tr>
</tbody>
</table>

WHO projects that over the next 10 years, the largest increase in deaths from diabetes, cardiovascular disease, cancer, and respiratory disease will occur in Africa and the Eastern Mediterranean.

(WHO, Chronic Disease Report, 2005)
NCDs are closely related to poverty and contribute to poverty

Poverty at household level

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

Globalization
Urbanization
Population ageing

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

Non-communicable 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 non-communicable diseases

8 million people die prematurely each year in developing countries from non-communicable diseases
Smoking prevalence (2004)

- Smoking prevalence by income quintiles:
  - Low-income countries
  - Lower-middle-income countries
  - Upper-middle-income countries
  - High-income countries

- Categories:
  - Lowest household income quintiles
  - Highest household income quintiles
Health care costs are enormous

- Cardiovascular diseases
- Chronic kidney diseases
- Cancers
- Diabetes
The poorest people in developing countries affected the most.

The cost of caring for a family member with diabetes can be more than 20 per cent of low-income household incomes in developing countries.

The cost per year of diabetes care at household level:

<table>
<thead>
<tr>
<th>Country</th>
<th>Insulin</th>
<th>Syringes</th>
<th>Testing</th>
<th>Consultation</th>
<th>Travel</th>
<th>Total cost</th>
<th>% of per capita Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mali (2004)</td>
<td>38%</td>
<td>34%</td>
<td>8%</td>
<td>7%</td>
<td>12%</td>
<td>$339.4</td>
<td>61%</td>
</tr>
<tr>
<td>Mozambique (2003)</td>
<td>5%</td>
<td>24%</td>
<td>1%</td>
<td>9%</td>
<td>61%</td>
<td>$273.6</td>
<td>75%</td>
</tr>
<tr>
<td>Nicaragua (2007)</td>
<td>0%</td>
<td>73%</td>
<td>0%</td>
<td>0%</td>
<td>27%</td>
<td>$74.4</td>
<td>7%</td>
</tr>
<tr>
<td>Zambia (2003)</td>
<td>12%</td>
<td>63%</td>
<td>6%</td>
<td>6%</td>
<td>12%</td>
<td>$199.1</td>
<td>21%</td>
</tr>
<tr>
<td>Vietnam (2008)</td>
<td>39%</td>
<td>8%</td>
<td>5%</td>
<td>3%</td>
<td>46%</td>
<td>$427.0</td>
<td>51%</td>
</tr>
</tbody>
</table>
Percent and number of men with and without CVD experiencing catastrophic spending and impoverishment - 2005

- Catastrophic spending >30% HH income in one year
- Impoverishment from above poverty line to below during year

Source: Mahal et al 2010

Number of CVD affected: 1.4 – 2.0 million
Number of No CVD affected: 0.6-0.8 million
NCDs lead to catastrophic health expenditures in India.

Percent with and without cancer experiencing catastrophic spending and impoverishment (2004)

- Catastrophic expenditures
- Impoverishment

- Cancer
- No cancer
Heart disease lead to catastrophic expenses

*Percent and number of men with and without cardiovascular diseases experiencing catastrophic spending and impoverishment (2004)*

![Bar chart showing percentages and numbers of men affected by catastrophic spending and impoverishment.](chart)

- **Catastrophic spending:**
  - **Percent:** 25%
  - **Number affected:** 1.4 – 2.0 million
  - **With CVD:** 25%
  - **Without CVD:** 5%

- **Impoverishment:**
  - **Percent:** 10%
  - **Number affected:** 0.6-0.8 million
  - **With CVD:** 10%
  - **Without CVD:** 2%

*Source: World Bank, Mahal et al 2010*
Families with members who have a chronic disease are at increase financial risk and more likely to be exposed to catastrophic spending and impoverishment.

Chronic diseases can play an adverse role in efforts to reduce poverty.
NCDs are the third largest global risk in terms of likelihood.

"A problem neither the developed world nor the developing world can afford" (WEF Global Risk 2010 Report)
Global commitments to public health (2007) (measured in Official Development Assistance)

- Total Health ODA in 2007: $22.1 billion
- Health ODA for NCDs: ?

(Source: Kaiser Family Foundation, 23 July 2009, based on OECD/DAC)
Global Strategy for the Prevention and Control of Noncommunicable Diseases

2000

2003

2004

2008

2009

2010

2011

Global Strategy to Reduce the Harmful Use of Alcohol

Set of Recommendations on the Marketing of Foods to Children

UN General Assembly resolution A/RES/64/265

Global Strategy for the Prevention and Control of Noncommunicable Diseases

Action Plan for the Global Strategy (World Health Assembly, 2008)

Ministerial Meetings (Doha)

Doha Declaration

ECOSOC Ministerial Declaration

UNSG Report on NCDs

High-level Meeting

UNSG Report on NCDs

ECOSOC Ministerial Declaration

Ministerial Meetings (Doha)

Doha Declaration

UN General Assembly resolution A/RES/64/265
The Global Strategy for the Prevention and Control of NCDs
(World Health Assembly, 2000)

- Mapping the epidemic of NCDs
- Reducing the level of exposure to risk factors
- Strengthening health care for people with NCDs
Surveillance: Gaps and Lessons Leaned

• Good progress in risk factors surveillance over the last decade but NCD surveillance systems are still generally weak in member States

• No consensus on key components of an NCD surveillance system and lack of standardized indicators to monitor NCD trends at national and global levels – duplication/inconsistencies

• When it exists, NCD surveillance work is not institutionalized and rarely integrated into the national health information systems of LMICs

• Limited capacity in epidemiology and surveillance in Member States
Framework for a national NCD surveillance system

Exposures (Risk factors)
- Behavioral and dietary/nutritional risk factors
- Physiological and metabolic risk factors

Outcomes
- Mortality
- Morbidity

Health System Response
- Interventions
- Health system capacity
Prevention and Health Promotion
Prevention
Reduction of Risk factors

• Actions for:
  – Tobacco control
  – Promoting healthy diet
  – Promoting physical activity
  – Reducing the harmful use of alcohol

• Cost effectiveness and best buys..
Major Challenge

• Health in All Policies and Intersectoral Action
Improving Health Care

• Health system strengthening based on primary health care-

• Actions to achieve short term gains in promoting access to the essential NCD interventions
Improving Access to Health care

- Reduce cost sharing for NCD Services
- Cover the uninsured
- Provide NCD services

Current Public Expenditure On Health
Action Plan for the Global Strategy
(World Health Assembly, 2008)

Six objectives:
1. Raising the priority accorded to non-communicable diseases in development work at global and national levels
2. Establishing and strengthening national policies and programmes
3. Reducing and preventing risk factors
4. Prioritizing research on prevention and health care
5. Strengthening partnerships
6. Monitoring NCD trends and assessing progress made at country level
DECLARATION OF PORT-OF-Spain: UNITING TO STOP THE EPIDEMIC OF CHRONIC NCOS

We, the Heads of Government of the Caribbean Community (CARICOM), meeting at the Crowne Plaza Hotel, Port-of-Spain, Trinidad and Tobago on 15 September 2007 on the occasion of a special Regional Summit on Chronic Non-Communicable Diseases (NCOS);

Conscious of the collaborative actions which have in the past fuelled regional integration, the goal of which is to enhance the well-being of the citizens of our countries;

Recalling the Nassau Declaration (2001), that "the health of the Region is the health of Region", which underscored the importance of health to development;

Inspired by the successes of our joint and several efforts that resulted in the Caribbean being the first Region in the world to eradicate poliovirus and measles;

Affirming the main recommendations of the Caribbean Commission on Health and Development which includes strategies to prevent and control heart disease, stroke, diabetes, hypertension, obesity and cancer in the Region by addressing their causal risk factors of unhealthy diets, physical inactivity, tobacco use and alcohol abuse and strengthening our health services;

Impelled by a determination to reduce the suffering and burdens caused by NCOS on the citizens of our Region which is the one most affected in the Americas;

Fully convinced that the burden of NCOS can be reduced by comprehensive and integrated preventive and control strategies at the individual, family, community, national and regional levels and through collaborative programmes, partnerships and policies supported by governments, private sectors, NGOs and all other social, regional and international partners;

Declare:

1. Our full support for the initiatives and mechanisms aimed at strengthening regional health institutions, to provide critical leadership required for implementing our agreed strategies for the reduction of the burden of Chronic, Non-Communicable Diseases as a central priority of the Caribbean Co-operation in Health Initiative Phase III (CCH III), being coordinated by the CARICOM Secretariat, with able support from the Pan American Health Organisation/World Health Organisation (PAHO/WHO) and other relevant partners;

2. That we strongly encourage the establishment of National Commissions on NCOS or analogous bodies in all States which have not done so and support the immediate enactment of legislation to limit or eliminate smoking in public places, ban the sale, advertising and promotion of tobacco products to children, insist on effective warning labels and introduce such fiscal measures as will reduce affordability of tobacco;
To raise the priority accorded to NCDs in development work
Regional Ministerial Meeting on Health Literacy (Beijing, 29-30 April 2009)
Regional Ministerial Meeting on Non-communicable Diseases and Injuries, Poverty and Development (Qatar, 10-11 May 2009)
ECOSOC High-level Segment on Global Health (Geneva, 6-9 July 2009)
ECOSOC Ministerial Roundtable Meeting on Non-communicable Diseases and Injuries (Geneva, 8 July 2009)

United Nations General Assembly Resolution
A/RES/64/265 on the prevention and control of non-communicable diseases (adopted on 13 May 2010)
Resolution A/RES/64/265 – Prevention and Control of NCDs

- **Decides** to convene a High-level Meeting of the General Assembly in September 2011, with the participation of Heads of State and Government, on the prevention and control of non-communicable diseases;
- **Also decides** to hold consultations on the scope, modalities, format and organization of the high-level meeting of the General Assembly on the prevention and control of non-communicable diseases, with a view to concluding consultations, preferably before the end of 2010;
- **Encourages** Member States to include in their discussions at the High-level Plenary Meeting of the sixty-fifth session of the General Assembly on the review of the Millennium Development Goals, to be held in September 2010, the rising incidence and the socio-economic impact of the high prevalence of non-communicable diseases worldwide;
- **Requests** the Secretary-General to submit a report to the General Assembly at its sixty-fifth session in collaboration with Member States, the World Health Organization and the relevant funds, programmes and specialized agencies of the United Nations system, on the global status of non-communicable diseases, with a particular focus on the developmental challenges faced by developing countries.
To establish and strengthen national policies and plans for the prevention and control of NCs
To promote interventions to reduce the main risk factors for NCDs (tobacco use, unhealthy diet, physical inactivity, and harmful use of alcohol).
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