KDIGO - Controversies Conference
Chronic Kidney Disease as a Global Public Health Problem: Approaches and Initiatives
12-14 October, 2006

Classification, Surveillance and Public Policy for CKD
Global overview

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Sheffield Kidney Institute
UK
CKD as a Global Public Health Problem

Preventing CHRONIC DISEASES a vital investment

“The lives of far too many people in the world are being blighted and cut short by chronic diseases such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes.”

Lee Jong-Wook

Global Goal: +2% mortality reduction/year
CKD as a Global Public Health Problem

CHRONIC DISEASES DEATHS WORLDWIDE

Chronic diseases (NCD) vs. Communicable diseases

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Yach et al, 2004
Projected global deaths (58 million) by major cause 2005

30% CVD = 17,528,000 deaths

Yach et al, 2004
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Projected deaths by major cause and World Bank income group, all ages, 2005

4 billions
China
India
Brazil
Egypt
Global Goal: +2% mortality reduction/year
Albuminuric and CVD Risk

Hillege et al, 2002
CKD and CVD Risk

- HOORN Study, Henry et al, 2002
- Pooled Analysis, Weiner et al, 2004
CKD

All Cause Mortality

Fried et al, 2005
CKD as a Global Public Health Problem

- CKD
- eGFR<60
- Albuminuria
- CVD
- DM
- Cancer
- Infectious Disease

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1,000,000 death/year

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Projected global deaths (58 million) by major cause 2005

30% CVD = 17,528,000 deaths

Yach et al, 2004
WHO STEPwise Surveillance of Chronic Diseases

STEPS

The stepwise framework

1. PLANNING STEP 1
   Estimate population need and advocate for action

2. PLANNING STEP 2
   Formulate and adopt policy

3. PLANNING STEP 3
   Identify policy implementation steps

Policy implementation steps | Population-wide interventions | Interventions for individuals
-------------------------------|-------------------------------|-----------------------------
Implementation step 1
   CORE | Interventions that are feasible to implement with existing resources in the short term.
Implementation step 2
   EXPANDED | Interventions that are possible to implement with a realistically projected increase in, or reallocation of, resources in the medium term.
Implementation step 3
   DESIRABLE | Evidence-based interventions which are beyond the reach of existing resources.
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CKD Surveillance STEPS

- **DEFINE**
- **PREVENT**
- **DETECT**

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NKF-K/DOQI Definition of CKD
KDIGO Modifications (Amsterdam 2004)

Structural or functional abnormalities of the kidneys for ≥3 months, as manifested by either:

1. **Kidney damage**, with or without decreased GFR, as defined by
   - pathologic abnormalities
   - markers of kidney damage
     - urinary abnormalities (proteinuria)
     - blood abnormalities (renal tubular syndromes)
     - imaging abnormalities
   - kidney transplantation

2. **GFR <60 ml/min/1.73 m²**, with or without kidney damage
CKD Classification

Table 3. Current CKD Classification Based on Severity and Therapy

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>GFR (ml/min/1.73 m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kidney damage with normal or ↑ GFR</td>
<td>≥ 90</td>
</tr>
<tr>
<td>2</td>
<td>Kidney damage with mild ↓ GFR</td>
<td>60-89</td>
</tr>
<tr>
<td>3</td>
<td>Moderate ↓ GFR for transplant</td>
<td>30-59</td>
</tr>
<tr>
<td>4</td>
<td>Severe ↓ GFR</td>
<td>15-29</td>
</tr>
<tr>
<td>5</td>
<td>Kidney failure</td>
<td>&lt; 15 (or dialysis)</td>
</tr>
</tbody>
</table>

Levey et al, 2005
## Proposed Classification of CKD by Diagnosis

<table>
<thead>
<tr>
<th>Disease</th>
<th>CKD Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage</td>
</tr>
<tr>
<td></td>
<td>Marker of Kidney Damage</td>
</tr>
<tr>
<td></td>
<td>Disease (ICD Code list)</td>
</tr>
<tr>
<td><strong>Diabetic Kidney Disease</strong></td>
<td></td>
</tr>
<tr>
<td>Type 1</td>
<td>Same for all (585.x), V codes for dialysis or transplant</td>
</tr>
<tr>
<td>Type 2</td>
<td></td>
</tr>
<tr>
<td><strong>Non-Diabetic Kidney Disease</strong></td>
<td></td>
</tr>
<tr>
<td>Glomerular diseases</td>
<td>Hematuria +Proteinuria</td>
</tr>
<tr>
<td>Vascular diseases</td>
<td></td>
</tr>
<tr>
<td>Tubulointersitial Diseases</td>
<td></td>
</tr>
<tr>
<td>Cystic Diseases</td>
<td></td>
</tr>
<tr>
<td>Non-diabetic kidney disease not otherwise specified</td>
<td></td>
</tr>
<tr>
<td><strong>Transplant</strong></td>
<td></td>
</tr>
</tbody>
</table>
CKD Surveillance STEPS

DEFINE

DETECT

PREVENT

CKD as a Global Public Health Problem
CKD as a Global Public Health Problem
GLOBAL CKD Programmes

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Global CKD Detection Programmes

Approaches

• **Population studied:**
  – General, Health service, Targeted
  – Targeted high risk including minorities/ethnicities
  – Children, adults, elderly

• **Methods:**
  – Urine Dipstick
  – Albuminuria
  – sCreatinine
  – Formulated eGFR (CG & MDRD)
Global CKD Detection Programmes

Results

- **Albuminuria:** ~5-16%
- **Proteinuria:** ~0.6-4.5%
- **eGFR<60:** ~2.5-5%
- **eGFR<30:** ~0.3-4%
- **ESRD:** ~0.1-0.3%
Global CKD Detection Programmes

Issues

• Representativeness of sample? Variable
• Urine testing: Seldom repeated/confirmed
• **Albuminuria:**
  – Methodology: Calibration/Standardisation
  – Confounders: age, obesity, smoking, poverty, infections
  – Diagnostic: CKD/CVD?
  – Prognostic: CVD>CKD

• **Serum Creatinine:**
  – Variability: Biological and methodological
  – Methodology: Calibration/standardisation

• **eGFR Equations:**
  – Applicability: Healthy Population, elderly, ethnicities, obese, females
CKD as a Global Public Health Problem

CKD = 100,000,000
CKD Surveillance STEPS

PREVENT

DETECT

DEFINE
WHO Global InfoBase
Causes of Chronic Diseases

UNDERLYING SOCIOECONOMIC, CULTURAL, POLITICAL AND ENVIRONMENTAL DETERMINANTS
- Globalization
- Urbanization
- Population ageing

COMMON MODIFIABLE RISK FACTORS
- Unhealthy diet
- Physical inactivity
- Tobacco use

NON-MODIFIABLE RISK FACTORS
- Age
- Heredity

INTERMEDIATE RISK FACTORS
- Raised blood pressure
- Raised blood glucose
- Abnormal blood lipids
- Overweight/obesity

MAIN CHRONIC DISEASES
- Heart disease
- Stroke
- Cancer
- Chronic respiratory diseases
- Diabetes

CKD

CKD

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Global obesity

1.2 billion

CKDCVD

1.7 billion

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Global Diabetes (2000-2030)

World

Developed

Developing

<table>
<thead>
<tr>
<th>Year</th>
<th>CKD</th>
<th>CVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>154 m</td>
<td>55 m</td>
</tr>
<tr>
<td>2030</td>
<td>370 m</td>
<td>84 m</td>
</tr>
</tbody>
</table>

*In million subjects

WHO, March 2003

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Global Hypertension

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CKD
CVD

2000

Number of people with hypertension (millions)

116.1
40.6
60.4
60.4
35.9
38.4
972m

2025

147.9
44.0
107.3
102.1
72.2
68.3
1.56b

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Kearney et al, 2005
Global Smoking

1.3 billion smoker
Chronic Diseases and Health Promotion
annual death rate

- Raised blood pressure: 7.1 million
- Smoking: 4.9 million
- Raised cholesterol: 4.4 million
- Overweight and obesity: 2.6 million
- Fruit & vegetable intake: 2.7 million
- Physical inactivity: 1.7 million
- Diabetes: 1.2 million

WHO Global InfoBase
CKD as a Global Public Health Problem

Global Goal: +2% mortality reduction/year
Heart Disease Fall

-70%/last 3 decades
Polypill Reduction of CVD

Figure: Lifetime costs and QALYs of strategies assessed in six World Bank regions

~$300/QALY

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Gaziano et al, 2006
CKD-CVD Detection, Prevention & Treatment

Detection
High Risk Groups
DM/HT
CKD Relatives
Minorities
CVD
Infections
Aged
The poor

Prevention
Modifiable Factors
Lifestyle:
Diet and exercise
Smoking
Obesity
Hypertension
Diabetes
Poverty
Infection
Inflammation

Treatment
Modifiable factors
BP control
ACEi-ARBs
Proteinuria
Glycemia
Lipids
Smoking
Nephrotoxins

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Chronic Disease Outreach Program in Australia

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Hoy et al, 2003
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National Programmes

**SPOTLIGHT: CHINA’S NATIONAL STRATEGY FOR CHRONIC DISEASE CONTROL**

China’s Ministry of Health, with the support of WHO and the cooperation of relevant sectors, has been developing a national plan for chronic disease prevention and control, which focuses on cardiovascular diseases, cancer, chronic obstructive pulmonary disease, and diabetes. It is expected to be applicable to both the medium and long term, and include an action plan for 3–5 years. This follows an earlier Programme of Cancer Prevention and Control in China (2004–2010) developed by the Ministry of Health.

The national plan aims to reduce the overall level of risk factors, to improve early detection and treatment and to provide accessible and affordable health services. It includes the development of a national system of prevention and control, which will require comprehensive financing, multisectoral cooperation and the establishment of export committees at the national and local levels. It will also involve capacity building and the establishment of a national surveillance system, as well as periodic surveys of nutrition and health.

**SPOTLIGHT: THAIHEALTH**

The Thai Health Promotion Foundation (ThaiHealth) was established in 2001 as a statutory, independent public organization, following the success of Thailand’s nationwide anti-smoking movement, funding of approximately USD 50 million per year comes from a 2% excise tax on alcohol and cigarettes. ThaiHealth advocates and supports civil society groups, and with the support from a series of studies managed by the Health System Research Institute, the Government and the Ministry of Health, a new model has been established to enhance the healthy lifestyles.

**SPOTLIGHT: INDONESIA’S NATIONAL POLICY DEVELOPMENT**

For many years the scale of the chronic disease problem in Indonesia had been concealed by a lack of reliable information. Prevention and control activities were scattered, fragmented and lacking coordination. Periodic household surveys have revealed that the proportion of deaths from chronic diseases doubled between 1980 and 2010 (from 25% to 49%). The economic implications and the pressing need to establish an integrated prevention platform at national, district and community levels became clear.

In 2001, inspired by the WHO Global Strategy on the Prevention and Control of Non-communicable Diseases, Indonesia’s Ministry of Health initiated a broad consultative process that resulted in a national consensus on chronic disease policy and strategy. A collaborative network for chronic disease surveillance, prevention and control was established, involving health programmes.

**SPOTLIGHT: REDUCING SALT INTAKE IN THE UNITED KINGDOM**

In November 2003 a “Salt Summit” in the UK brought together governmental health ministers, the Chief Medical Officer, the chair of the Food Standards Agency, food retailers, producers, caterers, and health and consumer groups to discuss plans to reduce salt in food. The government’s target of reducing salt consumption in the population from 9.6 g per person per day by 2010.

**SPOTLIGHT: PROMOTING FRUIT AND VEGETABLE INTAKE IN ENGLAND**

Current average consumption of fruit and vegetables in the United Kingdom is around three portions per day. The 5 A DAY Programme aims to increase this to the recommended daily level of around five portions, thereby contributing to the achievement of national targets on reducing mortality rates from cardiovascular disease and cancer, halving the year-on-year rise in obesity by 2010, and reducing inequalities in life expectancy.

The programme consists of several areas of work undertaken by an evaluation and monitoring programme. The 5 A DAY communications programme provides information and advice for consumers through television and radio advertising, leaflets, posters, health checks, web sites and magazines, products and articles, and a 5 A DAY logo has been developed. Local and national partners include industry, government departments and other agencies. The School Fruit and Vegetables Scheme has led to nearly 2 million children accepting four or more portions of fruit or vegetable each school day. A survey in October 2003 found that over a quarter of children and their families reported that they were eating more fruit at home after attending the scheme, including in lower socioeconomic groups. Research from December 2004 indicated that 21% of people claimed to have eaten “a lot more” or “a little more” fruit and vegetables over the previous 12 months. There was a 10% year-on-year increase in awareness of the 5 A DAY message from 42% in October 2000 to 52% in October 2004.
CKD Programmes

US Healthy People 2010

- NKF-Kidney Early Evaluation Program (KEEP)
- National Kidney Disease Education Program (NKDEP)
- NIH-NIDDK Chronic Renal Insufficiency Cohort Study (CRIC)
- CDC: “CKD A public health problem that needs public health action”

Latin America Nephrology Associations

- The “Sustainable and Tenable Renal Health Model”
Chronic Disease Prevention Programmes
Regional Networks

- **CARMEN:** Americas

- **CINDI:** EU
  “Countrywide Integrated NCD Intervention Programme”

- **EMAN:** Eastern Mediterranean
- **SEANET:** South East Asia
- **NANDI:** African Region
- **MOANA:** Western Pacific
  “Mobilization of Allies in Noncommunicable Disease”

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Partnerships

NGOs

Government

Implementation

PCP

Nephrologist

Patients

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Awareness

WORLD HEART DAY AND WORLD DIABETES DAY
One of the ways in which non-governmental organizations draw attention to issues is by means of annual health days. The World Heart Federation, for example, initiated the World Heart Day programme in the year 2000 to increase awareness of cardiovascular disease prevention and treatment. The day is now recognized by WHO and other major organizations. Similar to World Heart Day is World Diabetes Day annually on 14 November. The day is marked worldwide by the 185 member associations of the Federation in more than 145 countries, as well as by other associations and organizations, healthcare professionals, and individuals with an interest in diabetes. The Federation produces a variety of support materials for its member associations which in turn distribute them to people with diabetes and their families, the general public, health-care professionals, and the media, as well as to local and national decision-makers.

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Chronic Disease Surveillance Programmes

CKD

CVD

DM

smoking

Obesity
Think CKD

“...too many people in the world are being blighted and cut short by chronic diseases such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes.”
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CKDDCVD