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Helpdesk Report: Non Communicable Diseases

Date: 13 April 2011

Query: Please find some information on:

Burden: Graph showing the burden of NCDs in Asia and Africa including trends projected into the future. Perhaps useful to have a comparator, say with Europe.

Age structure: Are NCDs a disease of the elderly? What is the evidence that NCDs affect people at younger ages in the developing countries?

Links with poverty: Poverty and NCD links both as a cause and consequence. A few specific examples/evidence from countries is useful along with references. Examples from South Asia and sub-Saharan Africa will be most useful.

Extent of links of NCDs with MDGs: with particular emphasis on the health of women and children i.e. MDG 4, 5 and 8.

Links with urbanisation

Content

1. Overview

Burden

Evolution of NCDs in developing countries:

- Caused 18.7 million deaths in 1990 (47% of all deaths)
- Caused 25 million deaths in 2000 (56% of all deaths)
- Estimated 36.6 million deaths in 2020 (69% of all deaths)

By 2050, cancer burden in developing countries could reach 17 million cases (out of 24 million worldwide). Between 2000 and 2020, the total number of cases of cancer in the developed world is predicted to increase by 29 percent whereas, in developing countries an increase by 73 percent is expected.

Number of cancer deaths by region, 2001:

- South Asia – 853,000
- Sub-Saharan Africa – 410,000
- East Asia and the Pacific – 2,142,000
- Europe and Central Asia – 826,000
- Latin America and the Caribbean – 485,000
- Middle East and North Africa – 167,000

Diabetes prevalence:

- In 2003 the developing world accounted for 141 million people with diabetes (72.5 percent of the world total).
- The number of people with diabetes is expected to double by 2025 in the Middle East and North Africa, South Asia, and Sub-Saharan Africa.

Cardiovascular disease (CVD):

- The leading cause of death in all regions except Sub-Saharan Africa.
- In Sub-Saharan Africa, deaths attributable to CVD are projected to more than double between the years 1990 and 2020.
- The World Health Organisation estimates that, by 2010, 60 percent of the worlds cardiac patients will be in India.
- China CVD rates are higher than 35 percent and dominated by stroke.

Age Structure

- Although HIV/AIDS is the leading overall cause of death in Sub-Saharan Africa, CVD is the second leading killer and is the first among those over the age of 30.
- A study in Cape Town showed that NCDs accounted for large numbers of deaths in those over the age of 40.
- A study in India found NCD risk factors increased with age.
- Estimates from Sub-Saharan Africa and Bangladesh show that deaths from cardiovascular disease increase significantly after 45 years of age.

Links with poverty

The major NCDs, diabetes, cardiovascular diseases, cancers and chronic obstructive pulmonary disease (COPD), have common risk factors such as smoking, unhealthy diet, alcohol consumption and low levels of physical activity. These risk factors are high among poor people and poor nations.

The poor have the worst outcomes from NCDs. More severe outcomes for the poor from NCDs are not only caused by greater risk behaviours and increased incidence of disease, but also from their inability to access or afford preventative services and treatment.

Diabetes and the other NCDs are increasingly diseases of poverty, and in countries where universal healthcare coverage does not exist, the cost of medications, healthcare and foregone income resulting from NCDs can plunge households into a vicious cycle of transgenerational hardship and loss of life chances.

Links with MDGs

MDG 4 and 5, Maternal and Child Health (WHO, 2009):

- Gestational diabetes is associated with adverse outcomes in pregnancy, with later development of diabetes, and with foetal programming for later chronic disease.
- Tobacco use in women, and under-nutrition in pregnant women due to household spending on tobacco, leads to miscarriage, still birth, and premature and low birth weight babies who are less likely to survive and are more prone to illness.

- Mothers who smoke are likely to breastfeed for shorter period of time and have lower quantities and less nutritious milk.
- Exposure to second hand tobacco smoke increases the risks of childhood respiratory infections (one of the largest causes of death in very poorest children), sudden infant death and asthma.
- NCDs in women, such as chronic respiratory disease, heart disease and stroke, weaken their capacity to cope with pregnancy and to care for children.
- Smoking also increases the risk of dying from pregnancy related haemorrhage.
- Obesity in pregnancy is similarly associated with complications for both mother and infant, ranging from increased risks of infertility, hypertensive disorders, gestational diabetes mellitus, obstructed labour, intrauterine foetal death and stillbirth.

A blog by Leith Greenslade, of the GAVI Alliance Immunize Every Child, states that pneumonia is the number one killer of children. Fighting pneumonia, therefore, is key to MDG 4 because there is proven cost-effective interventions to treat pneumonia.

Links with urbanisation

- A study in India finds a relationship between urbanicity and NCD risk factors. Among men, urbanicity was positively associated with smoking, BMI, blood pressure and low physical activity; among women, urbanicity was associated with low physical activity and BMI.
- Epidemiological studies in India have shown that in rural adults, the prevalence of coronary heart disease is lower (3–5%) than in urban adults (7–10%).
- Rapid urbanisation in South Africa has been accompanied by large shifts in health patterns and increased the prevalence of NCDs.
- Studies have shown that urbanisation leads to dietary changes towards adoption of the so-called 'Western diet', which is high in animal proteins, fat and sugar. This is often accompanied by lifestyle changes including alcohol consumption, cigarette smoking and physical inactivity, increasing the population's risk for non-communicable diseases.

2. Burden

Non-Communicable Diseases
World Bank, 2006
http://files.dcp2.org/pdf/expressbooks/noncomm.pdf

Cancer

Figures 29.1 and 29.2 of this report show a graphical representation of the number of different cancer cases in both developed and developing regions.

In developing countries, the top five female cancers in rank order of incidence are breast, cervical, stomach, lung, and colorectal cancer; however, cervical cancer still accounts for more deaths than breast cancer in developing countries. The top five male cancers are lung, stomach, liver, esophageal, and colorectal cancer. The incidence of cancers of the lung and breast is relatively high in both developed and developing countries. Colorectal cancer accounts for a smaller share of the burden in developing countries than in developed countries, but cancer of the stomach accounts for a higher share.

Some cancers that are more common in developing than in developed countries, including stomach, liver, and cervical cancer, are related to the absence of a well-developed public health infrastructure for the control of cancer-causing infectious agents and contaminants, the

lack of basic preventive health care and screening services for much of the population, and the poor-quality diets available to the most economically disadvantaged members of society in many developing countries. Cancer of the esophagus, also relatively common in developing countries, may reflect, in part, the consumption of traditional beverages at extremely high temperatures. Some cancers that are increasingly common in developing countries, including lung, breast, and colorectal cancer, may reflect the increasing Westernisation of lifestyles, longer life expectancy, and globalisation of markets for tobacco products.

Table 29.1 shows estimated cancer deaths and the estimated disease burden in terms of disability-adjusted life years (DALYs) lost as a result of various types of cancers in developing and developed countries and by region in 2001. Considerable heterogeneity in the pattern of cancer burden across the six regions is apparent, and additional heterogeneity is apparent within these regions. Deaths from liver cancer are relatively high in East Asia and the Pacific and in Sub-Saharan Africa, probably because of the high prevalence of chronic HBV infection and the lack of adequate resources for food storage and preservation in those regions (Parkin and others 2003). The number of deaths from colorectal and breast cancer, as a proportion of all cancer deaths, is relatively high in Europe and Central Asia and in Latin America and the Caribbean, probably because those regions have increasingly adopted more Western lifestyle patterns of reproductive behaviour, diet, and physical activity. The number of deaths from oral cancer is particularly high in South Asia, where the use of betel quid is common.

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By 2050 cancer burden in developing countries could reach 17 million cases (out of 24 million worldwide).

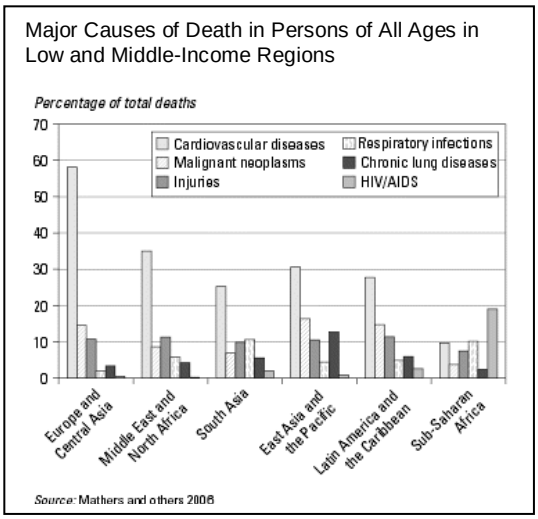
Diabetes

In 2003, the worldwide prevalence of diabetes was estimated at 5.1 percent among people age 20 to 79. The prevalence of diabetes was higher in developed countries than in developing countries. The prevalence was highest in Europe and Central Asia and lowest in Sub-Saharan Africa. Some of these variations may reflect differences in the age structures and level of urbanisation of the various populations. By 2025, the worldwide prevalence is projected to be 6.3 percent, a 24 percent increase compared with 2003. The largest increase in prevalence by 2025 is expected to be in East Asia and the Pacific, and the smallest in Sub-Saharan Africa. In terms of those affected, the biggest increase in the developing countries is projected to take place among adults of working age.

In 2003, 194 million people worldwide ages 20 to 79 had diabetes, and by 2025, this number is projected to increase to 333 million, a 72 percent increase. The developing world accounted for 141 million people with diabetes (72.5 percent of the world total) in 2003. During the same period, the number of people with diabetes is projected to double in three of the six developing regions: the Middle East and North Africa, South Asia, and Sub-Saharan Africa.

Cardiovascular disease (CVD)

CVD is the leading cause of death in all regions with the exception of Sub-Saharan Africa, where HIV/AIDS has emerged as the leading cause of mortality. Between 1990 and 2020, ischemic heart disease (IHD) is anticipated to increase by 120 percent for women and 137 percent for men in developing countries, compared with age-related increases of 30 to 60 percent in developed countries.



In Sub-Saharan Africa, deaths attributable to CVD are projected to more than double in between the years 1990 and 2020. Although HIV/AIDS is the leading overall cause of death in this region, CVD is the second-leading killer and is the first among those over the age of 30. Stroke is the dominant form, in keeping with patterns characteristic of earlier phases of the epidemiological transition. With increasing urbanisation, levels of average daily physical activity are falling and smoking rates are increasing. Hypertension has emerged as a major public health concern, and hypertensive disease accounts for the dominance of stroke. Rheumatic heart disease (RHD) and cardiomyopathies, the latter caused mostly by malnutrition, various viral illnesses, and parasitic organisms, are also important causes of CVD mortality and morbidity.

India is experiencing an alarming increase in heart disease, which seems to be linked to changes in lifestyle and diet, rapid urbanisation, and possibly an underlying genetic component. The World Health Organization estimates that, by 2010, 60 percent of the world's cardiac patients will be in India. About 50 percent of CVD-related deaths occur among people younger than 70, compared with about 22 percent in the West. Between 2000 and 2030, about 35 percent of all CVD deaths in India will occur among those age 35 to 64, compared with only 12 percent in the United States and 22 percent in China.

China CVD rates are higher than 35 percent and dominated by stroke.

The Burden of Non Communicable Diseases in Developing Countries
Boutayeb, A., *International Journal for Equity and Health*, 4(2), 2005
http://www.equityhealthj.com/content/4/1/2

Evolution of NCDs in developing countries:

- Caused 18.7 million deaths in 1990 (47% of all deaths)
- 25 million in 2000 (56% of all deaths)
- Estimated 36.6 million in 2020 (69% of all deaths)

According the World Health Organization's statistics, chronic NCDs such CVDs, diabetes, cancers, obesity and respiratory diseases, account for about 60% of the 56.5 million deaths each year and almost half of the global burden of disease. In 1990, 47% of all mortality related to NCDs was in developing countries, as was 85% of the global burden of disease and 86% of the disability adjusted life-years (DALYs) attributable to CVDs. An increasing burden will be born mostly by these countries in the next two decades. The socio-economic transition and the ageing trend of population in developing countries will induce further demands and exacerbate the burden of NCDs in these countries. If the present trend is maintained, it is predicted that, by 2020, NCDs will account for about 70 percent of the global burden of disease, causing seven out of every 10 deaths in developing countries, compared with less than half today.

In 1990, approximately 1.3 billion DALYs were lost as a result of new cases of disease and injury, with the major part in developing countries. In 2002, these countries supported 80% of the global years of life lived with disability (YLDs) due to the double burden of communicable and non communicable diseases. Consequently, their people are not only facing higher risk of premature life (lower life expectancy) but also living a higher part of their life in poor health. These remarks indicate that NCDs are exacerbating health inequities existing between developed and developing countries and also making the gap more profound between rich and poor within low and middle-income countries.

By the year 2010 CVDs will be the leading cause of death in developing countries as a consequence of lifestyle changes brought about by industrialisation and urbanisation in developing countries engaged in the socio-economic transition.

Diabetes prevalence (millions)

Country	**2000**	**2030 (projected)**
India	31.7	79.4
China	20.8	42.3
US	17.7	30.3
Indonesia	8.4	21.3
Japan	6.7	14.9
Pakistan	5.2	11.8
Russia	4.6	11.3
Brazil	4.5	8.9
Italy	4.2	5.4
Bangladesh	3.2	5.3

Cancer in developing countries in 2000 (in 000's)

Cancer	**Incidence**	**Deaths**
Total	5376	3563
Breast	471	184
Colorectal	334	252
Stomach	543	417
Liver	457	443
Prostate	127	76
Cervical	379	194
Oesophagus	341	274
Head and neck	262	154
Bladder	124	65
Other	1546	992
Lung	792	522

Between 2000 and 2020, the total number of cases of cancer in the developed world is predicted to increase by 29% whereas, in developing countries an increase by 73% is

expected (largely as a result of an increase in the number of old people and as a result of urbanisation and change in dietary habits).

The incidence of cancers of the lung, colon and rectum, breast and prostate generally increases in parallel with economic development, while the incidence of stomach cancer usually declines with development.

Most developing countries have no standard protocols for assessing and managing chronic non communicable respiratory diseases such as Chronic Obstructive Pulmonary Disease (COPD) and Asthma.

The Burden and Costs of Chronic Diseases in Low-income and Middle-Income Countries
Abegunde., D. O. et al., *The Lancet*, 370, Issue 9603, 2007
http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2807%2961696-1/fulltext

This paper estimates the disease burden and loss of economic output associated with chronic diseases—mainly cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes—in 23 selected countries which account for around 80% of the total burden of chronic disease mortality in developing countries. In these 23 selected low-income and middle-income countries, chronic diseases were responsible for 50% of the total disease burden in 2005. For 15 of the selected countries where death registration data are available, the estimated age-standardised death rates for chronic diseases in 2005 were 54% higher for men and 86% higher for women than those for men and women in high-income countries. If nothing is done to reduce the risk of chronic diseases, an estimated US$84 billion of economic production will be lost from heart disease, stroke, and diabetes alone in these 23 countries between 2006 and 2015. Achievement of a global goal for chronic disease prevention and control—an additional 2% yearly reduction in chronic disease death rates over the next 10 years—would avert 24 million deaths in these countries, and would save an estimated US$8 billion, which is almost 10% of the projected loss in national income over the next 10 years.

Burden of non-communicable diseases in South Asia
Ghaffar, A., Srinath Reddy, K. & Singhi, M., *BMJ*, 328, 2004
http://www.whoindia.org/LinkFiles/HSD_Resources_Burden_of_Non-Communicable_Diseases_in_South_Asia.pdf

Validated nationally representative estimates of cause specific mortality are not available for any country in South Asia. In India, for example, deaths are registered as a part of “medical certification of cause of death” (registration of hospital deaths) and “survey of cause of death” (a rural based registry). Other countries in the region provide mostly hospital based mortality data for assignment of cause of death. Population based estimates of mortality from non-communicable diseases are therefore difficult to produce: the urban data are based on inadequate death certification, and the rural data are limited by the inaccuracies in record keeping and partial coverage of health information systems.

Deaths from non communicable diseases in 2000 (as a percentage of all deaths)

	India	**Sri Lanka**	**Sub-Saharan Africa**	**China**
CDV	31.7	20.1	11.2	32.1
Diabetes	1.1	1.5	0.3	0.6
Cancer	7.4	5.6	6.2	20.5
COPD and asthma	2.5	1.6	1.9	17.8

The report includes more data on specific illnesses in the different countries.

Monitoring and surveillance of chronic non-communicable diseases: progress and capacity in high-burden countries
Alwan, A., et al, *The Lancet*, 2010
http://bit.ly/h51gjq

Although reliable data for cause-specific mortality are scarce, non-communicable diseases were estimated to be responsible for 23·4 million (or 64% of the total) deaths in the 23 low- and middle-income countries analysed in this study, with 47% occurring in people who were younger than 70 years. Tobacco use and being overweight are common in most of the countries and populations examined, but coverage of cost-effective interventions to reduce these risk factors is low.

The Rise of Chronic Non-Communicable Diseases in Southeast Asia: Time for Action
Dans, A. et al., *The Lancet*, 377, issue 9766, 2011
http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2810%2961506-1/fulltext

Southeast Asia faces an epidemic of chronic non-communicable diseases, now responsible for 60% of deaths in the region. The problem stems from environmental factors that promote tobacco use, unhealthy diet, and inadequate physical activity. Disadvantaged populations are the hardest hit, with death rates inversely proportional to a country's gross national income. Families shoulder the financial burden, but entire economies suffer as well. Although attempts to control non-communicable diseases are increasing, more needs to be done. Health-care systems need to be redesigned to deliver chronic care that is founded on existing primary health-care facilities, but supported by good referral systems.

Priority Actions for the Non-communicable Disease Crisis
Beaglehole, R., *The Lancet*, 2011
http://www.oecd.org/dataoecd/15/9/47531330.pdf

The UN High-Level Meeting on Non-Communicable Diseases (NCDs) in September, 2011, is an unprecedented opportunity to create a sustained global movement against premature death and preventable morbidity and disability from NCDs, mainly heart disease, stroke, cancer, diabetes, and chronic respiratory disease. The increasing global crisis in NCDs is a barrier to development goals including poverty reduction, health equity, economic stability, and human security. *The Lancet* NCD Action Group and the NCD Alliance propose five overarching priority actions for the response to the crisis—leadership, prevention, treatment, international cooperation, and monitoring and accountability—and the delivery of five priority interventions—tobacco control, salt reduction, improved diets and physical activity, reduction in hazardous alcohol intake, and essential drugs and technologies. The priority interventions were chosen for their health effects, cost-effectiveness, low costs of implementation, and political and financial feasibility. The most urgent and immediate priority is tobacco control. The report propose as a goal for 2040, a world essentially free from tobacco where less than 5% of people use tobacco. Implementation of the priority interventions, at an estimated global commitment of about US$9 billion per year, will bring enormous benefits to social and economic development and to the health sector. If widely adopted, these interventions will achieve the global goal of reducing NCD death rates by 2% per year, averting tens of millions of premature deaths in this decade.

Facts on the increasing burden of non-communicable diseases (NCDs):

- Two of three deaths each year are attributable to NCDs. Four-fifths of these deaths are in low-income and middle-income countries, and a third are in people younger than 60 years.

- Overall, age-specific NCD death rates are nearly two-times higher in low-income and middle-income countries than in high-income countries.
- NCDs often cause slow and painful deaths after prolonged periods of disability.
- In all regions of the world, total numbers of NCD deaths are rising because of population ageing and the globalisation of risks, particularly tobacco use.
- In addition to the longstanding challenges of curtailing infectious disease, this double burden of disease places enormous strains on resource-deficient health systems.

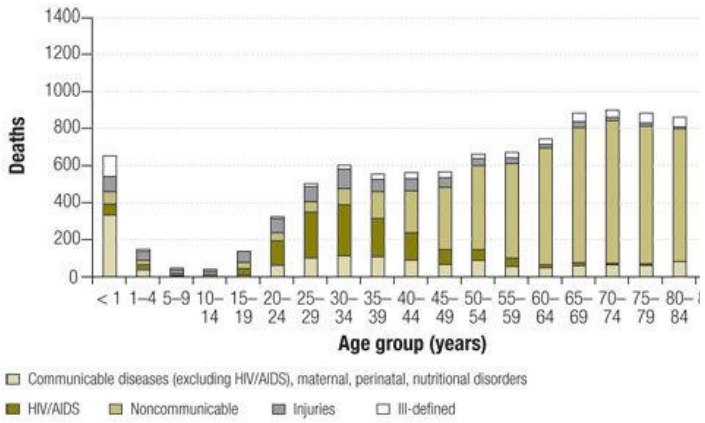
Figure 1, in the report, represents associations between poverty, non-communicable diseases (NCDs), and development goals.

3. Age structure

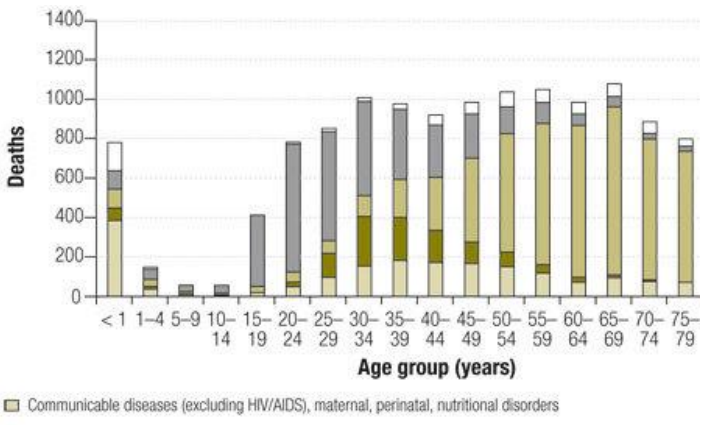
Local-level Mortality Surveillance in Resource-limited Settings: a Case Study of Cape Town Highlights Disparities in Health
Groenewald, P. et al., *Bulletin of the WHO*, 2010
http://www.who.int/bulletin/volumes/88/6/09-069435/en/

Data showed that non communicable diseases accounted for large numbers of deaths over the age of 40 years.

Age distribution of female deaths (n = 11 132) by cause and age group, Cape Town, South Africa, 2006



Age distribution of male deaths (*n* = 14 119) by cause and age group, Cape Town, South Africa, 2006



The report also found non communicable diseases are more prevalent among the urban poor.

Sociodemographic Patterning of Non-communicable Disease Risk Factors in Rural India: a Cross Sectional Study
Kinra, S. et al., *BMJ*, 41, 2010
http://www.bmj.com/content/341/bmj.c4974.full

Risk factor outcome measures taken were:

- prevalence of tobacco use
- alcohol use
- low fruit and vegetable intake
- low physical activity
- obesity
- central adiposity
- hypertension
- dyslipidaemia (lipids in the blood)
- diabetes
- underweight

Results found that prevalence of most risk factors increased with age. The report includes a table of the distribution of risk factors for non-communicable diseases in rural participants of the Indian Migration Study by age and sex.

Results found that different risk factors were positively associated with different socio-economic groups. Tobacco and alcohol use, low fruit and vegetable intake and low body weight were more common in the lower socio-economic group. Obesity, dyslipidaemia, diabetes and hypertension were more prevalent in the higher socioeconomic groups.

Cause-specific Mortality Rates in Sub-Saharan Africa and Bangladesh
Adjuik, M. et al., *Bulletin of the WHO*, 84, 2006
http://www.scielosp.org/pdf/bwho/v84n3/v84n3a12.pdf

Figure 3 in this report shows cause-specific mortality by age for non communicable diseases in sub-Saharan Africa and Bangladesh (1999–2003). It shows deaths from cardiovascular diseases increase significantly after 45 years of age. The report suggests that in most of the African sites, NCDs are more important when the rates are age-standardised, indicating that a major reason for the low proportions of deaths due to chronic diseases in these populations is the young average age and the low proportion of adults.

Figure 4 shows mortality by broad disease group in sub-Saharan Africa and Bangladesh (1999–2003).

4. Links with poverty

Noncommunicable Disease and Poverty. The Need for Pro-poor Strategies in the Western Pacific Region. A Review
WHO Western Pacific Region, 2006
http://www.wpro.who.int/NR/rdonlyres/1FC8050D-36F2-40D4-88A4-45E819EEF0FB/0/poverty_ncd.pdf

The major NCDs, diabetes, cardiovascular diseases, cancers and chronic obstructive pulmonary disease (COPD), have common risk factors such as smoking, unhealthy diet, alcohol consumption and low levels of physical activity. These risk factors are high among poor people and poor nations. In the Western Pacific Region, all major risk factors for NCDs are increasing. Smoking is widespread in the Western Pacific, especially among the poor. As a result, NCDs are expected to rise sharply among vulnerable populations such as older people and those of low socioeconomic status. Due to common risk factors, the upward trend in NCDs can be mitigated by deploying effective prevention programmes which incorporate multi-level, multi-sectoral and community-based strategies. Interventions focused on risk factors and their environmental, economic, social and behavioural determinants are crucial. There is a strong link between low education levels and high rates of non communicable disease in both developed and developing nations. Improving social capacity in education has a significant positive impact on reducing NCDs.

The poor have the worst outcomes from NCDs. In developing nations, deaths from NCDs are highest among economically productive age groups. More severe outcomes for the poor from NCDs are not only caused by greater risk behaviours and increased incidence of disease, but also from their inability to access or afford preventative services and treatment. Late diagnoses due to a delay in seeking care means more chronic illness and complications. Poor people may also receive inferior services and be subject to discrimination from care providers. In developing countries, more accessible healthcare for the poor improves equity. NCDs prevention, education programmes and affordable treatment initiatives are an appropriate priority for the World Health Organization (WHO), development agencies, and national and local health service providers.

The economic impact of ill-health on low-income households can be substantial, creating a vicious cycle which forces people deeper into poverty and more illness. Reducing reliance on out-of-pocket payments for health care can lessen the impact of these diseases on the poor. Targeting NCD interventions on the poor leads to a more efficient health sector by improving the well-being of the group with the greatest burden of disease and mortality. From an economic perspective, providing higher quality health care for the poor increases their productivity and income, thereby assisting national development. Successful prevention programmes for the poor also reduce costly hospital admissions and the demand for acute care.

The assumption that NCDs are diseases of affluence has inhibited effective planning for, and servicing of, the growing incidence of NCDs among the poor in the Western Pacific Region. The issues are clear: incidence and prevalence of NCDs are increasing rapidly and the poor bear a disproportionate burden. What is now urgently needed are policies, mechanisms and budget allocations to address this growing pandemic.

Table 8 in this report is particularly useful and shows evidence on relationships between poverty and NCDs.

Non-communicable Diseases: Still No Sense of Urgency
Keeling, A., *HealthG20.com*
http://healthg20.com/wp-content/uploads/2010/11/40-45-Keeling_2010.pdf

This is an opinion piece from the CEO of the International Diabetes Federation.

Diabetes and the other NCDs are increasingly diseases of poverty, and in countries where universal healthcare coverage does not exist, the cost of medications, healthcare and foregone income resulting from NCDs can plunge households into a vicious cycle of transgenerational hardship and loss of life chances. Poor and irregular nutrition are consequences of poverty, and both are fuelling the global diabetes epidemic. An increasing

body of evidence shows that under-nutrition during pregnancy increases the risk of the infant developing chronic conditions such as diabetes later in life. The intrauterine environment plays a highly significant role in determining the long-term health prospects of the foetus. With twice as many women suffering from malnutrition than men, and in regions such as South Asia 60% of women are underweight, the under-nutrition of girls and women stands to fuel already alarming levels of diabetes through an intergenerational transmission of chronic disease.

This document also discusses the link between NCDs and the MDGs.

5. Links with the MDGs

Noncommunicable Diseases, Poverty and the Development Agenda
WHO, ECOSOC High-level Segment 2009
http://www.who.int/nmh/publications/discussion_paper_ncd_en.pdf

The implications of NCDs for MDG 1, eradication of extreme poverty and hunger:

- The NCD epidemic is growing faster in poor countries.
- Poor, rural populations with NCD are doubly disadvantaged.
- Tobacco and poverty form a vicious circle.
- The costs of NCD create a poverty trap.
- The NCD epidemic threatens to overwhelm health systems.
- The NCD epidemic slows economic growth.

Links with MDG 2, Education:

- Greater tobacco control would increase available household spending reducing the need for child labour and allowing money to be spent on schooling. This could improve results for Universal Primary Education.

MDG 4 and 5, Maternal and Child Health:

- Gestational diabetes is associated with adverse outcomes in pregnancy, with later development of diabetes, and with foetal programming for later chronic disease.
- Tobacco use in women, and under-nutrition, in pregnant women due to household spending on tobacco, leads to miscarriage, still birth, and premature and low birth weight babies who are less likely to survive and are more prone to illness.
- Mothers who smoke are likely to breastfeed for shorter period of time and have lower quantities and less nutritious milk.
- Exposure to second hand tobacco smoke increases the risks of childhood respiratory infections (one of the largest causes of death in very poorest children) sudden infant death and asthma.
- NCDs in women, such as chronic respiratory disease, heart disease and stroke, weaken their capacity to cope with pregnancy and care of children.
- Smoking also increases the risk of dying from pregnancy related haemorrhage.
- Obesity in pregnancy is similarly associated with complications for both mother and infant, ranging from increased risks of infertility, hypertensive disorders, gestational diabetes mellitus, obstructed labour, intrauterine foetal death and stillbirth.

MDG 6, Tuberculosis:

- Part of the scaling up in tuberculosis control must account for the intimate link with NCD.
- Malnutrition, smoking, diabetes, alcohol abuse, and indoor air pollution, all impair the host immune defence against TB.

MDG 6, HIV/AIDS:

- Anti-retroviral therapy increases the risk of people with HIV getting cardiovascular disease, with alteration of fat distribution and other metabolic changes.
- The link between HIV and cancer is well established. HIV-infected patients are at higher risk of developing cancerous malignancies.

MDG 7, Environmental Stability:

- Land cleared for tobacco production accounts for 5% of deforestation in developing countries. It also involves pesticide use which causes environmental degradation.
- There is an overlap between climate change and the burden of respiratory disease.
- Improved stoves are highly cost effective for both reducing greenhouse gas emissions and improving health.
- Link between transport emissions affecting health and the environment.

MDG 8, Global Partnership:

- Access to medicine issues.

Drivers of Inequality in Millennium Development Goal Progress: A Statistical Analysis
Stuckler, D., Basu, S., McKee, M. *PLoS Medicine*, 7(3), 2010
http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000241

Unequal progress in health MDGs in low-income countries appears significantly related to burdens of HIV and NCDs in a population, after correcting for potentially confounding socioeconomic, disease burden, political, and health system variables. The common separation between NCDs, child mortality, and infectious syndromes among development programmes may obscure interrelationships of illness affecting those living in poor households—whether economic (e.g., as money spent on tobacco is lost from child health expenditures) or biological (e.g., as diabetes or HIV enhance the risk of tuberculosis).

Non-communicable Diseases and Achieving the Millennium Development Goals
Sen. A., *UNESCAP*
http://www.unescap.org/esid/hds/issues/NCD-MDG.pdf

This document makes some points on NCDs and the link with MDGS and links to poverty. It also discusses the impact of NCDs on health systems and ways of moving forward.
Fighting Pneumonia the Key to Achieving MDG4
http://blog4globalhealth.wordpress.com/2009/11/02/fighting-pneumonia-the-key-to-achieving-mdg4/

This is a blog by Leith Greenslade, Director on the Board of GAVI Alliance Immunize Every Child.

Pneumonia is the No. 1 killer of children, killing some 2 million children under age 5 every year. Fighting pneumonia is the key to MDG 4 because there is proven cost-effective interventions to prevent and treat pneumonia. If efforts to get them to the world's poorest children can be accelerated, millions of child deaths could be averted.

6. Links with urbanisation

Level of Urbanization and Noncommunicable Disease Risk Factors in Tamil Nadu, India
Allender, S. et al. *WHO Bulletin*, 88, 2010
http://www.who.int/bulletin/volumes/88/4/09-065847/en/

The hypothesis that a relationship exists between urbanicity and NCD risk factors has been supported by the findings of this study. Among men, urbanicity was positively associated with smoking, BMI, blood pressure and low physical activity; among women, urbanicity was associated with low physical activity and BMI.

Data from a range of countries have shown differences in health in urban and rural areas. Several studies in India have demonstrated a higher prevalence of NCD risk factors in urban than in rural areas. Epidemiological studies have shown that in rural adults, the prevalence of coronary heart disease is lower (3–5%) than in urban adults (7–10%). However, this relationship is not straightforward and there is no universally accepted definition of urban, urbanisation or urbanicity and therefore no definitive measure. This study has demonstrated that it is possible to construct and apply a quantitative measure of the urban environment which allows for a more refined examination of the relationship between urbanicity and risk factors for NCD. It identified significant variation in the urbanicity of areas classified as rural by the Census of India. These differences in urbanicity are associated with an increase in prevalence of several common modifiable risk factors for NCDs.

The Emergence of Cardiovascular Disease During Urbanisation of Africans
Vorster, H.H., *Public Health Nutrition*, 5(1A), 2002
http://www.cpc.unc.edu/projects/nutrans/research/bellagio/papers/PHNVorsterCVD-SAfrica.pdf

The mortality rates from CVD confirmed that stroke is a major public health problem amongst black South Africans, possibly because of an increase in hypertension, obesity, smoking habit and hyperfibrinogenaemia during various stages of urbanisation. The available data further suggest that black South Africans may be protected against IHD because of favourable serum lipid profiles (low cholesterol and high ratios of high-density lipoprotein cholesterol) and low homocysteine values. However, increases in total fat and animal protein intake of affluent black South Africans, who can afford Western diets, are associated with increases in body mass indices of men and women and in total serum cholesterol. These exposures may increase IHD risk in the future.

Chronic Non-Communicable Diseases
Puoane, T. et al., *Health Systems Trust*, 2008
http://www.hst.org.za/uploads/files/chap5_08.pdf
In South Africa it is estimated that 56% of the population now live in urban centres, with the urbanisation of the Black population increasing rapidly. This rapid urbanisation, in the context of globalisation, has been accompanied by large shifts in the health patterns of South Africans, thus increasing the prevalence of non-communicable diseases.

Studies have shown that urbanisation leads to dietary changes towards adoption of the so-called 'Western diet', which is high in animal proteins, fat and sugar. This is often accompanied by lifestyle changes including alcohol consumption, cigarette smoking and physical inactivity, increasing the population's risk for non-communicable diseases.

An Exploration into the Determinants of Noncommunicable Diseases Among Rural-to-Urban Migrants in Periurban South Africa
Stern, R., Puoane, T. & Tsolekile, L., *Preventing Chronic Disease*, 7(6), 2010
http://www.cdc.gov/pcd/issues/2010/nov/09_0218.htm.

Non communicable diseases are increasing in developing countries, exacerbated by growing urbanization. This study examined the experiences and perceptions about non communicable diseases of people who migrated from rural areas to urban Cape Town, South Africa.

Participants described changes in eating patterns and levels of physical activity. These changes were a result of socioeconomic and environmental constraints. However, respondents were not concerned about these changes. Despite hardships, they were pleased with their urban lifestyle. Furthermore, they approved of their weight gain because it signified dignity and respect. Participants who attended health clubs found them informative and socially and emotionally supportive.

7. Additional information

Author

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