

# Non-communicable Diseases in Developing Countries; A Time to Act

*A look at the need for improved focus and interventions on non-communicable diseases in developing countries.*

by

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## **Summary**

36 million people died in 2005 from non-communicable disease like cardiovascular diseases, cancer, and diabetes, which is more than 60 % of the global burden of mortality. Furthermore, 80 % of these deaths occurred in low- and middle-income countries, while only 20 % occurred in high-income countries. The diseases share the same risk factors from behavioral aspects, which include tobacco smoking, a diet high in saturated fat and low in fruit and vegetables, alcohol consumption and physical inactivity. This tendency is concentrated in urban areas in developing countries and is a result of globalization. Non-communicable diseases lead to great morbidity and even death, and paralyze families and their economy due to reduced income, reduced opportunities for investment, and increased expenditure on medication.

Despite strong evidence, the response from policy-makers, international aid agencies, and academics is sparse. Increased focus cannot rectify the inequities, but it can contribute to inform and educate people about the global problem. It can lead to increased investigation of the problem and eventually to preventive interventions. A few interventions have shown potential for effective reduction of non-communicable diseases and sustainable interventions can be obtained via small steps. However, further research is needed to conclude final remarks.

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## **Abbreviations**

**AIDS** – Acquired Immunodeficiency Syndrome

**BMI** – Body Mass Index

**CEA** – Cost-effectiveness analysis

**CD** – Communicable Diseases

**COI** – Cost-Of-Illness

**CVD** – Cardiovascular Diseases

**DALY** – Disability Adjusted Life Years

**GDP** – Gross Domestic Product

**HIV** – Human Immunodeficiency Virus

**MDG** – Millennium Development Goals

**NEJM** – New England Journal of Medicine

**NCD** – Non-Communicable Diseases

**TB** – Tuberculosis

**U.S.A.** – the United States of America

**USAID** – U.S. Agency for International Development

**UN** – the United Nations

**WHO** – World Health Organisation

## 1.0 Introduction

For centuries communicable diseases (CD) were the main cause of death worldwide with uncontrolled epidemics killing thousands of people. When medical research developed vaccinations and antibiotics and at the same time emphasized good life conditions, deaths from communicable diseases decreased and non-communicable diseases (NCD) (as diabetes, cancer, cardiovascular diseases) became a rising burden, especially in the developed countries. This burden of non-communicable diseases (or chronic diseases) is now increasing in developing countries with a rapidly growing rate.

In year 2000 world leaders within the United Nations (UN) decided to create development goals for low-income countries that were to be reached before 2015, the so-called Millennium Development Goals (MDG). The emphasis was directly or indirectly linked to public health problems that affect the poor of the poorest. Examples are better maternal health, obtaining clean drinking water and basic sanitation, creating a sustainable and healthy environment, eradication of hunger and extreme poverty, control of the communicable diseases like malaria, HIV/AIDS, tuberculosis, and other communicable diseases (“Millennium Development Goals”, n.d.)

Surprisingly, no attention was drawn at the non-communicable diseases when the 15 MDG were established. Chronic diseases are, after all, also affecting people in low- and middle-income countries. Instead, the world leaders chose only to focus on diseases that are visible and clearly linked to poverty, namely the communicable diseases, and thereby overlooked the chronic diseases.

Observations indicate that developing countries are experiencing a double burden of diseases, due to problems with both communicable and non-communicable diseases. This double burden will increase substantially in just a few years if no action is initiated to reduce the non-communicable diseases. Diseases in developing countries have important economic consequences on the individual, the family, the community and potentially on the nation (Suhrcke 2006).

The increased prevalence and frequency of chronic diseases in developing countries are due to risk factors that formerly only were known in western countries. This disease development is a result of an epidemiological transition, which includes an increased urbanization, globalization and modernization combined with an enhanced average lifespan (Meyrowitsch et al 2006).

The burdens of chronic diseases are becoming a substantial problem worldwide and are affecting some of the world’s poorest populations with significant morbidity and mortality to follow (Ibid, Unwin et al. 2006). The extent of the problem is predicted to be large, but sustainable interventions can play a role in hindering the expected extent of the problems. The increasing tendency should

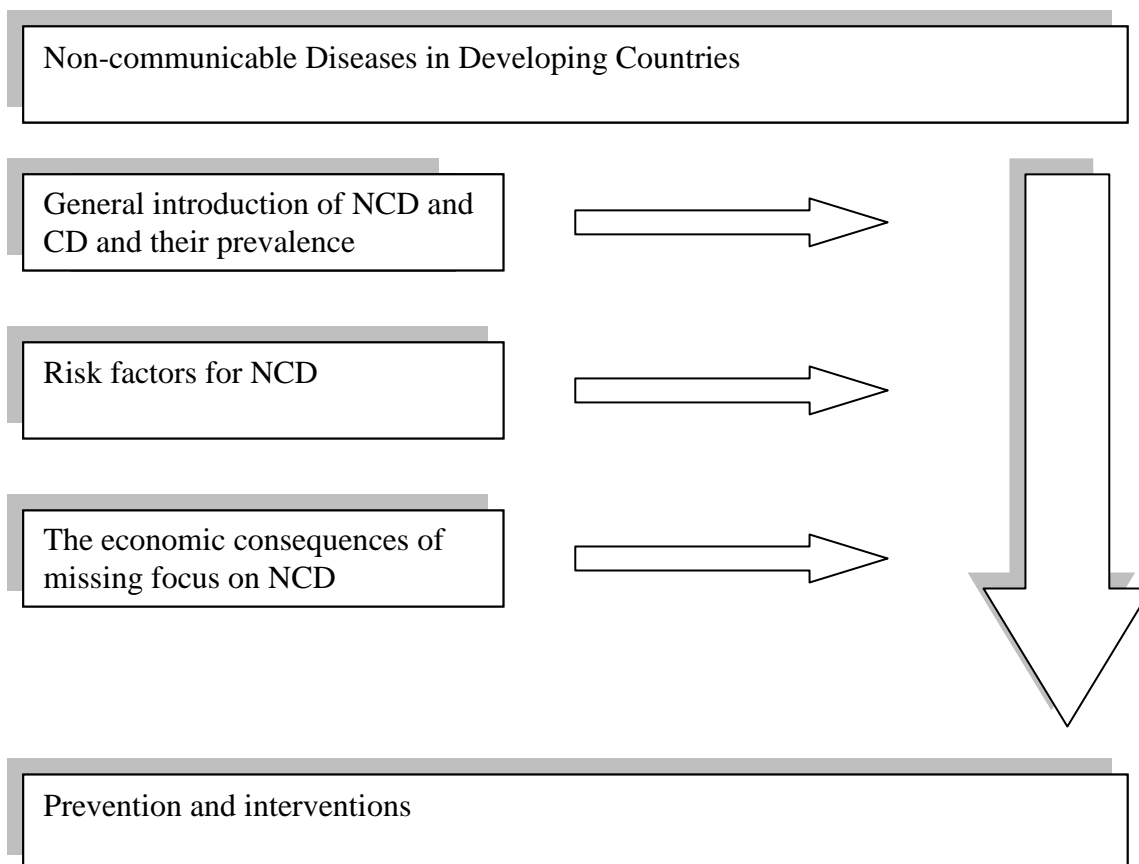
immediately be stopped and non-communicable diseases should be controlled, so poverty can be defeated.

*What are the consequences of the missing attention and action on non-communicable diseases?*

*What can be done to rectify the growing rate of chronic diseases and change the economic situation in many poor countries?*

## **2.0 Structure and Approach of the Paper**

The first part of the paper is going to explore the definition of NCD and CD together with the current prevalence and the predicted prevalence of the diseases. The second part is going to investigate the known risk factors of the diseases and look how the diseases can be avoided. After that, is it examined whether the focus on NCD is sufficient, and what the economic consequences can be of the missing focus. At last, a look at how the prevalence of chronic diseases can be reduced is conducted and in what extent some interventions are already trying to reduce it.



### **3.0 Non-communicable Diseases, Communicable Diseases and their Prevalence**

#### **3.1 Non-communicable Diseases**

##### *3.1.1 Cardiovascular Diseases*

Cardiovascular diseases (CVD) are the collective name for the group of disorders of the heart and blood vessels. It encompasses hypertension (raised blood pressure), coronary heart disease (heart attack), cerebrovascular diseases (stroke), peripheral vascular diseases, heart failure, rheumatic heart disease, congenital heart disease and cardiomyopathies (Boutayeb 2005). CVD are the most common kind of NCD and the biggest “killer”. 17.5 million deaths were caused by CVD in 2005 with almost 80 % of them occurring in developing countries (“Fact sheet No 317”, 2007).

##### *3.1.2 Cancer*

Cancer is the collective name for a group of diseases that arises in a single cell and creates dysplasia<sup>1</sup>. Cancer can affect any part in the body and it can spread to other organs. Lung, stomach, colorectal, liver and breast are the main types of cancer, but it differs between men and women. Cancer accounted for 7.4 million deaths in 2004, and 70 % of these occurred in low- and middle-income countries (“Fact sheet No 297”, 2009).

##### *3.1.3 Diabetes*

Diabetes occurs when the pancreas cannot produce sufficient amounts of insulin, or when the body cannot effectively use the produced insulin. Insulin is the hormone that regulates the blood sugar to avoid the condition of hyperglycaemia<sup>2</sup>. An uncontrolled blood sugar level can lead to severe conditions. In 2005 1.1 million died from diabetes and more than 180 million were affected by diabetes. 80 % of the deaths occurred in low- and middle-income countries (“Fact sheet No 312”, 2008).

#### **3.2 Communicable diseases**

##### *3.2.1 HIV/AIDS*

HIV is a virus that infects the cells of the immune system and slowly destroys or impairs their protective function against infections from micro organisms (bacteria or viruses). In the beginning

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<sup>1</sup> Abnormality in a cell

<sup>2</sup> Raised blood sugar

there are no signs of disease, but as the vira spread, the immune system becomes weaker. When the condition worsens, the infected person can develop AIDS, which is the most advanced stage of HIV. 33 million were living with HIV by the end of 2007 and 2 million died from AIDS. Two thirds of the infected are living in sub-Saharan Africa (“HIV/AIDS”, 2008).

### 3.2.2 Malaria

Malaria is a fatal disease caused by a parasite, which is transmitted via bites of infected mosquitoes. The parasite multiplies itself in the liver and then infects and damages red blood cells. The red blood cells transport oxygen around the body, and damaged blood cells cannot maintain this job. 247 million people were infected with malaria in 2006 and it caused 100 million deaths. Most of them occurred among children in the African Region (“Fact sheet No 94”, 2007).

### 3.2.3 Tuberculosis (TB)

Tuberculosis is an infectious disease that spreads through the air. It mostly affects the lungs, but can also occur in other parts of the body. TB is a deadly infectious disease that caused 1.6 million deaths in 2005, mostly people in the Africa Region (“Fact sheet No 104”, 2007).

## 3.3 The Prevalence of Non-communicable Diseases

According to World Health Organisation (WHO), non-communicable diseases are a major contributor to deaths worldwide, which is illustrated in figure 1. NCD were estimated to be responsible for around 60 % of all deaths (around 35 million) in 2005 worldwide (Unwin et al 2006). In comparison, communicable diseases were causing only 30 % of total deaths.

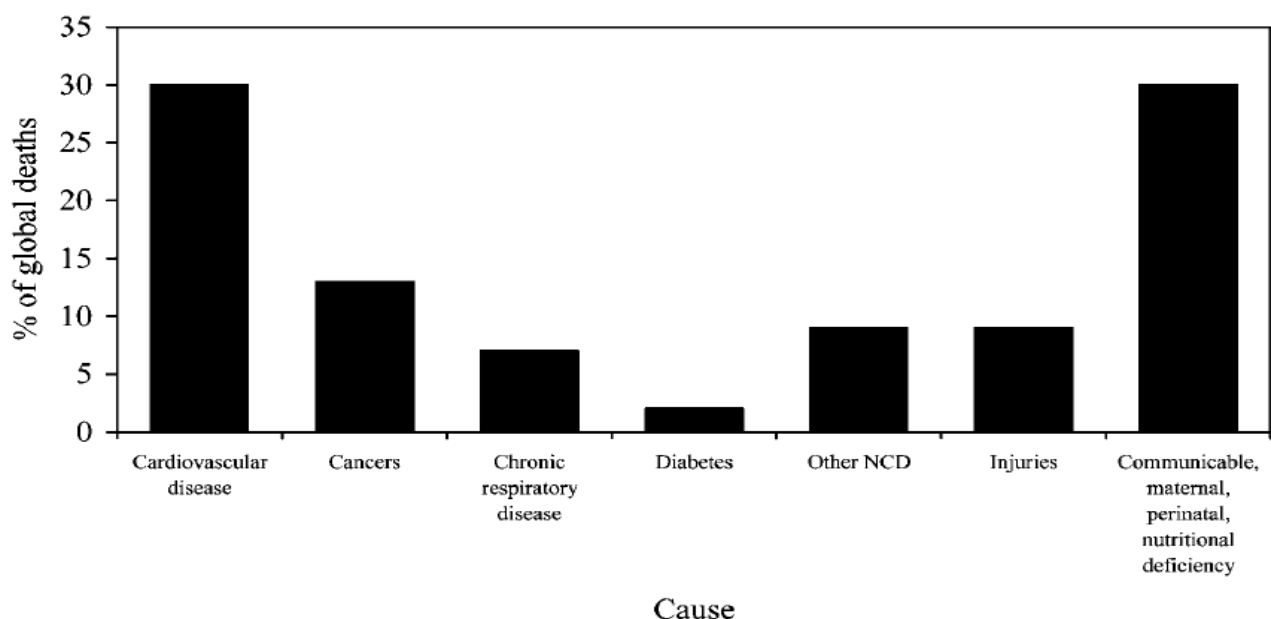
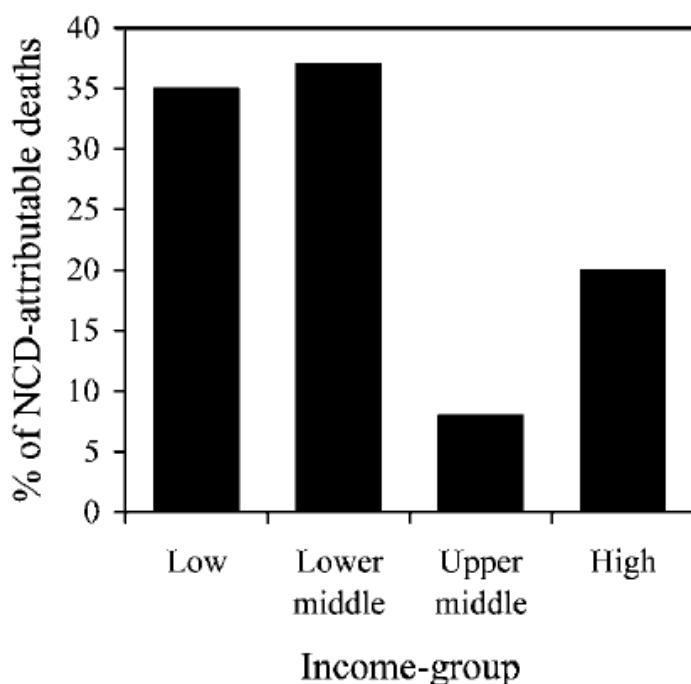


Figure 1(Unwin et al. 2006; p.456). The causes of the 58 million deaths in 2005. Most (36 million) of the deaths were attributable to non-communicable diseases.





Chronic diseases are as stated not only a problem in the developed countries, but they are a major and still increasing problem in developing countries. Almost 80 % of deaths from NCD occur in low- and middle-income countries (figure 2). The health imbalance among people in developing and developed countries is exacerbating the inequalities both economically and socially, and is complicating the poverty reduction in low-income countries (Ibid).

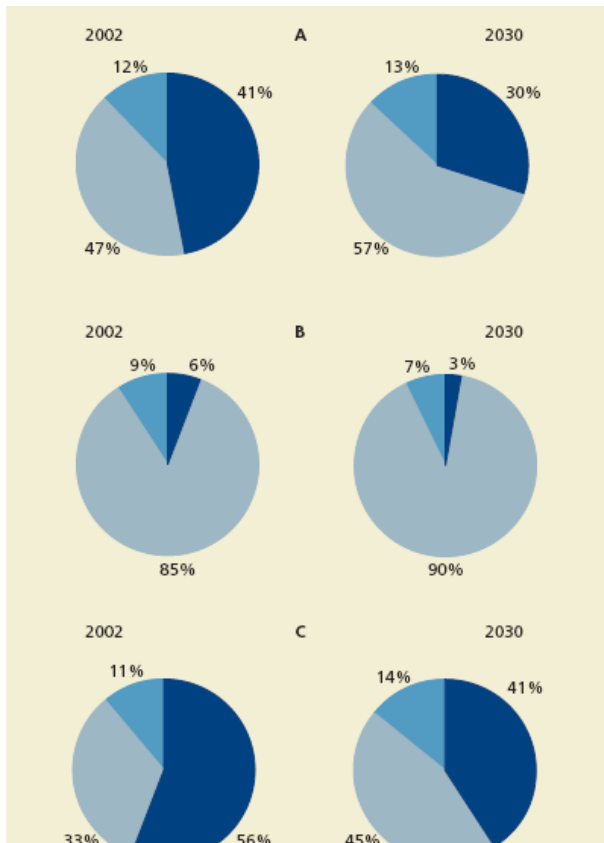
**Figure 2 (Unwin et al. 2006; p.456). The 36 millions deaths from NCD split according to the income group.**

### **3.4 Disability Adjusted Life Years**

As illustrated above, the burden of diseases can be measured in death occurrence. Since both CD and NCD result in shorter or longer periods of illness and not necessarily lead to death rapidly, there are several limitations when measuring the burden of NCD in deaths. Consequently, another measurement that includes these considerations has been developed to measure the burden of diseases more accurately. The Disability Adjusted Life Year (DALY) is an indicator for the time lost due to premature death and the time living with a disability caused by NCD. The time lost because of morbidity or mortality is compared to standard expected years of life. The DALY considers gender, age, cause and region (Murray 1994). When this is used it is possible to measure and compare the consequences of CD and NCD.

The current future picture is, if nothing is changed, that the incidences of NCD will increase and become an enormous problem in the developing countries in just 10-20 years. Several studies indicate that the burden of NCD will have escalated extremely by year 2030. Meyrowitsch et al. (2007) investigated the burden of NCD in 2002 and the subsequent projection of the diseases in year 2030 worldwide. They separated the burden into high- and low-income countries. They found a significant difference in the distribution of diseases between 2002 and 2030, and a significant difference between the burdens of disease in high- and low-income countries. The burden of NCD

expressed in DALY was in 2002 47 % for the entire world and will increase to be responsible for 57 % in 2030. The greatest increase of NCD is expected to appear in low-income countries with an increase from 33 % in 2002 to 45 % in 2030 (figure 3).



**Figure 3 (Meyrowitsch et al. 2007; p.33). The proportional contributions of DALY attributable to communicable diseases (CD), non-communicable diseases (NCD), and accidents for 2002 and 2030. The top two (A) shows the situation worldwide, the middle two (B) shows the situation within the high-income countries, and the bottom two (C) shows the situation within the low-income countries.**

When examining figure 3, it seems like the high-income countries suffer tremendously from chronic diseases. This is, however, not a picture of the numbers of people suffering from diseases, but of the distribution of NCD and CD. Figure 2 illustrates that low-income countries are suffering more extensively from chronic diseases and that the burden of these are almost twice as big as for the high-income countries.

### 3.5 The Double Burden

Chronic diseases have unfortunately not displaced communicable diseases in developing countries, only just added another burden and thereby combating communicable diseases *and* chronic diseases (the double burden). Communicable diseases are almost eliminated in western countries, whereas dealing with a double burden is a substantial problem only for developing countries (Boutayeb 2006, Mascie-Taylor et al. 2003). Malaria, for example, continues to worsen in many developing countries and count for 300-500 million new cases and 2-4 million deaths annual (Ibid).

44 % of total burden of disease (in DALY) was attributed to NCD in India in year 2000, and 43 % was attributed to CD (Ibid). NCD will become the biggest threat in all low-income countries, except for the Africa Region who still will suffer mostly from communicable diseases like HIV/AIDS, TB and malaria (Yach et al 2004).

#### 4.0 Risk Factors

The future burden of chronic diseases is a result of people's exposure to major risk factors. Even though the causes and risk factors for NCD are more complex than the causes for CD, they are well known and most of them are modifiable. The major risk factors for NCD are very similar in all regions of the world, albeit with small differences. People living in developing countries are exposed to major risk factors in the same extension as people in developed countries (Meetoo 2008).

The causes of chronic diseases are divided into two main areas; those that are *not* modifiable and those that *are* modifiable. The non-modifiable risk factors include age, gender and genetics. As a population is ageing, an increase in chronic diseases will automatically occur (Ibid). The modifiable risk factors include exposure to tobacco, alcohol consumption, unhealthy diet and lack of physical activity (Ibid).

The known common risk factors for cardiovascular diseases, diabetes, cancer, and other chronic diseases are mostly due to a change in lifestyle and can be prevented. For some people in developing countries, a change in lifestyle is due to the transition from rural to urban areas, since all the risk factors tend to be more common in urban areas. However, the rural areas are developing to become more industrialized with increasing mechanizations and an increased access to refined, high-fat, and high-sugar food, which even out the differences between rural and urban areas (Unwin et al.2006).

- Tobacco is one of the worst risk factors. In the twentieth century around 100 million people died from tobacco-associated diseases like cancer, chronic lung disease, diabetes and CVD. 80 % of the 1.2 billion smokers worldwide live in poorer countries and the number is still increasing. This is contrary to the richer countries, where the prevalence of smokers is decreasing with 3.4 % per year (Boutayeb 2006).
- Obesity and dietary habits are potential risk factors for many chronic diseases. Unhealthy diet can lead to illnesses, while healthy dietary habits can provide people with a protecting effect. A regular intake of fish and fresh fruit will for example, reduce the risk of chronic diseases. This is, however, thwarted by the invasion of the western lifestyle's unhealthy dietary habits joined with the government's enormous export of fruit and vegetables from developing countries (Ibid).
- Alcohol is especially associated with development of cancer in the gastrointestinal system together with liver disease. In addition, accidents from intake of alcohol will contribute to

- the total burden of diseases, but these deaths are however not directly linked to NCD (Ibid). Alcohol consumption has increased in the last decade, with most of that increase in developing countries. It is estimated to cause 1.8 million deaths worldwide (“Alcohol”, n.d.)
- Physical inactivity is a major factor for the risk of NCD. It can cause obesity and thereby an increased risk of chronic diseases. Physical inactivity is estimated to cause 1.9 million deaths globally. Inactivity is reaching high levels in developed countries, but physical inactivity in large cities in developing countries is an even greater problem due to urbanisation (“Physical Activity”, n.d., and “Physical Inactivity: A Global Public Health Problem”, n.d. )

#### ***4.1 Low Birth Weight***

The mentioned risks above are the common known risk factors for development of chronic diseases. Nevertheless, another risk factor for NCD’s, which underlines an overlap between NCD and CD, is low birth weight. Prentice et al. (2005) stated that events early in life can create great changes in physiology that later can predispose people to disease, depending on which environment they are exposed to. Low birth weight is common in low-income countries and it is related to malnutrition and maternal infections. The low birth weight is suspected to create negative health outcomes later in life. It is assumed that low birth weight can “program” the unborn baby to use and save the energy it is provided with, which will be a contributing factor for chronic diseases if this person is faced with over-nutrition later in life. The low birth weight is considered to be a risk factor for NCD as coronary heart disease, stroke, diabetes 2, and metabolic syndrome (Ibid).

#### ***4.2 The Overlap between Non-communicable and Communicable Diseases***

It is not always easy to distinguish between communicable diseases and non-communicable diseases when studying the impact and burden of these diseases. The difficulties of measuring the burden of CD and NCD arises in the overlap between the diseases and conditions since they often are linked, as seen in the case with low birth weight and increased risk of chronic diseases. Liver, bladder, stomach and cervical cancer are often linked to communicable diseases. People who suffer from HIV/AIDS are more exposed to become infected with TB because of their weakened immune system and people with diabetes are at substantially greater risk of developing TB than people without diabetes (Boutayeb 2006).

Despite this overlap, chronic and communicable diseases are often regarded separate politically, academically and within healthcare organisations (Suhrccke 2006). This perception is not only

incorrect, but also unhelpful in the prevention and control of CD and NCD, which makes focus on the interaction essential.

#### ***4.3 Globalisation and Risk of Chronic Diseases***

Globalisation contributes to health positively and negatively and increases the risk of chronic diseases directly and indirectly as well. The direct negative health effects are clearly seen in the globalised production, promotion and marketing of tobacco, alcohol, fast food and similar products with adverse health effects. The promotion of these products reaches almost every corner of the world including the poorest countries, and affects the people in these areas to obtain negative health behaviour. Tobacco, alcohol and bad dietary habits' great risk on chronic diseases, indirectly makes globalisation responsible to an increased risk of chronic diseases (Yach et al. 2004).

Globalisation is not only negative though. It can disseminate health messages that have a positive effect by using modern communication and information. Unfortunately the dissemination of these positive effects is limited compared to the dissemination of negative effects, which makes the health effects of globalisation mainly negative (Ibid). Globalisation can consequently lead to a change in behaviour among people in developing countries. People who before lead a life build on specific cultural and religious beliefs are now adopting a western lifestyle and putting themselves in great risk of chronic diseases. They are e.g. changing their dietary habits from a healthy diet rich in vegetables and animal products, to a diet rich on refined sugar and high in fat.

#### **5.0 Missing Focus on Non-communicable Diseases**

The increasing burden of chronic diseases is undeniable, and attention and action is much needed to end this negative pattern. First of all a shift in focus is needed. The focus on this growing problem is not sufficient and therefore politicians, researchers, and health organisations need to be aware of the looming crisis to be able to combat it.

Many developed countries have used a lot of effort and money on fighting the threat from chronic diseases. The developing countries, in contrast, have received inadequate attention on chronic diseases from policy makers, major multilateral and bilateral aid agencies, academics and research, despite strong evidence of economic and social consequences from the increasing burden (Beaglehole et al. 2003).

Lown et al. (2006) examined the extent of the focus on health, and especially the focus on non-communicable diseases, in developing countries. They examined 416 weekly issues of the New

England Journal of Medicine (NEJM) over an eight year period from 1997 to 2004 resulting in a total of 8857 articles. Out of these articles only 202 were related to low-income countries and most of them were concerning HIV/AIDS and other communicable diseases. Surprisingly, only 23 out of 8857 articles in an eight year period dealt with non-communicable diseases and only one article discussed heart disease, which is the largest risk of NCD.

The prevalence of articles regarding non-communicable diseases within different journals will undoubtedly change, and other journal might publish more articles on NCD in developing countries than NEJM. However, NEJM were chosen because it is the leading journal of medical publications in the U.S.A. Similar findings are, nonetheless, found in other major medical journals (Ibid).

### ***5.1 Economic Consequences***

The increased double burden of CD and NCD is placing a strain on health services in developing countries. The economic burden of non-communicable diseases are multiple in all level of society, and it is imposing economical costs on individual, family, community and national levels. NCD can be considered as a threat for the developing countries' opportunity for economic development. As there were different methods to measure the burden of chronic diseases, there are different methods to measure the economical burden and consequences of chronic diseases. Suhrcke et al. (2006, pp.17-28) describe three different aspects to measure the economical consequences; the "cost-of-illness" (COI) approach, the microeconomic approach and the macroeconomic approach.

The COI perspective separates the costs into three different components. The first is the direct costs that include medical costs as prevention, diagnosis and treatment of disease, and costs related to ambulances, patient care, medication, rehabilitation, and other health services. The second is the indirect costs that cover losses due to foregone productivity caused by morbidity or premature death. The third approach deals with intangible costs, which is hard to measure economically. It includes psychological aspects as pain, disability and suffering caused by chronic diseases (Suhrcke et al. 2006).

The microeconomic perspective is examining the economic consequences at individual and family level. Consumption and savings in a household can be affected by chronic diseases in several aspects but only a few of them will be examined.

The treatment of chronic diseases can burden the economy, consumption, and savings of a family. Insurance is often scarce in poor families, so when the money for treatment is not sufficient, people are compelled to borrow from neighbours, use their savings, sell their assets or reduce on education and farming equipment for instance.

The negative effects on consumption and savings are not only related to treatment, but also to expenditure on tobacco, alcohol, and unhealthy diet (Ibid). A study in rural China revealed that money spent on tobacco negatively affected the expenditure on health, education, farming equipment, seeds, savings and insurance. Poor people tended to spend enormous amounts on tobacco compared to housing, clothing, health and education combined, and in total they spend more on tobacco and alcohol than on basic needs. This affects the smokers' families who are exposed to second-hand smoking. Furthermore, smoking affects the household economically on short and long term basis due to the money spent on tobacco and on the potential money that are going to be spent on an eventual chronic disease (Wang et al. 2006). In addition, the morbidity or death due to NCD of a parent or family member will have many negative consequences for the rest of the family. Children can experience difficulties with continuing school and families will receive an extra burden of work (Suhrcke et al. 2006).

The macroeconomic perspective is examining economic consequences on macroeconomic level. This perspective suggest, that since the NCD account for a major part of reduced life expectancy, they can be expected to have a negative relation with the economic growth on gross domestic product (GDP), when measured as annual per capita GDP (Ibid). Barro (1996) conducted a study, which demonstrated that the relationship between life expectancy and growth rate is almost linear, namely that increased life expectancy will result in increased economic growth.

Taken together, the three perspectives conclude that chronic diseases are associated with negative economic consequences. There are, however, some limitations when using these approaches in developing countries, since they initially were designed for developed countries. Nevertheless, a fair amount of evidence exist to conclude that chronic diseases induce negative economic consequences for developing countries on individual, family, community, and national level. These findings must remind policymakers to act now to reduce the growing burden of NCD to promote economic growth.

Stiglitz (2006; chapter 3) stresses that development, however, is much more than just improvement of the economic situation; "*Development is about transforming the lives of people, not just transforming economies*" (Ibid; p.50). Clearly the economic development is an essential aspect of the poverty reduction, but other aspects are just as important, as for example education. Education is beneficial in many aspects, and among them it can be used to promote health. He

argues that development is about changing more than just one aspect and instead consider and change many aspects simultaneously (Ibid; chapter 3).

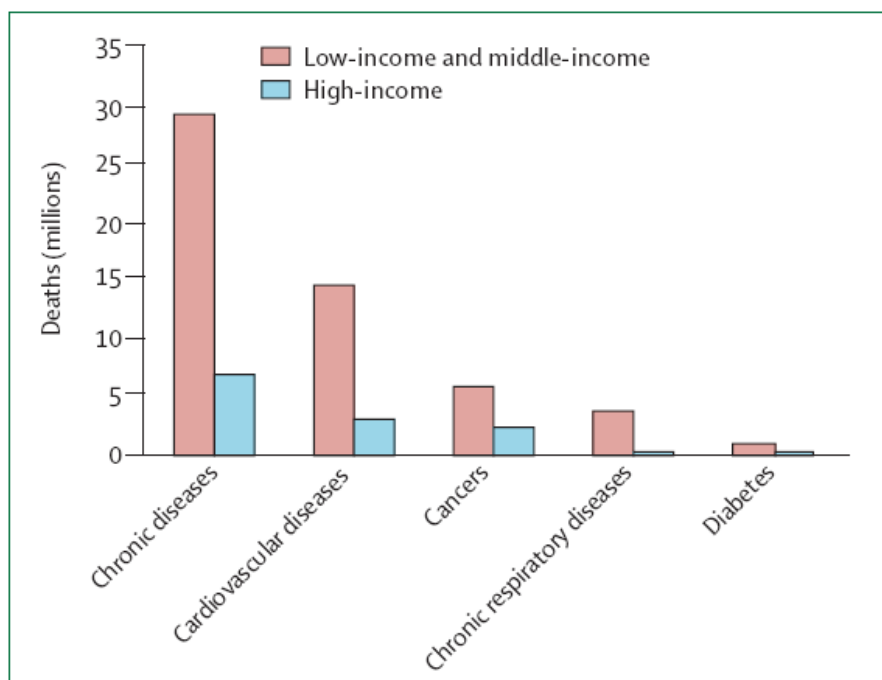
The prevalence of communicable diseases generally decreases with a country’s economic development, which Meetoo (2008) highlight is *not* the case with NCD. He argues that NCD does not decline before a high level of wealth and literacy is reached. This emphasizes the need of more than just a change in health and the need of e.g. information and education. It emphasizes that nothing can be done by just changing a single thing, but that the world should be regarded holistic to succeed in reducing the poverty in low-income countries.

*“Poverty leads to ill health and ill health breeds poverty. Where there is structural poverty and ill-health, there will be poor development – and poor human rights”* (Brundtland 1998).

These words are simple and state the simple reality of for example chronic diseases that causes morbidity, mortality, economic suppression, and poverty.

## 6.0 Preventing Non-communicable Diseases

*“The purpose of prevention is to reduce the amount of damage that could occur, and for many chronic diseases this may mean “unlearning” unhealthy behaviours.”* (Suhrcke et al. 2006, p.40)



WHO proposed a goal in 2005 to reduce deaths from chronic diseases by an additionally 2 % every year from 2005 to 2015 (Strong et al. 2005). This would avert around 36 million deaths worldwide with 28 million of them averted in low- and middle-income countries (figure 4), and result in a gain of 500 million years of life during these 10 years. Almost 90 % of these would be in

**Figure 4 (Strong et al. 2005; p.1580). Cumulative number of deaths averted by a 2 % additional annual reduction in deaths rates from NCD from 2006 to 2015.**

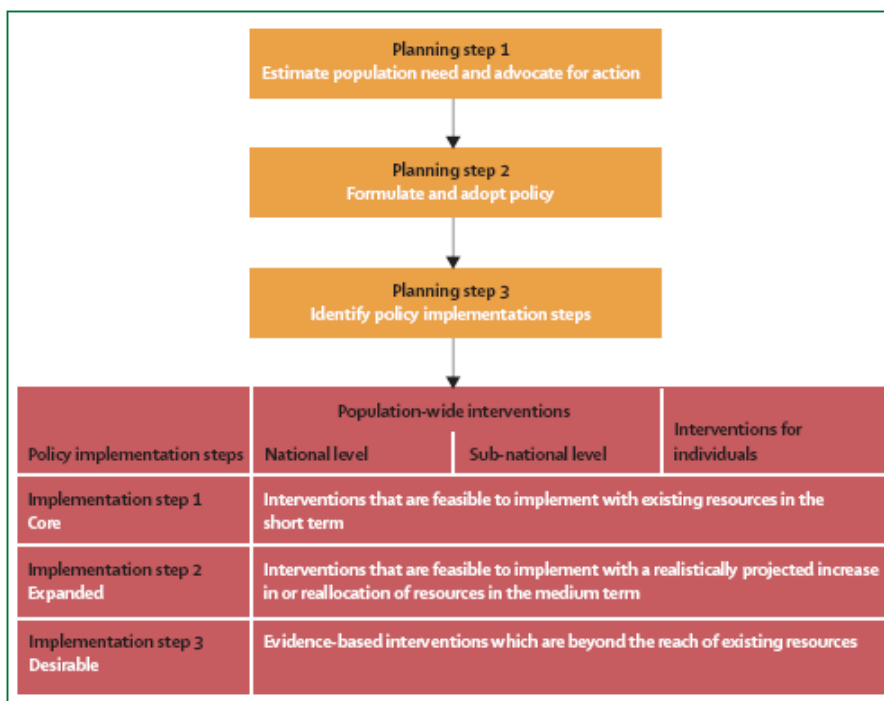
low- and middle-income countries. Additionally, almost half of the saved lives occur in men and women under the age of 70, which is beneficial for individuals, families and communities (ibid).



Therefore, by implementing interventions in developing countries, a lot of damage could be avoided and reduced, and better opportunities for economic development would occur. Interventions do not, however, originate by itself but focus on the problem and attention from governments and political parties can facilitate the implementation of new interventions.

In the policy making, three main overlapping components are important to consider; individual (microeconomic) interventions, population-based interventions, and macroeconomic interventions. If the interventions are not consistent with the financial basis of the country, no intervention will succeed (Ibid).

Many low- and middle-income countries must deal with limited resources and the double burden of both CD and NCD. Therefore, stepwise action is important in successfully preventing chronic diseases. Epping-Jordan et al. (2005) suggested a stepwise action that builds on three main planning steps and three main implementation steps (figure 5)



The first planning step is to examine the population’s current risk factors and the burden of chronic diseases in a specific country. This is key information in order to be able to implement sustainable preventive programmes. This information is collected and distributed to ensure that the essential message is expressed correctly.

**Figure 5 (Epping-Jordan et al. 2005; p.1669).**

**WHO stepwise framework for preventing chronic diseases.**

adoption of a policy regarding NCD. This policy is important to ensure the attention and priority is pointed towards chronic diseases. This policy sets out the vision for prevention and control of major risk factors for NCD.

The second planning step is the formulation and

The third planning step is to discover the most effective way of implementing the new policies. Planning of the stepwise interventions should include consideration of the countries' feasibility and local conditions and also potential and unexpected constraints and barriers.

The first implementation step, "Core", involves interventions that are feasible to implement without additional resources. This first step is marking the starting point and form future steps plus the speed of interventions.

The second implementation step, "Expanded", takes a step further to interventions that demand more resources, but still enough to realistically implement the interventions.

The third implementation step, "Desirable", includes identification of the most effective way to implement the newly developed policies (figure 5).

Epping-Jordan et al. (2005) conclude that every country has potential to make substantial improvements and have potential to succeed in creating sustainable interventions and development. They highlight that small and controlled steps are more effective than large and less controlled steps.

### **6.1 The Need for Interventions:**

The need for controlling and preventing chronic diseases is widely recognized, but the developing countries are however lagging behind. The industrialized countries have since the 1960s developed programmes and strategies in preventing NCD, based on smoking cessation, physical activity, and diet (Meyrowitsch et al 2007). Ideally these actions and strategies should be implemented in developing countries. Beaglehole (2001) criticize the gap existing between the knowledge gained during the last 50 years, of risk factors for cardiovascular diseases and its application to policy and action. However, he argues that economic globalisation, international trading and regulations, constrain the capabilities of countries and national health services to adapt equally to health problems and programmes. Poor countries' limited health service complicates the implementation of interventions from western countries (Ibid). This emphasize that cost-effective and stepwise interventions is the answer in reducing health costs from NCD.

Sen (1999) discusses, that "*famine prevention is very dependent on the political arrangements for entitlement protection*" (Ibid; p.169), which could be argued to be the same case for prevention of chronic diseases. The government and policymakers' engagement in prevention are important for the origination and implementation of interventions.

Public action can help reducing a crisis and Sen argues that small amounts of well-planed public expenditure are beneficial in this aim (Sen 1999). Public action is not only based on actions from

the state to the public, but just as well on the public's own action. This encompasses that the public is concerned for others and the public is motivated and willing enough to improve the life conditions of other people. Sen argues that if the public have this motivation, they will understand the role social leaders, political parties and journalist can play in combating deprivation (Dan Banik March 19<sup>th</sup> 2009). The role of the government is to take preventive action. Oppositional political parties, the media and organisations have great responsibility in making the government realise the problems and act on them before they become a crisis (Banik 2006, chapter 3).

### ***6.2 The Cost-effectiveness of Interventions***

Cost-effectiveness analysis (CEA) is used by policy-makers to decide which intervention best could improve public health. CEA measures the costs of obtaining a certain amount of health improvement and is based on the cost of carrying out an intervention and the subsequent result. Even though the equation is quite simple it is often difficult to get access to adequate data, despite that there exist standard measures (like DALYs) to describe outcomes of interventions (Suhrcke et al. 2006). The DALYs are unfortunately not used for all evaluations, which complicate the comparing of interventions.

Therefore, results from developing countries rely heavily on modelling or estimation where data is extrapolated from small interventions or where data is borrowed from developed countries.

Many potentially effective interventions do exist, and some would eventually be proven to be cost-effective. "Simple" lifestyle changes such as smoking and drinking cessation, increasing physical activity and dietary changes can all with a low cost prevent chronic diseases at individual level. This can be achieved by information, education and the desire to live healthier (Ibid), but the limited evaluations from developing countries makes it difficult to make any final conclusions.

### ***6.3 Difficulties***

Differences in culture, economy, education and climate can complicate the implementation of western designed interventions in developing countries. It can be problematic to promote outdoor physical activities in tropical countries due to hot and humid climate. Cultural-specific interpretations of tobacco, diet and body ideals can complicate the direct transfer of already known strategies for health promotion (Meyrowitsch et al 2007). For example, a high Body Mass Index (BMI) equals a high social status in some developing countries. A study conducted by Faber et al. (2005) revealed that most overweight and obese women was not concerned about their weight and were not interested in losing weight. The acceptance of overweight and obesity can hinder the

effectiveness of overweight preventing programmes (Faber et al. 2005). In South Africa it can be difficult to implement physical activities due to limited exercise infrastructure and high prevalence of urban violence (Suhrcke et al. 2006). Suhrcke and colleagues argues that these barriers are similar in developing countries. However, it is not impossible to implement physical activity and preventing interventions; it just needs to be designed to the culture and climate of the specific country. Furthermore, interventions should be addressed to both men and women equally, but Degnbol-Martinussen (2002) further argues that the outcome will be better if interventions are directed towards women (Ibid).

#### ***6.4 International Aid Agencies - Missing in Action***

It is fairly problematic that most of the focus on diseases is addressed to communicable diseases. Unfortunately, most of the international aid agencies such as the World Bank, Global Fund, U.S. Agency for International Development (USAID), U. K. Department for International Development, Rockefeller Foundation, Clinton Foundation, and Bill and Melinda Gates Foundation are only focussing on communicable diseases and are thereby neglecting the increasing incidences of non-communicable diseases. The outcome of no action in this area is outlined in figure 3, which makes it incomprehensible that these aid agencies are ignoring this major problem.

Middle-income countries are starting by preventing chronic diseases with primary intervention programs. Uruguay, for example, has initiated a non-smoking campaign, which has decreased the incidence of smokers from 40 to 20 percent over the past 20 years. Brazil has initiated secondary prevention programs to address hypertension, including media awareness campaigns, self-help groups, clinician training and awareness, and disease registries. This program was estimated to cost only 1\$ per capita. These two examples are not unique, but many countries are developing primary, secondary and tertiary programs to address and prevent the increasing rate of NCD. However, the support from international aid agencies is still lacking. The middle-income and low-income countries need technical assistance from the international aid agencies to implement and maintain prevention strategies (Anderson 2009).

It is difficult to understand why international aid agencies are not reaching out to help developing countries with implementation, because in the cases where international agencies have been involved there is actually indication of success (Ibid).

## 7.0 Discussion and Conclusion

Many challenges are facing the developing countries and chronic diseases are just an example of one of them, however, it seems to have passed international policy-makers and world leaders by. Whether or not chronic diseases should have been included in the MDG, there is no doubt that much more can be done to reduce the social and economic consequences of NCD. If no international action is initiated, the developing countries will in the near future experience an enormous burden of diseases both regarding communicable and non-communicable diseases. Therefore, focus should not only be addressed to communicable diseases *or* chronic diseases, it should be addressed *both* to communicable and chronic diseases. This would potentially improve the lives of thousands of people and save the same people from a fatal decrease in economic development.

As Stiglitz (2006) argued, development and poverty reduction is not only about improving the economic situation, “*Development is about transforming the lives of people...*” (Ibid; p.50).

In obtaining development and in the goal of reducing NCD and poverty prevention is necessary. Sustainable progress will only occur when international policy-makers and aid agencies acknowledge the problem and decide to act on the risk factors. Prevention has although only improved slowly and it has not kept up with the rapidly growing burden of NCD. It is possible and realistic to prevent and control NCD through interventions. However, only limited research has been examined on the basis for interventions on chronic diseases, due to the missing focus on NCD. The few potentially effective interventions from developing countries compared interventions from developed countries indicate that interventions could be implemented, although further research is necessary.

It is not too late, nor is it too early to establish sustainable policies and interventions to reduce the growing burden of NCD. It is essential to act on this problem before it becomes a crisis, and by reducing the incidences of chronic diseases a crisis can be avoided. Small steps are important in fulfilling this goal, and one of the first is to create more focus on the problem among international policy-makers, aid agencies, and academics.

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