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A life course perspective of maintaining independence in older age

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under the guidance of WHO's **Ageing and Health**

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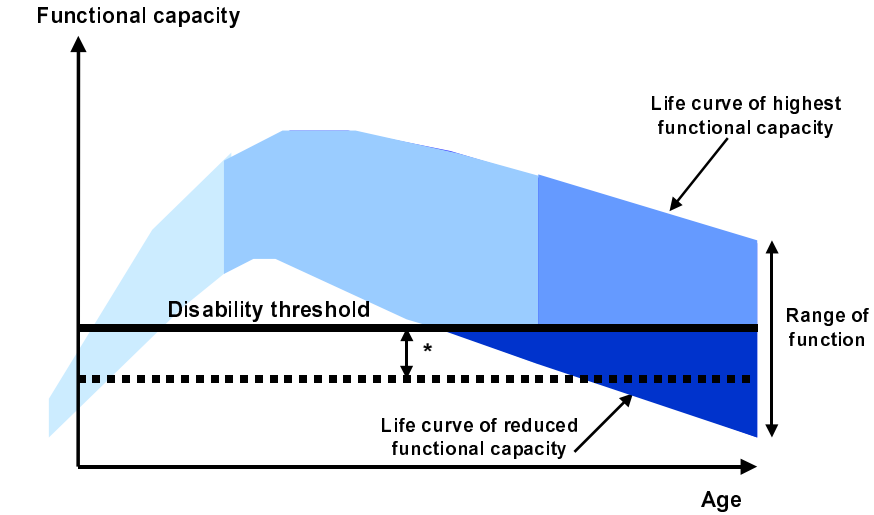
1. THE LIFECOURSE PERSPECTIVE OF AGEING

Ageing can be defined as the process of progressive change in the biological, psychological and social structure of individuals. For statistical purposes, 'the aged' are commonly placed into specific age groups, for example those aged 60 years and above, depending on cultural and personal perceptions. However, ageing is a life-long process, which begins before we are born and continues throughout life.

The functional capacity of our biological systems (eg. muscular strength, cardiovascular performance, respiratory capacity etc.) increases during the first years of life, reaches its peak in early adulthood and naturally declines thereafter. This is captured in Figure 1, which has been developed as the conceptual framework of the WHO Programme on Ageing and Health. The slope of decline, however, is largely determined by external factors throughout the life course. The natural decline in cardiac or respiratory function, for example, can be accelerated by smoking, leaving the individual with lower functional capacity than would normally be expected for his/her age. Similarly, poor nutrition in childhood may predispose through weaker bone structure to the development of osteoporosis in adulthood, thus increasing the slope of decline. The difference in decline in functional capacity between two individuals is often only evident later in life when a sharper descent may result in disability.

Health and activity in older age are therefore a summary of the living circumstances and actions of an individual during the whole life span. This conceptual approach presents new opportunities, as people are able to influence how they age by adopting healthier life styles and by adapting to age-associated changes. However, some life course factors, which influence health and ageing, may not be modifiable by the individual. Socio-economic factors, including economic disadvantages and environmental threats, may affect the ageing process by predisposing to disease in later life. In this respect it is important to note that the 'disability threshold' shown in Figure 1 is not rigidly defined. In a supportive environment an individual who has experienced substantial loss in any given functional capacity may continue to live independently while another, with the same degree of functional loss in a less supportive environment will experience loss of independence. There are also important gender differences in the way we age, with women having a

Figure 1: A life-course perspective for maintenance of the highest possible level of functional capacity



higher life expectancy but on the whole suffering more disabilities in older age than men.

This report presents a summary of the life course events, which determine the ageing process. It is acknowledged that the elements may not be sequential, but a chronological order has been chosen for practical purposes. Although some of the factors are presented individually, they are often inter-linked and rarely occur in isolation.

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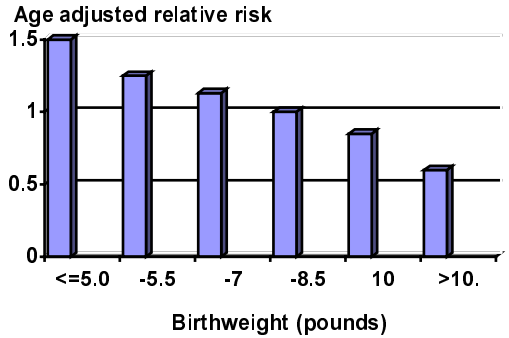
2. FETAL DEVELOPMENT

2.1 Fetal 'programming'

The life course begins when we are still in the womb, and the influences we are exposed to during this time may leave a lasting mark on it. Current research strongly suggests that adverse influences during fetal life, including undernutrition and lack of oxygen, prompt the fetus to make numerous adaptations to sustain its development. These adaptations may result in persisting changes to organ structure and metabolism, which are called 'programmed'. They are thought to lead to disease in adult life, such as circulatory diseases, diabetes, chronic airflow obstruction and disorders of lipid metabolism.

Figure 2.1 shows that the risk for coronary heart disease and stroke falls with increasing birthweight, a surrogate marker for growth in the womb. People who have been undernourished in the womb may therefore be

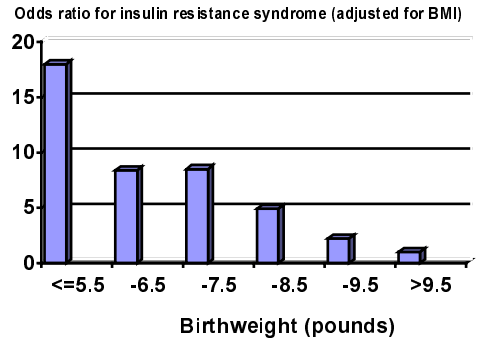
Figure 2.1: Relative Risk of non-fatal coronary heart disease and stroke according to birthweight



(Source: Barker DJP. Mothers, Babies and Health in Later Life. Churchill Livingston, 1998)

more likely to develop coronary heart disease in adulthood. These observations can even be made in individuals who do not smoke and who have maintained normal body weight later in life. Similar findings were reported for the insulin resistance syndrome, a condition which leads to non-insulin dependent diabetes (Figure 2.2). More recently, impaired early growth has been linked with accelerated ageing. A decline in muscular strength (as indicated, for example, by reduced grip strength of the hand) is a marker of ageing, and was found to be more pronounced among men and women who had low weight at birth. A specific nutritional deficiency is maternal iodine deficiency, which leads to hypothyroidism (and subsequently cretinism) in the newborn, if it remains untreated.

Figure 2.2: Prevalence of insulin resistance syndrome in British men aged 64 years according to birthweight



(Source: Barker DJP. Mothers, Babies and Health in Later Life. Churchill Livingston, 1998)

Moreover, the effects of our own fetal development may be carried into the following generation. It has been shown that the two main determinants of a baby's weight are the mother's weight before she conceives and her own birthweight. It may therefore take several generations before nutrition in the womb can be optimised. Further intensive research is needed to establish the cellular and molecular mechanisms, which may determine fetal nutrition and growth, and therefore guide interventions.

The concept of programming does not dismiss the influences and importance of risk factors operating later in life, such as smoking, excessive alcohol consumption, inadequate exercise, and obesity, all of which contribute to the development of chronic diseases. Instead it proposes that these environmental factors amplify the disadvantages that may have occurred in fetal life. This has important implications for countries where fetal growth retardation is common and rates of smoking, obesity and a sedentary life style are increasing.

Improving fetal development by

- *targeting health promotion activities at improvement of health and **nutrition** of girls, young women, and mothers during pregnancy and lactation, especially in countries and/or social groups where fetal growth retardation prevails*
- *promoting the adoption and maintenance of a **healthy life style** (chapter 4), with special emphasis on people undernourished while in the womb*

2.2 Congenital disorders

Permanent physical or mental defects in the newborn can be caused by genetic disorders, by exposure to toxins, or through infections during pregnancy. Examples of genetic diseases are phenylketonuria (a metabolic disorder that, if left untreated, can lead to mental retardation), or familial hypercholesterolaemia (high cholesterol levels predisposing to cardiovascular disease in adult life).

Exposure to toxins, such as smoking, drug misuse and excessive alcohol consumption during pregnancy may cause growth impairment and mental retardation in the newborn. Common infections, which may cause long-

term injury, include the rubella and cytomegaly virus, and especially malaria infection during pregnancy, which is probably the biggest cause of low birth weight worldwide.

Reducing disease in the newborn through

- *availability of adequate **screening** programmes, both pre- and post-natal, for all pregnant women and their families*
- *ensuring long-term **follow-up** for those with congenital disease and their families*
- *providing information about the risks of toxic substances and the mode of transmission of infectious diseases, which may be hazardous to the unborn child. **Smoking prevention** and cessation programmes should be particularly targeted at women*
- *promotion of universal **immunisation** against rubella for girls and for susceptible women*

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3. INFLUENCES IN INFANCY AND CHILDHOOD

3.1 Breast-feeding

Protein-energy malnutrition in childhood is common in developing countries and in poorer communities of industrialised countries. Breastfeeding is an effective, low-cost intervention to reduce malnutrition in infancy and childhood. Breastmilk provides ideal nourishment, and protects against infections and allergies, promotes mother/child bonding, and may reduce the development of malabsorption syndromes.

But there is also evidence, that exclusive breast-feeding beyond the age of 6 months may not supply adequate energy to babies, and solid foods should be added to the baby's diet. Infants should be fed exclusively on breast milk from birth to 4 to 6 months of age; that is, they should be given no other liquids or solids other than breast milk, not even water, during this period. Continuing to breastfeed up to two years of age or beyond, in addition to giving adequate complementary foods, helps to maintain adequate nutritional status and prevents diarrhoea.

Despite this knowledge breast-feeding is not sufficiently encouraged at present. WHO figures indicate that only 35% of all infants worldwide are exclusively breast fed between birth and 4 months of age.

Increasing rates of breast feeding by

- *encouraging **breast feeding** among mothers throughout the world, by training health workers who take care of women and infants, on breastfeeding counselling and lactation management*
- *Using the **media** to promote community support for breastfeeding*
- *promoting **legislation** compatible with the Code of Marketing of Breastmilk Substitutes and enforcing compliance where adopted*

3.2 Malnutrition in early life

According to WHO estimates, approximately one third of the world's children suffer from protein-energy malnutrition.

Vitamin and other nutritional deficiencies may lead to adult diseases like blindness, anaemia, bone disease, and brain damage. Iodine deficiency in childhood may lead to learning difficulties, which can be improved by iodine supplementation. Low weight gain in childhood, particularly during the first year of life, has been found to be associated with increased risk of cardiovascular disease and diabetes in adulthood. It is also linked to changes relating to the ageing process, including cataract, lower hearing acuity, and reduced muscle strength.

Malnutrition in childhood increases the risk of acquiring infectious diseases, particularly respiratory and diarrhoeal infections, which contribute to chronic disease in adult life (chapter 6).

Improving childhood nutrition through

- ***integrated social policies*** *to improve nutrition in childhood, as food security and nutrition are linked to the economic development of countries and individuals*
- *providing nutritional* ***information*** *through educational by social workers, midwives, health visitors, school environments, and the media*
- ***early recognition*** *of malnutrition, particularly in underserved rural and poor urban areas*
- ***fortification of foods*** *and/or water with micronutrients*

3.3 Childhood obesity

While undernutrition and malnutrition persist, childhood obesity is increasingly emerging as a global problem. Recent data from developing and industrialised countries suggest that about 22 million children under the age of 5 years are overweight.

Overweight in childhood has been linked to such factors as physical inactivity caused by long periods of TV watching. Over one third of overweight children carry obesity into adulthood, thus increasing their risk of developing cardiovascular disease and diabetes.

Reducing childhood obesity through

- *interventions aimed both at obese children and their parents (i.e., provision of information about* ***nutritional value*** *of food stuffs and accurate labelling of products)*
- *introduction of health promotion activities, which encourage* ***physical activity*** *at home and in schools*
- *education of clinicians to identify overweight children and advise on* ***weight reduction*** *measures*

3.4 Childhood infections

Infections in early childhood are common and often preventable. It is estimated that at least 2 million children die each year from infections for which vaccines are available. In those who survive, infectious diseases may lead to chronic disorders in later life, which can result in premature death. This is due to both the persistence of the pathogen in the body and the structural and functional impact of infection on the human body. Numerous studies have shown that respiratory infections in childhood may determine susceptibility to chronic bronchitis in adult life; children with poor lung growth before birth are particularly affected. These harmful effects are later magnified by adverse adult life style factors, such as smoking and indoor pollution.

Diarrhoeal disease, while often preventable, is common in children, particularly in developing countries. WHO estimates that nearly 20% of

all deaths in children under the age of 5 years in the developing world are due to diarrhoeal disease. One million deaths due to measles, another common but preventable childhood infection, were recorded in 1995. Other infectious diseases, such as river blindness, malaria and tuberculosis, may cause life-long and often debilitating functional disabilities.

Combating infection by

- *publicising the availability and promoting the up-take of **immunisation** programmes*
- *combating 'vaccine fatigue' (which has increased in industrialised countries) through educational efforts, using health visitors or the media*
- *reducing domestic **overcrowding**, and improving **housing** and **sanitation**, to reduce transmission of infections*
- *promoting **safe water** supply, frequent **hand washing** and good **food hygiene** to prevent transmission of diarrhoeal disease*
- *providing early diagnosis of and access to **therapy** for infections, for example through government policies, which offer free treatment for the most debilitating diseases (eg. free leprosy treatment in India)*
- *promoting **breastfeeding***

3.5 Working children

The International Labour Organisation estimates that the number of working children below the age of 15 is 120 million worldwide.
The issue is complex as in many cases the child's income is essential to the family's survival. The work is often carried out in hazardous industries, where exposure to toxic substances and pollution and the risks of occupational accidents are high. The effects of those exposures and long working hours without rest frequently lead to chronic disease and disability.

Promoting a safer childhood by

- *improving employment opportunities for **adults***
- ***legislation** against and regulation of child labour (introduction of **labels** marking products not manufactured by children has been suggested)*
- *providing access to **free schooling**, and facilitating enrolment for all children*
- *creating safer work environments*

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4. ADOLESCENT AND ADULT LIFE STYLE

The numerous so-called life style risk factors, which are listed below, have been associated with disease, disability and premature death in adult life. They are largely determined by harmful behavioural patterns, which are often acquired during adolescence. Harmful life styles are inter-related: those who smoke tend to drink more; those who drink are more likely to use illicit drugs, drop out of school earlier, and engage in more violent behaviour. Parental health behaviour is an important predictor of the life style that children will adopt.

4.1 Tobacco use

WHO estimates that tobacco causes approximately 4 million deaths each year worldwide, all of which are preventable. By 2030 this figure is projected to rise to 10 million deaths a year, of which 70% will occur in developing countries. Studies have shown that the majority of smokers began the habit before the age of 19 years. Smoking is the cause of up to 45% of cancer deaths, and contributes to circulatory diseases, including coronary heart disease and stroke, often at younger age.

Smoking is a major contributor to the development of chronic airflow obstruction, which in turn may greatly reduce quality of life in later years. Among those already affected by respiratory disorders, smoking tends to worsen lung function.

Preventing tobacco use and treating dependence by

- *providing **information** about the effects of smoking at school (incorporating teaching modules into national school curricula)*
- *legislation to **ban tobacco advertising** and the sale of tobacco to children*
- *increasing **tobacco excise taxes***
- *making **smoking-cessation programmes** more readily available*
- *taking the **differential needs** of adolescents and adults into account (eg. peer pressure)*
- *encouraging health insurers to offer lower premiums for non-smokers, and to cover costs for smoking cessation programmes in their policies*

4.2 Alcohol

While small amounts of alcohol protect against heart disease in later life, there is no evidence that encouraging drinking is beneficial for the individual or society as a whole. Chronic alcohol misuse is associated with impaired liver function and cirrhosis, cardiac disease and disorders of the central nervous system, including alcohol dependence. It is estimated that over 50% of those who report excessive drinking started before their fifteenth birthday. The overall impact of alcohol on mortality is high with approximately 774,000 deaths annually, many of which occur in young adulthood, such as those caused by traffic accidents, injuries, violence and homicides. Alcohol misuse may be the result or cause of a range of social problems including job losses, marital breakdown, and crime.

Reducing alcohol problems by

- *providing information about the consequences of alcohol consumption on health, family and society through **educational programmes** beginning at younger ages*
- *implementing **legislation** to ban the sale to and/or consumption of alcohol by teenagers, and limiting availability through **taxation** and **price control***
- *controlling **advertising** of alcoholic beverages, and banning those addressed at young people*
- *providing access to effective, early treatment for alcohol problems, liaising with NGO's and organizations that promote healthy life styles*

4.3 Illicit drug use

Throughout the world the periods most associated with illicit drug use are adolescence and young adulthood. There is evidence from numerous countries that up to 45% of 16-year-olds have tried illicit drugs at least once, and up to 29% were current users. Most of these young people are cannabis users, but the use of psychoactive substances, including amphetamines, 'ecstasy' and solvents is increasing among certain groups of young people. Health risks, which are associated with amphetamine

use, include psychiatric and neurological disorders, irregularities of the heart beat, high blood pressure, liver damage and even death.

The shared use of equipment for injecting drugs carries an additional risk of transmission of HIV and other viruses, including the ones causing hepatitis B and C. Both can induce chronic liver disease; the Hepatitis B virus causes 60-80% of all primary liver cancer. As with alcohol, drug use is associated with riskier health behaviour, such as unprotected sex, educational failure and crime.

Combating drug misuse by

- ***informing*** *children and adolescents about the physical, psychological and social effects of illicit drug use, using school and parental sources*
- *teaching young people* ***life-skills*** *to build confidence and self-esteem in young people, which enables them to 'say no' to drugs*
- *introducing and encouraging a broad, integrated and comprehensive range of* ***prevention, treatment*** *and* ***rehabilitation*** *approaches to substance use*

4.4 Physical activity

Physical activity is both enjoyable and leads to numerous health gains. Physical activity refers to a broad range of body movements from those undertaken in daily life to collective sport activities. The main benefits of regular physical activity are increases in functional capacity by boosting muscle strength, mobility and cardiovascular and respiratory performance. Physical activity is also important for reducing the risk of developing osteoporosis, a major cause of hip fracture in older age. Moreover, it generates a sense of wellbeing and contributes to social integration, as it is often conducted in a group setting.

Lack of physical activity increases the risk of developing and dying from chronic conditions, including obesity, diabetes, and circulatory diseases. It has been shown that even small improvements in physical capacity in older people are associated with significantly lower risk of death from cardiovascular disease.

Maintaining adequate fitness levels by

- *encouraging physical exercise in childhood by including it into* ***school curricula*** *and family activities*
- *creating supportive* ***environments*** *for people of all ages to engage in physical activity*
- *promoting physical activity in a* ***culturally sensitive*** *and appropriate way*

4.5 Dietary habits

There are considerable cultural differences in diets and eating habits around the world. Dietary habits are often established in childhood, but remain modifiable throughout the life course.

Diets rich in calories and **animal fat**, but relatively poor in vegetables, fruit and fibre (often referred to as 'Western type' diets), have been linked to bowel, prostate and breast cancer, as well as to obesity, cardiovascular diseases and diabetes. Excessive intake of **salt** (sodium chloride) contributes to the risk of developing hypertension, while potassium, which is found in fruit and vegetables, is thought to have a protective effect. Raised serum **cholesterol levels** are associated with an increased risk of cardiovascular disease. Being overweight multiplies the risk of developing chronic diseases like diabetes, high blood pressure and coronary heart disease.

Through increasing affluence many people in developing countries tend to adopt a 'Western type' diet. This could be particularly detrimental for individuals who had previously been chronically undernourished, either in childhood or in the womb.

Promoting healthy eating by

- *highlighting the importance of **food diversity** (fruit, vegetables, meat etc.) and a **balanced diet**, which is high in fibre and low in animal fat and salt*
- *encouraging **schools/work places** to organize 'healthy eating' promotions*

4.6 Body composition

Obesity, or overweight, is common and increasing worldwide. It is estimated that the number of moderately to severely overweight adults currently exceeds 200 million, nearly 60 million of whom live in developing countries. A recent study from Canada estimates that over half of the population is overweight, with one third being at increased risk of morbidity and premature death.

Overweight contributes to the development of numerous chronic diseases, including diabetes, circulatory disease, cancer, respiratory and musculo-skeletal disorders. The Canadian findings suggest that about 20% of cases of high blood pressure, diabetes, cervical cancer and gall stones may even be directly attributable to obesity.

Obesity is most commonly the result of unhealthy eating habits coupled with a sedentary life style. There is also evidence that predisposition to obesity, particularly of the so-called 'central' ('apple-shape') type, may be programmed by undernutrition in fetal life and infancy.

Reducing obesity by

- *promoting **healthy eating patterns**, especially in children and adolescents, and encouraging physical activity*
- *educating primary care professionals to provide advice on **weight reduction***
- *provide **information** about the health risks of obesity particularly to countries, where cultural and dietary patterns may encourage obesity*

Although rates of obesity are increasing worldwide, undernutrition and **underweight** remain by far the most important problem for most of the developing world. Like people who are overweight, those at the opposite spectrum of body composition, who are extremely thin, also carry a higher risk of developing chronic disease. In studies of older men and women, both very high and very low values of body mass index (BMI) were associated with reduced functional capacity. Being underweight in later life may also be a consequence or symptom of chronic disease, rather than its cause. Furthermore, rates of eating disorders like anorexia or bulimia, which may lead to fatal undernutrition, are increasing among younger people in many countries.

Avoiding undernutrition by

- *providing **food security** and economic support to countries where malnutrition or famines prevail, or which are at risk of developing food shortage*
- ***educating** health professionals in diagnosis and treatment of nutritional disorders*
- *promoting the concept of a healthy and **balanced diet** in schools, work places and leisure settings*
- ***challenging** the cultural appreciation of extreme thinness in many Western societies*

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5. INFLUENCES OF SOCIAL ENVIRONMENT

Previous chapters have described how the individual may influence his/her life course by alterations in behaviour and life style. This section illustrates how broader social and economic factors can affect health. Socio-economic components described below are often inter-linked, depend largely on a nation's economic development and are often beyond the individual's control.

5.1. Economic factors

Even in the richest countries, poverty is linked to a shorter life span and to poorer health and disability in older age. This gradient can be observed in all societies around the world.

Less well off people tend to live in more **harmful environments** as they are, for example, more likely to be exposed to higher levels of air pollution (indoor and outdoor) and to vector-borne diseases (e.g. malaria). In many developing countries the home is used as workplace where hazardous substances may be stored. It is estimated that up to 500 million cases of illness world-wide are attributable to environmental factors, and that air pollution is responsible for 3 million premature deaths annually.

Poorer people often live in inadequate **housing**; the poorest may not have shelter. Poor housing structure, dampness, overcrowding and lack of sanitation may predispose to accidents, respiratory disorders and transmission of infectious diseases. Although progress has been made, more than 1 billion people worldwide still do not have access to adequate and safe **water** supply, and a variety of physical, chemical and biological agents render many water sources unhealthy.

Information about and access to adequate **nutrition** depends largely on financial means. Poorer people in developed countries tend to substitute fresh food for cheaper processed food of lower dietary value. Although the percentage of people with inadequate access to food has declined worldwide, WHO figures indicate that 840 million people are still below the nutrition threshold (representing the minimum dietary requirements). Malnutrition remains a major contributor to disease and disability in the developing world.

People on lower incomes, particularly in countries with less established health care systems, may not be able to afford or obtain **medical care**, and curable diseases may lead to chronic disability.

Poor health in financially disadvantaged people is also a reflection of the **psychological effects** of material insecurity, including stress, anxiety, feeling of lack of control and low self-esteem. In 1997 WHO estimated the morbidity from anxiety disorders to be 400 million cases world-wide. The impact of anxiety on health also includes increased susceptibility to infection, and high blood pressure with its associated cardiovascular consequences.

Reducing economic inequalities by

- *promoting integrated policies to improve **housing, sanitation** and **water supply***
- *reducing **environmental threats**, including air pollution and vector-borne diseases, through legislation and ecological activities (eg. safer workplaces, chemical treatment of infested waters)*
- *enhancing **food security** and ensuring availability of fresh and nutritious food at affordable prices*
- ***reducing inequalities** in income and access to health care*

5.2 Education

Higher levels of education are associated with better health. This is partly, but not entirely related to the association between higher earning potentials and higher educational levels. However, United Nation figu-

res (1995) indicate that children's health is directly linked to the extent of schooling their mother had received. Throughout the world better educated women have fewer and healthier children. This is a reflection of higher nutritional status, access to child care information, safer pregnancies and childbirth, as well as improved access to health care.

More educated people tend to be more confident, feel empowered to make lasting decisions about their lives, and are more likely to choose and maintain healthy life styles.

Improving education through

- *development of policies and legislation to ensure **free** primary and secondary **education** for both boys **and girls***
- *introduction of **pre-school programmes** to stimulate children academically, to promote their social skills and the adoption of healthy behaviour from early in life*
- *improvement of **employment opportunities** for adults to reduce rates of child labour and to foster schooling*

5.3 Cultural and societal factors

Social perceptions of the value and benefit of older age vary in different cultures. In many traditional societies typical words which describe older people characterize them as 'persons with knowledge'. In such societies, older people tend to enjoy higher social status and perform more roles in society. They are more likely to live with their adult children, are often involved in childcare, and their opinions on family matters are more frequently sought. The modernisation of traditional societies has eroded those traditional values, often resulting in loss of esteem for older people and leading to social isolation.

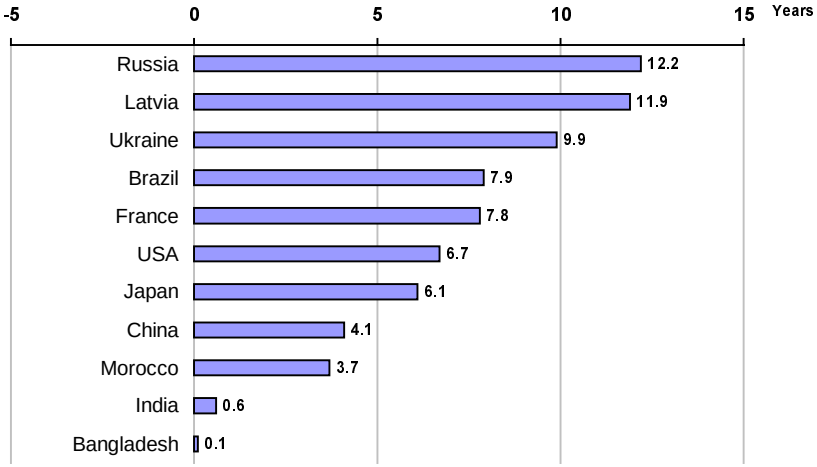
Social integration and support tend to provide people with emotional and practical resources. Older people, who are more socially integrated - for example those who are members of social clubs or religious organizations, or those involved in family activities - enjoy better health. The contributions they make increase their self-esteem, and they continue to be challenged in terms of physical mobility and mental agility.

Promoting social integration by

- *providing **opportunities** for older people to contribute to their families and societies through their paid and unpaid work and caring activities*
- *providing **support and opportunities** for families who care for older persons and those most often excluded (e.g.widows in some societies)*
- *promoting **intergenerational solidarity**, a 'society for all ages' - for example by active participation in the Global Movement for Active Ageing, launched by WHO Ageing and Health in 1999*

There are important **gender** differences in the way people age. Throughout the world, women have a longer life expectancy at birth than men (Figure 3), the largest differences being in Eastern Europe, the Baltic States

Figure 3: Female over male advantage in life expectancy (years) at birth in 1995



(Source: UN Population Figures, 1998)

and in central Asia. However, women tend to be affected by more disabling diseases in later life than men. Reasons for the different ageing experiences in men and women are still poorly understood.

There are important differences in the life course of men and women, and they become more pronounced with age. Women may suffer adverse effects from pregnancy and childbirth, and in many societies they encounter inequalities regarding literacy, training, and job opportunities, as well as poorer access to adequate nutrition and health care. Due to domestic tasks women are more frequently in contact with polluted water, leading to greater risks of infections from this source. Women may also have lower degrees of independence and more restrictions on life choices, depending on prevailing social expectations and roles. These factors are associated with poorer health in women. On the other hand, men are at disadvantage, too, as clearly indicated by their much higher mortality rates experienced throughout life, including in older age.

Narrowing the gender gap by

- *promoting **research** into risk factors and causality of disease to gain a clearer understanding of the gender differences, and strengthening of **databases** (collating mortality and morbidity information)*
- ***policies** to improve women's health - for instance, by increasing female literacy rates, valuing women's caring activities and narrowing the earning gap between men and women*
- *improving access to adequate **nutrition** and **health care**, and creation of safer work and domestic environments for women*

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6. DISEASE DURING THE LIFE COURSE

Chronic and infectious diseases, many of which are direct results of life course events, influence our quality of life in older age. Disease may affect biological structures, thus accelerating the ageing process, and can also lead to disabilities. Considering the concept of functional capacity (Figure 1), which reaches its peak in early adulthood and declines at varying speed, diseases in adult life may hasten the natural decline. This chapter presents the most common conditions, which may have a profound impact on the quality of later life.

6.1 Non-communicable diseases

Non-communicable diseases tend to be established over long latent periods of time during the life course and may not be apparent until complications arise.

Regardless of whether they have their origin in fetal, childhood or adult life, **coronary heart disease, high blood pressure** and **stroke** contribute to a faster decline in functional capacity, because they can reduce a person's exercise tolerance, mobility and mental functioning. **Diabetes** can accelerate organ changes often associated with ageing, including increased lens opacity (cataract), decline in kidney function, and impaired arterial circulation. These, in turn, may lead to circulatory diseases and their complications. Chronic airflow obstruction **(emphysema** and **chronic bronchitis)** may originate in the womb, through childhood infections, or may be a consequence of smoking and air pollution later in life - or may develop as a result of all of these factors combined. Chronic lung disease can limit an individual's functioning in very obvious ways, as shortness of breath, which is a common symptom, reduces exercise tolerance and mobility.

Most **cancers** arise in later life, and the risk for many forms of cancer increases with age. Numerous factors contribute to the development of cancers, such as smoking, diets rich in animal fat and (possibly) low in fibre or anti-oxidants, excessive alcohol consumption, infections and hormone disorders. WHO estimates that one third of cancers may be preventable, and a further third curable, if diagnosed early. The remaining third may benefit from recent improvements in palliative care. The effects of cancer on the individual's functional capacity may range from discomfort to severe disability, depending on type and location.

Musculo-skeletal disorders, including **osteoporosis**, can reduce mobility, thus affecting a person's independence and prospects for self-care. Abstinence from smoking, adequate physical exercise and maintenance of an adequate body weight during the life course protect against musculo-skeletal conditions. On the other hand, excessive physical demands coupled with malnutrition, as is common in many developing countries, increase their risk. Osteoporosis predisposes to fractures (particularly those of the hip), which are associated with temporary or permanent disability and high mortality.

Urinary incontinence is a common and often socially disabling condition among older people, which may lead to dependence or even institutionalization. It is estimated that 12% of the total population aged 75 or above in developed countries are affected. Worldwide the most common causes are thought to be dementia and stroke, the effects of childbirth, female circumcision and diseases of the prostate gland.

Mental illness contributes relatively little to mortality, but makes a large contribution to morbidity and disability - larger than hypertension, diabetes and musculo-skeletal disease combined. In 1997 there were an estimated 400 million cases of anxiety disorders, 340 million of mood disorders, 45 million of schizophrenia and 29 million with dementia worldwide. The causes of mental illness are poorly understood, and genetic, familial, behavioural and metabolic factors have been implied. Mental illness may also be a consequence of alcohol and drug misuse. Depression, often a result of social exclusion and isolation, is common

among many older people particularly in industrialized countries, and may diminish functioning in every aspect of their lives. Other mental disorders may pose a huge burden of suffering on the individual, their families and society.

Interventions for reducing the burden of disease

- *education of patients and physicians about life style adjustments (smoking cessation, weight reduction etc.) which are rewarding at any stage during the life course and contribute to healthier ageing*
- *information of patients about symptoms of **circulatory diseases, diabetes** and **airflow obstruction**, early diagnosis and appropriate treatment of disease*
- *encouragement of implementation and up-take of evaluated screening programmes for **cancers**. Information of physicians and patients about risk factors and symptoms. Promote early diagnosis, timely treatment and use of recent improvements in palliative care*
- *prevention of **osteoporosis** by abstinence from smoking, and maintenance of adequate body weight and levels of physical activity, and by hormone replacement therapy where indicated*
- *prevention of **incontinence** by practicing safe childbirth and banning female genital mutilation. Education of patients and physicians about treatment and self-care of incontinence*
- *development and evaluation of individual, integrated **mental health** care programmes, which include provisions for substance and alcohol misuse. Universal adoption of the WHO diagnostic and treatment guidelines mental disorders for primary care professionals, which have been translated into more than 25 languages*

6.2 Communicable diseases

Although infectious diseases are intrinsically acute, they may lead to chronic problems due to the infection's impact on the body's organ structure and physiology. This may give rise to permanent damage and disability in later life.
Even though **tuberculosis** (Tb) is being controlled in many parts of the world, over 7 million new cases of Tb were recorded in 1997. In the same year it was the leading infectious killer of adults with 3 million deaths. In those who survive, Tb may cause permanent lung and other organ damage, leading to reduced functional capacity in older age.

Due to the WHO eradication programme there has been a substantial decline in **leprosy** worldwide, but residual numbers of cases remain in India, Bangladesh, Brazil, and some African countries. Untreated leprosy may lead to very apparent and sometimes debilitating deformities. Domestic overcrowding and incomplete therapy in those affected, predispose to transmission of both diseases.

Vector-borne diseases, including **malaria** and **schistosomiasis**, may result from inadequate housing and constitute an occupational hazard because of employment in agriculture, mining and construction. Each year, there are 300-500 million clinical cases of malaria, up to 2.7 million of whom die. Even if treated, malaria attacks can persist, and result in chronic anaemia, multiple organ damage and disability, including brain injury.

A new health threat has emerged in the early 1980's in the form of **HIV/AIDS**, which currently affects about 31 million people. Transmission is most likely to occur through unsafe sexual practices, use of infected injection sets, through infected blood products and via the maternal-fetal route. AIDS is ultimately fatal, but sufferers tend to pass through a period of severe infirmity and disability. Although not primarily a health problem of older people, it will affect the way the younger generation will age. With up to 30% of the adult population infected in some countries, children are orphaned early in life. This in turn will influence numerous factors of their life course, including financial security, nutrition, and education, and affect their ability to age healthily. Moreover, the AIDS pandemic has far-reaching implications for the older generation who are left to care for their orphaned grandchildren.

Recent advances in anti-retroviral therapy have extended the life span in patients with AIDS in some countries; the high financial cost of the treatment, however, will limit the use of those therapies where the disease is most prevalent.

Combating infectious diseases through

- *promotion of the WHO recommended directly-observed-treatment-short-course (DOTS) for **tuberculosis**, which has been shown to achieve much higher cure rates and give less rise to drug-resistance, than non-DOTS approaches. Elimination of **leprosy** by establishing national programmes with assistance and technical co-operation from WHO. Increase of compliance in patients by offering treatment free of charge or at a reduced rate*

- *reducing rates and morbidity of **malaria** and **schistosomiasis** through policy decisions for vector control (e.g. desiccating or spraying of swamps, chemical treatment of infested waters), and availability of - usually cheap - treatment*

- *promotion of healthy life style measures as a key feature in the prevention of the spread of **HIV/AIDS**. Information of people of all ages about the mode of transmission (including mother to unborn child) and preventive actions ('safe sex', avoidance of needle-sharing etc.). Health promotional settings may include schools, primary care, media, and ante-natal clinics*

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7. HEALTHY AND ACTIVE AGEING IN THE FUTURE

Ageing is not an affliction but a natural part of the life cycle. We are all ageing, at any moment in our life, and we should all have the opportunity to do so in a healthy and active way.

To safeguard the highest possible quality of life in older age, WHO endorses the approach of investing into factors which influence health throughout the life course. The table below indicates how individual actions of people and health and social policies contribute to healthy ageing. For people who experience loss of function in later life, efforts should be targeted at restoring and/or maximising functional capacity to achieve the best possible quality of life.

ACTION TOWARDS ACTIVE AGEING

FACTORS	Individual action	Policy action
Fetal environment	● Ensure balanced nutrition in young girls and pregnant or lactating women ● Avoid smoking during pregnancy	● Focus health promotion activities on girls and women ● Increase awareness about importance of balanced nutrition for girls and women
Childhood environment	● Exclusive breastfeeding for the first 4 to 6 months of life ● Continue breastfeeding with adequate complementary food, up to 2 years of age and beyond ● Ensure balanced nutrition & adequate physical exercise for your children ● Have your child immunized ● Observe good hand & food hygiene ● Have infections treated early	● Promote breastfeeding and compliance with the Code of Marketing of Breastmilk Substitutes ● Promote balanced diet ● Fortify foods/water, particularly in areas of malnutrition ● Improve sanitation & housing and reduce domestic overcrowding ● Educate about and provide immunization programmes
Smoking	● Stop smoking - cessation is beneficial at any age ● Educate your children about the ill effects of smoking	● Ban tobacco advertising ● Ban sale of tobacco to children ● Provide health education in schools and workplace ● Promote smoke free environments ● Provide tobacco cessation programmes
Alcohol	● Maintain moderate drinking limits ● Seek professional help if you think you may drink excessively	● Ban sale of alcohol to children ● Provide health education in schools and workplace ● Provide counseling services to those who may be drinking excessively
Physical activity	● Exercise regularly, from the earliest years to older age; walking, climbing stairs, and housework are effective forms of exercise!	● Incorporate exercise into school curricula ● Create workplaces which provide exercise facilities

FACTORS	Individual action	Policy action
Diet	● Consume a diet high in fibre and low in animal fat and salt ● Reduce your weight if you are overweight and maintain normal body weight	● Increase consumer awareness about direct links between good nutrition and health
Adult Diseases	● Make life style adjustments as advocated above ● Make use of available prevention (screening & vaccination) programmes ● See your doctor at regular intervals	● Implement evaluated prevention programmes ● Ensure access to safe maternity services ● Legislate against and reduce environmental threats ● Provide accessible and affordable health care for all
Social integration	● Stay involved in your family, your community, a club, or a religious organization ● Continue to educate yourself and all your children	● Promote social cohesion and intergenerational solidarity ● Provide access to life-long education ● Implement legislation to protect the rights of vulnerable members of society and to prevent discrimination ● Educate the public about negative attitudes and practices resulting in social exclusion for older people
Gender	● Be aware of and speak out against gender discrimination ● Educate boys and girls to avoid gender stereotyping	● Implement legislation against gender discrimination in education, jobs, health care, property rights, marriage & inheritance laws ● Integrate gender analysis in health research & health care programmes
Income security	● Be informed about the public and private measures intended to protect income security over the life course	● Provide income security and access to appropriate health care for older persons ● Fight age discrimination in the work place