CHAPTER 1

Innovative Care for Chronic Conditions

Building Blocks for Action

GLOBAL REPORT

Noncommunicable Diseases and Mental Health
World Health Organization
This report was produced under the direction of JoAnne Epping-Jordan, Health Care for Chronic Conditions. It is the first key component of a three-pronged WHO strategy to improve the prevention and management of chronic conditions in health care systems. This strategy is overseen by Rafael Bengoa, Director, Management of Noncommunicable Diseases, and Derek Yach, Executive Director, Noncommunicable Diseases and Mental Health.

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Chronic Conditions: The Health Care Challenge of the 21st Century

Chronic conditions are health problems that require ongoing management over a period of years or decades. Considered from this perspective, “chronic conditions” cover an enormously broad category of what could appear on the surface as disparate health concerns. However, persistent communicable (e.g., HIV/AIDS) and noncommunicable diseases (e.g., cardiovascular disease, cancer, and diabetes), certain mental disorders (e.g., depression and schizophrenia), and ongoing impairments in structure (e.g., amputations, blindness, and joint disorders) while seemingly different, all fit within the chronic conditions category.

Chronic conditions share fundamental themes: they persist and they require some level of health care management across time. In addition, chronic conditions share some concerning features:

✦ Chronic conditions are increasing throughout the world, and no country is immune to their impact.
✦ Chronic conditions seriously challenge the efficiency and effectiveness of current health care systems and test our abilities to organize systems to meet the imminent demands.
✦ Chronic conditions engender increasingly serious economic and social consequences in all regions and threaten health care resources in every country.
✦ Chronic conditions can be curtailed, but only when leaders in government and health care embrace change and innovation.
A New, Expanded Definition of Chronic Conditions

The term “chronic conditions” encompasses but expands beyond the traditional “non-communicable diseases” (e.g., heart disease, diabetes, cancer, and asthma) to include several communicable diseases. Consider the communicable disease, HIV/AIDS. A decade ago, this diagnosis meant the likelihood of impending death. However, because of advances in medical science, HIV/AIDS has become a health problem with which people can live and effectively manage for years. Tuberculosis (TB) is another example of an infectious or communicable disease for which advances in medical technology have yielded similar achievement. Although TB can be cured in many cases, a number of people manage TB over time only with the help of the health care system.

When communicable diseases become chronic problems, the delineation between non-communicable and communicable diseases becomes artificial and unwieldy. Indeed, the noncommunicable/communicable distinction may not be as useful as using the terms, acute and chronic, to describe the spectrum of health problems.

The consideration of mental disorders and physical impairments stretches traditional concepts about what constitutes a chronic condition. Depression and schizophrenia are examples of disorders that more often than not follow a chronic course. They wax and wane in terms of severity and they require long-term monitoring and management. Depression is of particular concern because by the year 2020, it will be surpassed only by heart disease in terms of the disability it causes. The personal, social, and economic impacts from depression will be substantial. Physical disability or “structural problems” including blindness or amputation are often the result of improper prevention or management of chronic conditions. Regardless of cause, they are chronic conditions unto themselves, and require lifestyle changes and health care management over time. Persistent pain problems, from a variety of causes, fit within the category of chronic conditions as well.

In summary, chronic conditions are no longer viewed conventionally (e.g., limited to heart disease, diabetes, cancer, and asthma), considered in isolation, or thought of as disparate disorders. The demands on patients, families, and the health care system are similar, and, in fact, comparable management strategies are effective across all chronic conditions, making them seem much more alike than different. Chronic conditions therefore include:

- noncommunicable conditions
- persistent communicable conditions
- long-term mental disorders
- ongoing physical/structural impairments

Chronic Conditions are Escalating

Chronic conditions are increasing at an alarming rate. The rise in noncommunicable conditions and mental disorders is the most concerning, overwhelming both high and low-income countries. This undeniable shift in health problems, away from infectious and perinatal conditions to chronic health problems, has far-reaching implications and poses predictable and
significant threats to all countries.

Chronic conditions presently make up the major health burden in developed countries, and trends for developing countries forecast a similarly concerning situation. Epidemiological trends demonstrate increases in chronic conditions throughout the world.

**Mortality trends for cancer, diabetes, and hypertension in Botswana**

![Graph showing mortality trends for cancer, diabetes, and hypertension in Botswana.](image)

Source: Botswana Ministry of Health, Community Health Services Division, Epidemiology and Disease Control Unit

**Epidemiological Evidence**

Chronic conditions are accelerating globally, undaunted by region or social class. Consider the traditional noncommunicable conditions as an example of this exponential growth. Noncommunicable conditions and mental disorders accounted for 59% of total mortality in the world and 46% of the global burden of disease in 2000. This disease burden will increase to 60% by the year 2020; heart disease, stroke, depression, and cancer will be the largest contributors.

By the year 2020, chronic conditions including injuries (e.g., transport injuries that result in persistent disability) and mental disorders will be responsible for 78% of the global disease burden in developing countries.
Low- and middle-income countries are the biggest contributors to the increase in burden of disease from noncommunicable conditions. In China or India alone, there are more deaths attributed to cardiovascular disease than in all other industrialized countries combined. In fact, in 1998 77% of all mortality related to noncommunicable conditions was in low- and middle-income regions, as was 85% of the global burden of disease. Unfortunately, these countries experience the greatest impact from chronic conditions, while they continue to deal with acute infectious diseases, malnutrition, and poor maternal health.

**Leading causes of death by region, 2000 (rank order)**

<table>
<thead>
<tr>
<th>Cause</th>
<th>Africa</th>
<th>Americas</th>
<th>Eastern Mediterranean</th>
<th>Europe</th>
<th>South East Asia</th>
<th>Western Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischaemic heart disease</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>9</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Trachea, bronchus, lung cancers</td>
<td>4</td>
<td></td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>5</td>
<td>12</td>
<td>12</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COPD</td>
<td>3</td>
<td>6</td>
<td>15</td>
<td>5</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>1</td>
<td></td>
<td></td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TB</td>
<td>7</td>
<td>6</td>
<td></td>
<td>6</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>


**Global burden of disease 1990–2020 by disease group in developing countries**

The increase in diabetes in developing countries is especially concerning. This chronic condition is a major risk factor for heart and cerebrovascular disease and it often co-occurs with hypertension, another major risk factor for chronic problems. Developing countries contribute $\frac{3}{4}$ of the global burden for diabetes. However, the number of persons diagnosed with diabetes will increase from 135 million in 1995 to 300 million in 2025. India reports a startling two-fold increase.


Mental health problems represent five of the 10 leading causes of disability world-wide, amounting to 12% of the total global burden of disease. Currently, over 400 million people suffer from a mental or behavioural disorder, and in view of the ageing of the population and worsening social problems, increases in the number of diagnoses are likely. This growing burden will create a substantial cost in terms of suffering, disability, and economic loss.

What is a DALY? In the case of prolonged health problems and their associated disability, “global disease burden” is a meaningful way to examine the related magnitude. This methodology provides a metric called the disability adjusted life year (DALY) to quantify the burden of premature death and disability. One DALY is considered one lost year of “health” and the burden of disease is considered the gap between a person’s current health status and the health status that one could expect with old age, perfect health, and no disability.

Why are Chronic Conditions Increasing?

The Demographic Transition

Throughout the world birth rates are declining, life expectancies are increasing, and populations are ageing. For example, in the 1950s, the expected number of children a woman would bear over a lifetime was six; today, the total fertility rate has declined to three. In addition, over the last century, life expectancies have increased by 30 to 40 years in developed countries. Longer lives are due, in part, to advances in medical science and technology, but also are because of successful public health and development efforts during the past 100 years.

One consequence of these changes in world demographics is an accompanying increase in the incidence and prevalence of chronic health problems. As infant mortality declines,
and life expectancies and the possibility of exposure to risks for chronic health problems rise, chronic conditions become more pervasive.

All regions of the world can anticipate similar transitions in their populations and health problems, but the timing of the changes will differ across regions. There will be a continued shift in the relative balance of acute and chronic health conditions, accompanied by progressive increases in the prevalence of prolonged disorders unless these conditions are prevented. Stated in other words, increases in longevity do not inevitably lead to higher rates of chronic conditions, but actions are necessary to prevent the onset of chronic problems.

**Consumption Patterns and Lifestyle Changes**

The modifiable risk factors for chronic conditions such as heart disease, cerebrovascular disease, diabetes, HIV/AIDS, and many cancers are well known. In fact, lifestyle and behaviour are primary determinants of these conditions with the potential to prevent, initiate, or advance these problems and their associated complications. Predominantly implicated in chronic conditions are lifestyles that embrace unhealthy behaviours and patterns of consumption. Tobacco use, prolonged and unhealthy nutrition, physical inactivity, excessive alcohol use, unsafe sexual practices, and unmanaged psychosocial stress are major causes and risk factors for chronic conditions. Unfortunately, the world is undergoing an undeniable transformation in adopting these health-jeopardizing behaviours.

Tobacco use is a remarkable example of the effects of behaviour on health. It is a major health threat with negative consequences recognized for more than four decades. Tobacco use is a cause of numerous chronic conditions including heart disease and stroke, cancer, and chronic respiratory conditions. The evidence that it is associated with premature death and disability is clear, yet dissemination of accurate information regarding the hazards of tobacco use is limited, and tobacco controls are inadequate in most parts of the world. In fact, tobacco
consumption, while decreasing in developed countries, is increasing in developing countries by 3.4% every year. Consequently, low and middle-income countries are where 82% of all smokers currently reside. Tobacco is responsible for approximately four million deaths annually in the world today. Ten million deaths will occur per year by 2030 and over 70% of these deaths will be in the developing world.

Tobacco will cause more deaths than any other single reason, and health systems will not be able to afford the long and expensive care in its wake.

Dr Gro Harlem Brundtland, World Health Assembly 2001

Unhealthy changes in dietary patterns, reduced physical activity, and increased illicit drug use may seem minor by comparison to the destruction caused by tobacco. Nevertheless, these negative changes in lifestyle are on the increase throughout the world and they merit serious attention in the context of chronic health problems. All of the above health-threatening behaviours are known risk factors for a variety of chronic problems, including heart disease, diabetes, and stroke. Diet is increasingly recognized as a primary determinant of chronic health problems.

Urbanization and Global Marketing

“Diseases of urbanization” is a term ascribed to chronic conditions, and the number of persons moving to urban areas is on the rise. Between 1950 and 1985, the urban population of industrialized countries doubled, and in developing countries the urban population quadrupled. Cities in developing nations, which already have enormous squatter settlement populations, added an additional 750 million people between the years 1985 and 2000. The problem with such rapid growth is the lack of facilities and services for the "urban poor” that are essential to good health. These deficiencies include housing, infrastructure (including roads, piped water, sanitation, site drainage, and electricity), and basic services (including collection of household wastes, primary health care, education, and emergency life-saving services).

Concurrent with the shift in population from rural to urban areas is a dramatic increase in advertising and promotion of unhealthy products in developing countries. These regions are particularly attractive markets for industries selling health-threatening goods. Tobacco, alcohol, and food industries have identified countries in which national regulation and public health education programmes are weak, or in many cases non-existent. Vulnerable countries are prime targets for creative marketing plans that seem to capitalize on social deprivation in many cases. The combination of deprivation and early exposure to harmful products appears to be especially profitable to companies marketing harmful commodities. Unfortunately, the success of these marketing campaigns is equalled by the devastation they bring to the health, economic, and social well being of countries and their populations.
What is the Impact of Chronic Conditions?

**Economic Impact: Everyone Pays the Price**

Health care costs become excessive when chronic conditions are poorly managed. However, the impact of chronic health problems extends far beyond the obvious expenses associated with medical treatment. From an economic perspective, everyone pays a toll:

- Patients (and families) pay the measurable monetary costs, including the expense associated with medical care, reduced workdays, and lost employment. In addition, patients (and families) incur costs that defy precise monetary calculation, such as condition-related disability, shortened life span, and lowered quality of life.
- Health care organizations pay most of the cost of medical care, but also bear many of the expenses that hide behind the cost of treatment.
- Health care workers experience professional and work-related frustration in managing chronic conditions and health care administrators are dissatisfied with outcomes of care and wasted resources.
- Governments, employers, and societies suffer because of the loss of workers due to death, disability, and morbidity related to chronic conditions. Moreover, chronic conditions result in major losses of productive potential.

HIV prevalence rates of 10–15%, which are no longer uncommon, can translate into a reduction in growth rate of GDP per capita of up to 1% per year. TB takes an economic toll equivalent to $12 billion dollars per year from the incomes of poor communities.

The studies described below address the expenses related to chronic conditions. They vary in terms of methods and degree of rigor. However, the findings consistently demonstrate high economic costs related to chronic conditions.

**Cost of Asthma in Singapore**

Medical costs for asthma constitute 1.3% of Singapore’s total health care cost (i.e., $33.93 million per year).


Tobacco companies target the poorest countries that have inadequate or non-existent public health education campaigns.
Cost of Asthma in Estonia
Asthma accounts for 1.4% of direct health care costs, or 2.1 million EUR. Medication expenses are 53% of the total.

Cost of Heart Disease in the USA
Direct health care expenditures for heart disease are $478 per person per year. Indirect costs, including lost workdays and reduced productivity, on household income are $3013 per year. To the extent that all of these people would be employed, this translates into an estimated $6.45 billion lost in productivity every year.

Cost of Diabetes in Taiwan, China
Over 2% of the population has a diagnosis of diabetes. The direct costs of health care for this condition in 1997 was 11.5% of the total costs of health care for the country and was 4.3 times higher than the average cost of care for individuals without diabetes.

Cost of Diabetes in India
Approximately 20 million persons in India are diagnosed with diabetes and the annual estimated cost of US$ 2.2 billion for health care for this population.

Cost of HIV/AIDS in the Ivory Coast
In the Ivory Coast, the direct costs of treatment of children born to HIV-infected mothers and children infected with the virus were estimated for 1996. The mean cost of treatment was 1,671 FF (254 EUR) per child-year for infected children. This amount is 709 FF (108 EUR) more than the mean cost of treatment for HIV-negative children born to HIV-positive mothers. HIV infection resulted in a 74% increase in treatment costs.

Cost of HIV/AIDS in India
The loss of productive potential due to HIV/AIDS from 1986 to 1995 is estimated to be between 8 and 28 million years. The estimated total annual cost (in billions of Rupees) of HIV/AIDS in India under low, medium and high estimates was 6.73, 20.16 and 59.19, respectively. The estimated annual cost of HIV/AIDS appears to be about 1% of the GDP of India if based on the high estimates.
Cost of Hypertension in the USA

The medical costs related to hypertension were $108.8 billion in 1998. This is approximately 12.6% of total national health care spending.


The failure to address the economic repercussions of chronic conditions by revising health policies and health services endangers the economic prosperity of all nations.

Impact on the Poor: A Vicious Cycle

Approximately 1.2 billion people in the world live in extreme poverty (i.e., live on less than $1 per day). This group is less healthy and experiences increased exposure to risks associated with ill health than do more economically advantaged groups. For example, conditions such as HIV/AIDS and TB disproportionately affect the poor.


Even in high-income countries, those in poverty are vulnerable to chronic conditions. For example, in the United States, children from poor families are at increased risk of experiencing chronic problems. Once a chronic condition develops, economically disadvantaged children experience barriers to care, they are more likely to be uninsured than are children from non-poor families, and they are more likely to lack a regular source of health care. More concerning, poor children with chronic conditions receive less ambulatory care services, and use more inpatient hospital care than their non-poor counterparts.


The poor are at risk of becoming more impoverished when they experience diminished health or a health crisis in the household. They often spiral in a vicious cycle of poverty and poor health as shown in the diagram at right.
A cycle such as this one involving limited resources and poor health is difficult to break. It often perpetuates. Consider families in which a parent has a chronic condition that precludes his/her working. Children in these families are at risk of poor health due to the lack of family resources, and when they surrender to illness, the cycle of poverty and chronic health problems endures. The children develop chronic conditions, cannot participate in the work force as adults, cannot purchase resources, and are unable to improve their health or poverty situation. When they have children, the cycle continues.

The Path from Poverty to Chronic Conditions

To understand further the health and poverty relationship, consider the path from poverty to chronic conditions. A number of socioenvironmental factors play a role and are critical determinants of health status:

- **Prenatal factors.** Mothers with poor nutritional standing bear children who experience chronic conditions in adulthood such as diabetes, hypertension, and heart disease. Poverty and poor health during childhood is associated with adult chronic conditions as well, including cancer, pulmonary disease, cardiovascular disease, and arthritis.
  
  
  

- **Ageing.** The role of age surfaces in studies of the impoverished elderly in developed and developing countries. In Kenya, the poor elderly are observed to have poor health and unsatisfactory access to care. A UK study found that older adults are at high risk of physical dysfunction and cannot afford care for their chronic conditions.
  
  
  

- **Socio-economic Status.** People with the lowest socio-economic status (SES) have eight times more relative risk for schizophrenia than do people with the highest SES.
  
  
Education and Unemployment. Poor families tend to receive less education, which has been associated with higher rates of mental disorders in Brazil and in Pakistan linked with limited knowledge of chronic conditions and their management. Moreover, unemployment has been associated with health problems; morbidity and mortality rates are higher in the unemployed than in the general population. For example, compared to people without mental disorders, those with schizophrenia are 4 times more likely to be unemployed.


A significant portion of poor health results from poverty and low education levels or from their consequences in inadequate food or sanitation or other specific risks.

The World Health Report 1999

Environment. Environments where the poor live and work are associated with diminished health status. Greater exposure to disease agents, increased susceptibility, and poor health behaviours interact to impact health status. This occurs in developed as well as developing countries. The work environments of the poor tend to be more physically demanding and place individuals at risk of injury due to automobile collisions or exposure to harmful substances. Hazardous chemical exposure and pollution, particularly in developing countries have been linked with local prevalence rates of cancer, cardiovascular, and respiratory diseases.

Warden J. Britain’s new health policy recognises poverty as major cause of illness. BMJ. 1998; 316(7130):495.

Access to care. The economically impoverished often lack access to health care or preventive measures that, in turn, have been associated with poor health outcomes and
exacerbation of chronic conditions. Care often is delayed or impeded because of cost for indigent groups. In Vietnam, compared to the rich, the poor were observed to delay treatment, use less government provided health services, and pay more for each episode of care. Similarly, in Mexico, poor populations experience inadequate care because of restricted access to medications and health professionals due to unavailability or expense. In general, preventive care is too costly and often is out of reach for the poor allowing avoidable health problems to become chronic conditions. This relationship holds for developed countries, such as the USA and has been substantiated in Ghana, and Sub-Saharan Africa. Finally, even when care is publicly funded, distance and travel time may exclude the poor from receiving adequate services.


The Path from Chronic Conditions to Poverty

The poverty-chronic condition relationship is bi-directional, and while there is a path from poverty to chronic health problems, the path of chronic health problems to poverty deserves equal consideration. Loss of income, the costs of treatment, and marginalization because of chronic health problems negatively affect the economic status of those with chronic conditions.

↓ Loss of income. Chronic conditions have been linked to work disability, early retirement, and reduced productivity that may put employees at risk of premature job termination. This phenomenon has been observed in persons with heart disease and asthma. In addition, a survey in Bangladesh noted significant loss of income in persons with tuberculosis.


**Loss of education.** In an underdeveloped community in South Africa, 50% of school age children who had at least one parent with chronic hip disease had not received schooling. This was in contrast to the 30% of young people whose parents did not suffer from hip disease, who had no schooling.

**Treatment costs.** Treatment expenses for chronic conditions can be exorbitant when conditions are not initially well managed or prevented. For example, Rice et al. estimated direct costs of treatment for chronic mental disorders at $42.5 billion per year.

**Marginalization.** Persons with chronic conditions are at risk of marginalization and stigmatization in their communities that may result in further limitations in educational and employment opportunities. Moreover, stigmatization and neglect have been associated with exacerbation of chronic problems. Women with chronic conditions are at even greater risk of harm, educationally, financially, and physically.

Finally, the relationship between poverty and chronic conditions is limited not only to the lack of resources in the economically disadvantaged. Education about health and healthy behaviours among impoverished groups appears especially deficient. For example, consider the costs associated with health-threatening behaviours and unhealthy lifestyle: not using tobacco costs less than using tobacco, basic foods may cost less than unhealthy foods, and daily travel by walking or bicycling is less expensive than using other modes of transportation. Clearly, there are additional factors beyond lack of resources to be considered when examining the poverty-chronic condition relationship.
Impact on Developing Countries: “Double Jeopardy”

Developing countries are experiencing a case of “double jeopardy.” They concurrently face two major and urgent health concerns:

- Continued infectious diseases, malnutrition, and maternal/perinatal deficiencies
- Rapid escalation of other chronic conditions that are not communicable (e.g., heart disease, depression, and diabetes)

The “double burden” of disease for countries experiencing a transition in their health care problems is especially challenging. Infectious diseases and malnutrition problems obviously necessitate attention, but these problems cannot take precedence over the growing epidemic of other chronic conditions. Both problems require judicious planning and strategizing. Thus, countries experiencing “health transitions” are in the double jeopardy situation of simultaneously addressing acute infectious diseases and maternal health in addition to chronic conditions that are noncommunicable. The only solution is a dual agenda of health care in countries experiencing multiple acute and chronic problems. Developing countries have to brace themselves to meet these challenges and to embrace innovative ways of doing so.

Double Burden of Disease in Middle/Low Income Countries

![Graph showing DALYs for India and Sub-Saharan Africa in 2000 and 2020]

Summary

“Chronic conditions” describes all health problems that persist across time and require some degree of health care management. Diabetes, heart disease, depression, schizophrenia, HIV/AIDS, and ongoing physical impairments all fall within the category of chronic conditions. This section outlines the justification for an updated definition and conceptualization of what constitutes a chronic condition. The separation of health problems into acute vs. chronic seems most pragmatic, comprehensible, and in line with the most contemporary thinking.

Globally, chronic conditions are on the rise. Due to public health successes, populations are ageing and increasingly patients are living with one or more chronic conditions for decades. This places new, long-term demands on health care systems. Not only will chronic conditions be the leading cause of disability throughout the world by the year 2020; if not successfully managed, they will become the most expensive problems faced by our health care systems. In this respect, they pose a threat to all countries from a health and economic standpoint. Chronic conditions are interdependent and intertwined with poverty, and they complicate health care delivery in developing countries that concurrently face unfinished agendas around acute infectious diseases, malnutrition, and maternal health.

Chronic conditions will not go away; they are the challenge of this century. To alter their course will require the concerted and sustained efforts among decision-makers and leaders in health care in every country in the world. Fortunately, there are known, effective strategies to curtail their growth and reduce their negative impact.