

# Summary

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- *The first overall Danish public health report is a collation of available knowledge about the state of health, morbidity and trends in these as well as public health determinants. Trends in Denmark are also elucidated in an international perspective.*
- *The report comprises four main sections. The first section examines the development in illness in Denmark generally and in relation to the eight widespread diseases – in Denmark called “folk-diseases” – (cardiovascular diseases, cancer, musculoskeletal diseases, mental diseases, chronic obstructive lung disease, diabetes, and asthma and allergy) together with infectious diseases, accidents and violence as well as dental status.  
The second section sheds light on factors of significance to public health. First the “KRAM” factors (diet, smoking, alcohol and exercise) and other lifestyle factors (stress, overweight and use of illicit drugs). Then selected areas governed by living conditions, the importance of the working environment, the external environment and nature for public health. Last follows an examination of the importance of the health services, including the importance of screening, and the need for evidence-based prevention and health promotion.  
In the third part the focus is on the state of health of selected population groups: children, elderly, men and women, social differences and ethnic minorities. In the fourth and final part, it is attempted to look into the future. How will morbidity develop up to 2020, what will the impact on hospital services be like, and how will preventive and health-promoting initiatives go?*
- *The “folk-diseases” are monopolizing so many resources, creating a poor life for many people and burdening the health services.*
- *Life expectancy continues to rise and in 2006 is 75.9 years of age for men and 80.4 for women, but compared with other OECD countries Denmark still ranks bottom.*
- *Many factors have a bearing on the development of “folk-diseases” (widespread diseases). There is a complex interaction involved between individual lifestyle factors, social relations and communities, living conditions and working conditions as well as general socioeconomic, cultural and environmental terms. The individual lifestyle factors account for much of this interaction. The health services seem to be taking on ever greater importance for a proper ability to function and quality of life among the elderly.*
- *There is a positive trend in a number of health habits. The proportion of daily smokers has fallen, but numbers of heavy smokers are growing among those that do smoke. The proportion of physically active people is on the increase. Dietary habits have improved, with a drop in fat content and increasing intake of fruit and vegetables. The use of hash (cannabis) and other illicit drugs seems to have stagnated.*
- *The negative side includes a marked rise in the proportion of obese people, an increase in the proportion of people exceeding sensible drinking limits, and a small but constant increase in the proportion that often feels stressed.*
- *Many middle-aged and elderly people have high blood pressure and among those on treatment, only one third are considered to be on optimum treatment. In general, falling cholesterol levels are in evidence.*
- *Working environment conditions and the state of the environment generally (air, soil, water, radiation, foodstuffs and indoor environment) have a bearing on the development of a number of disorders: musculoskeletal disorders, asthma and allergy, cancer, cardiovascular disorders, respiratory disorders, infectious disorders and skin disorders.*

- *Most children and young people are prospering and developing in keeping with their age. But children and young people's health behaviour are worrying in a number of areas, primarily with regard to smoking, alcohol consumption and physical inactivity. Approx. every tenth child is living with some chronic illness.*
- *The physical functional level and quality of life of the elderly have improved. From 1987 to 2005 life expectancy without functional limitations for 60-year-olds rose by 2.4 years for men and 1.3 years for women.*
- *There are still clear differences between men's and women's state of health and morbidity, and clear social differences in the population's health behaviour, morbidity, use of the health services and mortality. The disparity in health has not been eliminated—men's mortality is still greatest, and women live with more illness than men.*
- *The increase to date in morbidity is expected to continue. It is estimated that in 2020 there will be approx. two million adults stating that they have one or more long-standing illness, corresponding to a total growth of approx. 300,000 adults from 2005 to 2020.*
- *Activity in the health services is also expected to rise. The number of hospital admissions is estimated to rise by approx. 230,000 to just under 1.4 million admissions in 2020, and the number of outpatient contacts is expected to almost double from 2005 to 2020 to approx. five million in 2020.*
- *The current state of health and the statistical projections for health development up to 2020 signal a need for considerably increased efforts to promote health and prevent disease and in order to give the increasing group of chronically ill a good range of treatments as part of the health services.*

A public health report is a collation of available knowledge on the state of health, morbidity and trends in the same as well as determinants of public health.

Public health is about the population's state of health and morbidity. The point of departure is a broad concept of health, which includes both the current state of health and determinants like lifestyle and living conditions. Public health is also about the health services' efforts and initiatives designed to improve the health of the population and about society's efforts to reduce morbidity and mortality.

## Public health – “folk diseases”

In the Danish government's public health programme Sund hele livet [“Healthy throughout Life”] from 2002, priority is assigned to eight widespread diseases – in Denmark called “folk-diseases” – and general, non-quantitative policy objectives are posited for developments in disease in 2002-2010. All disorders are included in the Public Health Report and discussion is also given over to infectious disorders, accidents and violence as well as dental status.

## Life expectancy and mortality

Recent years have seen the life expectancy increase by a couple of months a year for men and 1½ months for women, but the Danes' life expectancy still continues to increase considerably more slowly than in neighbouring countries. In 2006 the life expectancy for a man was 75.9 and for a woman 80.4 years. Danish men rank 18th among 20 OECD countries and Danish women rank last. There is just under three years' difference up to those countries that have the highest life expectancy.

Changes in mortality are attributable to a change in disease incidence (the number of new cases per annum) and a change in survival among those who have contracted the illnesses.

Over the past 50 years mortality has fallen right across the population, most markedly among infants but among small children and young people a drop in mortality is also seen. Among the 35-74 year-olds there is striking excess mortality in relation to our neighbouring countries.

Mortality is increasing for several lifestyle-related disorders. That applies to lung cancer, chronic obstructive pulmonary disease (COPD), cirrhosis of the liver among men and diabetes. For these disorders mortality in 2005 is far higher than 50 years ago, chiefly due to more people in

the population developing these disorders – the results of treatment have improved. For bowel cancer and breast cancer mortality has been more or less constant, while the development in mortality from heart diseases and stroke has generally been on the decline.

## Quality of life and functional capacity

In 2005 the EU decided that, in future, not only life expectancy but also the number of healthy life years (HLY) should be an important structural indicator. This indicator, which forms part of the EU's financial growth strategy, is a measure of the population's life expectancy with good health, defined as not having been limited within a 6-month period in performing normal everyday activities due to health problems. Thus in 2005 a 65-year-old Danish man was able to expect a further 13.1 healthy life years and a Danish woman a further 14.1 healthy life years.

The majority (79%) of adult Danes rate their health to be really good or good, and a corresponding share of the population state that they feel well enough to do whatever they feel like doing. In relation to 1987 the oldest age groups rate their health to have improved, while the youngest age groups rate their health to be unchanged or even slightly poorer.

Among 11-15 year-olds, a good third judge that their well-being is at its peak in a number of different areas, while 13% judge that their well-being is at an all-time low. The physical functional level among 60-year-olds and above has improved markedly since 1987. Life expectancy without functional impairment has risen since 1987 by 2.4 years for men and 1.3 years for women.

Four out of ten adult Danes state that they have had one or more long-standing diseases, disorders or illnesses. Self-reported morbidity rose from 1987 to 2000 and then stagnated. Musculoskeletal diseases are the biggest group of diseases (cited by 15% of adults), followed by cardiovascular disease, diseases of the respiratory organs, diseases of the nervous system and sensory organs, metabolic diseases (incl. diabetes) and injuries. According to the parents' information, 11% of children under 16 years of age had one or more long-standing illnesses.

A total of 80% of adults have one or more types of pain, discomfort or symptom within a fortnight and 40% have actually been greatly troubled by them. The most frequently

stated types are pain or discomfort in the shoulder or neck (33%), pain or discomfort in the arms, hands, legs, knees, hips or joints (31%), low-back pain or discomfort (30%), and tiredness (29%).

Women consistently rate their health poorer and report more diseases and ailments than men. The same applies to people with a short formal education as compared with people with a long education.

## Better survival following cardiovascular disorders

The improved survival following cardiovascular disorders means that more people are living with their illness and are in need of the available health services. In 2005 86,000 people were hospitalized once or more, corresponding to 12% of all admissions. More than 300,000 adults state that they have a long-standing cardiovascular illness.

The hospital admission rate for cardiac disorders as a whole has risen over the past 25-30 years, whereas for non-cardiac vascular disorders there has been a slight tendency to fall off. The development varies greatly within the various subgroups however. Thus the hospital admission rate for myocardial infarction has fallen, but has multiplied tenfold for angina pectoris. For heart failure and cerebral embolisms the hospital admission rate rose up to the turn of the millennium and then fell.

The increase in the hospital admission rate also reflects the availability of increased therapeutic options, with a well-documented effect existing. Thus the number of bypass operations and balloon dilations (angioplasties) in particular rose from less than 1,000 in 1990 to 12,500 up to 2005. There has been a marked rise in the consumption of medicine for cardiovascular disorders and particularly for preventive medical treatment (cholesterol-lowering medicine, antihypertensives). In 2005 more than one million Danes redeemed a prescription for heart and circulatory system medication.

Deaths and admissions due to cerebrovascular causes occur relatively more frequently among women than among men, whereas deaths and admissions as a result of ischaemic heart disease are more frequent in men than in women. The trend in risk factors for cardiovascular disorders has been both positive and negative – positive in connection with the development in smoking, physical activity, low-fat

diet and raised cholesterol, but negative in connection with the development in overweight, diabetes, high blood pressure and stress.

The effect of cardiac rehabilitation has been documented as positive on patients' lifestyle and risk of deterioration of disorders, and patients are willing to participate. Citizen-directed prevention has included both mass and high-risk strategies, and there are documented advantages and drawbacks to both methods. What they have in common, however, is that it has been difficult to document any direct impact on mortality, whereas an effect has been demonstrated on risk factors for cardiovascular disorders – albeit a modest one. Statutory interventions and taxation of tobacco are the most effective methods of reducing the extent of smoking, both active and passive.

### Many cases of cancer could be avoided

Since the beginning of the 1970s the incidence of new cancer cases has risen among men and women alike. During the same period cancer mortality was constant, though declining slightly at the end of the period. The number of new cancer cases rose from just over 9,000 in the 1940s to just under 33,000 in 2001. In 2001 approx. 216,000 adult Danes were living with a cancer diagnosis, equal to some 4% of the population.

Above all, cancer strikes elderly people. Approx. 84 men and 120 women out of 100,000 in the 30-34 age group are diagnosed with cancer every year, as compared with 3,414 new cases among men and 2,165 among women, respectively, per 100,000 in the 75-79 age group. This strongly age-related incidence is part of the explanation for the continued increase in the number of cancer cases.

The most frequent forms of cancer among men are ordinary skin cancer, lung cancer and cancer of the prostate. Among women it is breast cancer, skin cancer and lung cancer. Mortality from lung cancer is very high, whereas to all intents and purposes no deaths occur on account of ordinary skin cancer.

The prime risk factors for cancer are smoking, overweight, physical inactivity, unhealthy diet, alcohol and sun worship as well as exposure to carcinogenic substances, including chemicals. Smoking is the most important risk factor and is deemed to be the cause of approx. 5,000 new cases of cancer every year. It is judged that at least a third of the can-

cers occurring in 2000 could have been prevented if these known risk factors had been eliminated.

During the period 2000-2004 there were an average of 78,800 patients being treated in the public hospital system, and over 77,000 were in contact with the hospital services on the grounds of a suspected cancer or precursor to such. A further 32,000 attended follow-ups for cancerous diseases.

Cancer treatment can be curative, palliative, rehabilitative or preventive. Curative treatment can be surgical, radiation therapy or medical, and treatments can be used alone or in combination. It is estimated that 45% of all cancer patients are cured through treatment.

Recent years have seen an intense focus on improving the quality and treatment of cancer, and trends are monitored closely by a cancer steering group, formed by the Danish Minister for Health.

### Musculoskeletal disorders are welfare-threatening disorders

Musculoskeletal disorders are welfare-threatening disorders that result in restrictions on activities, sickness absence, and a change or discontinuation of work. It is the group of illnesses that costs most years of healthy life lost: a 20-year-old man can expect to live 5.5 years with musculoskeletal illness and a 20-year-old woman 8.4 years.

Musculoskeletal illness is the most common form of long-standing illness in the population – in 2005 15%, equal to approx. 660,000 adults, stated that they have one or more musculoskeletal disorders. Well over half (58%) of adults indicate that they have had musculoskeletal conditions and symptoms within a fortnight in the form of pain or discomfort in the shoulder or neck (33%), low-back pain or discomfort (30%) or in the arms, hands, legs, knees, hips or joints (31%).

The commonest forms of musculoskeletal illness are low-back pain, shoulder-neck pain and osteoarthritis. In total 60-65% of adults are expected to get low-back pain at some point. In the 2005 health interview survey (SUSY-2005) 15% state they have a back disorder now, and a third ailments and symptoms within a fortnight. The prevalence of low-back pain is slightly on the increase.

Neck pain is estimated to have a lifetime prevalence of 70-80% and shoulder pain 7-10%. In the SUSY-surveys an increase in the prevalence of pain or discomfort is seen within a fortnight period from 23% in 1987 to 33% in 2005. Practically all 70-year-olds or above have osteoarthritic changes, but only 10-30% have symptoms. In SUSY-2005 5% state that they have osteoarthritis.

Around 500,000 Danes are estimated to have osteoporosis and the incidence of new osteoporotic fractures is on the increase. Osteoporosis is strikingly underdiagnosed in the National Patient Registry. In SUSY-2005 2% state that they have osteoporosis.

It is generally true of musculoskeletal diseases that they are seen more frequently in women than in men, and that prevalence increases with increasing age. Moreover, a clear social gradient is visible, with higher prevalence among people with a short-term education.

A number of risk factors are common to the musculoskeletal disorders mentioned. These are smoking, poor physical condition (physical inactivity), stress and inclination to depression as well as a poor working environment. In addition, all the disorders have a hereditary component. Overweight is an important risk factor in low-back pain, shoulder-neck pain and osteoarthritis, whereas low weight increases the risk of osteoporosis.

Prevention of musculoskeletal diseases has been on the agenda since the first prevention programme from 1989. Efforts on the labour market have focused particularly on repetitive strain injury (RSI) and heavy lifting. In day-care facilities and schools the focus has been on increased physical activity, healthy diet and increased body-consciousness.

### **Mental disorders are common and onerous**

Mental disorders weigh heavily. They are associated with excess mortality – primarily owing to suicide but also owing to accidents and illness. A third of all early pensions granted on health grounds are due to mental illness, which also plays a large part in connection with sickness absence and long-term statutory sick pay cases. Mental disorders are associated with increased somatic morbidity from all disorders with the exception of cancer.

In SUSY-2005 4% of adults stated that they suffer from chronic anxiety or depression and 2% from bad nerves or some other mental disorder. Mental disorders are reported considerably more frequently by women than by men; prevalence decreases with the increase in the number of years' education and is greater among cohabitants and single people than among married people.

It is estimated that during one year 20% of the adult population will have mental problems matching the criteria for one or more mental disorders – that corresponds to 700,000-800,000 adult Danes.

A total of 8% of primary care contacts are due to mental problems, and 4% are due to large alcohol consumption. But mental disorders are diagnosed relatively rarely by GPs – for example, fewer than half of patients with depression are diagnosed as such in general practice.

The prevalence of mental disorders among patients admitted to a somatic ward is estimated to be very high (35%), but as in primary care the mental disorders often remain undiagnosed, and very few people with mental disorders are referred for psychiatric evaluation and treatment during hospitalization.

In 2004 approx. 82,000 people were undergoing treatment in the hospital services owing to mental illness – as admissions, as outpatients or as a result of contact with an accident and emergency department (A&E). The frequency of contact with the health services is greatest among younger people (15-44 year-olds). Among men the most frequent disorders are states of abuse, nervous and stress-related conditions, schizophrenia and affective mental disorders. Among women it is nervous and stress-related conditions as well as affective disorders.

The number of suicides has dropped noticeably since 1980, and in 2005 there were 628 suicides. The suicide rate is higher among men than among women and highest among 75-84 year-olds. There are estimated to be 1,600-2,000 suicide attempts annually among men and 1,700-2,400 among women. The number of suicide attempts is on the increase, especially among very young women. In SUSY-2005 slightly under 1/2% stated that they have attempted to take their own life within the past year, and 7% stated that they have thought of taking their own life. Relatively most among young people have suicidal thoughts, and more among women than among men.

Psychiatric treatment services have changed markedly over the past 30 years. Approx. two thirds of such hospital beds have been decommissioned, and residential facilities in local authorities set up instead, district psychiatric centres created and outreach teams and liaison officer schemes established etc. The opportunities for prevention in relation to mental disorders primarily take the form of patient-directed prevention.

There is much to indicate that, in the case of children, given a relevant preventive effort on the part of the family, educators, and social and health authorities, it is possible to provide mental development corresponding with age, including competences and functional abilities, well-being and a positive and cheerful basic outlook as well as absence of serious illness commensurate with age.

### **The disease burden from COPD is rising among women in particular**

The most essential cause of chronic obstructive pulmonary disease (COPD) is smoking, and it is assessed that 15-35% of all smokers get COPD.

COPD is the fourth most common cause of death in Denmark, with 90% of deaths occurring in those 65 or above. In 2001 there were 3,500 deaths as a result of COPD. Mortality has risen since 1970, and the increase is most pronounced among women. Mortality from COPD is appreciably higher in Denmark than in our neighbouring countries.

The hospital admission rate from COPD rose markedly from 1990 to 2000 and then fell again, which is primarily attributable to changes in rates of diagnosis-related groups (DRG), however. In 2000 there were more than 20,000 admissions as a result of COPD as the primary cause of admission (action diagnosis) and 20,000 with COPD as secondary diagnosis. The number of outpatient contacts has also risen.

On the basis of SUSY-2005 there are estimated to be 260,000 adult Danes with chronic bronchitis, equal to 5% among men and 7% among women.

In general the disease burden is increasing most in women. This is true of the number of deaths, which is now on a par with that of men and the number of admissions, where there has been a tripling since the mid-1960s up to 2000. Since the start of the 1990s there have been more

admissions among women than among men. The increasing disease burden reflects the trend in the smoking pattern among women.

The treatment for COPD is to quit smoking, first and foremost, thereby enabling the progression of the disorder to be halted. COPD rehabilitation includes the components smoking cessation, physical training, medical treatment, nutritional guidance, patient education and psychosocial support.

The possibilities for prevention are clearly focused around quitting smoking.

### **Increasing prevalence of allergic rhinitis and asthma**

Allergy, allergic rhinitis and asthma have risen markedly in Denmark since the 1950s and 1960s. In general, prevalence seems to increase with mounting affluence, increasing urbanization and the adoption of a "western" lifestyle.

The prevalence of allergic rhinitis (congested and runny nose due to hay fever or other allergies) in Danish surveys varies between 14 and 22%. It is the most frequent chronic illness among young people and younger adults in Denmark. Prevalence is highest in densely populated areas. On the basis of longitudinal studies it is assessed that allergy is a far more persistent condition than previously assumed. As a result, the average age for patients with allergy will rise in the years ahead, and the prevalence in the population as a whole will also rise. This trend corresponds to what is expected to happen in other European countries.

In the 2005 health interview survey 6% of adults stated that they have asthma. In the oldest age groups asthma is often confused with chronic obstructive pulmonary disease, but COPD rarely occurs in people under 40. The prevalence among 16 to 24 year-olds and 25 to 44 year-old men and women rose markedly from 1987 to 2005.

The mounting prevalence of allergic rhinitis and asthma is caused by an interaction between hereditary dispositions and a number of lifestyle and environmental factors – but as yet it has not been possible to point with any certainty to the particular lifestyle and environmental factors involved. However, given a knowledge of what triggers an allergy in the individual person, relevant preventive precautions can be taken.

The majority of patients with allergic rhinitis and asthma are diagnosed and treated at general-practice level, a small proportion under specialist practitioners. The treatment consists partly of information about the disorders and preventive precautions, and partly of medical treatment.

Citizen-directed prevention can be targeted at advice on breastfeeding until the child is 4-6 months old and freedom from tobacco smoke. Patient-directed prevention can focus on reducing exposure to the allergens causing the allergy. (Citizen-directed prevention corresponds to primary prevention (“keep healthy people healthy”) while patient-directed prevention corresponds to secondary and tertiary prevention (prevent progress of disease and dysfunction).

### “The diabetes epidemic”

The striking trend in the prevalence of diabetes – both in Denmark and in the world as a whole – is often termed an epidemic. The increase in the number of people affected by diabetes is not, however, due simply to the increasing incidence of new cases, but also to declining mortality from the disorder and hence more people living with the disorder and the higher average lifetime, which means an increased risk of developing diabetes.

There are approx. 25,000 people with type-1 diabetes and an estimated 200,000 with type-2 diabetes in Denmark. To this can be added a further 200,000 presumed to have the illness without knowing it. The prevalence of type-2 diabetes rises markedly with increasing age up to the age of 75. The increase in prevalence is most pronounced among men.

Age is the factor of greatest importance for developing diabetes. Other essential risk factors are overweight and obesity, physical inactivity and inappropriate diet. Hereditary conditions and low birth weight also play a role. Finally, ethnicity turns out to be an essential factor, not merely for the risk of developing diabetes but also for when the disorder débuts in terms of age.

The risk of developing late complications from diabetes is great. These involve complications from eyes, kidneys, nerve paths and the cardiovascular system, e.g. cerebral or cardiac embolism, renal failure, impaired vision or blindness, impaired touch or foot ulcers. It is important for treatment and patient-directed prevention, therefore, to set up systems and organizational frameworks to provide regular

and systematic screening for early and late-onset complications.

Citizen-directed prevention of type-2 diabetes must focus on lifestyle modification (diet, physical activity and overweight). It has been substantiated that changes in lifestyle over a period of three to six years can reduce the risk of developing diabetes by 50-60%.

### Infectious disorders

The improved standard of living in Denmark – and improved hygiene, in particular – and a comprehensive vaccination programme have reduced the Danes’ risk of multiple infectious disorders, including diphtheria and tetanus. Nonetheless, the high rate of sickness absence due to infectious disorders constitutes a great strain on society. Treatment with drugs has considerably reduced mortality among the ill.

A seasonal flu epidemic is deemed capable of striking up to a fifth of the Danish population with increased mortality as a result. This excess mortality is seen predominantly in the oldest age groups. Seasonal flu is prevented by vaccinating risk groups annually.

Bird flu is caused by influenza A virus among birds and is only rarely transmitted to humans. The risk of bird flu is the risk of the influenza virus mutating, thus effectively enabling it to infect from person to person. If that does happen, a flu pandemic can arise.

Since HIV became officially notifiable in 1990, just under 300 cases have been registered annually, and it is estimated that 5,500 people are living with HIV. By end-2005 AIDS had been detected in just over 2,500 people, the vast majority being men (87%). The medical treatment of HIV, which postpones the development of AIDS, has meant that the annual number of AIDS cases and also the annual mortality from AIDS has been cut by 80%. Conversely, it is worrying that there has been no drop in the annual number of HIV cases reported. In particular, the mounting number of infectees among homosexual men is a challenge to preventive work together with the provision of counselling to the relatively many immigrants infected.

Chlamydia is seen in young women particularly. It is estimated that 5% of the population aged 16-25 are infected with chlamydia. Approx. 65% of those infected are women.

In between half and three quarters of those infected there are no symptoms, and consequently the infection is not discovered. Every year chlamydia is the cause of approx. 4,000 pelvic infections, just under 480 cases of infertility, 320 cases of ectopic pregnancy and 600 cases of chronic abdominal pain. In terms of prevention, the emphasis is on informing younger girls about the disorder and about the importance of using condoms.

Hospital infections have become a growing problem. The most frequent forms are urinary tract infections, infections in wounds, respiratory tract infections and sepsis ("blood poisoning") brought about by staphylococci and coli bacteria. In 2003 10% of just over 4,000 patients examined had contracted an infection in connection with their hospital stay. The number of hospital infections can be contained by means of good hospital hygiene.

Tuberculosis (TB) is one of the most widespread disorders on a global level. It is estimated that approximately one third of the earth's population is infected with TB. In Denmark the prevalence of TB has risen since 1980, primarily as a result of immigration from areas with a high prevalence of TB. After 2000 prevalence fell again, primarily owing to a decline in the number of immigrants.

### Accidents and violence – especially among younger men

Accidents make up just over half of the total number of contacts with an accident and emergency department (A&E). Accidents result in approx. 568,000 A&E contacts annually, approx. 40,000 hospital admissions and just under 2,000 deaths.

Four out of five accidents are home and leisure incidents. This form of accident happens among the 10-19 year-olds and the elderly in particular, while road-traffic (RTA) and occupational accidents peak among the 10-29 year-olds.

Falling accidents are the commonest form of home and leisure accident and are seen primarily among the elderly. Contact accidents, i.e. accidents in which people are hit by or bump into objects, people or animals, are most frequently seen among children and young people. The same applies to accidents caused by jamming and lodging, punctures or cuts and accidents caused by acute overload, e.g. sprains. In 2005 there were 449,000 A&E contacts and 32,200 admissions as a result of home and leisure acci-

dents – slightly more A&E contacts among men than among women but slightly more admissions among women than among men.

The risk of falling victim to an RTA is greatest among 10-29 year-olds – that applies to all groups of road-users (cyclists, moped-riders, car-drivers and pedestrians). In 2005 there were approx. 44,000 A&E contacts and 5,500 admissions as a result of RTAs – most of them among men.

The total number of A&E contacts as a result of home and leisure accidents and RTAs has been virtually constant since 1995. Similarly, the number of deaths as a result of home and leisure accidents has been constant, whereas the number of RTA fatalities has fallen steadily since the 1970s.

Violence injuries are injuries deliberately inflicted by another person. Violence is the cause of more than 20,000 A&E contacts, 1,400 hospital admissions and 50 deaths. Men are at greater risk of violence outside the home and women of violence in the home. Younger people are more subject to violence than elderly people and men more subject than women.

There is a correlation between violence and a number of chronic health problems, including poor self-rated health, mental problems, symptoms from the gastrointestinal tract, headaches and gynaecological complaints.

### Positive development in dental health

Caries (cavities in the teeth) and parodontosis are the altogether dominant dental diseases in the population. The level of education is the one single factor of greatest importance to the prevalence of dental disease. On average, people with a short-term education have 20 tooth surfaces more with caries than people with a long-term education, and 15% of adults with a short-term education have deep gingival pockets emblematic of parodontosis, as compared with 4% among people with a long-term education. The clear social gradient in dental status is also seen where the evaluation concerns a functioning dentition (set of 20 or more teeth).

Four out of five adult Danes go to the dentist's regularly - more in the elderly age groups than in the younger ones. Again, there are clear educational differences in the regularity of attendance at the dentist's. Seven out of ten adult Danes brush their teeth at least twice a day, one quarter

use toothpicks daily and one tenth use dental floss daily. WHO's and the National Board of Health, Denmark's, targets for the population's dental status were met in 2005 for 35-44 year-olds (maximum of 1% edentate and 96% with 20 or more teeth), while the target has not yet been achieved for the elderly population. A very positive development is evident among the elderly group, however.

The school dental service provided by local authorities is an essential factor for the positive development in the population's dental status. Three quarters of the 35-44 year-olds participated in regular dental care during their childhood years, whereas one quarter regularly attended dental care with a private dentist. The long-term effect of taking part in regular dental care during childhood shows up in more natural teeth having been preserved and a lower proportion of edentate and denture-wearers.

## Factors of importance to public health

A number of factors have a bearing on public health. Above all, these involve individual lifestyle factors and health habits, but also biological and genetic factors. In addition, a number of more structural determinants are significant. This applies to the working environment and environment in the broad sense and to the preventive and therapeutic range of offers from health services.

### Blood pressure, cholesterol and weight are important predictors of illness

To a very predominant extent the importance of a number of biological and physiological factors for illness has been analysed in relation to the development of cardiovascular disease and premature death but their importance for the development of other disorders is increasingly being elucidated.

With rising blood pressure the risk of developing stroke, myocardial infarction and other cardiovascular disorders increases. Danes' blood pressure fell from the start of the 1960s to the mid-1980s but rose during the 1990s. On the basis of studies in the former Copenhagen County it is estimated that approx. 50% of 60-year-old men and 40% of 60 year-old women either have raised blood pressure or are being treated for it. Among those being treated for high

blood pressure, only one third had achieved the desired therapeutic target (140/90 mmHg).

With falling cholesterol levels, the risk of developing heart disease falls. The cholesterol level has generally declined since the 1960s – slightly more for women than for men. The average cholesterol level for middle-aged men, however, is still above the recommendations.

Body Mass Index (BMI) is an expression of relative weight, and adiposity is a marker for developing chronic disorders like diabetes, cardiovascular disease and a great many forms of cancer. Both high and low BMI are associated with premature death. Self-reported data show that the proportion of fat people in the population has risen to 11%. In studies done in the former Copenhagen County, in which the participants were measured and weighed, approx. 20% of the 50-60 year-olds were fat.

Blood pressure, cholesterol and weight are individual factors that are easy to measure and of great importance to public health, so that there is every possible reason to intensify the focus of attention on these markers in terms of both prevention and treatment. Other essential physiological and biological markers for developing illness are fitness, lung function, fat distribution, hand/forearm strength and carbohydrate metabolism.

### Genetics offers new possibilities

The importance of developments in genetics can be felt in a number of fields. They spell increased understanding of the causes and mechanisms underlying disorders. They provide new opportunities for individual-based risk assessment and counselling, and better diagnosis. In addition, genetics increases the scope for pharmacological treatment (“tailored medicine”), and for the pathology with regard to determining infection types and cancer types.

### Danes have high alcohol consumption

Apart from directly alcohol-related disorders (alcoholic cirrhosis of the liver, pancreatitis and alcoholism) alcohol is a contributory factor in the development of a large number of disorders, including cancer of the oral cavity, breast and colon. Danes' alcohol consumption results in more than 3,000 deaths annually, equivalent to 5% of all deaths. The alcohol-related deaths occur at a relatively young age.

Large alcohol consumption is also associated with work-related problems, divorces, mental disorders, reporting sick, violence, crime, accidents and deaths.

On the positive side, middle-aged and elderly people with moderate alcohol consumption have a 20-30% lower risk of dying of ischaemic heart disease than those who abstain.

The sales statistics show fairly constant, but high consumption of alcohol, averaging 11.4 litres of pure alcohol per year of age per Dane over 14. Since 1994 the national health interview surveys have shown that a growing proportion are exceeding the sensible drinking limits (14 units of alcohol for women and 21 for men), that more men than women are exceeding these limits, and that the young and the middle-aged in particular have very high weekly consumption. Episodic consumption (binge-drinking) is associated with a higher risk of morbidity and mortality than regular consumption (steady). Alcohol consumption is unevenly distributed socially, with consumption increasing as the number of years' education increases.

Viewed from an international perspective the Danes have high alcohol consumption, and Danish young people rank top in Europe in terms of frequent intoxication. Out of 15 EU countries and Norway only four countries have a less restrictive alcohol policy than Denmark.

One essential element in any long-term preventive effort is consistency between various political perspectives, but in Denmark decisions concerning border trading and taxes etc. seem to have gone in one direction while efforts to tackle e.g. age limits seem to have gone in another. With a view to lowering total consumption in a population, particularly good effect has been achieved by regulating prices and tax. Furthermore, there is good evidence for lowering the blood-alcohol limit, deploying frequent, random breathalyzerization and tightening the legislation on driving licences in connection with driving under the influence of alcohol.

### Smoking costs most human life

Regardless of how much a person smokes, smoking is associated with increased risk of disease. Smoking is one of the most important causal factors of cardiovascular diseases, cancer, and lung and respiratory disorders. Smoking also entails the risk of exacerbating disorders or conditions, e.g. diabetes and osteoporosis, and smoking increases the risk of complications in connection with

operations. Smoking reduces fertility in men and women alike, increases the risk of complications during pregnancy and doubles the risk of malformations in the child.

Every year just under 14,000 die as a result of smoking, and it is estimated that 2,000 die of passive smoking. Smoking accounts for 24% of all deaths. Among men mortality rose until the 1980s, only to fall slightly after that. Among women there has been a steady increase.

The proportion of smokers has fallen steadily in recent decades – for men from 68% in 1970 to 31% in 2006; for women the fall during the same period was from 47% to 25%. The proportion of heavy smokers increased steadily up to the beginning of the 1990s and has declined gently since. Heavy smokers make up an ever increasing proportion of all smokers – in 2005 more than 50% among male smokers were heavy smokers, whereas for women the figure was 40%. There is a clear educational gradient in the smoking pattern: the higher the level of education, the fewer daily smokers and heavy smokers.

The fall in the proportion of smokers in Denmark parallels the development in our neighbouring countries – albeit the Danish fall is slightly more marked. The development in several countries has apparently stagnated, e.g. it applies to Finnish and English men and to Finnish and Swedish women.

Four out of five smokers started to smoke during their teens. Both parents' and friends' smoking behaviour is of great significance for young people's smoking behaviour.

The most cost-effective prevention initiatives to combat both active and passive smoking are increased cigarette prices and controls based on legislation. To these can be added efforts in specific arenas, e.g. general practice, hospitals, schools and workplaces, as well as group-based and one-on-one counselling to quit smoking combined with nicotine substitutes or bupropion.

Compared to those countries we normally liken ourselves to, Denmark is lagging behind with regard to legislation on smoking.

### The human body is built for movement

Physical activity provides energy, pleasure and mental well-being. Physical inactivity increases the risk of a number

of disorders, first and foremost cardiovascular disorders, type-2 diabetes, musculoskeletal disorders, breast cancer, cancer of the colon and mental disorders as well as overweight.

The National Board of Health, Denmark's, recommendation is that adults should be physically active for at least 30 minutes of moderate intensity, preferably every day of the week. Those 30 minutes can be pieced together from shorter bouts. Children and young people should be physically active with at least moderate intensity for 60 minutes a day.

Approx. 4,000 deaths a year are estimated to be related to physical inactivity – that is equivalent to 7-8% of all deaths. A 25-year-old who is and remains physically active is expected to live 5-6 years longer than a 25-year-old physically inactive person.

In total 27% of adult Danes state that they are moderately or intensively physically active for at least four hours a week in their leisure time, while 13% indicate being physically inactive. Almost twice as many men as women are moderately or intensively physically active, while the proportion of physically inactive people is the same among men and women. As age increases, fewer and fewer are heavily or somewhat heavily physically active. The higher the level of education, the greater the likelihood of a person being heavily or somewhat heavily physically active in their spare time. Since 1987 there has been a marked rise in the proportion with a moderate or intensive level of physical activity during their leisure time.

In total 59% of adults practise sport—collectively or in some self-organized form. Recent years have seen marked growth in the proportion of actively sporty individuals among 50-year-olds or over. Just under three quarters of those in active employment spend less than 15 minutes of their daily transport time walking or cycling, while slightly more than 10% spend half an hour or more. Most of those in active employment (39%) have a sedentary job.

Over recent years there have been a number of local and central initiatives to promote the population's physical activity levels. Catalogues of ideas have been compiled, general and localized cyclist campaigns mounted, model projects initiated, targeting day-care centres and schools, and aimed at nurturing social networks with the aid of physical activity. A number of municipalities and former counties have instituted trials with "Exercise on prescription", and the provisional results show that, firstly, it is

feasible and, secondly, in the short term there are positive effects on several biological measures, such as condition, blood pressure and weight.

## Diet – too much and too unhealthy

For the Danes' part, the health effects of diet relate primarily to the consequences of inappropriate dietary make-up and overeating for their health. These health-related consequences are best documented in relation to cardiovascular disease, overweight and obesity, type-2 diabetes, cancer (oral cavity, oesophagus, stomach, bladder and colorectal) as well as osteoporosis. It is estimated that 17% fewer Danes would die of cardiovascular disease if the population's fruit and vegetable intake was increased to 500 grams a day, and 9% fewer if the population cut its dietary fat intake to the recommended 30% maximum of energy intake.

The trend in dietary habits from 1995 to 2000-2001 shows that the average intake of fruit and vegetables has risen, the fat content has fallen, while the sugar intake – particularly for children – has risen. But in relation to the recommendations for a healthy diet, fat intake is still too high in all age groups, and fruit and vegetable intake too low. In total 22% of adult Danes meet the recommendations for dietary fat, while 12% satisfy the recommendations for fruit and vegetables.

Supply statistics from the Nordic countries show that the Danes get the largest proportion of energy from the fat in their diet. From a European perspective, too, the Danes have a high intake of animal fat but a low intake of fruit and vegetables.

There are clear social differences in dietary habits. Groups with a long-term education eat a diet more closely approximating the recommendations than groups with a short-term education, who also eat more potatoes and more meat than the highly educated.

Dietary habits have to do with a different lifestyle. The intake of fruit and vegetables is smallest and fat intake highest among those who primarily pursue sedentary leisure activities, are heavy smokers and drink a lot of alcohol.

Information has been the primary instrument in the official nutrition policy and a number of information campaigns and local initiatives have been conducted at workplaces,

canteens and schools, which has had a positive effect on the Danes' eating habits. Using legislation and taxes and applying differentiated VAT to food has often been suggested as part of the initiative to improve dietary habits – but as yet none of this has been translated into practice.

## Obesity—a rapidly growing threat

There are many severe disorders secondary to obesity, above all type-2 diabetes and cardiovascular disorders, but a number of cancer disorders (cancer of the uterus, breast, ovaries, gall bladder and pancreas, liver, kidney and prostate as well as cancer of the gastrointestinal tract) are also seen more often in conjunction with overweight. In addition, osteoarthritis, particularly in the knees, low-back pain and sleep apnoea (snoring and pulmonary insufficiency) are related to obesity. Finally, psychosocial problems are common among the overweight and obese.

Body Mass Index (BMI) is used to measure the degree of overweight and obesity and is calculated as weight divided by the square of the height measured in metres, kg/m<sup>2</sup>. A BMI of between 25 and 30 is characterized as overweight and BMI of 30 or more as severe overweight or obesity.

SUSY-2005 showed that 41% among men and 26% among women were overweight, with 12% and 11%, respectively, being severely overweight (obese). Obesity occurs with equal frequency in men and women, rising with increasing age up to the age of 80, when it decreases. There is a clear link between obesity and the level of education: the fewer years' education, the higher the prevalence of obesity. Both studies based on measured weight and height and studies based on self-reported data show a noticeable rise in the prevalence of obesity. The national health interview surveys show an age-standardized increase from 6% in 1987 to 11% in 2005. The increase is most pronounced among younger people and people with a short-term education. Session data, too, show a marked increase in the prevalence of obesity.

Globally, the number of overweight people now exceeds the number of underweight.

In 2003 a national action plan was drawn up on severe overweight. The objective is to prevent more people becoming fat and to reduce weight among those who are already fat. It is recommended taking action at three levels, i.e. private, community and public level.

Treating obesity requires life-long effort and control, but in general the prognosis for lasting weight-loss is poor.

## Stress - reaction to strain

Stress is not an illness but the individual's reaction to strain. That strain (or stressor) can be both physical, e.g. a trauma, and mental, e.g. unrealistic expectations, lack of recognition at the workplace, divorce and deaths. Handling the state of stress is called coping, the purpose being to prevent, relieve or avert the state of stress. Coping can be both positive and negative, and it can be directed at the strain or at the symptom.

The degree of stress – and any health-related sequelae – depend on the intensity and the duration of the strain, the perception of the strain, the personal and environmentally determined resources on the part of the person under strain, handling of the strain, symptoms and the extent of the physiological responses brought about by the strain, as well as the person's predisposition to illness.

Typical physical signs of stress are palpitations, stomach pains and shaking of the hands. Mental signs can be disinclination, tiredness, difficulty concentrating and irritability; behavioural signs can be sleeplessness, withdrawnness, impaired ability to perform, sickness absence and so on.

There has been much focus on the correlation between working environment and stress. Particularly people who experience rigorous demands being made of their performance at work while having only a modicum of control – and possibly a minimum of social support – are most under strain and thus at greatest risk of developing stress-related illness. Other stressors can be long working hours, pressure of time, fast pace and lack of recognition, night work, shift work, harassment and bullying.

More protracted strains can lead to stress-conditioned illness. Best documented is the correlation between strain and ischaemic heart disease and depressive conditions. A link has also been ascertained between stress and musculoskeletal illness. In addition, a number of chronic disorders can be affected by stress, e.g. insulin-dependent diabetes, allergy, arthritis and psoriasis.

The sex and age-adjusted prevalence of self-reported stress rose from 6% in 1987 to 9% in 2005. The increase took place in those age groups in active employment. More

women than men state that they often feel stressed, and the prevalence of stress is highest among the 25-44 year-olds and lowest among people aged 65 or over. The highly educated and people with high socioeconomic standing, in particular, state that they feel stressed. The experience of being subject to frequent stress is most pronounced among people with inappropriate health habits (sedentary physical activity level, smoker/ heavy smoker, exceeding the sensible drinking limits).

Stress prevention can be directed at reducing strains in both working life and the population's day-to-day life, and at the ability to cope with stressful situations in working and family life.

### Young people's use of illicit drugs has stabilized

Illicit drugs include hash and a number of other psychoactive substances with stimulating, stupefying and/or hallucinogenic effects.

Experimental use of drugs takes place primarily during the young years and peaks among 16-24 year-olds. In 2005 8% of 16-44 year-olds had used hash within the past year, and 3% had used one or more other illicit drugs, most frequently cocaine and amphetamines. In SUSY-2005 every fourth 16-24 year-old man and just under every fifth 16-24 year-old woman stated that they have taken hash within the past year, while approx. 8% among men and 3% among women in the same age group had used other euphoriant within the past year. Use of euphoriant is most widespread among young people not in education.

Both the SUSY studies, monitoring of young people's lifestyle and health habits (MULD) and European School Survey Project on Alcohol and Other Drugs (ESPAD) show concordant signs that young people's use of euphoriant has stabilized within the past years.

Many factors are of significance to young people experimenting with substances, e.g. curiosity, lack of well-being, mental needs, inspiration from friends etc.

On average there are 1,000 abuse-related deaths annually, equivalent to 2% of all deaths. These deaths occur at a relatively young age. There is a close link between the use of euphoriant and mental disorders – but the causal relations remain to be clarified.

There are estimated to be 27,000 drug abusers in Denmark, and 13,000 drug abusers are in treatment annually. There is a close link between drug abuse and poor social and economic living conditions in the form of lack of education and disaffiliation with the labour market, lack of social development with faltering contact with family and network, as well as resort to alternative sources of income (crime, drug dealing, prostitution).

Danish drugs policy is based on prohibition, information and treatment. The responsibility for both prevention and social and medical treatment of abuse rests with the municipal authorities.

### Both classic and new working environment exposures

Work environment exposures are conditions at work that can have a bearing on health and well-being. Among employees and the self-employed, 10% work wholly or partly in the evening and 7% wholly or partly at night. Night work, in particular, can take its toll on health. In total, 22% among men and 7% among women have long working weeks (48 hours or more). Getting on for three times as many women as men have part-time work (less than 30 hours a week).

Developments in the physical working environment from 2000 to 2005 show that a larger proportion of employees and self-employed complain about noise, while a smaller proportion complain about heavy lifting and inappropriate working positions. A smaller proportion state that they have been exposed to solvents. There has been an essential reduction in one of the most important indoor climate problems, i.e. exposure to passive smoking, which fell from 20% in 2000 to 14% in 2005. Monotonous, heavy, repetitive work has previously been reduced thanks to a conscious effort to improve the working environment.

As regards the psychosocial working environment, a mounting proportion feel the pace to be fast, but also enjoy increasing support from their immediate manager and better prospects for the future.

The number of work-related fatal accidents has for many years been constant at around 50-70. There is a tendency towards a drop in the number of on-the-job accidents reported – in 2005 there were just under 45,000 on-the-job accidents.

The most essential work-related disorders and symptoms are musculoskeletal difficulties and disorders, skin disorders, hearing impairments, cardiovascular disorders, respiratory disorders, cancer, reproductive injuries, ulcers and indoor climate symptoms in the form of mucosal irritation, headaches, fatigue, nausea and dizziness.

The consequences of morbidity in the various job groups can be sickness absence, early retirement and death. In total 33% of the employees with the poorest working environment had high levels of sickness absence as compared with 13% among those with the best working environment. The risk of long-term sickness absence and early retirement was highest among unskilled workers, who also had excess mortality in relation to other groups on the labour market. The number of years of life lost (measured here as the number of years lost due to deaths) differs strikingly between the various sectors – among men between 1 and 4 years and among women between 1 and 2.5 years.

The chapter describes in detail which job groups and sectors are particularly exposed to unhealthy work environment, and which work-conditioned disorders and complaints are particularly pronounced in the various job groups. Also differences between job groups and sectors with regard to the consequences of morbidity are discussed in detail.

Over the past 20 years the preventive work on the labour market has been guided by a number of action plans. The current plan focuses on industrial and occupational accidents, sickness absence in relation to the mental working environment and in relation to musculoskeletal complaints as well as exposure to noise.

Developments in the years ahead will make new demands of preventive work. There will be new ways of organizing work in the form of "borderless labour", where the transition between work and leisure is blurred, and the 24/7 society, i.e. a labour market where production and work go on around the clock and all year round. It is predicted that more people will be working interpersonally, whirlwind development is anticipated within information and communications technology, and new technologies and new substances are expected to be introduced, e.g. nanotechnology. At the same time, efforts to deal with the "old" work environment exposures will be maintained.

## Detrimental environmental factors

Environmental factors detrimental to health may be naturally occurring or man-made. Mankind is exposed to harmful environmental factors through the air, soil, water, indoor climate, food, noise and radiation.

The use of fossil fuel substances is the main source of emissions of air-polluting substances, which may have been transported over great distances. The urban population is most exposed. Just under 11,000 locations have currently been mapped as being polluted, and there are estimated to be a total of 31,000 polluted locations – most in towns and cities. In Denmark 99% of drinking water is sourced from the groundwater, but in recent years it has become more difficult to take good untreated water from the subsoil. During the past 15 years a number of waterworks have been closed owing to groundwater contamination with nitrate, pesticides and organic solvents.

It is estimated that man-made particulate air pollution in the external air annually causes approx. 3,400 premature deaths, 3,300 cases of chronic bronchitis, 11,600 cases of acute bronchitis in children under 15, 160,000 asthma attacks, approx. 2,200 hospital admissions due to circulatory disorders and approx. 1,500 hospital admissions and just under two million sick days owing to respiratory ailments.

Physical factors in the indoor climate (temperature, light conditions, air humidity etc.) have a bearing on comfort and well-being. The interaction between e.g. air humidity and temperature is of importance to the growth of mould fungi. Pollution of the indoor environment can stem from chemical substances (e.g. building materials, paints, detergents, combustion processes or in the form of passive smoking) and from biological mechanisms (e.g. mould fungi, house dust mites, dandruff, dander and hair from pets, and from pollen penetrating the home).

It is estimated that passive smoking causes 30 cases of lung cancer annually among never-smokers and an unknown number of cases among ex and current smokers.

Contamination of foodstuffs is due to microorganisms (e.g. the bacteria salmonella and campylobacter) or unwanted chemical substances. Such chemicals can be due to naturally occurring contamination (due to environmental pollution as a result of man-made activities) or may have arisen in connection with preparation and cooking (e.g. lead, cadmium, PCB, dioxins, brominated flame retardants or cook-

ing mutagens). In 2004 5,657 new cases of food-borne infectious disorders were registered, which is estimated to be 5-10% of actual occurrences.

Traffic noise, especially road traffic noise, is the most essential source of noise nuisance. In 2003 705,000 homes are estimated to have been troubled by noise (> 55 decibel (dB)). Of these, 150,000 homes are judged to have been severely burdened by powerful road noise (> 65 dB). Other principal sources of noise are train traffic, plane traffic, companies, building sites and neighbourhood noise. It is estimated that traffic noise causes 800-2,200 cases of ischaemic heart disease/elevated blood pressure annually.

Radiation occurs through sources both man-made (e.g. medical irradiation in connection with X-rays and radioactive drugs) and natural (e.g. the sun's ultraviolet radiation, radon in the home) or from electromagnetic fields from high-voltage plants and plant-to-mobile telecommunications.

It is estimated that UV light from the sun annually causes 1,150 new cases of malignant melanoma of the skin, equivalent to 94% of all new cases, and approx. 5,500 new cases of other skin cancers, equal to 80-85% of all new cases of other skin cancers.

### Nature and health - new topic in health policy

In terms of research, there is only limited knowledge as yet of the importance of nature for health, but essential aspects are that the use of natural amenities and green areas has a positive impact on health in terms of experiences, mentally and physically, and that frequent use of nature has a destressing effect and is also used as an out-and-out destressor.

The link between nature and health can be on several levels. On a psychological level it is about positive experiences in the form of peace and quiet and beauty by contrast with a busy and hectic daily routine in town and at work; on a social level it is about socializing with other people; and on a physical level about ease of access to amenities for staying physically active.

Although there is a lack of detailed knowledge about the correlation between use of nature and health, it is recommended that land-use planning authorities and local authorities factor in ease of access to natural amenities and

recreational areas in their policies and planning. Three factors, in particular, are important for promoting the use of nature and green spaces: proximity, ease of access and quality, i.e. natural and recreational areas must contain the qualities users are looking for.

A survey of the municipalities' health policies from autumn 2007 showed that every fourth municipality explicitly mentions that nature is a direct part of their health policy.

### Screening

Screening is a series of systematic examinations whose purpose is twofold, using a screening test: to divide those examined into a high-risk group that will be offered additional diagnostic investigation, and a group that, in all likelihood, is healthy. Such screening can concern an early stage of an illness or a risk factor and take the form of mass screening, in which whole segments of the population are examined, or selective screening, in which selected groups are examined, e.g. those at presumed or known high risk.

A number of requirements should have been met before screening examinations are initiated. These concern aspects of the illness being screened for, the actual screening test and the actual programme. In addition, the validity of the test and the ethical and psychological consequences for those examined, and the financial conditions and actual organization of the screening should have been thoroughly evaluated.

There are many ethical issues associated with implementing screening. The positive ones include a sense of security, safety, faster treatment and greater odds of being cured. The negative ones include the experience of voluntary coercion, undue worry, false security, unnecessary consumption of time and the risk of the actual screening test.

In relation to cancer, screening is done for cancer of the cervix (smear test) and breast cancer (mammography), while screening for colorectal cancer by examining blood in the stools is being trialled. For all three screenings there is evidence that mortality from the illness in question is on the decline in the population screened.

In less than two years (2004-2006) systematic screening of pregnant women for Down's syndrome (mongolism) has been introduced. The screening includes fetal nuchal fold scanning in the 11-13th gestational week together with a

blood sample. Even in 2005 81% of all cases of Down's syndrome were detected by means of this prenatal screening, and the number of children in which the diagnosis was first made after birth was down to 30.

Trials on preventive health studies in general practice have demonstrated positive effects on health in the form of years of life gained and a reduction in the risk of developing ischaemic heart disease. At the same time, it has been documented that the service of offering health examinations and consultations is cost neutral.

### Careful, explicit and critical use of current best knowledge

Evidence is the current best knowledge one has about any particular matter. When it comes to evidence-based prevention it is appropriate to distinguish between evidence about the causes and prevalence of illness, evidence about the effect of preventive efforts and evidence about organization and implementation of such efforts.

The nature and content of the evidence must be adapted to the specific goals and levels at which the preventive effort is directed. In connection with evaluations, the focus can be on the structural aspects, on the actual effort, on the process and on the outcome. In connection with the planning and implementation of greater preventive efforts, the focus can be on e.g. actual implementation, quality assessment or evaluation of the leverage and impact the service has on the population.

Systematic overviews based on randomized controlled trials (RCT) are the golden standard in medical treatment. Only the effect of the intervention is measured in RCT. In systematic overviews compiled in accordance with the model for health technology assessment, not only the effect of the intervention is assessed but also the structural, user-oriented and economic conditions under which the effort is being realized.

Particularly in connection with evidence about the organization and implementation of preventive efforts, it may also be relevant to incorporate experience-based evidence in the form of e.g. expert statements, health professionals' experience, the "silent knowledge" and the grey-zone literature (e.g. local health profiles, evaluation reports, quality assurance reports etc.), which are communicated primarily

in Danish and therefore do not find their way into the scientific and scholarly journals.

Health impact assessment is an evaluation of the future effects on the health of the population, directly or indirectly, of a strategy, programme or project. A recently conducted survey of the municipalities' health policies in 2007 showed that around one quarter of the municipalities are planning to use health impact assessments as part of the development of their health policy.

### The health services contribute to improving public health

The functions of the health services include health promotion and prevention, diagnosis, treatment, care and nursing, rehabilitation, palliation, education and research.

The bulk of the improvements in the population's state of health and life expectancy are attributable to factors outside of the health sector. The health services can contribute to improving public health by reducing mortality, by reducing morbidity and improving quality of life, and by reducing inequality in health.

There is a widespread view in the international literature that the trend in life expectancy during the latter half of the 20th century may – partly, though not exclusively – be explained by the progress of the health services.

The health services can be said to have an effect on public health if an initiative targets a common illness, if there is a documented effect of the initiative at individual or group level, and if that initiative involves sufficiently large numbers. Based on these criteria the health services have a positive effect on the state of health in relation to the so-called reactive services, e.g. operation for cataracts, medical and surgical treatment of the coronary arteries of the heart and therapeutic dental care. By contrast, it is uncertain whether treating rare disorders that affect only few people, e.g. heart and liver transplants, has any effect on public health.

The health services' general preventive programmes, involving numerically large target groups, are presumably of importance to public health too. That applies to e.g. maternity care, health care, prophylactic paediatric examinations, children's dental care, preventive home visits to the elderly etc.

Health service activities also entail a risk in the form of inadvertent or injurious events in connection with admission. Thus 8-10% of patients admitted to a hospital contract a hospital infection with possible mortality or invalidity as a result. Four out of ten inadvertent events are considered to be preventable.

According to the Danish Health Act one of the aims of the health services is to ensure easy and equal access for everyone, enabling the health services to help reduce the inequality in health brought about by the unequal distribution of aetiologies. However, there are both formal and informal barriers. The formal ones include user charges in relation to e.g. drugs, dentist and physiotherapist. Similarly, the numerous private health insurances can help ensure that some population groups receive faster and better access to health service provision. The two informal barriers to ease and equality of access to the health services include, for instance, a low level of education and foreign ethnic origin, where factors including cultural and linguistic differences, insufficient knowledge and lack of confidence can make contact with the health services difficult.

## The state of health in different population groups

This part of the Public Health Report deals with the state of health among children and young people, among elderly and among ethnic minorities. In addition, it sheds light on differences in men's and women's state of health as well as social differences.

### Most children and young people prosper and develop commensurate with age

Most children and young people prosper, develop on a par with their age and have confidential, intimate contact with friends and parents. However, 13% of 11-15 year-olds state that they are generally unhappy and failing to thrive. In early adolescence the overall picture is that the girls' schooling, social and personal skills are better than the boys'.

Just over one fifth of children under 16 have been ill within the past fortnight. Morbidity is particularly high among the 1-2 year-olds, where 41% of boys and 34% of girls have been ill within a period of a fortnight. Approaching school

age, morbidity falls year on year and is at its lowest among the 9-12 year-olds, but in the teenage years morbidity again becomes more frequent. During the early years, boys are more ill than girls, but the picture changes from prepuberty. Infectious diseases dominate the clinical picture in all age groups but are particularly pronounced among small children.

According to the parents' information, approx. 11% of children have one or more long-standing illness, most frequently diseases of the respiratory organs (asthma, asthmatic bronchitis). More than 5% of all children are born with a malformation, though under half of these are of no major significance to the child's state of health.

In total 5-15% of children in the western world are estimated to have mental disorders. Approximately half are due to behavioural disorders. In total 2-3% are estimated to have serious mental disorders.

The proportion of overweight children has risen concurrently with those who are overweight having become even more overweight. The prevalence of overweight in 15-year-olds has thus risen from 5-6% at the start of the 1970s to 16% at the end of the 1990s.

On average every fourth child aged 12 attends an accident and emergency department (A&E). The vast majority of injuries are less serious, however. Boys get into accidents more frequently than girls. The smallest children most frequently get injured in the home, the slightly older ones particularly at institutions and in school, while young people suffer injuries particularly during sport and athletics or in traffic.

Children's dental health has improved markedly - in 2004 slightly more than 70% of 5-year-olds and approx. 60% among 12-year-olds had no caries.

Infant mortality has fallen noticeably over the past 50 years and is now less than half a percent. Mortality is greatest during the first week of life and continues to fall during early childhood up to the age of 9-12, increasingly slightly thereafter during the teens. The most frequent causes of death among infants are illness in connection with birth and malformations. Among 1-15 year-olds accidents are the most common cause of death.

Since immunization against measles, mumps and German measles (rubella) (MFR) was introduced in 1987, there have been virtually no hospital admissions as a result of these

childhood diseases.

Danish children's health behaviour is cause for concern in a number of areas: In 7th grade 10% regularly drink alcohol, 20% have tried getting drunk, 11% smoke, and the proportion who drink and smoke is increasing sharply through the teens. The number of hours spent in front of the TV, PC or playstation is on the increase, fewer 15-year-olds are exercising intensively for at least four hours a week, and among 3rd grade children it has been possible to note a poorer level of physical fitness. At the same time, the consumption of foodstuffs with added sugar has risen. Bullying is widespread both among small children and schoolchildren, and children who are bullied are more often lonely, sad, perturbed and passive, and more often have some long-standing illness.

Most parents express the view that it is very important for their children not to start taking drugs and not to start smoking, that they learn to cooperate and resolve conflicts, and that they have good contact with other children.

### More elderly – fewer with functional loss

The physical and cognitive functions diminish from as early as age 30, but with greater speed than before after age 70. In general, morbidity increases with increasing age, and cardiovascular disorders, cancer, lung disorders and diabetes are strong predictors of survival among the younger elderly, but among the very oldest (90 and above) these disorders – together with other known risk factors, e.g. smoking – lose their predictive value.

Morbidity also influences the functional level. The healthy life expectancy without functional restrictions rose from 1987 to 2000 by 2.4 years of age for men and 1.1 years for women. Among the very oldest, there is considerable loss of skills at individual level as age increases, but at population level there is only moderate loss, owing to large-scale mortality among the most disabled.

The elderly are generally cheerful and content with life, and only as they approach their nineties does that satisfaction wane – although in this age group there are still three quarters who express satisfaction with their life. The older people are, the fewer think their health is poorer than that of their peers.

Mortality among the elderly has fallen markedly since the

1950s – most markedly among women. Thus the annual risk of death for 80-84 year-old women has fallen from 14% per year to 6% per year. There is no biologically determined limit to how old we can grow. On the contrary, the ageing process seems to be susceptible to both psychological factors, living conditions and therapeutic options.

The municipal authorities must offer everyone aged 75 or above preventive home visits at least twice a year. The purpose is to create a sense of security and well-being and to help citizens take advantage of their own resources and avoid loss of any functionality for as long as possible.

### Women live longer than men – men have poorer health

For as long as mortality statistics have existed in western countries, it has been known that women have longer life expectancy – and that is despite considerable mortality in connection with birth and pregnancy. By far the majority of studies show that women rate their own health more poorly than men, and that men have fewer functional restrictions. In addition, women report more morbidity than men. Apart from the gender-specific disorders, women have a preponderance of disorders associated with low mortality, while men have increased prevalence of cardiovascular disorders.

The background to this paradox is multifactorial, and there is not one but many different theories and explanations. Biological and genetic factors, lifestyle and health habits, living conditions, social roles and differences in the use of health services are all factors which, in their different ways, can contribute to clearing up the paradox. None of the explanations stands up alone but they all form part of a complex interplay.

### Social differences or social inequity

Social differences in health and illness often conflict with notions of fair distribution of goods, and reducing social inequity has therefore been assigned high priority in both the present and the former governments' prevention programmes.

Social inequities is more indicative of injustice and something that needs to be eliminated or changed while social differences or inequalities, e.g. between education groups,

refer to something factually ascertainable.

There are a number of different theories and views about the causes of social disparities in health and morbidity, e.g. the life course perspective, i.e. accumulation of health effects throughout the course of life, and social inheritance, which can be understood as the impact on the state of health, behaviour, knowledge, attitudes, life values, action competence etc., which can be traced back to the family one grew up in, and the social and subcultural family background environment in the wider sense. Social inheritance can thus be both positive and negative.

Social differences are often described in terms of level of education, socioeconomic status and income. However, education is considered to be the most robust measure. In Denmark virtually all manifestations of illness and all risk factors are unevenly distributed in social terms – more often than not with the heavy end pointing downwards. By way of example, a 30-year-old man with high education can expect to live a good four years longer than a 30-year-old man with no education following elementary school. Furthermore, the highly educated can expect more years of life with good health than the group with short-term or no education. The difference between the best-off and the poorest-off groups shows the potential for improvements to the state of health.

The chapter examines a number of examples of social differences in relation to life expectancy and mortality, health and morbidity, lifestyle and health habits, living conditions and use of the health services.

## Health among ethnic minorities

There is no clear-cut definition of the concept of ethnic minority, but a recurring feature of many definitions is that it involves a social group which, as regards language, diet, religion, physical attributes and original homeland, is perceived by itself and/or others as different from a majority population. Most studies use the country of birth as a measure of ethnic affiliation. In general, however, owing to various definitions, inclusion of different minority groups and different data collection methods etc. it is difficult to compare the results of the surveys. To this must be added the problems of small data material sets, decrease and the problems of allowing for background factors other than sex and age.

In 2006 there were approx. 361,000 immigrants and 117,000 offspring, equal to just under 9% of the population. The largest group were people of Turkish origin. On the basis of a number of Danish studies, the chapter provides an overview of differences between Danes' and ethnic minority groups' morbidity, use of health services and health and health-related quality of life.

A larger proportion of the ethnic minorities than of the Danes rate their health as poor and assess themselves as stressed. Among the ethnic minorities the prevalence of diabetes and HIV/AIDS is higher, while the prevalence of cancer is lower; a smaller proportion are hospitalized owing to accidents. A greater proportion of the ethnic minorities have used a GP, while a smaller proportion have had a preventive check-up carried out, as compared with the Danes.

A smaller proportion from an ethnic background believe in the importance of their own efforts in preserving good health. By the same token, a smaller proportion exceed the alcohol unit limit as compared with the Danes. Equal proportions of Danes and ethnic minority groups eat fruit and vegetables, while a greater proportion among the ethnic minorities have sedentary leisure activities and a smaller social network.

## Difficult to make predictions – especially about the future

The last chapter of the report deals with public health in the future. A projection of the self-reported morbidity from 2005 to 2020 shows that the number of adult Danes reporting having one or more long-standing illness is expected to increase by approx. 300,000 to a total of approximately two million adults. A similar projection of two proxy measures for morbidity (24-hour admissions and outpatient contact pathways) shows that the number of 24-hour admissions is expected to increase by approx. 230,000 to just under 1.4 million admissions in 2020, and that the number of outpatient contacts is expected to almost double from 2005 to 2020 and be approx. five million in 2020.

In general this projection of the individual disease groups shows a very motley picture. Among the “folk-diseases” (widespread diseases) a numerical rise is expected, particularly in relation to cardiovascular disorders, respiratory disorders, diabetes, and asthma and allergy.

Any statistical projection is associated with many, and great, elements of uncertainty. Therefore, it is important not merely to take a critical stance on the actual results of the projection, including evaluating both the method used and the prerequisites for it, but also to take a stance on whether the development is a desirable one or whether action must be taken in order to avert the anticipated development.

Viewed over a 50-year period preventive work in Denmark has developed from cautious experiments and ad hoc grants to being a working task for the municipalities. Development has been influenced by international trends, in-

cluding WHO's Health for All strategy from 1984 and the follow-up to it as well as the EU's public health programmes, the most recent of which assigns high priority to the field of health and to promoting the well-being of citizens.

In 2008 the Danish government is expected to set up a prevention commission, whose remit will be to analyse and present proposals for a consolidated preventive effort. On the basis of the commission's work, a new national action plan for prevention is expected to be drawn up in 2009 in collaboration with the municipalities and regions.