Burden and measurement of Noncommunicable diseases

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NCD and Health Promotion Team
(NHP)
WPRO, WHO
Burden of Disease

- Incidence, Mortality, Morbidity (Prevalence): by site, age group, sex
- Summary measurements:
  - **DALY**: disability adjusted life year
  - YLLs: yrs life lost due to premature death
  - YLD: years lived with disability
  - HeaLY: healthy life years lost, etc
- Economic burden: Medical cost, non-Medical cost
Deaths, by broad cause group and WHO Region, 2000

Impact of NCD in WPR

- WHO projects that over the next 10 years (2005-2015)
  - 106 million people will die from NCDs
  - Deaths from infectious diseases, maternal and perinatal conditions and nutritional deficiencies combined will increase by 1%
  - Deaths from NCDs will increase by 20%-most markedly deaths from DM will increase by 15%

- 2% annual reduction in NCDs during the next 10 yrs would save 10 million lives in WPR
  - 4 million of these will be in people under age 70

## Surveillance for NCDs

<table>
<thead>
<tr>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease registries</td>
<td>Reliable data on incidence</td>
<td>Resource heavy</td>
<td>Few Cancer Registries</td>
</tr>
<tr>
<td></td>
<td>Cohort can be followed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunity for intervention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mortality</td>
<td>Cause specific mortality is the most reliable indicator</td>
<td>Incomplete regist</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Unbiased estimates</td>
<td>Inadequate and insufficient coding in mortality</td>
<td></td>
</tr>
<tr>
<td>NCD risk factor surveillance</td>
<td>Provides population prevalence of risk factors which can predict future</td>
<td>No information on current disease burden</td>
<td>STEPS Surveys</td>
</tr>
<tr>
<td></td>
<td>burden of disease</td>
<td></td>
<td>Regularly at fixed intervals</td>
</tr>
<tr>
<td></td>
<td>Feasible</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Burden of disease by broad cause group and region, 2004

- **High income**
- **Africa**
- **Americas**
- **Eastern Mediterranean**
- **Europe**
- **South-East Asia**
- **Western Pacific**

**Group I:** Communicable, maternal, perinatal and nutritional conditions
**Group II:** Noncommunicable diseases
**Group III:** Injuries

DALYs per 1000 population
Type 1 Diabetes

called juvenile diabetes or insulin-dependent diabetes, is a disorder of the body's immune system -- that is, its system for protecting itself from viruses, bacteria or any "foreign" substances.

Type 2 diabetes, Coronary heart diseases
WHAT IS DIABETES?

Diabetes is recognized as a group of heterogeneous disorders with the common elements of hyperglycaemia and glucose intolerance, due to insulin deficiency, impaired effectiveness of insulin action, or both 1. Diabetes mellitus is classified on the basis of aetiology and clinical presentation of the disorder into four types.

- type 1 diabetes,
- type 2 diabetes,
- gestational diabetes mellitus (GDM), and
- other specific types.
Growth of the Diabetes Epidemic

Nos. of People with Diabetes (millions, 2000 and 2010 with % increase)

# Western Pacific at a GLANCE

<table>
<thead>
<tr>
<th>Western Pacific</th>
<th>2010</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (millions)</td>
<td>2,237</td>
<td>2,444</td>
</tr>
<tr>
<td>Adult population (20-79 years, millions)</td>
<td>1,531</td>
<td>1,772</td>
</tr>
<tr>
<td>Diabetes (20-79 age group)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional prevalence (%)</td>
<td>5.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Number of people with diabetes (millions)</td>
<td>76.7</td>
<td>112.8</td>
</tr>
<tr>
<td>Diabetes mortality (20 - 79 age group)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of deaths, male (thousands)</td>
<td>588.3</td>
<td></td>
</tr>
<tr>
<td>Number of deaths, female (thousands)</td>
<td>486.7</td>
<td></td>
</tr>
<tr>
<td>Health expenditure for diabetes (USD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total health expenditure, R=2, (billions)</td>
<td>38.2</td>
<td>44.8</td>
</tr>
</tbody>
</table>
% of all-cause mortality attributable to diabetes by age and sex, 2010

Western Pacific Region
Overall: 9.7%
TEENS are now getting Type 2 Diabetes, a disease once mostly associated with adults, because of one’s lifestyle

Diabetes in one of the top causes of death in Filipinos

Type 1 Diabetes?
Cancer Burden

International Agency for Research on Cancer

World Health Organization

GLOBOCAN 2008
Cancer Incidence and Mortality Worldwide in 2008

THE GLOBOCAN PROJECT

Welcome to the GLOBOCAN project. The aim of the project is to provide contemporary estimates of the incidence of, and mortality from, cancers in all countries of the world. The GLOBOCAN estimates are presented for 2008, separately for each sex and for all ages. Please note that:

1. These estimates are based on the most recent data available at IARC and on information publicly available on the Internet, but local sources.
2. Because the sources of data are continuously improving in quality and extent, estimates may not be truly comparable overtime and with estimates with those published earlier. The observed differences may be the result of a change in the methodology and should not be attributed to a change in cancer incidence.

Usage:

- Before you start using GLOBOCAN, we recommend that you first read the section Data sources and methods.
- For a quick access to a summary of the burden of cancer in a country or for a cancer, use the FACT SHEETS option. Fact Sheets are a most common cancer types or for each country or region of the world. They were developed to provide a quick overview of frequently-require.
- If you want to perform simple analysis or create your own graphs using GLOBOCAN data, use the ONLINE ANALYSIS menu options.

http://globocan.iarc.fr/
Preparing National Incidence Estimates

National incidence data

Mortality data

Regional incidence data

Relative frequency

No data

Average

GLOBOCAN 2008

Same
Preparing National Mortality Estimates

National mortality data

Regional mortality data (Weighting)

No data

Incidence+
Survival

Country-specific survival data only to the country of origin and to the neighboring countries: India, Bangladesh, Nepal and Sri Lanka using Indian survival probabilities, and Thailand, Cambodia, Laos and Myanmar using Thai and/or Chinese survival data.

For the other countries, country-specific survival, by cancer, using socio-economic data (country specific GDP).
Male

Estimated age-standardised incidence rate per 100,000
All cancers excl. non-melanoma skin cancer: male, all ages
Incidence

Most frequent cancers: Men Western Pacific region

Mortality

[Pie charts showing cancer incidence and mortality rates in the Western Pacific region, with lung cancer being the most frequent cause of both incidence and mortality.]
Female

Estimated age-standardised incidence rate per 100,000

All cancers excl. non-melanoma skin cancer: female, all ages

GLOBOCAN 2008 (IARC) - 20.7.2010
Incidence

Most frequent cancers: Women Western Pacific region

Mortality

[Pie charts showing incidence and mortality rates of cancers for women in the Western Pacific region]
## Burden of cancer in WPR

<table>
<thead>
<tr>
<th></th>
<th>Western Pacific</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>1,811.4M (26.8%)</td>
<td>6,750.1M (100%)</td>
</tr>
<tr>
<td>Cases</td>
<td>4,072.0 (32.1%)</td>
<td>12,678.0 (thousands)</td>
</tr>
<tr>
<td>Deaths</td>
<td>2,638.5 (34.8%)</td>
<td>7,571.5 (thousands)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Cases</th>
<th>Deaths</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lung</td>
<td>Lung</td>
<td>Breast</td>
<td>Lung</td>
</tr>
<tr>
<td>2</td>
<td>Stomach</td>
<td>Liver</td>
<td>Prostate</td>
<td>Breast</td>
</tr>
<tr>
<td>3</td>
<td>Breast</td>
<td>Stomach</td>
<td>Lung</td>
<td>Stomach</td>
</tr>
</tbody>
</table>

The majority of the increase is expected in low- and middle-income countries where health services are least able to meet the impending challenge.
Estimation of new cancer cases in 2020
WHO Western Pacific Region (WPRO)

WHO Western Pacific region (WPRO)
All cancers excl. non-melanoma skin cancer
Number of new cancers in 2020 (all ages)

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3,147</td>
<td>2,316</td>
</tr>
<tr>
<td>Female</td>
<td>2,315</td>
<td>1,755</td>
</tr>
</tbody>
</table>

(35.9%)  (31.9%)

Thousands

GLOBOCAN 2008 (IARC) (20.7.2010)
Recent information of available data
-for the GLOBOCAN 2008-

<table>
<thead>
<tr>
<th>Country</th>
<th>Incidence</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Regional CR data and national mortality estimates</td>
<td>Sample mortality data</td>
</tr>
<tr>
<td>Japan</td>
<td>Regional CR data</td>
<td>National mortality</td>
</tr>
<tr>
<td>Korea, S</td>
<td>National incidence</td>
<td>National mortality</td>
</tr>
<tr>
<td>Mongolia</td>
<td>National incidence</td>
<td>National mortality</td>
</tr>
<tr>
<td>Cambodia</td>
<td>Frequency data</td>
<td>No data</td>
</tr>
<tr>
<td>Lao</td>
<td>No data</td>
<td>No data</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Regional CR data</td>
<td>No data</td>
</tr>
<tr>
<td>Thailand</td>
<td>Regional CR data</td>
<td>No data</td>
</tr>
<tr>
<td>Indonesia</td>
<td>No data (frequency data)</td>
<td>No data</td>
</tr>
<tr>
<td>PNG</td>
<td>No data (frequency data)</td>
<td>No data</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>Regional CR data</td>
<td>Sample mortality data</td>
</tr>
</tbody>
</table>
The Problem: assessment
15 Pacific Island Countries undertaking STEPS surveys

<table>
<thead>
<tr>
<th>Planning STEPS</th>
<th>Data collection</th>
<th>Data entry</th>
<th>Data analysis</th>
<th>Draft report (unpublished)</th>
<th>Final report (published)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNMI</td>
<td>PNG</td>
<td>Vanuatu</td>
<td>Samoa</td>
<td>American Samoa</td>
<td></td>
</tr>
<tr>
<td>New Caledonia</td>
<td></td>
<td>Cook Is</td>
<td>FSM</td>
<td>Fiji</td>
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<tr>
<td>Niue</td>
<td></td>
<td>Kiribati</td>
<td></td>
<td>Marshall Is</td>
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<tr>
<td>FRP W&amp;F</td>
<td></td>
<td>Palau</td>
<td></td>
<td>Nauru</td>
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<td></td>
<td></td>
<td>Tonga</td>
<td></td>
<td>Tokelau</td>
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<td></td>
<td></td>
<td></td>
<td>Solomon Islands</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Kiribati</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FSM</td>
<td></td>
</tr>
</tbody>
</table>
The problem: risk factor 1
We eat too few fruits and vegetables

CONSUME < 5 SERVES OF FRUIT & VEGETABLES PER DAY

Prevalence (%)
The problem: risk factor 2
We are not physically active

PHYSICALLY INACTIVE

Cook Islands
Nauru
Fiji*
Tokelau
Samoa
A. Samoa
Fiji*

Prevalence (%)

Females
Males
The problem: risk factor 3
We smoke too much
The problem: risk factor 4
We are overweight
The problem: risk factor 5

RAISED BLOOD PRESSURE

<table>
<thead>
<tr>
<th></th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanuatu</td>
<td></td>
<td></td>
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<tr>
<td>Marshall Islands</td>
<td></td>
<td></td>
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<tr>
<td>Cook Islands</td>
<td></td>
<td></td>
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<tr>
<td>Nauru</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tokelau</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samoa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Samoa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiji*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prevalence (%)
The problem: % with at least 3 risk factors

POPULATION (25-44 years) % HIGH RISK OF NCD

- Marshall Islands
- Cook Islands
- Nauru
- Tokelau
- Samoa
- A. Samoa

Prevalence (%)

0 10 20 30 40 50 60 70 80
Age-standardized prevalence estimates for current tobacco smoking among adults in the Western Pacific, weighted by sex, 2006

Data from Global Tobacco Control Report II
Proportion of the population who are overweight (BMI > 25.0)
(From WHO STEPS surveys and other sources)
Proportion of the population who have hypertension
SBP ≥ 140 and DBP ≥ 90 and known hypertensive cases

Percentage

Male
Female

Australia
Lao (Vientiane)
Malaysia
American Samoa
Fiji
Kiribati
Solomon Islands
Surveillance for NCD

• Relative rarity of events in comparison to reportable events in communicable diseases
• Lack of uniform case definition
• Infrastructure availability varies widely between urban and rural areas
• Alternate systems of medicine
• Expensive
• Options
  ✔ Disease registers
  ✔ Mortality data
  ✔ Risk factor surveillance
Cancer Registry

Types
1. Population based cancer registry
2. Hospital cancer registry
3. Pathology registry

Disease Registry
Data Sources

1. Med Records Dept
2. Outpatient clinic
3. Pathology lab
4. Hematology lab
5. Radiol Oncology
6. Diagnostic Rad
7. Health Insurance
8. Screening
9. Death certificates
10. Autopsy
11. Others
Quality : Quality Control

Quality of Data
The registry data – reliable and of good quality
Should be complete, consistent and accurate

Quality Control
The mechanism by which the quality of data can be assessed
* a formal ongoing programme
* ad hoc survey to assess completeness and consistency of case finding, abstracting, and coding as well as the accuracy of reporting
Comparability

• The system used for classification and coding of neoplasms;
• The definition of incidence, i.e. what is defined as a case, and what is the definition of the *incidence date*;
• The distinction between a primary cancer (new case) and an extension, recurrence or metastasis of an existing one (*multiple primary*);
• The recoding of cancers detected in asymptomatic individuals
International standards for classification and coding of neoplasm

ICD-O-3 (2000, WHO)

**Topography**: location of the tumour in the body
(T code: C16)

**Morphology**: microscopic appearance and cellular origin of the tumor
(M code: 8000)

**Behavior**: whether the tumour is malignant, benign, in situ or uncertain (/3)

**Grade**: the extent of defferentiation of tumour

A standard coding scheme is also provided for recording the basis of diagnosis of cancers
# Data quality and Comparability Criteria CI5 vol IX

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete coverage</td>
<td>No access to death certificates</td>
<td>No Death Clearance as source of case finding</td>
<td>DCO, Unk, ill-defined site &gt; 20%</td>
</tr>
<tr>
<td>Death reporting meet WHO recommendations</td>
<td>Official mortality data not available by cause or poor quality by cause</td>
<td></td>
<td>MV% too high (99-100%) or low for selected sites (overall MV% &lt; 75%)</td>
</tr>
<tr>
<td>%Unk, DCO, ill-defined site &lt;10%</td>
<td>10% &lt; %Unk, DCO, ill-defined site &lt;20%</td>
<td>No official mortality data</td>
<td>M/I threshold by site</td>
</tr>
<tr>
<td>No abrupt trends, cases denominators OK</td>
<td>75% &lt; MV% &lt; 80%</td>
<td>No <em>ad hoc</em> study of completeness</td>
<td>Implausible incidence rates</td>
</tr>
<tr>
<td>MV% &gt; 80% (99-100% excluded) DCO 0.0 % (DCO:none )</td>
<td>MV% but C22 MV% but C91-95</td>
<td></td>
<td>Specialized registries e.g. childhood, mesothelioma</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Data with ≤2 years</td>
</tr>
</tbody>
</table>
CanReg5

• The goal of the CanReg5 project is to make available an easy to use and flexible software package to support cancer registries in accomplishing these tasks.

• CanReg5 contains modules for:
  • data entry
  • quality control
  • basic analysis of the data

• Provides online help

• Currently beta version

Responsible Officer: Ervic Morten, CIN, IARC
RISK FACTOR SURVEILLANCE

• Major non communicable diseases have common risk factors
• Tobacco/Alcohol/Diet/
  Physical inactivity
• Measuring risk factors will help to understand the emerging epidemics
• Today’s risk factors are tomorrow’s diseases
• Risk factors can be kept under surveillance
Strategies for NCD risk factor surveillance

- Piggy back on existing surveys
  - National Family Health Survey,
  - National Sample Survey etc.
- Stand alone surveillance systems
SURVEILLANCE IS NOT JUST DATA COLLECTION!
Monitoring and Evaluation

- Availability and implementation of policies
- Programmatic indicators
- Surveillance—Risk factor profile—using WHO STEPwise approach
- Mortality and morbidity—selected sites
- Health expenditure
- Process indicators depending on the intervention
  - Programmes conducted
  - Policies and orders
  - Implementation
  - Number of healthy settings
Thank you very much for your attention

Contributor:

Dr Cherian Varghese (Technical Officer)