Health Inequality
- determinants and policies

Finn Diderichsen*, Ingelise Andersen*, Celie Manual* and the Working group of the Danish review on social determinants of health**

Translation to English of the “Ulighed i Sundhed – årsager og indsatser” by Celie Manuel.

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Foreword

The fact that all countries in the world have large and often growing social disparities in the health led in 2005 WHO to appoint the Commission on Social Determinants of Health chaired by Professor Michael Marmot. The ensuing report resulted in the adoption by the WHO in May 2009 of the resolution: Reducing health inequities through action on the social determinants of health (WHA 2009 62:14). The resolution urges member states to conduct national analyses of the determinants of and policies against social inequality in health. Denmark is facing a particular challenge: In spite of highly developed welfare policies, and income inequalities among the lowest in the world, social inequalities in life expectancy has been growing since the 1970s and has doubled the last 20 years. In January 2010, against this backdrop, the National Board of Health in Denmark requested Professor Finn Diderichsen, Department of Public Health, University of Copenhagen, to lead such an analysis of social inequalities in health in the Danish context.

As a result a Danish report “Ulighed i sundhed – årsager og indsatser” was published on May 16th 2011. (http://www.sst.dk). The same day the Minister of Health, Mr. Bertel Harder, announced that the report will serve as a foundation for a detailed action plan on social inequalities in health. A translation to English of the full report is published in this supplement of the Scandinavian Journal of Public Health. The report identifies 12 determinants of inequalities in health, and suggests 58 policy initiatives within a broad range of policy areas. Indicators for monitoring determinants and implementation of policies are suggested.

With this report, an important step has been taken in the direction of better understanding the possibilities for working actively on reducing social inequality in health in Denmark. The report points to a number of developments within existing policy areas, showing that reducing health inequality is not primarily the task of the health sector. It is a complex task requiring coordinated efforts from different sectors (e.g. the education, social, health, and employment sectors) at different administrative levels (national, regional and local). As such, there are many approaches and professions at play and this report will hopefully constitute an important basis for the organisation and prioritisation of future efforts.

So far, the National Board of Health has focussed on descriptive analyses of social inequality in health as well as on the development of cross-sectoral interventions that may have a compensatory effect, albeit without addressing the fundamental factors of importance for the development of social inequalities in health, and thereby provide foundations for a mainstreaming of equity oriented health policies. The fact that this has not hitherto been addressed has, among other things, to do with the lack of a sufficient evidence base. This is what the current report seeks to contribute in building.

The report reaches far beyond the health sector and describes how many sectors and disciplines have central roles to play if the social inequality in health is to be reduced. A concerted effort to reduce health inequality thus requires a close coordination and collaboration between the sectors, political prioritisation and leadership, and that each sector and discipline take responsibility for contributing within their fields.
On the basis of the content of this report, the National Board of Health will initiate dialogue with the authorities of other policy areas involved. Furthermore, the National Board of Health will develop follow-up material, the content and focus of which are targeted municipalities and regions.

The report is a collaborative project between the National Board of Health and the Department of Public Health, University of Copenhagen. The project is supported financial by Trygfonden.

The scope of this report is wide and several experts have provided contributions from their respective disciplines:

Professor Finn Diderichsen selected a working group comprising:
Professor Anne-Marie Nybo Andersen, University of Copenhagen
Head of Research Elsa Bach, The National Research Centre for the Working Environment
Head of Research Mikkel Baadsgaard, The Economic Council of the Labour Movement
Head of Research Henrik Brønnum-Hansen, National Institute of Public Health, University of Southern Denmark
Head of Research Finn Kenneth Hansen, Centre for Alternative Social Analysis
Associate Professor Bernard Jeune, University of Southern Denmark
Professor Torben Jørgensen, University of Copenhagen
Professor, Director Jes Søgaard, The Danish Institute for Health Services Research

The composition of the working group was intended to cover a range of relevant competencies and policy areas in the best possible way. A secretariat, consisting of associate professor Ingelise Andersen, cand.scient.san.publ. Celie Manuel and Professor Finn Diderichsen, was set up at the Department of Public Health, University of Copenhagen. The working group held five meetings and has provided numerous contributions along the way in the form of data, references and text which has been incorporated into the report. Members of the working group have consulted colleagues at their respective institutions as needed.

A steering committee was set up with the Director of the National Centre for Health Promotion and Prevention Else Smith (and Annemarie Knigge as of September 2010), Head of Department at the Department of Public Health Mette Madsen, and the Director of the National Institute of Public Health Morten Grønbæk. In addition, there has been a project group at the National Board of Health consisting of Line Raahauge Hvass, Anna Paldam Folker and Niels Sandø.

The work on this report is primarily a review of existing international publications on the topic with special attention paid to accessible Danish studies and the relevance of international studies in the Danish context. The English review *Fair Society – Healthy Lives* (2010) and the Norwegian *Nasjonal strategi for å utjevne sosiale helseforskjeller* (2007) have been important sources of inspiration. In addition, some secondary processing of existing register and survey data has been conducted.

We thank Professor Denny Vågerö, CHESS, Stockholm, member of the global commission, for comments on an earlier version, and also Allan Krasnik, Ulla Christensen and other researchers from whom the working group have received valuable comments.
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Summary

Denmark has, just as many other countries, two health policy goals: longer mean life expectancy with fewer years of illness as well as reduced social inequality in health. However, Denmark has met considerable challenges on both accounts. The development in mean life expectancy over the period 1975-1995 was much slower in Denmark than in other OECD countries, while at the same time inequality in mortality has been gradually increasing since the 1970s. It is a great challenge that Denmark, despite relative low economic inequality and easy and equitable access to the health system, has still experienced a rise in inequality in mortality comparable to other Western-European countries. While it has long been clear that the reason for the weak development in mean life expectancy is that Denmark has not to the same degree as other countries implemented structural preventive measures in the fields of tobacco smoking and alcohol, there has been more uncertainty about how to break the progression of health inequality in Denmark and the rest of Europe. Therefore, in later years, most prominently England, Sweden and Norway have all taken steps to assess the causes of and possible countermeasures against health inequality. Most recent and relevant to the work in hand is the review carried out by WHO’s Commission on Social Determinants of Health. With the current report, an analysis has now been conducted in a Danish context to point to the existing knowledge about the determinants of health inequality, and the policies and countermeasures that may be expected to impact on it.

Social inequality in health will always exist and is defined by a systematic relationship between people’s social position in society and their health. This relationship is found for both men and women of all ages. Most of the major health problems occur more often in people with low levels of education, and normally their consequences in terms of mortality and disability are more serious in this group. For people with mental illness or addictions the social consequences can become so severe that we speak of social marginalisation. If the social inequality in burden of disease is calculated as the difference between educational groups in years of life lost due to premature death and disability, then chronic obstructive lung disease, heart disease, dementia, lung cancer and depression are diseases that together account for two thirds of the inequality in Denmark.

Since tackling health inequality is not isolated to just the core activities of health policy, it is necessary to point out the potential of other sectors to reduce social inequality in health. A coordinated and cross-sectional policy for the reduction of health inequality (cf. the EU’s Health in All Policies) can strengthen both legitimacy and effectiveness of the policy areas involved and create better population health for all, both as a goal in and of itself and as a means for the economic development of society.

Three types of determinants have been defined which all act, each in their place, in the mechanisms that generate health inequality. For each type, the Danish working group has chosen a number of determinants, twelve in total:
i. Early determinants that affect social position and health
   1. Early childhood development – cognitive, emotional, social
   2. Schooling – school completion
   3. Segregation and the local community

ii. Determinants of illness influenced by social position:
   4. Income – poverty
   5. Longstanding unemployment
   6. Social marginalisation
   7. Physical environment
   8. Work environment – ergonomic and psychosocial
   9. Health behaviour
   10. Early functional decline

iii. Determinants generating unequal consequences of illness
   11. Health services utilization
   12. The exclusionary labour market

For each of these twelve determinants, the existing knowledge of their effect on illness and injury and about the background conditions that influence the development and distribution of the determinants is described. Also, for each determinant, a certain number of policies are proposed that may be expected to change the occurrence and social distribution of the determinant. Summarised in a life course perspective, the following overview of measures for the reduction of social inequality in health is attained:

- 0-8 years: The foundation of many important functions occurs already during pregnancy. Screening for behavioural, physical and social risk factors by midwives is of great importance to the child’s and the later adult’s health (#1.1). Helping to ensure an infant’s close emotional contact with its parents, already in the early phase of transition between maternity ward and the home, and in the first 18 months in general, can be done by the proactive supportive work carried out by home-visiting health nurses (#1.2). Securing good material and social conditions for the child has to do with minimising childhood poverty and providing services that include optional parent support groups (#1.5). The preventive child health examinations should focus particularly on reaching those children who are behind in their language, emotional and social development (#1.4). Focussed efforts in pre-school and the first years of school to achieve reading skills for all children have been shown to be greatly influential on how they cope later in life, in school and on the labour market.

- 9-18 years: During the school years, the possibility exists of reducing health inequality by focussing on support for disadvantaged and vulnerable children and by creating a school that is actively motivating also for those who are not motivated to school work by their parents. If
children can be given a sense of success in reaching the goals they set themselves and in the experience of everyday victories, their self-confidence and self-efficacy can be developed (#2.2). In this way, their motivation to do well up until and including a high-school level education is encouraged. At the same time, one prevents their getting into unhealthy risk behaviour such as smoking, drinking, taking drugs and physical inactivity. The inclusiveness of high-school level education programmes for those who have difficulties finding their place as well as easy access to training places are important (#2.3). It is in this age group that dependency-generating contact with tobacco, alcohol and drugs is made, and where the norm-generating structural measures have a particularly large effect (#9.1-#9.2). It is also during the school years that efforts to stimulate physical activity are important (#9.3). Maintaining youth unemployment at a very low level is also important (#5.2).

- **19-44 years:** This is a period of life where much has to be achieved: beginning a career, starting a family, having children and establishing a home. In this age group, the occurrence of fatigue and sleep problems increases. The combination of workplace-, home- and economic demands can generate a high level of stress in all social groups. The increase in psychiatric symptoms is, however, most pronounced in people with a short education. Creating a working life with flexible physical and mental demands, wellbeing, possibilities for development and having an influence on, and support for, how to live up to the demands is important (#5.1). This is an age group for which it makes sense to combine interventions for improved work environment with interventions for better health behaviour (#8.4). It is also in this age group that economic stress can be pronounced and where measures against poverty are important (#4.2). Many in this age group are affected by mental disorders entailing a road back to work that can be long and difficult. Securing effective treatment of mental illness and coordinated efforts on the parts of job centres, employers and practitioners is critical. For people who have experienced severe social consequences of long-term mental handicap or abuse, support for a social life with some kind of employment, and acceptable economy, own housing and treatment of both mental and somatic disorders becomes of great worth to public health (#8.1-4).

- **45-74 years:** In this age group, those that have had heavy physical work start to feel it. The need for a job market with flexible demands increases so that those with reduced work ability can continue in the workforce (#12.2). Physical activity and dietary habits with less fat and salt and more fruit and vegetables become extra important (#9.3). Several risk factors and early signs of disease such as hypertension, serum lipids imbalance, overweight and diabetes and certain types of cancer become more common and it is, as such, important that the general practitioner is aware of this, especially among patients with a low level of education (#11.3). Early signs of aging and functional decline should direct attention to need of and possibilities for physical activity (#10.2).

75 year +: Signs of functional decline are so normal in this age group that preventive home visits should focus on detecting these (#10.3). It is also in this age group that the need for treatment and rehabilitation becomes large and where access to health system services becomes essential (#11.1-7). The ability of the health system to integrate the efforts of hospitals, private practitioners and the municipality becomes central, especially for those patients who have difficulty arguing for their
needs (#11.8). Extra attention to inequality is required in the long chronic patient plans that include rehabilitation etc.
Content guide

The report consists of five chapters. **Chapter 1** sets the stage by introducing the term health inequality and giving a short historical overview of international developments and the Danish point of departure.

In **Chapter 2**, some of the principal reasons why health inequality is a problem are presented along with a model for how the causal mechanisms behind this phenomenon can be understood.

**Chapter 3** explains in more detail the scope of the inequality and analyses which illnesses and diagnosis-related groups create the social inequality in the health burden of the Danes. On this basis, a number of determinants behind health inequality are identified.

Twelve selected determinants are reviewed in **Chapter 4**. For each determinant, the literature on the topic is reviewed, and policy measures that according to the literature can reduce the inequality are highlighted. The determinants are categorised according to the following headings: (i) Early determinants that affect social position and health, (ii) Determinants of illness influenced by social position, and (iii) Determinants generating unequal consequences of illness.

**Chapter 5** draws together the different threads and gathers the many policy measures described in Chapter 4, while explaining how collaboration across sectors can contribute to reducing health inequality.

In addition, Appendix A contains the indicators for monitoring determinants and policy measures, and Appendix B contains a glossary that explains technical terms, methods and abbreviations.
1. Introduction and Background

1.1 Health inequality – neither new nor Danish
Societal interest in the strong association between human health and material conditions goes back a long way. The relations became very clear when population movement towards urban centres picked up pace. In the 1850s, the destructive effect of living conditions on the health of the poor in Denmark came into focus and the first initiatives to improve these conditions were made. When the first welfare legislation in Denmark saw the light of day in 1891-92, it revolved around financial support for the disabled and subsidies for the many private health insurance funds which guaranteed members free medical treatment and sickness benefits. Later, in 1898 and 1921 respectively, came the laws on accident and invalidity insurance.¹ The objective of all this was to reduce the catastrophic social and economic consequences that illness and accidents had had on the victims and their families. In the 1930s, the stagnating population size became a matter of concern and with it the material conditions of families with children, birth rates, and the high and socially skewed child mortality. This led to legislation on health nurses and maternity care. Thus, even before the welfare state was created, social causes and consequences of disease had been a key political topic in Denmark, as in many other European countries.

After World War II there was great confidence in the ability of medical science and an extended, easily accessible health care system and health insurance to solve the problems regarding social inequality in health outcomes. Not least, this ambition was high on the agenda in the United Kingdom with the great social and health political venture: the National Health Service.² In the first thirty years after World War II, immense economic growth was experienced which reduced economic inequality both in the UK and in Denmark, and at the same time, the hospital sector was greatly expanded. It was an implicit assumption that this development would concurrently reduce social inequalities in health. Some studies, however, indicated the continued large influence of social conditions.³ Around 1970, political interest in societal inequities intensified⁴ and assessments of low income circumstances and living conditions were conducted in Denmark,⁵ ⁶ Sweden⁷ and Norway.⁸ These also described health inequality,⁹ but the conclusions regarding policy countermeasures centred largely on the further expansion of primary health care.

In view of the large political efforts towards a public, easily and equally accessible health service in the UK, it is not surprising that the findings of the Black Report in 1980¹⁰ - that social inequality in mortality had increased significantly in relative terms since the 1930s - were received with great concern. An important reason was that the increase in heart mortality that had occurred since 1950 was almost exclusively to be found among skilled and unskilled workers.¹¹ In the Black Report, the much lower inequality, for instance in child mortality, in the Scandinavian countries was noticed and the authors proposed a wide range of social policy initiatives to reduce child poverty, improve housing benefits for young low-income families, health nurse schemes, and so on. The report received broad international attention, including in the Nordic countries and awakened interest, especially in Sweden, in how social health inequalities had developed there.¹² ¹⁵ It now became clear that, in the Nordic countries too, inequality in mortality had increased since the 1970s. This initiated comprehensive research in many countries as to what the reasons then might be. In Denmark, interest was focused on the fact that the rise in life expectancy had stagnated since 1980. The
Government appointed ‘Middelvetidsudvalget’ (The Life Expectancy Commission) which among other things looked at social inequality in mortality, but which due to the high unemployment of the early 1990s focused especially on the mortality of those outside the labour market.\textsuperscript{16} The later ‘Forebyggelseskommissionen’ (the Prevention Commission)\textsuperscript{17} focused on undertakings to improve the still relatively short mean life expectancy and did not deal with policies against health inequality per se.

On the global scene, the HIV epidemic of the 1980s especially illustrated that there was a strong association between economic development and health in low income countries. The epidemic made it clear that economic development was an important prerequisite for positive health development, but also that a problematic development in human health could be a barrier to economic development. Spending money on health should therefore not be seen as a burden but as a necessary investment. The World Bank, in its 1993 annual report, launched the term “\textit{Investing in Health}” and in the so-called \textit{Global Health Equity Initiative} a group of researchers showed that the issue of health inequality was at least as large a problem in low- and middle-income countries as in high-income countries.\textsuperscript{18} The WHO appointed its commission on \textit{Macroeconomics and Health} \textsuperscript{19} which outlined the health political consequences that this insight into the impact of health policies on economic development ought to bring about globally.

In Europe, the attention has rather been on the potential shortage of labour ensuing from demographic development. Labour shortage has made clear that there is a labour market policy potential in improving population health and reducing health inequalities.\textsuperscript{20} A recent calculation has assessed that if everyone had the same low mortality, sickness leave and high retirement age as the most highly educated quintile of the population, the costs in terms of decline in production and expenses for the health system and income transfer payments could be reduced by an amount equivalent to 5.8% of GNP in the whole European Union. This type of calculation is clearly fraught with enormous uncertainty and the EU figures are affected by the fact that the inequality in Eastern Europe is about twice what is found in Western Europe. However, the problem is of an extent that has made it natural to take a number of initiatives to collect all existing knowledge with the aim of coming up with policy solutions for tackling health inequalities. In England, in 1999, the so-called Acheson Report\textsuperscript{21} was published. In Sweden, the then existing Folkhälsokommitté in 2001 presented \textit{Halsä på like villkor (Health on equal terms)}, while Norway in 2005 published \textit{Gradientutfordringen (The gradient challenge)}. All three analyses led to a range of political initiatives both nationally and locally.

At the same time, the WHO in 2005 appointed a global \textit{Commission on the Social Determinants of Health (CSDH)},\textsuperscript{22} with Michael Marmot as chairman. This report indicated a broad range of policy options for reduced social inequality in health within social policies, labour policies, environmental policies, and health policies\textsuperscript{22} - initiatives that according to existing scientific knowledge might be expected to reduce health inequality in rich and poor countries alike. CSDH was followed in 2009 by a resolution in the World Health Assembly (WHA 2009 62:14) which, supported among many others by Denmark, requests all the member countries of WHO to conduct national analyses of the specific causes of social inequality in health and to suggest lines of action to reduce it. Already in 2010, the British so-called Marmot Commission published its specific recommendations for the United Kingdom – \textit{Fair Society, Healthy Lives – a Strategic Review of Health Inequalities in England post-
The WHO’s Regional Office for Europe has also initiated a review. This current report is, as far as we know, the first national review after the British and Norwegian appraisals of the topic.
1.2 The Danish point of departure

Denmark has, just as most other countries, expressed its health political goals both in terms of improving public health overall and reducing social inequality in health. In the former Government’s *Folkesundhedsprogram 1999-2008* (Public Health Program 1999-2008)\(^24\)-\(^26\), two goals about (i) increased longevity with higher quality of life and (ii) reduced social inequality in health were marked out. These goals were followed up after the change of Government with *Sund hele livet* (Healthy throughout life)\(^25\). *Sundhedspakke 2009* (Health Package 2009)\(^26\) focused on a single goal: lengthening life expectancy by 3 years by 2020.

The Health Package includes two proposals regarding inequality: 1) Utilising rate adjustment pool funds on projects that strengthen preventive interventions towards groups with few resources and vulnerable children and adolescents; 2) Distributing guidance material on recruitment and motivation of groups with few resources to lifestyle changes, including smoking cessation.

Figure 1.1 illustrates the inequality in remaining life expectancy according to education quartiles of the population above 30 years of age. It can be seen that this inequality has increased dramatically from 1987 to 2009. For men, the inequality has increased from 2.0 to 3.8 years and for women, from 1.2 to 2.5 years. This is almost a doubling of the inequality over 22 years.

![Figure 1.1 Remaining life expectancy for 30-year olds in the highest and lowest educational quartiles. Denmark 1987 and 2009](image)

Source: The Economic Council of the Labour Movement and The National Institute of Public Health

In a large number of European countries, where it has been possible to compare the inequality in mortality since the 1970s, similar tendencies of growing inequality have been found.\(^27\)-\(^28\) The magnitude of the inequality is, however, very different from country to country in Europe. Table 1.1 shows the magnitude of the inequality in Denmark compared with a number of other European countries which have good quality data. The latest comparative data are from the 1990s and show a difference in mortality between those that have the shortest and longest educations respectively. In the table, we have also included life expectancy, a measure of income inequality (the Gini-
coefficient), and a measure of the degree of coverage of social policies, i.e. what proportion of the population is covered by public income transfers for the elderly, the unemployed, and the sick, and to which degree they cover the pre-sickness or pre-unemployment level of income.

The inequality in mortality is clearly lowest in the two southern European countries Italy and Spain as well as in Sweden. Among the western European countries, it is largest in Finland, but in Poland and other eastern European countries it is dramatically larger. In the remaining countries such as Denmark, Norway, England, Belgium, Switzerland and France, the inequality is at a fairly similar level. Among these countries, Denmark has a relatively high inequality in mortality for woman, but a low one for men. If an unequivocal association between economic inequality, welfare policies and health inequality is assumed, the figures in Table 1.1 - with their cross sectional data about the year 2000 - do not show the pattern one would immediately expect. The two columns farthest to the right in the table show that Italy, Spain and England have large income inequalities and that England has a considerably lower degree of coverage of social policies (decommodification) than the countries on the continent and especially compared with the Nordic countries. Yet the social inequality in mortality is of the same magnitude in all these countries.

Table 1.1 Inequality in mortality, life expectancy, income and socio-political coverage in selected OECD countries. Ranked according to increasing level of income inequality

<table>
<thead>
<tr>
<th>Country</th>
<th>Inequality in mortality$</th>
<th>Life expectancy$</th>
<th>Income inequality#</th>
<th>Socio-political coverage¤</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>Denmark</td>
<td>828</td>
<td>511</td>
<td>76.8</td>
<td>23.2</td>
</tr>
<tr>
<td>Sweden</td>
<td>625</td>
<td>381</td>
<td>79.7</td>
<td>23.4</td>
</tr>
<tr>
<td>Finland</td>
<td>1255</td>
<td>483</td>
<td>77.7</td>
<td>26.9</td>
</tr>
<tr>
<td>Belgium</td>
<td>915</td>
<td>417</td>
<td>77.8</td>
<td>27.1</td>
</tr>
<tr>
<td>Norway</td>
<td>980</td>
<td>518</td>
<td>78.7</td>
<td>27.6</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1012</td>
<td>337</td>
<td>79.9</td>
<td>27.6</td>
</tr>
<tr>
<td>France</td>
<td>1044</td>
<td>375</td>
<td>79</td>
<td>28.1</td>
</tr>
<tr>
<td>Spain</td>
<td>662</td>
<td>236</td>
<td>79.4</td>
<td>31.9</td>
</tr>
<tr>
<td>UK</td>
<td>862</td>
<td>462</td>
<td>77.9</td>
<td>33.5</td>
</tr>
<tr>
<td>Italy</td>
<td>639</td>
<td>197</td>
<td>79.8</td>
<td>35.1</td>
</tr>
<tr>
<td>Poland</td>
<td>2192</td>
<td>750</td>
<td>73.9</td>
<td>37.2</td>
</tr>
</tbody>
</table>

$ Inequality in mortality in the 1990s is measured as the "slope index of inequality" which measures the absolute difference in mortality per 100,000 between highest and lowest educational level. Source: Mackenbach et al: NEJM 2008; 359:2668-81. Data from Italy and Spain are from the cities of Turin and Barcelona respectively

$ Life expectancy for men and women 2000. Source: OECD

# Income inequality among individuals measured via the Gini-coefficient*100, 2006. Source: OECD 2008

¤ Sociopolitical coverage is a composite measure of coverage and level of public pensions, sickness benefits, unemployment support (i.e. the so-called decommodification score). The higher the score, the better the coverage. It varies in the OECD countries between 11 in Australia and 35 in Sweden (1998/99). Source: Bambra: J Soc Policy 2005; 34: 195-213

Comparing life expectancies, Finland and Poland with a large absolute inequality in mortality also tend towards shorter mean life expectancy, while Italy and Spain, on the other hand, have low inequality and high mean life expectancy at the same time. A part of the explanation for Denmark’s larger inequality in mortality than, say, Sweden, is that we have a higher mortality overall (i.e. a lower life expectancy). The noticeably low health inequality in the southern European countries has
been interpreted as a result of the fact that they are in an earlier phase of the tobacco epidemic, where smoking of tobacco has not yet become concentrated in the low-educated population, to the same extent as it has in north-western European countries. At the same time, the intake of a healthier diet in southern Europe counteracts some of the unhealthy effects of tobacco on heart disease mortality.

The most challenging part of this picture, however, is that Denmark and other Nordic countries, which for many years have had a high level of coverage of social policies with, consequently, relatively low income inequalities, do not seem to have been able to secure a low social inequality in mortality. This has been termed ‘The Scandinavian Welfare Paradox of Health’.
1.3 Macroeconomics and public health
The fact that public health, measured both in terms of population health overall and as social inequality in mortality and morbidity, varies so much between countries that otherwise all are affluent welfare states with well-developed health systems has generated a large interest in both research and political arenas as to what might explain the variation. There is, however, an important distinction in whether the countries are compared in terms of total mortality (measured for instance as life expectancy), or whether it is the inequality that is being compared.

When looking at the health of the total population, a wide range of studies have indicated that when countries (and states within the USA) that have similar levels of income are compared, the societies with lower income inequality have, on average, better population health when measured by life expectancy and other indicators, as countries with greater income inequalities. This can wholly or partly be explained by the fact that the relationship between income and health at the individual level is curvilinear, i.e. that the positive effect of a certain increase in income on health becomes smaller as income increases (see also section 4.4). But it has also given rise to the hypothesis that small income inequalities, and the universal welfare systems that commonly underlie them, create a societal context with greater social cohesion and social capital and thereby better health. The results of this type of study are, however, not consistent. The evidence for greater economic inequalities affecting public health is strongest in societies with large income inequalities such as the USA, Brazil and Russia. The effect is often largest for the causes of mortality that have the greatest social gradient, i.e. tobacco- and alcohol-related diseases, injuries and violence. This indicates that lesser income inequality first and foremost benefits the health of lower socioeconomic groups. In any case, Denmark is an exception to the rule, being among the countries in the OECD with very low income inequality as well as low life expectancy (see Table 1.1). Regardless of whether this contextual effect of income inequality is concluded to exist, the individual effects of income on health are so marked that this in itself instils a health policy potential for income policies.

In the 1930s, the income inequality in Denmark was twice what it is today, corresponding to the level currently found in some countries in South America (Gini-coefficient > 0.5). From the 1950s till 1985, the income inequality has largely been decreasing. In the period 1985-1995 it was constant, but from 1995 onwards, there has been a gradual increase in the Gini-coefficient from 0.2 to 0.25. This is in itself a significant increase which has taken place during a time of economic growth and declining unemployment.

Despite the association between income inequality and mean population health, vigorous research in the OECD countries has not been able to identify an unambiguous relationship between income inequality or the configuration of welfare policies on the one hand, and social inequality in mortality or self-rated health on the other. That a Nordic welfare model should be a sufficient precondition, in itself guaranteeing low health inequality, cannot be confirmed.

This means that we need to proceed in a much more detailed fashion if we are to identify the determinants of, and possible countermeasures against, the social inequality in health.
1.4 Social inequality in a life course perspective

The fact that different types of determinants are bound to different phases of life is important when assessing social inequality in health and implies that the social inequality should be assessed in a life course perspective.

In a life course perspective, attention is directed towards the interaction of biological and social processes. For instance, the social position of its parents is a predictor of a child’s birth weight. Low birth weight is associated with health later in life, such as heart disease and diabetes. The theory is that during a foetal period with low growth, an intrauterine biological programming occurs that interacts with risk factors later in life.

During childhood, it is parents’ social circumstances that, in an interaction with societal support structures such as health care and day care institutions, affect the early cognitive, emotional and social development of children. In the next step, the child’s development has a large influence on its movement through the education system and later on its labour market chances. This further determines the individual’s health development. As such, childhood is a vulnerable period, in which exposure to social and other determinants exerts an effect which would not necessarily occur had the exposure happened later in life. At the same time, the biological and social development in childhood can, due to a long induction period, influence the risk of different diseases in adulthood.

Adulthood diseases are thus influenced both by childhood circumstances as well as by conditions during adulthood. The lower the socioeconomic statuses of the parents and of the child when it grows up, the more risk factors will the individual be exposed to during the course of its life. We speak of a clustering of health determinants. The effect of these determinants can be accumulated over the life course whereby the health effects are added to each other or they can interact with each other so that early life exposure increases the health vulnerability to exposures later in life.

The health of the elderly is, as such, the aggregated effect of circumstances over a long life. But there are also conditions during old age, which have a large impact on the health and functional ability of the elderly. Income, physical activity and social relationships are some examples. On the other hand, it is often found that risk factors of great importance earlier in life have less influence among the elderly. This is in part due to the fact that people with a high intake of and vulnerability to tobacco and alcohol often do not attain a high age.
2. Health inequality – ethics and mechanisms

2.1 Solidarity and universalism
A rich welfare society requires a high degree of division of labour and uses incentives to get people to educate themselves and work. The division of labour creates a certain level of social and economic inequality in both working conditions and income and thereby also in status, housing and way of life. But it also creates health inequality and the question is to what extent it is possible to avoid the health consequences of this socioeconomic inequality. Social inequalities in health are hardly conducive to societal development. On the contrary, they are an economic burden for society if large groups of citizens have such bad health that they cannot contribute to societal production and development. Furthermore, a good state of health is such a fundamental prerequisite for people’s freedom to live a life they value that many societies perceive the reduction of health inequalities as a particularly high priority.18;22;40;41

This founding value has guided Danish health politics for a long time. The health services have been planned with a view to solidarity in financing according to ability to pay and universal access to prevention and treatment. These are the two principles of equity in health care. The fact that 85% of health system financing is obtained through income tax with 8% of all taxable incomes earmarked the health system, and that the majority of services are free of charge to the user, is quite unique in a global perspective. It is worth pointing out that the countries, most of them outside of western Europe, that do not maintain such a system with solidarity in financing have a health inequality that is of a quite different magnitude than in Denmark. Letting people pay the full costs of health care which thereby easily surpass 40% of their yearly income, makes user fees for treatment in such countries an important cause of long-standing poverty.42

The Nordic welfare model41 is first and foremost characterised by the fact that all citizens have universal access to both a number of income transfers (such as the standard social pension, unemployment benefit, child care benefit, etc.) and to a range of services (medical treatment, day care institutions, elderly care, etc.). A smaller part of the assistance, however, is not universal but is allocated according to defined needs (social assistance, housing benefit, home help, etc.) or is dependent on private insurance (supplementary pensions and health insurance etc.). A welfare policy that simultaneously has to limit economic inequality and poverty as well as provide services of a scope and quality acceptable to the majority of the population, entails at least three challenges which shall be described in the following.

The principle about solidarity in financing of health care services is very well anchored in the population. But in recent years, there has been discussion about the degree to which health is a personal choice. The discussion stems from the fact that we, at present, term a large part of the non-communicable disorders “lifestyle diseases”. By doing so, it is tacitly suggested that a certain degree of free choice is involved. However, it may be questioned how many freely choose to become grossly overweight or dependent on alcohol or tobacco. It rather has to do with the fact that human beings are biologically and psychologically impacted upon by social conditions and may therefore have difficulty resisting the temptations of a society with easy access to tobacco, alcohol and calorie-
dense food and where, concurrently, the option of physical inactivity in the form of sedentary work, computer programs and games and television is ever-prevalent. As the risky health behaviour is increasingly concentrated around a socially less privileged group, societal solidarity is put to the test. The need for solidarity with those who for genetic, psychological and social reasons are more vulnerable to the “lifestyle temptations” is increasing. In section 4.9 we will describe a range of structural measures for ensuring societal solidarity in the prevention of non-communicable disorders.

The second challenge stems from the fact that in a welfare model where everyone is meant to contribute according to ability and benefits according to need a key issue is how to set the limits for what is a legitimate degree of disability to be freed from contributing to society. Traditionally, it has been a task for the medical profession to decide who is ill enough and sufficiently incapacitated in terms of ability to work to receive disability pension, etc., but as ever more people are outside of the workforce and receiving health-related income transfers this criterion is challenged. The demands of work-life are increasing and a growing proportion of especially the less privileged part of the population suffers from physical and mental fatigue and feeling worn-out without necessarily having a diagnosed illness (see section 4.12). This, in combination with the labour shortage conditioned by demographic development, challenges solidarity with regard to financing.

Thirdly, a universal welfare state requires that public services, not least health services, are sufficiently accessible and of an adequate quality to keep the majority of the population from engaging supplementary private insurance schemes. If too many pay into private insurance schemes it can, over time, undermine willingness to pay tax for public services. Many measures and market-oriented reforms in the public system towards reducing waiting times and increasing freedom of choice should be seen in the light of retaining willingness to pay for the public health services. However, this challenges the principle of equal access and equal quality. In section 4.11 we indicate a number of measures that can, at the same time, maintain the principle of equal access and quality and make prioritisations in keeping with the principle of vertical equality, i.e. treatment according to need rather than according to demand.

Prevention policy has also to a large extent been characterised by universal access, with preventive services (such as health nurses, childhood vaccinations, preventive child health examinations, cancer screening and preventive home visits for the elderly) being offered to everyone. Preventive legislation regarding environment, traffic, work environment and food-stuffs is, in that sense, naturally also universal.

The positive effect of universality on mean life expectancy has been documented in an econometric analysis of seventeen OECD countries in the period 1900-2000, even though Denmark, as already mentioned, is an exception to the prevailing pattern. But, as illustrated in Table 1.1 the effect on social inequality in mortality is less certain.

This raises the fundamental question about whether policy for reducing health inequality should be universal or targeted at one or more specific groups. It has been called a “paradox of distribution policy” that those countries which have succeeded best in reducing poverty and income inequality are those that have not targeted their social policies towards the poor, but rather have had a high degree of universalism in their income transfer system. The explanation for this is that a universal model, where everybody both contributes and benefits, is more politically sustainable than a model
where one part of the population contributes while another part receives. Is something akin to this applicable to health politics? Similar internationally comparative studies have not been conducted. This is probably because it is difficult to quantify the degree of universalism vs. target group focusing in cross-sectoral equity-oriented health policy. Studies of the relationship between welfare model and social inequality in health do not, as mentioned, provide any definitive answers (Chap. 1).

It is therefore necessary, as set out in this report, to develop suggestions for policy measures and prioritisations from the bottom up based on specific determinants, and base these suggestions on knowledge about causes, effective measures and the prerequisites for their successful implementation.
2.2 Inequality in what?
Most societies call for equity in one way or another. It can take the form of equality in fundamental freedoms and civil rights, equal opportunities for children at the start of life, equal opportunities for education or health equality later in life. For any given policy, it is essential to specify what the demand for equity is targeted towards, because a demand for equality in one area might create inequality in another.46 If we’re talking about equality limited to the right to freedom, the consequences might be health or income inequality, but if, on the other hand, the goal is equality in income, it will require, among other things, limitations in some people’s freedom to dispose fully of their gross income (as is the case in all tax-financed welfare societies). The justification for inequality in one area is, as such, made in reference to equality in another area, which is seen to be more important or more fundamental from a value-based perspective.

The question is which inequalities may be justified to attain a goal of health equity and whether some aspects of health equity are more important than others? Is it inequality in how much people are exposed to the causes of illness and injury we are after, or equality in occurrence of illness and injury, or in the consequences of diseases, such as mortality, disability and quality of life? Equality in exposure to causes of illness is only important because it has consequences for the next two steps in the causal pathway: exposure to cause of illness → occurrence of illness → consequences of illness. But the distribution in one step does not translate directly as a one-to-one distribution in the next step. This is partly due to biological factors. For instance, the effect of exposure to a contagious agent depends on whether the individual has immunity from vaccinations or earlier infections. The absolute effect of smoking on heart infarction is also stronger if the individual has high blood pressure or increased levels of lipids in the blood at the same time. And partly, the lack of one-to-one translation from one step to the next is explained by structural factors: the impact of a heart infarction on work ability is determined by what kind of job one holds, and whether one has access to treatment and rehabilitation (see section 2.4).

If it is the inequality in people’s freedom to live the life they would like which is central, then it is the inequality in the consequences of illness and injury that is the critical challenge. The reasons behind this inequality might have to do with unequal occurrence of the causes of illness, unequal vulnerability to their health effects and inequality in course and consequence of illness and injury. It follows that measures against health inequality need to target a broad spectrum of determinants and pertain to preventive, treatment and rehabilitative measures.

2.3 Inequality between whom?
When we speak of inequality in society, the discussion often revolves around income inequality and we measure the degree of inequality between individuals in the income distribution as a Gini-coefficient (see Table 1.1). Health inequalities between individuals are also not difficult to observe but often have to do with causes and mechanisms about which we only have limited knowledge and great uncertainty in predicting. It is the systematic inequalities between population groups divided according to socioeconomic criteria which constitute the ethical and political question at hand,
among other reasons, because these inequalities remain virtually unaltered despite the individuals in the groups changing over time.

Which group classification is most relevant in this regard is not a given. Social group, gender, ethnicity and geography all have great health policy relevance. We choose, similar to WHO and the assessments in the UK and Norway, to focus on the social stratification because the inequalities in other dimensions to a large extent are subsidiary to it. The geographical health inequality between parts of cities or areas in the country is for instance only to a limited extent a result of physical geographic circumstances but has to do with the selective functioning of the labour and housing markets. Ethnic inequality is partly determined by inequalities in education, occupation and other social determinants, as is gender inequality.

Further, as described in the following, we choose to focus the analysis on the determinants of social inequality in health and not on health outcomes, because the temporal and spatial distance between intervention and effect along the causal pathway is much shorter than if we focused on the occurrence and consequences of disease. Most of these determinants are relevant to all inequalities, whether pertaining to gender, social or ethnic groups or geographic areas. Inequalities in determinants associated with childhood poverty and social inheritance, and with adulthood labour market and housing conditions, as well as health behaviour and certain biological risk factors, all have a large influence, not only on differences between social groups but also on the inequalities between men and women, ethnic groups and geographic areas. Economic, cultural and geographic determinants in relation to inequality in access to health services are also of relevance to social, ethnic and geographical inequalities in the consequences of illness.

Even though we limit ourselves to the social inequalities in health, the problem of how to measure the social position of individuals arises. Seen from the perspective of society, the categorisation of social positions has to do mostly with educational demands and other requirements for specific positions and the power and prestige attached to that position. From the perspective of the individual, however, it has more to do with one’s own education, employment and income. At the same time, a type of causal chain exists, whereby the individual’s level of education influences which job (position) is held and thereby the level of income obtained. However, the two latter variables, especially, are also influenced by the individual’s health and ability to work (see Figure 2.1).
It is true that level of education can also, for some serious and early-commencing diseases such as schizophrenia and substance abuse, be impacted by the disease. Though the association between income and health may be of interest, it is important in this case to keep track of the causal relationships, since it is crucial for the choice of countermeasures. If, for instance, a poor economy is the cause of illness, then countermeasures have to do with preventing low income and economic stress, but if low income is a consequence of illness, then the impetus should be on rehabilitative measures with a focus on returning-to-paid-work after illness. For this reason, we will primarily describe health inequality as inequality in the determinants which are causes of illness according to educational level. This allows us to obtain results only marginally influenced by reverse causality, thus lessening problems of interpretation. In the description of the determinants that affect inequality in the consequences of illness (sections 4.11-4.12), it is nevertheless particularly interesting to look at determinants, also in relation to occupation and income, that describe the circumstances of the ill person after the emergence of the illness or injury.

Gradient and Gap

For certain illnesses, not least serious psychological ailments and substance abuse, the social consequences can become so severe and occur so early in life that people become marginalised and excluded from the labour market, the housing market, family life and social insurance schemes. In such circumstances, we talk about health inequality as the gap between one socially marginalised and very ill group and the rest of the population. Correspondingly, the association described above as the relationship between the social position of individuals and their risk of illness, which goes through the entire population, is termed the gradient. Even though both (i) the gap between the socially marginalised and the rest of the population and (ii) the gradient can be expressions of social inequality in health, it is important to keep them conceptually detached, because the causal mechanisms, and thereby the effective countermeasures, are different. While the measures against the gradient often revolve around disease prevention and health promotion in relation to socially skewed causes of illness, the measures for the vulnerable groups have to do with treatment and rehabilitation.
2.4 Determinants of health inequality – a model

We employ a model\(^{50}\) for the understanding of causes of, and measures against, inequality which has been used among others by the WHO and the UK commissions.\(^{22,23}\) It points to five central causal mechanisms behind social inequality in health (see I-V in Figure 2.2). For each of these, a group of interventions, A-D in Figure 2.2, exist. In the following, we briefly describe each of the five mechanisms and comment on the relevant measures society can instate.

Figure 2.2 Overview of central mechanisms (I-V) and associated policy entry points (A-D) related to social inequality in health

Source: Diderichsen et al. The Social Basis of Disparities in Health OUP, 2001\(^{50}\)

(1) **Social stratification**: Societies create a range of social positions, which the human being through education and in other ways tries to attain. In this social stratification, education, heritage, gender, age, ethnicity and health play a central role. Some people experience great difficulty achieving or maintaining such a position and become socially marginalised. Circumstances during childhood and early development which are influenced by the economic, social and psychological situation of the family and later by circumstances in day care and schooling have a strong impact on the child’s chances in the stratification process and thereby on its health later in life. Early social determinants can influence the individual’s life among other things through their effect on personality and cognitive development. Some factors, such as a lack of emotional contact with
parents during the first years of life, can also create psychological vulnerability to the health effects of later crises.

As such, there are a range of determinants connected to early childhood development, family environment and schooling which have partly direct health effects, partly indirect effects through the later social position of the individual in question. The fact that we are dealing here with factors that influence the life course both socially and medically illustrates that a distinctive life course perspective in the analyses is necessary.

(2) Differential exposure: Depending on the social position of adults in society, they are to a varying degree exposed to a wide range of risk factors though their work, economic circumstances and thereby residential conditions and physical environment. The individual background is also of great importance to health behaviour and a range of biological risk factors such as blood pressure, blood lipids, overweight, etc. All these specific causes of illness are often socially skewed (arrow II). This can be expressed as a situation in which this type of determinant mediates the effect of social position on health. Though the figure only illustrates one such mediating cause, in real life we are often talking about long chains of causality, where, e.g., social determinants in the organisation of labour or social relationships assert their influence through physiological mechanisms, psychological processes or through health behaviour.

(3) Differential vulnerability: Causes of illness have by definition an effect on the risk of falling victim to disease or injury (arrow III). The strength of this effect, however, is often dependent on the existence of other risk factors for the same illness. For example, smoking has a larger absolute effect on heart disease if high blood pressure is also present. We talk about the causes of illness interacting or acting synergistically. Because lower social groups are frequently exposed to several different physical, social and behavioural risk factors for disease, the effect of one of the given risk factors is likely to be stronger in lower social groups than in higher. They are therefore deemed to be more vulnerable. Differential vulnerability does thereby not necessarily have to do with other determinants than those already active under mechanisms (I) and (II), but with their clustering and mutual interaction. Particularly relevant is the interaction between earlier exposures (I) and those that occur later in life (II).

(4) Differential disease consequences: Illnesses and injuries affect survival, functional ability and quality of life as well as people’s opportunities to participate in work life and social life in general (arrow IV). These consequences are influenced by the social position of the individual because social position can impact access to treatment and rehabilitation as well as work and other demands, all of which is critical to the individual’s chances of returning to work despite a reduced functional ability. There is, as such, a third type of determinants which has to do with economic, cultural, and other barriers to access to care and to the job market even with reduced working ability, and with the social insurance schemes’ coverage of economic losses due to illness.

(5) Disease consequences for the individual and for society: Finally, the social consequences of illness have, at the individual level, an impact on the further course of the illness and will thereby often augment the social inequality in health (arrow V). For society, the consequences of illness impact upon the overall costs of illness and on supply of labour. The many people of working age who today are outside of the labour force (see 4.12) have varying degrees of poor health and reduced working ability. Not least for those with serious mental illness and substance abuse, the social
consequences of illness can be so severe as to lead to their becoming very marginalised and isolated (see 4.6).

The structure that is illustrated in Figure 2.2 is used in Chapter 4 to structure the discussion of the determinants of inequality. The model in Figure 2.2 illustrates that there are three types of determinants for social inequality in health, which are partly connected with different phases of life:

i. Determinants connected to early child development and education which affect the child’s social position in adulthood and, either through this social position or in some cases directly, influence its health later on in life.

ii. Determinants that are influenced by the individual’s social position, i.e. causes of illness in the environment, in working conditions, housing conditions or health behaviour, which thus mediate the effect of social position on the risk of illness and injury.

iii. Determinants which affect the consequences of illness, injury and aging in terms of survival, functional ability, quality of life and employment.
3. Social inequality in health – scope and development

3.1 Measuring health inequality

When measuring the scope of the social inequality in health and deciding whether it is changing, or whether it is larger in Denmark than in other countries, there are three principal questions to answer: 51

I: Should the inequality be measured in absolute terms (as a difference between groups) or in relative terms (as the ratio between groups)? For instance, in the not uncommon situation where risk of disease is decreasing in all social groups and where the decrease is proportional across groups, you can have a situation where the absolute inequality decreases while the relative inequality is unaltered. 52 Do we then speak of a declining health policy problem or the opposite? In the same way, it is not uncommon to find that the inequality in relative terms is greater, but in absolute terms smaller, in countries with a lower general mortality (e.g. Sweden) while it is lower in countries with a higher overall mortality (e.g. Denmark). Should one then conclude that the health policy of Sweden is more or less successful in reducing social inequality?

II: Should only the most contrasting groups in society be compared (e.g. those with shortest and longest education), or should all groups in between these two groups be included, and should attention be paid to the size of the groups? Does it play a role to our assessment of progress whether the group that is dragging behind in terms of mortality is gradually becoming smaller? This goes for those with a short education, for instance. They are becoming a smaller and smaller group. It influences the magnitude of the public health problem if the groups change size. Absolute measures such as the Slope Index of Inequality (SII – see e.g. Table 1.1) and relative measures such as the Concentration Index (CI) take account of all groups and their respective sizes. Another way of adjusting for this can be seen in Figures 1.1 and 3.3 where four equally large groups (quartiles) are compared over time. In effect, this means that the boundaries between the four education or income quartiles is adjusted over time.

III: Which group should be the ‘healthy’ reference group? If we have a situation in which mortality decreases with increasing level of education right up until Ph.D. level, should we then compare all other groups with those that have a Ph.D. degree? If so, we would have a very small reference group and thereby large uncertainty in our calculations. Or should we choose the larger group consisting of everyone with a higher education and thereby perhaps be left with less of a contrast between groups? A measure such as the Population Attributable Fraction (PAF) can be calculated both in absolute and in relative terms and takes account of all groups and their sizes but is at the same time very sensitive to the choice of “unexposed” reference group. SII and CI are less sensitive to choice of reference group. Explanations of these measures as well as other epidemiological terms and terminology specific to the Danish context can be found in the glossary (appendix B).
3.2 The scope of health disparities and their development over time
In this section, health inequality in Denmark will be described using various health measures. The account is exclusively based on epidemiological data and analyses and contains both absolute and relative measures.

3.2.1 Infant mortality and birth weight
Even at the start of life, large social disparities in health are found. For instance, infant mortality is twice as high among children born of mothers with maximum ten years of education as compared with children of mothers with more than twelve years of education. Children of mothers with a short education have lower birth weight than children of mothers with a medium or long education, even after adjusting for the duration of gestation (Figure 3.1). During the period 1981-2000, the difference in mean birth weight increased from 74 grams to 103 grams, while the social inequality in birth weight in Finland, Norway and Sweden held more or less constant. The inequality was thereby largest in Denmark in the year 2000.

Figure 3.1 Differences in birth weight between children of mothers with short education compared with medium to long education 1981-2000 in the Nordic countries

Over the period 1981-2000, women with less than ten years of education had about twice as large a risk of preterm birth compared to women with more than twelve years of education, and there was a tendency over time towards greater relative inequality, especially for very preterm births. This trend could not be found in the other Nordic countries which all had less and slightly decreasing social inequality in preterm births.

3.2.2 Mortality
When Figure 1.1 showed that inequality in life expectancy is growing, it could be due to the fact that the inequality in mortality is growing simultaneously in several different age groups, or that the change particularly affects one age group from a few birth cohorts. The graphs in Figure 3.2 show
the mortality from 1991-2009 for men and women in three age groups: 1-24 years, 25-44 years and 45-64 years. Older people are not included in this calculation because the register data on education for these ages is more uncertain.

In general, a decreasing mortality trend is noticeable in all groups, especially in the 1990s. Then there are signs of stagnation in the mortality of unskilled men and women in all three age groups after the year 2000, while the mortality of groups with longer education continues to fall. This is the background for the continued increase in the inequality in mortality, illustrated in Figure 1.1. But in contrast to the numbers in Figure 1.1, which pertained to quartiles of the educational distribution for each year, the sizes of the three education groups in Figure 3.2 change over time, because there are fewer and fewer unskilled workers and more and more with higher education.

Figure 3.2 Mortality (per 100,000) for the age groups 1-24, 25-44 and 45-65 years during the period 1991-2009 according to highest completed level of education (parental education for the 1-24 year olds). Age standardised.
While the level of education is a relatively constant feature over the life course, changes in income occur, inter alia, due to employment changes which are often contingent on the experience of illness. Therefore, if, for every age group, the association between income and mortality is calculated and thereafter determined in terms of life expectancy, it is not surprising that income has a stronger association with mortality than education does. What may be more surprising in Figure 3.3 is that this association is so potently augmented over time – especially for men. The difference in life expectancy between highest and lowest income quartile increases from 5.5 years to 9.9 years for men and from 5.3 to 6.2 for women during the period 1987-2009.
3.2.3 Expected years of life with good and poor health

If one combines mortality with prevalence rates of self-rated health one finds a marked social disparity in expected years of life with poor or very poor self-rated health, and that the disparity is increasing. Table 3.1 shows that not only do people with a short education have fewer years to live, but a lower proportion of these years can be expected to be in good health. From 1994 to 2005, the remaining years of life have increased for all groups, but especially for highly educated men. The proportion of the remaining years that are in good health has not changed significantly in any of the groups. It is, in other words, years in good health that have been added to life for all groups during this period.

Table 3.1 Inequality in 30-year olds' remaining life expectancy and the percentage of the remaining life that can be expected to be in good health. 2004/5

<table>
<thead>
<tr>
<th>Educational level:</th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Long</td>
<td>Medium</td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td>1994 Remaining life expectancy (years)</td>
<td>46.6</td>
<td>44.6</td>
<td>42.5</td>
<td>50.5</td>
</tr>
<tr>
<td>Years in good health (%)</td>
<td>86%</td>
<td>76%</td>
<td>72%</td>
<td>80%</td>
</tr>
<tr>
<td>2005 Remaining life expectancy (years)</td>
<td>49.3</td>
<td>47.1</td>
<td>44.4</td>
<td>52.7</td>
</tr>
<tr>
<td>Years in good health (%)</td>
<td>83%</td>
<td>80%</td>
<td>67%</td>
<td>82%</td>
</tr>
</tbody>
</table>

Source: Brønnum-Hansen. SJPH 2008;36:44-51

3.2.4 Inequality in the consequences of illness

A last aspect of health inequality which we would like to shed some light on here is that the graver the consequences of the illness studied, the greater the relative social inequality. Table 3.1 showed that people with a short education have a shorter life and concurrently a life with more years of illness. In Table 3.2 we see that illness furthermore has more serious consequences for those who have a lower education.

Table 3.2 Excess risk in per cent selected consequences of illness for persons with a short education (<10 years) compared to persons with a long education (>12 years), 2005. Age-and sex-standardised.

| Longstanding illness                          | +38%      | Visited general practitioner (past 3 months) | +12%     |
| Longstanding limiting illness                 | +78%      | Takes medicines regularly                     | +36%     |
| Long-term restrictions in activity due to illness | +118%    | Visited specialist practitioner (past 3 months) | -6%     |
| Work cessation due to illness                 | +178%     | Participated in rehabilitation (past 12 months) | +24%     |


The prevalence of longstanding illness is 38% greater among those with a short education, i.e. less than ten years, compared with those who have more than 12 years of education. When we look at whether they have a limiting illness, the difference rises to 78%, and for chronic restrictions in activity and for job cessation the differences are 118% and 178% respectively. The above table also shows that the distribution of contacts to health care does not correspond to the pattern that prevalence and consequences of longstanding illness exhibit. It seems that the need for assistance,
measured here as self-reported health and functionality, exhibits a much greater social disparity than what is found in the use of health care services. This suggests that there may be social inequalities in the use of the health services not corresponding to actual needs, and that the job market can be difficult to access for those who are both ill and have a short education (see sections 4.11-12).

3.2.5 The health of the socially marginalised
While the above figures and tables illustrate the inequality between large population groups categorised according to education and income (i.e., the gradient), Table 3.3 below shows a qualitatively different phenomenon namely the very high morbidity of socially marginalised people (i.e., the gap). In the total population, the proportion that indicates experiencing restrictions in activity due to illness is 13% while it is 40-50% for the marginalised. The difference according to educational level is a fraction of the gap between the marginalised group and the rest of the population.

<table>
<thead>
<tr>
<th>Marginalised groups</th>
<th>%</th>
<th>Total population by education</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol abusers</td>
<td>43.6</td>
<td>&lt; 10 years education</td>
<td>17.2</td>
</tr>
<tr>
<td>Mentally ill</td>
<td>49.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homeless</td>
<td>42.8</td>
<td>10-12 years education</td>
<td>14.2</td>
</tr>
<tr>
<td>Substance abusers</td>
<td>45.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>52.5</td>
<td>&gt;12 years education</td>
<td>11.9</td>
</tr>
</tbody>
</table>

Ann. ‘Poor’ are defined as persons indicating that they have often not had enough food because they could not afford it. Source: National Institute of Public Health - Health and Morbidity Survey of Marginalised People, and for the total population by education: Health and Morbidity Survey 2005

A study of the mortality of 509 homeless people in Copenhagen in the 1990s documented an excess mortality of 510% in 25-44 year olds. Of the homeless, 83% were mentally ill or substance abusers. The health gap between the marginalised and the rest of the population is thus of a quantitatively different order of magnitude than the gradient illustrated in the previous tables, but it is worth remembering that we are talking about relatively small groups – in this case only 0.1% of the population.

3.2.6 Immigrant health
A recent study of immigrant mortality in Denmark in the period 2005-2009 shows that immigrants from countries neighbouring Denmark have a higher mortality than the local population, while the mortality of non-western immigrants is lower than that of the Danes (Table 3.4). Had these figures been adjusted for the lower level of education and lower social position in Danish society of non-western immigrants, the disparities would likely have been even more pronounced. The explanation probably lies in a positive selection among those immigrants that come from afar and a different lifestyle with lower consumption of tobacco and alcohol, especially among women. Statistics Denmark, in its report, assesses that the potential bias of some people moving back to their home countries and dying there without this being reported to the Danish authorities is insignificant.
Table 3.4 Relative mortality among immigrants 25-89 years old in Denmark 2000-2009. Persons of Danish origin = 100. Age standardised

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>100 (ref)</td>
<td>100 (ref)</td>
</tr>
<tr>
<td>Sweden</td>
<td>104</td>
<td>98</td>
</tr>
<tr>
<td>Norway</td>
<td>109</td>
<td>102</td>
</tr>
<tr>
<td>Former Yugoslavia</td>
<td>105</td>
<td>101</td>
</tr>
<tr>
<td>Turkey</td>
<td>87</td>
<td>87</td>
</tr>
<tr>
<td>Pakistan</td>
<td>83</td>
<td>-</td>
</tr>
<tr>
<td>All non-western countries</td>
<td>80</td>
<td>76</td>
</tr>
<tr>
<td>All western countries</td>
<td>92</td>
<td>93</td>
</tr>
</tbody>
</table>

Source: Statistics Denmark: Indvandrere i Danmark 2010

It is, however, worth noting that the pattern of immigrant health is very unclear both in relation to the home countries of the immigrants and to the country they eventually settle in. For instance, there is a higher infant mortality among children of mothers from Pakistan, Somalia and Turkey than among children of Danish mothers, and this excess mortality cannot at all be explained by reference to socioeconomic conditions. When looking at children of Turkish mothers in Scandinavia, it has been shown that only in Denmark is there an excess neonatal mortality, but not in Norway or Sweden. A current study of admissions to hospital due to myocardial infarction based on data from The Danish National Patient Register has shown a high excess morbidity among immigrants of Pakistani and Turkish origins of 132% for women and 74% for men. This does not correspond to the pattern indicated by the general mortality. When adjusted for employment and income, this excess morbidity is reduced to 95% and 45% respectively, which illustrates that a part of the health inequality related to country of birth can be explained by socioeconomic factors. All in all, it must be maintained for the time being that the patterns and mechanisms behind the variations in immigrant morbidity and mortality in Denmark are far from clarified and that they partly seem to have to do with the less privileged socioeconomic situation of immigrants as regards education and income. Some of these variations can thereby wholly or partly be explained by the determinants described in this report, but this has not been investigated to any wider extent.
3.3 Which illnesses create the social inequality in health burden?

The next step in understanding what the social inequality in health is caused by is to look at which types of illness and injury create the social gradient in health and the very poor health of socially marginalised people. Not just mortality but also the morbidity burden is socially skewed. Data on cause of death and self-reported longstanding illness amongst those who participate in the large Health and Morbidity Studies (Sundheds- og sygeligheds undersøgelser) show that cardiovascular diseases account for a good 20% and cancer for a good 10% of the inequality in remaining life expectancy between educational groups. Musculoskeletal ailments account for over 70% of the inequality when measured as years with longstanding limiting illness.

If, instead, WHO’s calculations of the burden of disease in Denmark measured as years of life lost due to premature death and disability (DALYs) are used, a somewhat different picture is arrived at (see Table 3.5). The table shows the ten diseases that contribute most to educational inequality in disease burden. All told, they account for 85% of the disparity. The DALYs do not include disabilities without a specific diagnosis. Behind the individual figures in this table there are a wide range of assumptions and uncertainties, but two conclusions can be drawn: One is that the ten diseases shown here are those that dominate the picture, although their order can be somewhat uncertain. The second conclusion is that more or less the same diseases dominate the disease burden in the total population (right column), as dominate health inequality (left column), here presented as the difference in disease burden between the fifty per cent of the population with the shortest education and the fifty per cent with the longest education.

Table 3.5 The ten diseases contributing most to the Danish inequality in burden of disease. The difference in disease burden between the two halves of the population with shortest and longest educations respectively is measured in DALY per 1000

<table>
<thead>
<tr>
<th>Disease burden inequality DALY per 1000</th>
<th>Disease burden in the total population DALY per 1000 (ranking)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLD</td>
<td>11.5</td>
</tr>
<tr>
<td>Heart disease</td>
<td>10.9</td>
</tr>
<tr>
<td>Alzheimer’s disease</td>
<td>5.9</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>3.5</td>
</tr>
<tr>
<td>Depression</td>
<td>3.3</td>
</tr>
<tr>
<td>Alcohol dependency</td>
<td>2.6</td>
</tr>
<tr>
<td>Hearing loss</td>
<td>2.4</td>
</tr>
<tr>
<td>Diabetes</td>
<td>2.2</td>
</tr>
<tr>
<td>Liver cirrhosis</td>
<td>1.7</td>
</tr>
<tr>
<td>Stroke</td>
<td>1.6</td>
</tr>
<tr>
<td>All diagnoses</td>
<td>54.5</td>
</tr>
</tbody>
</table>

**Source:** Calculations based on WHO’s Global Burden of Disease 2009. Department of Public Health, University of Copenhagen

DALYs are computed as the sum of the number of years lost due to premature mortality and disability. Mortality is calculated as the remaining life expectancy for each death and the disability is calculated as the number of new cases of disease of each diagnosis multiplied by the duration of disease and a disability weight between 1 (death) and 0 (perfectly healthy). Serious depression is as an example ascribed a disability weight of 0.76. WHO publishes a standard version of DALY which
includes an age weighting where age groups that are active on the job market are weighted higher than children and the elderly and a discounting of 3% per annum. The above table is corrected for this age adjustment and discounting, so that they do not form part of the calculations.

In WHO’s DALY calculations the numbers are based on medical epidemiology’s knowledge of the occurrence of different illnesses and their consequences in terms of mortality and impact on functionality and quality of life. Here, diseases are also included which are underrepresented in population surveys like the Danish Health and Morbidity Surveys in which, e.g., the mentally ill participate less frequently. We therefore see that illnesses such as dementia, depression and alcohol abuse play a big role next to chronic obstructive lung disease (COLD), ischaemic heart disease, lung cancer, etc.

For the socially marginalised, Table 3.6 can illustrate which diseases specifically contribute to the excess morbidity in this group. The table shows the relative risk of being admitted to hospital for different types of diseases for men and women who have been contacted in different shelters in Denmark, i.e. primarily the homeless, compared to the rest of the population. As in Table 3.3 there are differences of several hundred per cent in risks of admission for infections and injuries and of several thousand per cent in the risk of hospital admission due to psychiatric ailments and substance abuse. This reiterates the issue referred to in Chapter 2: that while the social gradient to a large degree is a result of a skewed accumulation of determinants over the course of life, the difficult situation of marginalised people is created through a vicious cycle of social causes and consequences of (what is often mental) illness (see also section 4.6).

Table 3.6 Relative risk of hospital admission in 2007 based on registry data for socially marginalised groups (contacted in 120 shelters). Total population=1

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious diseases</td>
<td>6.7</td>
<td>12.4</td>
</tr>
<tr>
<td>Cancer</td>
<td>0.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Mental illnesses</td>
<td>25.3</td>
<td>37.1</td>
</tr>
<tr>
<td>Injury</td>
<td>4.6</td>
<td>7.3</td>
</tr>
<tr>
<td>All diagnoses</td>
<td>2.5</td>
<td>1.8</td>
</tr>
</tbody>
</table>

4. The determinants of inequality
Criteria for the choice of determinants

Health policy can seldom change an adult individual’s social position in society but it can take action against some of the mechanisms that generate social inequality in health. Several modifiable determinants in early life affect the social position which the individual achieves as a grown-up, others are causes of illness which are affected by social position in adulthood or which modify the effect of social position.

As appears from the depiction of the fundamental causal mechanisms in Chapter 2 and Figure 2.2, there are three groups of determinants driving health inequality:

i. Determinants connected with early childhood development and schooling which affect social position and through it the health of the individual later in life, and which for some people also have direct health consequences;

ii. Determinants which are affected by the social position of the individual, e.g. causes of illness within the environment or related to job, housing and health behaviour, which in this way mediate the effect of social position on the risk of illness and injury;

iii. Determinants which influence the consequences of illness, injury and aging in terms of survival, functional ability, quality of life and employment.

The chosen model (Figure 2.2) for prioritisation of determinants is similar to the model used by the WHO and in the UK review. Four criteria have guided the choice of determinants:

- That they have (or may be expected to have in the future) a sizeable effect on the burden of disease in the Danish populace.

- That the occurrence or effect of the determinant is socially skewed.

- That they can be influenced by national, regional or local policy measures.

- That they can be monitored with one or more valid indicators (see appendix A).

The following paragraph will impart the learning that comprises the scientific underpinning of effective health policy to reduce health inequality. It has to do with:

- Knowledge about the effect on health of the various determinants and about the causes behind them and their distribution in the population. To a large extent, this is about medical, epidemiological and social science knowledge collected by the use of quantitative methods.

- Knowledge about effective interventions with which it is possible to influence the occurrence of the determinants and knowledge about potential differential effects for assessing the expected effect on the distribution of determinants. In a medical context it would be reasonable to expect knowledge based on randomised controlled trials. For many
of the relevant determinants, which for instance have to do with work life, social policies, school, this type of knowledge does not exist – amongst other things because it has rarely been sought. In occupational health, for instance, it has often been found that epidemiological evidence is sufficient basis for legislation on exposure limits etc. In this report, suggestions for policy measures are also to a large extent based on this type of observational evidence. Even in such cases where our knowledge of effects is based on experimental evidence, we seldom know anything about differential effects and are therefore often compelled to assume that the effect is the same across social groups.

- The last type of knowledge has to do with the contextual preconditions for implementation. In this there is a limitation since we often deal with very context dependent learning, which means that experiences from other countries such as the UK or Sweden, that have worked on this question for many years, are not necessarily relevant per se. There is a serious dearth of Danish research in this field.

Effective interventions

When estimating the potential impact of a given measure on health inequality, regardless of whether it is a preventive, treatment, or rehabilitative measure, it is important to differentiate between three aspects of inequality in the intervention:

- Differential vulnerability
- Differential effect
- Differential implementation

In the forthcoming chapters, we shall point out (the few areas) areas where we know, according to the research, there is a larger (absolute) effect of a given cause of disease in less privileged population groups, because they are exposed to other interacting causes at the same time. This means that a given reduction of the exposure has the largest effect in the less privileged groups – we speak of differential vulnerability (see 2.4).

In the following, several examples are given of the fact that while we often lack knowledge about the effect of a given measure on various socioeconomic groups, structural measures (see table below) will often have a greater effect on the most exposed, while use of measures targeted at the individual often have the opposite effect, i.e. a larger effect on the most educated – we speak of differential effect.

<table>
<thead>
<tr>
<th>Structural measures</th>
<th>Individual measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic (e.g. taxes, income politics)</td>
<td>Pedagogical (e.g. campaigns, counselling)</td>
</tr>
<tr>
<td>Legislative (e.g. workplace regulation, maternity leave)</td>
<td>Psychological (e.g. smoking cessation courses, crisis therapy)</td>
</tr>
<tr>
<td>Physical (e.g. bike lanes, technology at the workplace)</td>
<td>Biological (e.g. vaccination)</td>
</tr>
<tr>
<td>Social (e.g. work organisation, day care institutions)</td>
<td>Pharmaceutical (e.g. hypertension treatment)</td>
</tr>
<tr>
<td></td>
<td>Surgical (e.g. removal of precursors of cancer)</td>
</tr>
</tbody>
</table>

Finally, the preconditions for implementing structural measures are very different depending on the political, social and economic resources of the local community. The possibilities for reaching
different groups with effective services can vary a lot (see section 4.9), as may the compliance of the different groups – we speak of differential implementation.

As regards the many measures for which there is no experimental knowledge about differential effects, we will assume, as do many of the international reviews, that structural measures do not have a weaker effect on people with few resources. There is more uncertainty about whether this also goes for measures targeted at the individual. In those situations where particularly effective measures target individuals, we emphasise that their implementation be via a proactive outreach approach.

12 determinants of social inequality in health

i. Early determinants that affect social position and health

1. Early childhood development – cognitive, emotional, social
2. Schooling – school completion
3. Segregation and the local community

ii. Determinants of illness affected by social position:

4. Income – poverty
5. Longstanding unemployment
6. Social marginalisation
7. Physical environment
8. Work environment – ergonomic and psychosocial
9. Health behaviour
10. Early functional decline

iii. Determinants generating unequal consequences of illness

11. Health services utilization
12. The exclusionary labour market
I. Early determinants affecting social position and health

In Chapter 1 it was pointed out that exposures occurring throughout the course of life can affect health in adulthood. In this section, we look at early determinants whose health effects are, to a great extent, asserted through their influence on social position, but that also have some direct health impact whereby factors occurring during childhood and adolescence influence the health of the individual as an adult regardless of his/her social position. As regards Figure 2.2, this relates to mechanism I and the point of intervention corresponding to the arrow A.

The selected determinants are early child development (section 4.1), unfinished schooling (section 4.2), and residential segregation (section 4.3). For each determinant the following is described: the effect on social position, the effect on health, causal mechanisms and intervention measures.

4.1 Early childhood development

By early childhood development, we mean the cognitive, verbal, social and emotional development of the child until age six to eight. Research from very different disciplines such as behavioural genetics, neurobiology, social epidemiology and psychology have in recent years afforded insights into how early childhood development lays the lifelong foundations for the physical, psychological, and cognitive competencies of the individual. As such, early development is a critical determinant of social and health-related circumstances later in life. Factors all the way back in the foetal period can lead to retarded foetal growth (also known as intrauterine growth restriction), premature birth and congenital malformations, which as we shall see in the following, influence the risk of negative health consequences later in life. After birth, the physical environment around the baby, the emotional attachment to and social interaction with parents, as well as verbal and cognitive stimulation, are of enormous importance to the further development of the child, its schooling and through this its achievement of social position in society. In particular, care, stimulation, support and attachment play a big role during the first 18 months of life. These factors influence the very development of neural pathways in the brain and thereby the cognitive, social and behavioural abilities of the child. When there are large social disparities in the occurrence of these factors, the seeds have already been sown for social disparities in morbidity later in life as well as for what is termed social inheritance, or more precisely: unequal life chances.

4.1.1 Effects of early development on health

Factors in early childhood impact both physical and psychological health indicators and lay the foundations for presenting good or bad health behaviour. The very early determinants such as restricted foetal growth and preterm birth occur to a much wider extent among children of mothers with short education and low socioeconomic position.

These factors are of great importance because they predispose to inhibited development, ADHD and cerebral paresis (brain lesions associated with birth/spastic paralysis) and later in life to heightened blood pressure, insulin resistance and ischaemic heart disease. The effect on chronic diseases is seen especially in those that have been overweight during youth and adulthood.
In addition to the determinants during the foetal period, many studies have demonstrated an effect of parents’ social position early on, in the life of the child, on a very broad spectrum of somatic and psychological health problems later in life. During childhood, there are already indications of social disparities in disease occurrence and well-being, though the differences are only marked and statistically significant on a couple of parameters. This goes for overweight and home injuries, for example. The Danish Injury Register for 1998-2003 discloses that children below the age of fifteen whose mothers had a low level of education had approximately 54% higher risk of having visited an emergency room due to accidents in the home than children whose mothers had a higher education. For poisoning the excess risk rose to 91%. From approximately ten years of age, when children start to move around in traffic, the number of traffic accidents increases and here the disparity is especially large for moped accidents where children whose mothers have a short education have 3.6 times the risk. Also self-rated physical and psychological health is dependent on the social position of the parents in that there is a social gradient, where children of mothers with a low level of education and who are recipients of income transfers are the worst off.

There is evidence of an association between the social resources of the parents and the health problems of the child as a grown-up. A consistent association can be found for premature death, disability and cardiovascular disease, mental illness, lung function, self-rated health and risk behaviour. This is particularly documented in British studies, but the association has also been found in Nordic investigations.

For some diseases, such as cerebrovascular disease, the effect of parents’ social position is independent of the child’s own social position later in life. For many other diseases and bodily functions, however, the effect of parents’ social position operates through the social position achieved by the child in adulthood.

In the Danish National Birth Cohort, the relationships between the occupational status of the parents and a few health-related factors in childhood have been explored. Two important indicators of later health, namely speech development (which is closely related to and a necessary prerequisite for cognitive development) and overweight at the age of 7 (an important risk factor for overweight and thus poor health later on) demonstrated a clear tendency towards problems for those children whose mothers had low occupational status.

Table 4.1.1 Occurrence (%) of poor cognitive development and overweight among 7-year olds by maternal occupation

<table>
<thead>
<tr>
<th></th>
<th>Slow speech development</th>
<th>Overweight (Age 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher functionaries</td>
<td>8.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Lower functionaries</td>
<td>9.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Skilled workers</td>
<td>10.0</td>
<td>10.5</td>
</tr>
<tr>
<td>Unskilled workers</td>
<td>11.3</td>
<td>12.6</td>
</tr>
<tr>
<td>Unemployed (&gt;1 year)</td>
<td>15.6</td>
<td>11.9</td>
</tr>
<tr>
<td>Students</td>
<td>8.5</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Source: Unpublished data from The Danish National Birth Cohort, analysed and provided by Mads Kamper-Jørgensen and Anne-Marie Nybo Andersen, Department of Public Health, University of Copenhagen
Although there is a gradient in the effects of parents’ social position measured through education or income, poverty and mental illness of the mother have a particularly pronounced effect. This effect is stronger, the earlier the child is exposed to it.\textsuperscript{91}

In addition, a strong health effect is seen for children growing up in families with alcohol problems. A longitudinal study has shown that children in families where the mother has an alcohol-related diagnosis have twice the risk of mortality by the age of 27 as others of the same age and three times the risk of admission to a psychiatric ward and of being placed outside of the home.\textsuperscript{92}

Studies from Sweden have furthermore shown that childhood poverty is related to later risk of suicide and that this goes for economic poverty, but also for emotional and social poverty.\textsuperscript{93} Similarly, neglect in childhood is a risk factor for low self-esteem and poor health behaviour (including sexual risk behaviour) as well as for depression and stress development later in life.\textsuperscript{94;95}

4.1.2 Effect on social position later in life
Numerous international studies have shown that the early cognitive and social development of the pre-school age child is strongly influential with regard to how the child gets by in school and in later education and working life.\textsuperscript{96} Despite a relatively high social mobility in Denmark, we still have a pronounced inequality in children’s educational chances.\textsuperscript{97;98} Cultural inequality is about disparities in knowledge, education and access to information. It also has to do with the knowledge of how to conduct oneself in a given social situation and is thereby related to social skills.\textsuperscript{98}

Along with poor language development children can have problems with non-verbal communication and social behaviour. The Danish Longitudinal Survey of Children (Børneforløbsundersøgelser) from the Danish National Centre for Social Research clearly shows that children with of parents with few resources have more problems in their early development than do children of families with many resources and that this also leads to problems during the introductory period of school attendance,\textsuperscript{97} and later on in the shape of academic problems, social conflicts, speaking and language difficulties, difficulties concentrating and psychological issues.\textsuperscript{99;100} At the same time, British studies have shown that indicators of cognitive functioning at a very early age determine school results and later social markers when the child reaches its thirties.\textsuperscript{101}

4.1.3 Determinants of early child development
Several factors affect the child as early as during the foetal period and increase the risk of intrauterine growth restriction and preterm birth. As well as genetic, biological, and obstetric risk factors in the mother, socially skewed risk factors such as smoking,\textsuperscript{102} alcohol and substance abuse, iron deficiency,\textsuperscript{103} physical inactivity,\textsuperscript{104} infections,\textsuperscript{105} diabetes and hypertension\textsuperscript{106} also come into play.

After birth of the child it is especially the physical environment in the family that affects the child’s development and thus it is in particular the parents’ receptiveness, response, protection, support, stimulation and active engagement with the child that is influential (i.e. their ‘parenting style’).\textsuperscript{68} Cognitive development depends on both genetic and biological factors related to the child itself and on the socioeconomic position of the family.\textsuperscript{107} While the effect of social background on cognitive development is successively strengthened during childhood and adolescence, it has been shown to be less important for children whose parents engage with them in their school work, read aloud to them, and so on.\textsuperscript{108} Cognitive stimulation is thus of great importance. Skills build on previously
acquired skills and if the earliest fundamental competencies are not sufficiently developed it will be more difficult for the child to build upon them and do well in day care institutions and later throughout the school system.

Day care institutions (and later on, schools) also have an independent influence, because access to a stimulating and pedagogic educational environment for the child can, to some extent, make up for lacking home stimulation. It has been shown, however, that for a small group of children the level of social stress they are exposed to in the home is so great that it is difficult to compensate for. Most vulnerable are those children who have parents with mental problems and they are also at heightened risk of corporal punishment.  

There are manifest consequences for children and youths growing up in families with alcohol problems both during their formative years and during adulthood, according to both Danish and foreign studies. A childhood with substance abusing parents is one of the central risk factors in child development. Studies indicate that it increases risk of serious trauma during childhood, of parental neglect, of development of mental illness or substance abuse in the child itself, and of the child not getting an education or a job. Alcohol problems in one of the parents can affect the inequality in life chances in many ways. Decade long studies conclude that parental alcoholism is one of the greatest stressors in a child’s life, when it co-exists with disharmony in the family.  

In addition to childhood family circumstances, contextual characteristics of the local community also influence childhood development (see also section 4.3). Several of the stressors are presumably similar for children and adults, e.g. high levels of crime, busy roads, etc. Community institutions (schools, police force, public service, etc.) and the physical conditions for recreational opportunities and social interaction as well as social cohesion all play a role in influencing the child’s sense of security and its courage to engage with, explore, and participate in its local environment. 

In all likelihood, economic, social and cultural poverty in childhood lead to an accumulated risk exposure in disadvantaged children and adolescents. As will be apparent from Figure 4.1.1, child poverty (see also section 4.4 for more on poverty in general) primarily exists in families where the parents have a low level of education or where their educational level is not documented. The latter often being the case for immigrants.

Figure 4.1.1 Childhood poverty (% of 0-6 year old children) according to parents' highest completed education 2001-07
The poverty line is defined here as 50% of the median income. Children of parents who are students are not, however, considered poor.

Source: The Economic Council of the Labour Movement based on the law model of the Ministry of Finance for a random sample of the Danish population

Not having the necessary resources for food, clothes, accommodation, health and school essentials means the child will have poorer conditions for getting by in terms of health and in terms of education. When parents cannot afford it, the child will not be able to participate in the same activities as its play mates. It can also be more challenging to steer clear of risk behaviour.

Figure 4.1.2 shows that 3.1% of all children lived in poverty in 2001. When families where at least one parent is a student are subtracted, the share of poor children was 2.8% in 2001 and has risen to 4.7% in 2007. Child poverty is particularly prevalent among the 0-7 year olds and among children living with a single mother.¹¹³

Table 4.1.2 Percentage of children growing up in poverty during 2001-2007

Ann. Calculations are based on poverty defined as income below 50% of median income with and without including children of parents who are students.

Source: The Economic Council of the Labour Movement based on the law model of the Ministry of Finance for a random sample of the Danish population
4.1.4 Effective measures

Several expert groups appointed by the large international organisations such as the WHO,22 OECD,114 EU,115 UNICEF116 and the World Bank117 have in recent years argued for prioritising early childhood development. The explanation has been that the expected effects in economic, social and health terms – and not least the inequality in these conditions – is perceived to be a large unnecessary loss for society as a whole.118;119 The conclusions are based on strong observational, including economic and epidemiological, evidence and somewhat less strong experimental evidence about the effects of the later cognitive, social and behavioural skills of children and their chances in the education system and on the job market. Especially economic research has pointed out that investments in cognitive and social development in early life have health and economic impact greatly surpassing what can be achieved later in life.120;121 The expected positive effects for health and health inequality are as such primarily based on the indirect effect that investment in early life has on education, health behaviour and work.122

These interventions can be divided into different types according to the development phase of the child. First of all, there are the interventions targeted at the pregnant woman and the foetus/child she is carrying. Then there are the measures for children aged 0-2 years, which have to do with establishing a basis for the strong emotional bond between mother and child, breast-feeding, parental ability to attend to the needs of their child and securing access to social and health services. Thirdly, there are the preschool interventions for the 3-5 year olds aiming to secure the cognitive, verbal and social development of the child.

Since the 1940s, Denmark has had an institutionalised preventive programme for pregnant women. The benefits of such a programme have been documented several times.123 Even so, the frequency of preterm births is increasing124 while, in later years, the universal and general preventive efforts have been cut and focus shifted to need-based interventions for high-risk groups. There is no evidence on this subject for intrauterine growth restriction. Nor have there been any recent publications on the use of the preventive examinations in conjunction with pregnancy and birth in Denmark, whereas an almost 25-year-old study showed that socially disadvantaged women had their first preventive consultation later in the pregnancy – a well-known risk marker for complications in childbirth. (See Measure #1.1)

In later years, conditions for women giving birth have changed, so that the women are discharged shortly after the birth of the child. But the elective early contact with health nurses provided by municipalities has not been correspondingly extended. There have been no studies of whether the consequences of removing otherwise well-functioning maternity services are socially biased. (See Measure #1.2)

In Denmark, there have been attempts to analyse the implementation of the preventive child health examinations at the general practitioner.125;126 These assessments have shown partly that 14% of the preventive child health examinations led to the discovery of health issues necessitating intervention (e.g. remediation of inhibited sensory function), partly that about half of the municipalities did not fulfil their obligations with regard to the recommended child health examinations for school children at the beginning and end of compulsory schooling. In a Danish study from 2008, social disparities in the use of preventive child health examinations have been found, in that children of parents with a low level of education or who are unemployed are much more unlikely to attend preventive child
health examinations at the general practitioner. For instance, calculations based on this study show that 69.5% of 4-year-old children whose mothers had a low level of education attended the preventive child health examinations versus 80.1% of those whose mothers had longer educations.\textsuperscript{127} (See Measure #1.3)

Internationally, it is the preschool interventions for children of few means that have been especially studied\textsuperscript{128-130}. Unfortunately, there does not seem to be a standard recipe for which interventions effectively promote early child development and there are but few scientific evaluations of what actually works. An American review from 2005 concluded that, according to the existing evidence base, children’s cognitive functioning seems to be improved most through programmes where staff is specially trained, where there are fewer children per adult caretaker and where services are offered with a relatively high intensity.\textsuperscript{131}

There is, however, a social imbalance in who uses publically provided day care and thereby benefits from the stimulating educational environment offered by these institutions. The differences are especially great for the youngest children, as is displayed in Table 4.1.2. (See Measure #1.4)

<table>
<thead>
<tr>
<th>Highest parental education</th>
<th>Per cent in day care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-2 yr olds</td>
</tr>
<tr>
<td>Unknown</td>
<td>47.5</td>
</tr>
<tr>
<td>Unskilled</td>
<td>78.2</td>
</tr>
<tr>
<td>Skilled</td>
<td>83.9</td>
</tr>
<tr>
<td>Short-cycle higher education</td>
<td>85.2</td>
</tr>
<tr>
<td>Medium-cycle higher education</td>
<td>87.3</td>
</tr>
<tr>
<td>Long-cycle higher education</td>
<td>87.9</td>
</tr>
</tbody>
</table>

Ann. The table does not cover the municipalities of Egedal, Næstved, Odense, Svendborg, Herning and Læsø due to lack of data on day care


The 3-5 years olds have quite a high level of day care coverage, except for those whose mothers have an unreported level of education, which to a large extent goes for immigrant mothers. There is as such a need to focus on including disadvantaged groups. In the kindergartens there is reason to believe that policies targeting children’s health behaviour benefit both strong and weak groups of children. Accordingly, several institutions have introduced food, activity and hygiene policies. (See Measure #1.4)

Focus on early child development has also led to a health professional interest in the health effects of this type of intervention. Current reviews of these studies\textsuperscript{57,132} have shown that there are few large, controlled, longitudinal studies, but that those which do exist suggest a positive effect on some parameters, including symptoms of depression and health behaviour related, inter alia, to tobacco. A recent review from the Royal Swedish Academy of Sciences\textsuperscript{133} highlights the fact that being able to read after the completion of grade 1 has a decisive effect on the mental health and development of children. Internationally, the following four policy initiatives are emphasised: \textsuperscript{23,116}
- Paid maternity leave of one year’s duration
- Health scheme for children including home visits and outreach work by health nurses, including screening, consultation and vaccination
- Full coverage of primarily tax-financed kindergartens and preschools with well-educated staff.
- Child poverty less than 10% (according to OECD’s definition: equalised disposable income of less than 50% of the median for the total population).

In the international comparisons made for these policy goals, Denmark has traditionally been placed quite high, among other things due to the universal services offered by the public system. There are, however, as mentioned, signs that not all population groups benefit equally from the universal services.

Existing knowledge thus suggests that the following measures will be effective with regard to health inequality:

#1.1 Antenatal care comprising interventions that reach all women early in pregnancy and which can prevent preterm birth, low weight for gestational age, smoking of pregnant women, damaging occupational environment, etc.

#1.2 Maternity visits by health nurses offered as a universal service to all families. At the same time, extra attention is given to reaching the socially and psychologically disadvantaged families, including families with substance abuse problems

#1.3 Active outreach measures to ascertain that children with restricted social and cognitive development attend the preventive child health examinations at the general practitioner

#1.4 Complete coverage and active recruitment of children with special needs through day care institutions and kindergarten class

#1.5 Elimination of childhood poverty to prevent the long-term irreversible consequences that poverty has for children
4.2 Uncompleted schooling

Education is an important precondition for being able to gain a foothold on the job market, and level of education influences job options and income. The need for education is intensified congruently with the rising demands of working life, and the falling demand for unskilled labour in that ever more intellectual skills are required for jobs and participation in social life in general. Where previously a 9th grade exam was enough for many unskilled jobs, there are now fewer and fewer jobs not requiring a qualifying education. The understanding of what constitutes a low level of education is thereby not constant over time and the differences in opportunities between those who only have 9th grade and those who have further education are steadily growing.

Almost everyone in the population has completed compulsory schooling and 98% of each year group continue their education within five years of completing 9th grade. But the dropout rate is relatively high especially for vocational education and training (approximately 50%) and in recent years there has consistently been 15% of each year group that neither achieves occupational skills nor competencies for further study.

4.2.1 Effects of uncompleted youth education on social position and health later in life

Young people who do not acquire a youth education or qualifying education after having finished compulsory schooling are having an ever more difficult time on the labour market and are at risk of being marginalised. A study conducted by the National Labour Market Authority showed that half of the 15-17 year olds who in 2006 were not attending a programme of study switched directly to social assistance upon turning 18. Not having an education is not just a problem for the young, but becomes a growing problem during adulthood, where unskilled workers have the highest risk of long periods of unemployment and early retirement from the labour market.

Analyses from the Economic Council of the Labour Movement shown in Table 4.2.1 show that people who do not obtain an education besides the compulsory minimum have significantly larger risk of being without employment as 35 year olds compared to those who move further in the education system. Among those who have 9th grade as the highest obtained grade, 68% are employed as 35 year olds, while 89% of those with further education are in employment. Those with the shortest education have a corresponding excess risk of receiving, inter alia, social assistance, unemployment benefit and disability pension. The table also shows that the (relatively few) people who have only completed 7th or 8th grade have an even higher risk of being unemployed than people with 9th grade. Among those who leave school this early, there will be many cases where serious health problems are the cause of their school problems.

---

a Corresponding to completion of compulsory education in Denmark
b Youth education is the Danish term for general and vocational upper secondary education
Table 4.2.1 Labour market status (%) among 35-year olds by highest completed level of education 2008

<table>
<thead>
<tr>
<th></th>
<th>7th grade</th>
<th>8th grade</th>
<th>9th grade</th>
<th>10th grade</th>
<th>Higher than basic schooling</th>
<th>Total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>45</td>
<td>56</td>
<td>68</td>
<td>68</td>
<td>89</td>
<td>84</td>
</tr>
<tr>
<td>Unemployed</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Social assistance (not ready for the job market)</td>
<td>12</td>
<td>11</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Educational measures</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Disability pension</td>
<td>15</td>
<td>16</td>
<td>9</td>
<td>12</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Others outside the workforce</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: The Economic Council of the Labour Movement based on Statistics Denmark’s labour market statistics

In addition to job market affiliation itself, the remaining determinants in this report will underline how a low level of education – normally defined as completion of compulsory education, i.e. nine years of school – is related to risk factors for poor health: This is the case for factors such as work environment (see section 4.8), poverty (section 4.4) and health behaviour (section 4.9).

The accumulation of risk factors in people with a low level of education entails a severe excess mortality which in the figure below is illustrated as the relationship between those that have at least a youth education and those that do not. Having at least a youth education refers to the fact that there is approximately 4% of every year group that after 25 years will have obtained a qualifying education without having completed a youth education. Figure 4.2.1 shows that the relative mortality for those who have not obtained a youth education (compared to those who have) is high. The difference in mortality between the two groups is largest in the age group 20-29 years, where it is 4-5 times greater for those without a youth education. In the age group 30-64 years, mortality is 1.5-3.5 times greater.

Figure 4.2.1 Relative excess mortality (relative risk) for 20-64 year old males and females (in 2008/9) with no youth education relative to the reference group of those who have completed a youth education (ref=1)

Ann. Persons with unknown level of education are not included

Source: The Economic Council of the Labour Movement based on Statistics Denmark
4.2.2 Causes of uncompleted youth education

There is a very strong relationship between parents’ social position and how far their children come in the education system. Figure 4.2.2 shows that amongst children growing up in the 10% poorest families, 36% have not completed a youth or further education. The corresponding number for those children growing up in the 10% richest families is only 9%.

Table 4.2.2 Completed or current education for 25-year olds (%) according to familial income during childhood grouped as deciles of the income distribution

Results from a range of research on children and adolescents show that growing up in material need can have negative consequences. Not having the necessary resources for food, clothes, accommodation, health or school aids weakens a child’s prerequisites for performing well both academically and socially. In addition to the economic circumstances during the child’s upbringing, parents with low levels of education have poorer abilities of supporting the child in its schoolwork. Especially the mother’s education is important to how well the child does in school.\textsuperscript{136}

Though the education of the parents, especially the mother, plays an important role it seems that family income during childhood and, even more strongly, family stability in childhood is of critical importance to the educational success of the child, as is apparent from Table 4.2.2.\textsuperscript{79}
Table 4.2.2 Percentage who have not completed a youth education by familial circumstances

<table>
<thead>
<tr>
<th>Family Type</th>
<th>2000</th>
<th>2005</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-habiting parents, none on long-term income transfers, at least one academic</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-habiting parents, none on long-term income transfers, both unskilled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced parents, at least one on long-term income transfer, both unskilled</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Lars Olsen: Den ny ulighed / from Ugebrevet A4, 20/2005

The results are supported by findings from the investigation of the 15-17 year olds who were not attending a programme of study, and which showed that the youth switching to social assistance upon turning 18 were especially children of single parents or children who had left home early. The risk of being on social assistance was less for children living with married parents. 135

Among the 9-10,000 youth of every year that do not obtain at least a youth education there is a larger share of boys than of girls, and especially boys with a non-Danish ethnic background. As the table below demonstrates, the difference between Danish and other ethnic groups has lessened over the past ten years. In particular, there is a growing share of girls with non-Danish heritage that obtain a qualifying education. This proportion is equal in size to the proportion among boys of Danish heritage (Table 4.2.3).

Table 4.2.3 Percentage of a year group expected not to have a qualifying education, 25 years after completing 9th grade

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2005</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
</tr>
<tr>
<td>Danish heritage</td>
<td>15</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Non-Danish heritage</td>
<td>33</td>
<td>20</td>
<td>36</td>
</tr>
</tbody>
</table>

Ann. The calculation is based on the assumption that the educational system and education-related behaviour after completion of 9th grade will remain as it was at the beginning of the projection.

Source: www.uvm.dk Ministry of Education’s profilfigurer

Along with the conditions in childhood, the structure and make-up of schooling itself is also important. Academic skills during compulsory schooling are strongly influential on choice and completion of a youth education. 138 But it is especially those children who have difficult childhood conditions and family problems that the schools themselves seem to have difficulty accommodating, and many finish compulsory schooling with poor academic skills. 139 The schools do not adequately manage to make participation in school a meaningful and cohesive experience for the children who are worst off. 140

An analysis of drop-out from the vocational youth education programmes shows that the most important reasons given for dropping out have to do with the programme not living up to the expectations of the young people. 141 Especially in the technical schools, a relatively large part of total dropouts indicated having lost interest in the programme of study, that the ratio of theory to practical work was not as expected and that they did not feel they were learning enough. In addition to these, the difficulty of finding a training place is a factor of great importance.
In general, it can be said that the young people who drop out of these school programmes have a weaker foundation measured across a number of dimensions. The combination of these dimensions increases the risk of quitting. For example, the analysis of drop-out from vocational youth education programmes shows that young men with a non-western background, who did not live in a nuclear family as 15 year olds and whose mother has only a low level of education, have a 70% risk of dropping out of a youth education. Only about 6% of the young non-western immigrants have these characteristics. For similar Danish youths, the risk is also high but still significantly less, namely 49%. \(^{141}\)

**At-risk children and vulnerable children**

As described above, the risk of not obtaining a qualifying education increases with the number and scope of psychosocial issues the young person is exposed to and it may therefore be relevant to think in degrees of vulnerability. The term *at-risk children* is loosely defined but is used for children who are assessed to be at risk of needing supportive measures from the social system and possibly medical treatment later in life. Risk factors might include the physical health of the child, poor sociocultural circumstances, stressful family relations and a bad school experience. \(^{142}\)

The latest investigation of the Danish National Centre for Social Research on the welfare and well-being of children and youth shows that the majority of children are happy and doing well both physically and psychologically. But nationwide there are still about 15% of children and adolescents assessed to be at-risk children due to their circumstances across eight different domains: material welfare, living conditions and local environment, health and safety, day care and education, social relations, behaviour and lifestyle, leisure time and civil participation, and subjective wellbeing. \(^{79}\)

Whereas the above refers to a cross-sectional study, Statistics Denmark has followed the development of a specific group of children and adolescents who are defined as “socially vulnerable” because they have, at some point in their lives, received preventive social measures or been placed in foster care. For these children and adolescents, their situation in adulthood as 20-39 year olds is analysed. The analyses from Statistics Denmark show that in the period 1997-2007 approximately 1.7% of all children yearly received preventive support or were placed in foster care. For the 20-39 year olds, between 5.5% and 7% had fit the definition of being “socially vulnerable” in the period 1997-2007. \(^{143}\)

Socially vulnerable youths are characterised by coming from unstable family backgrounds where the parents are divorced, marginalised from the job market, and have a low level of education and income, and where the youths themselves have experienced parental neglect, e.g., due to substance abuse. \(^{92}\) Furthermore, they frequently come from ghettoised areas (see section 4.3) which corresponds to the fact that municipalities with high rates of children being placed in foster care often have a high proportion of social housing and many single mothers, and by the municipalities exhibiting a low level of support for voluntary social work and sports and cultural activities. \(^{144}\)

Socially vulnerable youth have greater difficulties completing an educational programme than non-vulnerable youth. An analysis from the Danish Institute of Governmental Research shows that two thirds of those that were defined as socially vulnerable when they were 15-17 years old had not obtained anything further than compulsory schooling eight years later. \(^{145}\) This has to do with the fact
that socially vulnerable youth have poor academic skills (reading, writing, arithmetic and keeping up with school work) during their school years and have poor social skills.\[^{138}\]

Socially vulnerable youth have pronounced excess mortality. Figures from Statistics Denmark show that despite just 7% of a year group being defined as socially vulnerable, 24% of deaths among the 20-39 year olds in 2007 could be ascribed to those who had been defined as socially vulnerable earlier in life. While the chief cause of death was injury for both the socially vulnerable and non-vulnerable, mortality was four times higher among the vulnerable. There is concurrence in the main causes of death for the socially vulnerable group and those causes of death that entail the greatest absolute difference between the socially vulnerable and non-vulnerable. This is the case for injury, suicide,\[^{146}\] diseases of the nervous system, and mental illness, but not for cancer (see Table 4.2.4). Also, it is remarkable that so many deaths among the socially vulnerable are of unknown cause.

Table 4.2.4 Cause-specific death rates (per 100,000) for 20-39 year olds (2003-2006) who had and had not been recipients of social supportive measures as children

<table>
<thead>
<tr>
<th>Cause</th>
<th>Recipients of social supportive measures in childhood</th>
<th>Non-recipients of social supportive measures in childhood</th>
<th>Absolute difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>230.4</td>
<td>61.0</td>
<td>169.4</td>
</tr>
<tr>
<td>Injuries</td>
<td>59.6</td>
<td>13.6</td>
<td>46.0</td>
</tr>
<tr>
<td>Suicide</td>
<td>33.7</td>
<td>9.2</td>
<td>24.5</td>
</tr>
<tr>
<td>Cancer</td>
<td>16.5</td>
<td>12.9</td>
<td>3.6</td>
</tr>
<tr>
<td>Diseases of the nervous and sensory systems</td>
<td>16.2</td>
<td>1.7</td>
<td>14.5</td>
</tr>
<tr>
<td>Mental illness and behavioural disorders</td>
<td>14.0</td>
<td>1.9</td>
<td>12.1</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td>11.4</td>
<td>3.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Diseases of the digestive system</td>
<td>11.4</td>
<td>2.7</td>
<td>8.7</td>
</tr>
<tr>
<td>Endocrine, nutritional and metabolic diseases</td>
<td>9.9</td>
<td>1.6</td>
<td>8.3</td>
</tr>
<tr>
<td>Congenital malformations and chromosome anomalies</td>
<td>5.3</td>
<td>0.8</td>
<td>4.5</td>
</tr>
<tr>
<td>Violence</td>
<td>3.8</td>
<td>0.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Other diseases</td>
<td>18.8</td>
<td>7.1</td>
<td>11.7</td>
</tr>
<tr>
<td>Symptoms and abnormal findings, poorly defined causes</td>
<td>17.0</td>
<td>2.6</td>
<td>14.4</td>
</tr>
<tr>
<td>Unknown cause</td>
<td>12.7</td>
<td>2.1</td>
<td>10.6</td>
</tr>
</tbody>
</table>


4.2.3 Effective measures

The above review shows that the main causes of young people not completing a youth education are difficult childhood conditions with lack of stability, poverty, and parental neglect, and a lack of ability on the part of the schools to integrate these young people and create school programmes meaningful to them. These indicators underline that the implementation of some of the measures described in section 4.1 (early childhood development) will have an effect on the chances of obtaining a qualifying education as well. The dropout youths are a relatively disadvantaged group
with few resources. This is central to which initiatives can be assumed to have positive effects on this group in particular.

There are, in Denmark, several evaluations of earlier interventions and the following suggestions are drawn primarily from recommendations in the following reports: “Frafald på de erhvervsfaglige uddannelser” (Drop-out from vocational education and training programmes), “Unges veje mod ungdomsuddannelserne” (Youth pathways towards youth education) and “Vejen mod de 95%” (The road towards the 95%). This latter is a compilation of the experiences from implementation of the project “Uddannelse til Alle” (Education for Everyone) and points out that the necessary measures for achieving the Government’s goal of 95% of the youth of each year completing a youth education should be targeted at three general areas: compulsory schooling, the transition between compulsory schooling and youth education, and the youth educations themselves.

**Compulsory schooling.** Even before children start school, several skills are established which are fundamental to profiting sufficiently from the teaching in schools. A systematic review of school, learning and mental health among children conducted by the Royal Swedish Academy of Sciences has found that problems and the experience of failing during the first year of school (with regard to reading and other achievements) have negative consequences for the success of the child in school and serious consequences for its further progress through the educational system. According to the existing literature in this field, measures to counteract a bad start to school life should ensure small class sizes, sufficient and qualified teacher resources as well as the organisation of special education in a way that is not perceived as stigmatising and excluding. There are many studies of how schooling can be improved. The scope of this report does not allow for all of the programmes of action that have been suggested to be reported here, but, summing up, it can be said that there is a need for the strengthening of learning and of academic standards, with a focus on the wellbeing of the children in order to achieve this. The need for focus on wellbeing is especially pronounced for the socially vulnerable children who need to be offered assistance throughout the schooling period to give them the necessary healthy attention and care.

Social background influences reading skills, and international comparisons show that this influence is larger in Denmark than in other countries. Socially disadvantaged pupils obtain better reading skills if they attend schools with children from more advantaged backgrounds. At the same time, the PISA assessments show particularly good results for Finland, which is probably due to the fact that children from socially advantaged and disadvantaged backgrounds are mixed during teaching and because Finland expressly focuses on improving the level of teaching during the introductory period of school attendance. (See Measures #2.1 and #2.2)

**The transition between compulsory schooling and youth education.** The compilation of the experiences from implementation of the project “Education for Everyone” recommends focus on the transition to vocational education and training programmes for children with poor academic skills and for socially vulnerable youth instead of only analysing the reasons behind dropping out. It is remarked that information and student counselling about the different options for youth education should be improved and that the different counselling activities should be integrated. This also includes improving the parents’ knowledge owing to their important influence on the choices of their children. Student counselling has been shown to be especially beneficial for youths who have poor academic skills. Socially vulnerable youth, who would have trouble completing a youth
education without support, benefit from a distinct counselling effort that ensures a study programme with the necessary offers of social support measures.\textsuperscript{148}

In general, there is a lack of qualifying alternatives for socially vulnerable youth who have a hard time getting by in youth education programmes. Here, schooling with special support may be beneficial as well as schooling with clear job perspectives and alternatives such as production schools and individualised basic vocational education and training programmes. For those young people who are suffering from school fatigue or have poor academic skills, the possibility of starting vocational training from a practical entry point may be favourable.\textsuperscript{148} (See Measures #2.3 and #2.4)

**Youth education.** The experiences from “Education for Everyone” indicate that the social learning environment of vocational education and training programmes as well as the commitment, communication skills and teaching style of teachers are important for retaining young people in school, especially the socially vulnerable youth.\textsuperscript{147} Evaluations of efforts against drop-out, especially from vocational education programmes, support the conclusion about the importance of the social environment and further highlight the importance of taking the abilities of the pupil as point of departure and offering academic and personal support.\textsuperscript{141} Some schools use action plans to counter drop-out which has been shown to have a good effect, as does good contact to the municipal school management, cooperation with other institutions and a pedagogical approach to design of the school study programme.\textsuperscript{152} In addition, experience shows that schools that work in a targeted manner towards strengthening the practical approach to learning do better with regard to drop-out rates. (See Measures #2.5 and #2.6)

**Interdisciplinary collaboration.** Several of the contributing causes to young people not completing youth education lie outside of the education system. Youth policies must be developed to work across different policy areas: integration, social policies and housing policies. (See Measure #2.6)

Existing knowledge thus suggests that the following measures will be effective with regard to health inequality:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#2.1</td>
<td>A proactive effort to ensure that all children acquire basic competencies, including reading, during the introductory period of school attendance</td>
</tr>
<tr>
<td>#2.2</td>
<td>An actively motivating school, also for the children who are not as well stimulated from home, which mixes socially disadvantaged with advantaged children and gives the children opportunities for experiencing successes in daily life thereby developing their confidence and self-efficacy</td>
</tr>
<tr>
<td>#2.3</td>
<td>Counselling efforts for socially disadvantaged pupils and those with poor academic skills, which focus on the cohesion between different options and support measures</td>
</tr>
<tr>
<td>#2.4</td>
<td>Programmes of study that focus on practical learning targeted at young people who cannot complete a normal academic school programme</td>
</tr>
<tr>
<td>#2.5</td>
<td>Focus on the development of a socially, pedagogically and supportive environment for the individual, especially in technical schools</td>
</tr>
<tr>
<td>#2.6</td>
<td>Securing access to training places from all vocational schools</td>
</tr>
</tbody>
</table>
4.3 Local community – residential segregation

There are large geographical differences in the health status of the population in Denmark. Even with the somewhat larger and more heterogenic municipalities (in terms of population) ensuing from the Local Government Reform of 2007, the variation in life expectancy is substantial: from 75 years in the municipality of Lolland to 78.9 years in Sønderborg. And it is at least as manifest between suburbs of the larger cities from 75.6 years in Ishøj to 79.5 years in Rudersdal, and between neighbourhoods in Copenhagen the differences are as large as six to seven years.\textsuperscript{153}

Figure 4.3.1 Municipal life expectancy

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{municipal_life_expectancy}
\caption{Municipal life expectancy}
\end{figure}

The dominating explanation for these area-based differences is that the labour and housing markets sort people geographically according to education, occupation and income, and due to the social inequalities described in Chapter 3, large geographical inequalities result. Notwithstanding, the populations of these municipalities are all quite mixed in terms of social composition. When, despite this, there are large differences in life expectancy between municipalities and neighbourhoods it is because people’s health also influences where they live. For example, people assigned social housing often have poorer health than the background population. This means that some of the geographic health inequalities come about due to the characteristics of the people living in different municipalities. This is called the \textit{compositional effect}. Further, there are the characteristics of the area itself which affect health inequality. This is called the \textit{contextual effect}. The physical environment, especially as regards traffic, will be dealt with separately in section 4.7. The focal point of this section is the question of whether segregation is bad for health,\textsuperscript{154} and we will look into whether and how the social environment of the local community and the population composition in themselves affect people’s social position and health.

In this section we focus on residential segregation in larger cities, but it should be noted that there are socially disadvantaged and deprived communities also in smaller towns and rural areas. In rural areas, the mechanisms will to a large extent be different from what is relevant in cities. There, the
lack of job opportunities and distance to public services play a limiting role for the possibilities people have. In the cities, the issues have more to do with accumulation of social disadvantage and deprivation in the local community and the consequences thereof.

In Denmark there is a fairly pronounced residential segregation measured as the proportion of poor people in a given area. This is illustrated in Table 4.3.1. It will be seen that while the share of poor people (measured as an income of 50% of the median income) in Denmark lies at 3.7%, some parishes have a poverty rate of 10-20%. Similarly, these parishes have a markedly higher share of citizens outside of the labour force.

Table 4.3.1 Per cent poor, per cent poor children, and per cent outside the workforce in selected parishes, 2007

<table>
<thead>
<tr>
<th>Parish</th>
<th>Per cent poor</th>
<th>Per cent poor children</th>
<th>Per cent outside the labour market (aged 25-64 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maria, Vesterbro</td>
<td>12.8</td>
<td>-</td>
<td>18.7</td>
</tr>
<tr>
<td>Apostelkirken, Vesterbro</td>
<td>11</td>
<td>-</td>
<td>23.3</td>
</tr>
<tr>
<td>Kingo, Nørrebro</td>
<td>10.1</td>
<td>15.8</td>
<td>27.9</td>
</tr>
<tr>
<td>Vollsmose, Odense</td>
<td>15</td>
<td>20.2</td>
<td>49.2</td>
</tr>
<tr>
<td>Gellerup, Århus</td>
<td>19</td>
<td>25.6</td>
<td>51.2</td>
</tr>
<tr>
<td>Tingbjerg, København</td>
<td>13.4</td>
<td>17.1</td>
<td>38.4</td>
</tr>
<tr>
<td>Denmark in total</td>
<td>3.7</td>
<td>4.6</td>
<td>19.3</td>
</tr>
</tbody>
</table>

Ann. Poverty is defined as 50% of the median income. Families in which at least one provider is a student are not assessed to be poor. The percentage of poor children in the parishes of Maria and Apostelkirken are not included as the data are uncertain.

Source: The Economic Council of the Labour Movement based on the law model of the Ministry of Finance.

4.3.1 Community effects on social position and health later in life

A comprehensive body of research literature from North American and European countries exists on the effects on education and life course of residential segregation. Though the results are not altogether consistent it can generally be concluded that there is an effect of the socioeconomic and ethnic composition of the community population on how children do in school and later on the job market as well as on their income levels as grown-ups. However, the effect is noticeably weaker than the effect of family background and of the composition of pupils in schools (see section 4.2). Some studies have specifically looked at whether the effect varies between groups and it has often been shown that children from less advantaged backgrounds are more susceptible to the negative community effects. Which scale is used for the definition of community (neighbourhood, urban subdivision, municipality, etc.) also seems to be of importance to the research results. For instance, Swedish investigations show that the effects of neighbourhood (a unit comprising 4-800 inhabitants) are larger than those of municipality (10-100,000 inhabitants). There is, however, an uncertainty in this type of study in that adjustments for family background factors have often not been made, although these affect both the choice of residential area and child development. This could mean that the area effect is overemphasised. In later years, several sibling studies have emerged which are better at controlling for the effect of familial factors, and these studies confirm the earlier findings. Similarly for the very few experimental studies available, which also seem to show that a good deal of the area effect operates indirectly via institutions, e.g. day care institutions and schools.
Both the physical and social environment of the local community has been shown to be relevant to health and health inequalities. There is good evidence for a strong association between the physical environment (urban planning and transportation) and physical activity as well as geographic accessibility of healthy foods (see also section 4.9). Furthermore, the physical environment influences the occurrence of accidents and injury (see section 4.7).

Effects of the social environment have primarily been studied with regard to mental illness and cardiovascular disease. Areas marked by social fragmentation, large in- and out-migration, and a low degree of social cohesion and of supportive social relationships are associated with greater risk of depression. So is the occurrence of concentrations of people with limited resources (in terms of income, occupation and family). But many of these studies are uncertain, because the measurement of environment and of depression is done by self-report in cross-sectional studies. Other register-based, longitudinal studies from Sweden and the US have found contextual effects on the incidence of ischaemic heart disease of living in an area with few social resources. Some of this effect can presumably be explained by a higher prevalence of smoking and physical inactivity in deprived areas, but some presumably also operates through psycho-physiological stress mechanisms rooted in the physical and social environment.

The environmental risk factors concentrated in underprivileged residential areas that affect depression and heart disease, are risk factors which people with low levels of education and income, in general, have higher exposure to.

Thereby, segregation in the housing market contributes to differential exposure to environmental risk factors. It is also possible, but has been less studied, that there are effects via differential vulnerability operating simultaneously. Differential vulnerability is brought to bear when the population groups that primarily live in disadvantaged communities also are those who are most vulnerable to the effect of deprived urban environments.

4.3.2 Causes of segregation
Residential segregation most often occurs when there are substantial economic inequalities in society (see section 4.4) along with differences in quality and attraction of the existing housing stock. The market mechanism ensures that those who can afford it buy the most attractive houses. To secure housing for the worst off, the state and the municipalities have, since the 1800s, invested in social housing, which is kept out of the remaining housing market. This housing is accessible to people with few economic resources, since earning a profit from renting them out is not permitted. Planning of social housing has a large influence on today’s residential segregation. Approximately 40% of the housing stock in some southern suburbs of Copenhagen is social housing, while the proportion in most municipalities in the country is 5-25% (see Figure 4.3.1).
The residential segregation seen in Denmark today traces its roots back to the post-war period where the State invested heavily in social housing organisations (when the Law on Housing Aid - Boligstøtteloven – from 1946 opened up for the possibility of State loans of up to 97% of the cost of construction for social housing projects). To a large extent, social housing projects were built with a view to industrial rationalisation with prefabricated construction of cheap concrete high-rise and other collective buildings. An increase in wealth in the same period, however, created a growing demand for private, detached housing in other areas. An increasing residential segregation ensued, which especially was based in education and income disparities, as those with steady/higher incomes chose to buy their own homes and move away from the social housing projects. In time, the municipal right to allocate tenants to social housing and the out-migration of the more well-to-do resulted in the fact that people moving into the social housing areas to an ever further degree were people on income transfers including receivers of disability pension, social assistance and Start Help, etc.

The Danish Building Research Institute points at a process of deterioration in areas which, to begin with, are less attractive, either because of the housing standard, its size or form of tenure, poor location, appearance, distance to green areas and services, as well as traffic nuisance, noise and pollution. A lack of investment in improvements and maintenance exacerbates the problem.
high concentration of residents with social problems entails that residents with many resources move away faster. A questionnaire study has thus shown that if the proportion of residents with social problems comprise a fifth of the inhabitants in an area, then 90% of the residents with many resources will move away from the area within a year.\textsuperscript{168}

A Government initiative from 2010 “The ghetto back into society” identified 29 ghettos in Denmark. The ghettos are defined as areas with more than a thousand inhabitants and which live up to at least two of three criteria: (i) a high proportion (>40%) of residents with no affiliation to the job market or to an educational programme, (ii) a high proportion (>50%) of immigrants and descendants of immigrants from non-western countries, and/or (iii) a high proportion of residents convicted of a crime (>270 convicted per 10,000 population). The ghettos are concentrated around the larger cities Copenhagen, Odense and Århus.

Most immigrants live in social housing (at least 60%) and in multi-ethnic housing estates where two out of five residents are immigrants.\textsuperscript{169} The Danish Building Research Institute emphasises three main reasons for the skewed habitation practices: (i) the limited financial means of immigrants on the housing market, (ii) difficulties accessing the general housing market because of a lack of network, of knowledge about the housing market and of access to obtaining loans, and (iii) a preference for living close to friends and family – and to some degree – compatriots. The movement towards larger cities is primarily a question of limited employment opportunities in smaller towns.

\subsection*{4.3.3 Effective measures}

Because income inequalities are a fundamental precondition for residential segregation, it must be assumed that all efforts to keep income inequality at a low level should be helpful to restricting segregation too. There are few evaluations of measures against residential and social segregation in Denmark and internationally, which makes it challenging to describe effective measures. Residential sector initiatives which are assumed to counteract residential segregation already exist, such as construction of social housing, rent regulation and housing aid.\textsuperscript{169}

In many countries, the discussion about residential segregation focuses on ethnic minorities, but in some countries, e.g. Sweden, segregation is primarily seen as a socioeconomic issue, the solutions to which will also be found in social efforts such as improved labour market integration.\textsuperscript{170} In the study conducted by the Danish Building Research Institute, social stresses rather than the ethnic profile of a neighbourhood were shown to be the prime reasons for resourceful people wishing to move out of socially disadvantaged areas.\textsuperscript{171}

It must be supposed that were urban planning efforts to focus on mixing housing with different forms of tenure (e.g. social housing, rental housing and privately-owned housing), this would effectively counteract the process of segregation.\textsuperscript{172} A proportionate distribution of social housing across municipalities (see figure 4.3.1) would also influence the pattern. Coordinated urban and housing planning across municipalities could thus, from an inequality perspective, be motivated. (See Measure #3.1)

With regards to areas under existing social stress, the problem is more challenging because the social development in such areas needs to be changed. In such cases it is necessary to break the vicious circle that these areas seem to be stuck in. For this, we have the experiences of the Urban Council, established in 1993, and its efforts in social housing estates, as well as the urban
The evaluations show that attracting resourceful residents requires an improvement of the appearance and reputation of the area, for instance through physical improvements. At the same time, decreasing the rent can help to retain especially those resourceful residents who are employed. In addition, intensive efforts to reach children and adolescents through the municipal SSP partnerships (cooperation of school, social services and police) as well as a heightened focus on adult employment will presumably contribute to a positive development. (See Measure #3.2)

There are as such two types of countermeasures against residential segregation: broad housing policies and urban planning on the one hand and interventions towards existing deprived residential areas on the other. Furthermore, a health and social inequality focus introduces the need for directing attention to reducing the negative effects of segregation. Urban regeneration programmes and other area-based social interventions regarding housing have been realised in many large cities and have in some instances also included measures towards changing the composition of the local population. They have been shown to be less effective in terms of breaking the process of segregation, which is created by more powerful mechanisms that local efforts would be hard put to eliminate. The effects are therefore often transitory, though some argue that sustained interventions combining physical, organisational, financial and social aspects are more effective. School is a focal point for attention. Resourceful families with children move away from areas where neighbourhood social disadvantage might affect the quality of the child’s schooling. This could for instance happen in areas with a high concentration of children with special needs, but without corresponding resources for supportive measures, because the teaching in class and the schooling in general thereby becomes less gainful for the pupils. Policies that effectively support schools in disadvantaged areas are therefore of critical importance and have the potential to influence the process of segregation itself, and through it the social consequences for the children. Models of geographic distribution of resources for day care institutions and schools that secure a distribution across and within municipalities proportional to the need of the catchment areas are a pivotal prerequisite for reducing some of the effects of segregation on child and adolescent development.

Existing knowledge thus suggests that the following measures will be effective with regard to health inequality:

#3.1 Urban planning that mixes housing with different forms of tenure and that ensures a proportional distribution across municipalities of social housing in order to counteract segregation

#3.2 Urban regeneration projects combining physical, organisational, financial and social measures which ensure that prices correspond to housing quality and which improve the physical surroundings to create attractive residential areas

#3.3 Strengthen resource allocation to day care institutions, schools and youth education in less privileged areas to promote the development of children and adolescents and prevent the effects of segregation on them.
II. Determinants affected by social position

While sections 4.1-4.3 have focused on determinants relating to the development of children and adolescents this part of the chapter will concern itself with those causes of disease that are affected by a person’s social position.

Figure 2.2 illustrated that an important mechanism in the formation of health inequalities is that a person’s position in society affects how much they are exposed to a range of factors influencing their health.

The factors that will be dealt with in the following are income and poverty (section 4.4), long-term unemployment (section 4.5), social marginalisation (section 4.6), environmental factors (section 4.7), occupational health – ergonomic and psychosocial (section 4.8), health behaviour (section 4.9) and early functional decline (section 4.10).

Countermeasures have to do with reducing these exposures, especially among those who have a low level of education (arrow B) and reducing the vulnerability of these groups to the health effects of the risk factors (arrow C).

4.4 Income and poverty

Figure 3.3 demonstrated a very clear association between income and mean life expectancy, and that the association had become stronger over the last 20 years. There is now a disparity of 9.9 years for men and 6 years for women between the richest and the poorest quartiles of the population. The relationship between income and mortality expresses the accumulated effect of a long causal chain, where social background and early development affect both income and health via their impacts on health behaviour, employment and work environment.\(^{178,179}\) Income can additionally influence the development and management of health problems (see section 4.11). On the other hand, the reverse causality may also be operating so that the illness and its consequences for employment affect income. This would then also be a reason for the association between mortality and income the year before (see section 4.12).

What is central to this section is how income or wealth in itself affects the risk of illness and how strong this effect is in the different income groups. If there is no impact of income on health, then income and fiscal policies will have no bearing on health inequality. That inequality in mortality is larger when grouping by income (Figure 3.3) rather than by education (Figure 1.1) is not in itself proof of the significance of economic policies. This is exactly due to the fact that the association between income and health is a result of the interaction of many different causal relations including reversed causation.

4.4.1 Health effects of income

Questions concerning the effect of income on health have in numerous British, German, Swedish and American studies been dealt with by adjusting the income-related health inequality for education, occupation and employment, which are presumed to be prior steps and therefore
confounders in the causal chain.\textsuperscript{180-184} The studies illustrate a complex relationship between the different parameters in that a substantial part of the effect of education happens via its effect on occupation and employment, and the effect of occupation happens via income (see figure 2.1). Income still retains a significant effect after control for education, occupation and employment. Swedish studies have found a relative risk of approximately 2 between the lowest and highest income quartiles of dying at an active age. In British and German studies, the relative risk is about 3. The effect is often more pronounced in men, and in women when they are classified according to the incomes of their husbands.\textsuperscript{185}

Many studies have focused on what shape the relationship between income and health takes. In particular, it has been studied whether the relationship is curvilinear as indicated by economic theory. A curvilinear relationship reflects a situation where there are diminishing returns in terms of benefit to health as the level of income increases. Studies from many countries, including Denmark, have confirmed the existence of a curvilinear relationship between income and self-rated health as well as between income and mortality.\textsuperscript{181,186} As shown in Figure 4.4.1, the curvilinear relationship is also present for the association of income and life expectancy in Denmark in 2008/09.

![Figure 4.4.1](image)

**Figure 4.4.1 Relation between annual income (in 1000 DKK) and life expectancy 2008/9**

Ann. Income is calculated the year prior to death for all age-specific mortality rates
Source: The Economic Council of the Labour Movement based on Statistics Denmark

The interest in whether the relationship between income and health is linear or curvilinear has to do with the potential implications for distributional policy. The redistribution from high income groups to low income groups, e.g. via fiscal policy, means that the health losses among the high income groups will be much smaller than the health gains experienced by the low income groups. A society with low income inequalities will therefore, ceteris paribus, have a better mean population health than a society with large income inequalities. But, as described in Chapter 1, this does not necessarily bring about less social inequality in health.

Lowest on the income scale, are those who are often termed poor. Poverty, understood as not being able to manage in the society in which one lives, should be viewed relatively, i.e. in relation to the time and the country one is living in. Therefore, poverty in Denmark is completely different to and
should not be compared with the poverty prevalent in low-income countries and quite different from the poverty that was to be found in Denmark in the 1930s.

The effect of individual-level poverty on health in the Denmark of today has to do with both social and economic stress related to longstanding deprivation and anxiety about being able to cope with the economics of the household. A Swedish study found two to four times excess risk of poor self-rated health and longstanding limiting illness for people living under economic deprivation when controlling for social group and employment. There is also an income threshold delineating when the preconditions for living healthily with regard to housing, nutrition and physical activity, etc. are threatened. In the UK this is termed “a minimum income for healthy living.” It parallels the budget-based definition of poverty.

The definition of poverty may be determined on the basis of three different modes of calculation: the income method (income as percentage of median income of the total population), the budget method (what it costs to live) and the deprivation method (what types of deprivation a person suffers due to not having sufficient economic resources).

When poverty is determined via the budget-based definition of poverty, the question is to what degree a person’s income covers a given standard budget. In 2001, the Danish Consumer Agency developed a standard budget for a reasonable, normal level of consumption, while the Centre for Alternative Social Analysis subsequently developed two further budgets: one in which the standard budget is calculated without expenses for play and leisure activities and transportation, and one which also excludes expenses for durable consumer goods. As such, this latter budget only comprises expenses for food and drink, clothes, medicine and personal hygiene as well as everyday goods, i.e. a minimum standard of living. This will be a level of consumption reflecting a necessary and modest spending for active participation in society. Table 4.4.1 shows the available amounts for different types of income transfers in 2008 prices after taxes and accommodation expenses.

Table 4.4.1 Available amount in DKK per month for recipients of Start Help and social assistance in relation to the standard budget. 2008 prices and rates

<table>
<thead>
<tr>
<th></th>
<th>Single (woman 30-49 years old)</th>
<th>Couple with one child (3-6 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available amount, Start Help</td>
<td>2556</td>
<td>8583</td>
</tr>
<tr>
<td>Available amount, Social assistance</td>
<td>4533</td>
<td>13536</td>
</tr>
<tr>
<td>Available amount, 450 hr rule not met</td>
<td>-</td>
<td>7257</td>
</tr>
<tr>
<td>Standard budget at discount prices</td>
<td>7149</td>
<td>17010</td>
</tr>
<tr>
<td>Standard budget without leisure activities and transportation</td>
<td>3846</td>
<td>7961</td>
</tr>
<tr>
<td>Standard budget without leisure activities and transportation and durable consumer goods</td>
<td>3118</td>
<td>6844</td>
</tr>
</tbody>
</table>

Ann. Available amount = income - taxes - housing costs. Housing costs are the median expenses for rent in the 1999 Rent Statistics extrapolated according to the increase in the consumer price index for rent. The standard budget is the 2001 discount budget extrapolated according to the consumer price index.


The table demonstrates that a single parent on Start Help cannot live up to the standard budget defined by the Danish Consumer Agency. A single parent on social assistance cannot live up to the
standard budget either, but can just keep a budget that excludes expenses for leisure activities and transportation. A couple with one child can just about stay within the means of a budget without leisure activities and transportation but cannot at all live up to the standard budget by the Danish Consumer Agency. If the couple comes under the 450-hour rule they will only just be able to manage the barest necessities, such as food and drink, clothes, personal hygiene and everyday goods.

The calculations that exist for a Danish poverty line according to the budget-based definition of poverty take health-related needs into account to some extent, while the deprivation method includes social, health-related, material and residential deprivation as well as deprivation related to children. The Centre for Alternative Social Analysis has, in a Danish research project, focused attention on the consequences of poverty for everyday life, including as defined by deprivation. The study from 2009 shows that a larger proportion of the receivers of the lowest social benefits have refrained from buying medicine and visiting a dentist, than people who have income from other sources (see Figure 4.4.2). Also, among the receivers of the lowest social benefits, 74% experience at least five types of deprivation and 33% have ten or more types of deprivation (out of 19 possible types of deprivation). The problem is particularly serious for immigrants on Start Help. In this group, 29% experience more than ten types of deprivation, while 40% experience 7-10 types and nobody has zero deprivation. Taking the deprivation method as point of departure, it can be concluded that the lowest levels of unemployment benefit entail health-relevant deprivation and that this level of income is below what can be termed a minimum budget for healthy living.

Figure 4.4.2 Percentage who experience health-related and other deprivation by type of income transfer scheme, 2007

Source: Centre for Alternative Social Analysis 2009

Danish rules about social assistance state that both partners of a married couple need to document having worked 450 hours in a regular unsubsidised job within the past two years to qualify for social assistance. That amounts to five hours a week. Failure to do so means that one spouse loses their welfare check.
4.4.2 Causes of income inequality and poverty
As mentioned, income inequality and poverty in Denmark have increased over the period 1995-2008. The proportion of the total income among the poorest fifth of the population has thus decreased from 6.4% in 2005 to 4.8% in 2008. For the remaining income quintiles, their shares of the total income have increased a little. Even in absolute numbers, the income for the 10% with the lowest incomes has fallen. The reasons are neither a lack of economic growth nor rising unemployment, but the fact that the capital incomes from the housing market have increased for the most well off, that income transfers have not increased parallel to wages, and thirdly that changes in fiscal policy have entailed a weakening of the socially balancing effect of its distributional policy.

Income transfers have a very large effect on the income distribution. Inequality measured via the Gini-coefficient was 0.46 in 2006 for the primary occupational incomes (before taxes and income transfers). Taking into account income transfers reduces this to 0.30 while taxation reduces it further to 0.24. While, in this way, inequality is reduced by 40-50% in the Scandinavian welfare states, the equivalent reductions in the UK and US are 33% and 23% respectively.\(^{193}\) From 2000 to 2008, the ability of income transfers to keep poverty low was reduced from 63% to 57% (Eurostat 2010). The prevailing reasons for this are changes in the area of unemployment benefit, i.e. the ‘loft’ on unemployment benefits, the 450-hour rule, etc.\(^{194}\) The income transfers that in Denmark are most important in terms of distributional policy are social assistance, student grants, public pension supplements and various housing aids. The income transfers not dependent on household income i.e. unemployment benefit, early retirement benefit, disability pension, and child benefit play a somewhat smaller role.

With the increasing income inequality, more people have become poor. Figure 4.4.3 shows that when poverty is measured as an income of less than 50% of the median income of the total population, the share of the population that can be termed poor was decreasing up until 1995, but since then there has been a rise, especially among those with a short or no reported education. People whose level of education is not reported are, as previously mentioned, mainly immigrants. The risk of being struck by poverty is thus clearly connected to length of education – and this to an increasing degree. In 2007, 5.6% among the 25-64 year olds with compulsory schooling as their highest completed level of education were poor. For people with a vocational or further education, the corresponding proportion was about 2.3%.
In general, poverty is most prominent among children (4.7%) and adolescents (8.5%), also when students are not included in the calculations, while it is lowest among pensioners (1.5%) (see Table 4.4.2). This is primarily due to the important role played by pension and property for the circumstances of the elderly.

The new, reduced forms of unemployment benefit – introductory allowance and Start Help – have been a contributing cause of the rise in poverty since 2001, as can be seen from Table 4.4.3. Among those who receive introductory allowance or Start Help, 60-70% are poor (2007), and for those receiving unemployment benefit, 30% are poor. Among the employed or disability pensioners the proportion is approximately 2%. However, many are poor only for a short period of time. During the
course of 2004-2007 there were 70,000 people who for a shorter or longer period were dependent on the lowest social benefits for their upkeep. Of these, about 40,000 were of non-Danish heritage.195

Table 4.4.3 Mean income (DKK/year) and per cent poor by type of income transfer scheme, 2007

<table>
<thead>
<tr>
<th>Mean disposable income (DKK)</th>
<th>Per cent poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory allowance</td>
<td>79,600</td>
</tr>
<tr>
<td>Start Help</td>
<td>87,700</td>
</tr>
<tr>
<td>Social assistance</td>
<td>109,000</td>
</tr>
<tr>
<td>Unemployment benefit</td>
<td>178,600</td>
</tr>
<tr>
<td>Disability pension</td>
<td>169,900</td>
</tr>
<tr>
<td>Employed</td>
<td>221,300</td>
</tr>
</tbody>
</table>

Ann. Disposal income is here given as the annual mean household-equalised disposable income. Poverty is defined as < 50% of the median income. Families with at least one student provider are not included as poor.

Source: The Economic Council of the Labour Movement based on the law model of the Ministry of Finance

4.4.3 Effective measures

The income distribution is affected by numerous mechanisms of the political economy from the development of wages on the job market, to the configuration of the taxation scales, and the taxation of property and capital. From a health perspective it seems that the critical aspect is household income level and the degree of economic stress – or the opposite – that this income confers. Reducing income inequality in general, regardless of how this is achieved, has a beneficial effect on population health both in terms of population averages and health inequality. (See Measure #4.1)

The most serious health effects occur in those who are poor to such a degree that they suffer from deprivation that is of medical relevance. Sensitivity towards the health effects of poverty is especially pronounced among children, which means that measures that regulate the level of social assistance in families with children are of particular importance (see Measures #4.3 and 4.5). There is a lively discussion about how to establish poverty lines. From a health perspective, it is central to establish a level of what is termed a minimum level of income for healthy living, where the level of income is not the factor that limits the options for health-stimulating behaviour and for use of needed health services. (See Measure #4.4)

Existing knowledge thus suggests that the following measures will be effective with regard to health inequality:
#4.1 Ensuring that income inequality does not increase, e.g. through regulation of income transfers, taxation scales, etc.

#4.2 A universal social policy where as many as possible are covered by universal social services to limit social disparities and poverty

#4.3 Ensuring a level of social assistance which prevents economic deprivation impacting dietary habits, medical care (e.g. purchase of medicines), etc., and thus health consequences

#4.4 A yearly calculation of a yearly minimum income for healthy living

#4.5 Elimination of child poverty to prevent the long-term irreversible effects that poverty has on children
4.5 Long-term unemployment

All countries, including Denmark, have experienced periods where a substantial part of the workforce is thrown into long-term unemployment. At the present moment, in 2011, the world is again living through a crisis with high unemployment where Denmark, too, is hit. Traditionally, Denmark has had a labour market characterised by a very high level of job mobility with the share of the workforce changing employer being 25-35% every year since the 1980s. Just as many are affected by — often short — periods of unemployment. This is partly due to the fact that Denmark has an open economy very vulnerable to global competition, with many small and medium-sized businesses. The job mobility in Denmark is 40% higher than in the rest of the EU. In normal economic situations, about 10-15% of all job positions in Denmark are closed down annually and the equivalent number is created in other businesses. Just as in many other countries, Denmark is seeing a structural decline in demand for labour with no or little education.

Figure 4.5.1 Unemployment as percentage of the workforce 1983-2010; total unemployment, youth unemployment (16-24 years old) and longstanding unemployment (> 6 months)

Unemployment in Denmark was very high in the early 1980s and about the year 1990. Because of this, the development later in the 1990s was striking because unemployment fell dramatically in this period. In 2008, unemployment hit the lowest level since 1974 and employment was at its highest level ever.

4.5.1 The health effects of long-term unemployment

Numerous investigations and recent reviews have documented that the unemployed have worse health, because of depression, suicide (attempts), cardiovascular disease and other ailments. This is illustrated later in the report with up-to-date Danish data (Table 4.12.2) and the numbers indicate a particular excess of mental problems among people living on unemployment benefit. Unemployment afflicts people with a low education much more often than others (Table 4.5.1). In addition, some studies indicate that the association between unemployment and health is stronger
for those who have a low socioeconomic position.\textsuperscript{199} Behind this statistical relationship between unemployment and health are two important causal relations: The first is that poor health, not least psychological problems, increases the risk of becoming unemployed.\textsuperscript{200,201} This happens not only in countries like Denmark and England where a person can be laid off due to illness, but also for instance in Sweden, where there is legislation to stop such occurrences. Since psychological problems often present themselves as diffuse symptoms such as fatigue, problems cooperating, etc. they can be the cause of unemployment in these countries too.

The second causal relation has to do with the effect of unemployment on health. However, because of the reverse causal relation it has been challenging to arrive at clear conclusions in this regard. The best and newest British and Nordic studies in this area find that there is an effect of unemployment on mental health, especially depression and that the effect is larger when the unemployment is associated with economic stress.\textsuperscript{202-206} In Denmark, it has been shown that long-term unemployment is associated with a greater risk of use of anti-depressants also after control for selection bias.\textsuperscript{207} Consumption of anti-depressants in that study was largest for those who had formerly experienced a spell of long-term unemployment and were currently experiencing job insecurity. The same accumulation of stressful life events (including divorce and repeated episodes of unemployment) has been shown to be positively correlated with a very high consumption of alcohol (i.e. over 35 units a week)\textsuperscript{208} and negatively correlated with smoking cessation.\textsuperscript{209}

Similarly, many analyses, for instance using large Swedish twin study data, have found an effect on total mortality and on cause-specific mortality such as suicide. However, the effect on cardiovascular mortality is more uncertain.\textsuperscript{210,211} A 13 year follow-up study of Danes in the age group 20-58 years has shown that while all unemployed men under 50 years had an increased risk of death, for women it was only those in their twenties that had the same excess risk.\textsuperscript{212} After ten years of follow-up, increased mortality among men for cancer, suicide and other injuries but not for cardiovascular diseases was demonstrated. There was no statistically significant cause-specific excess mortality in women, but a tendency towards a higher suicide risk. An increased risk of suicide among the unemployed has also been revealed by Agerbo\textsuperscript{213} and Iversen.\textsuperscript{214} The first of these studies controls for earlier psychiatric admission, but it is likely that psychological symptoms not resulting in psychiatric admission play a critical role in both unemployment and suicide attempts. In recent Swedish studies with better control for psychological symptoms\textsuperscript{202} it becomes clear that the excess mortality, found among persons who have been unemployed, is dependent on the fact that the unemployed were more ill, before they became unemployed, and that the experience of unemployment may have exacerbated the illness. The effect seems to be stronger in men than in women.

It is as such likely that long-term unemployment, repeated job loss and experience of job insecurity together with other stressful life events result in a heightened risk of various negative health consequences, especially depression. It is an open question whether population groups with low socioeconomic positions are more vulnerable to the effects of unemployment.\textsuperscript{215} Christensen et al. have shown that this depends on length of education and how a person copes with the experience of being unemployed.\textsuperscript{216}

Most studies indicate that men in the age group 30-50 years are the ones most vulnerable to the health effects of unemployment. Though younger men may not be most vulnerable to the
Immediate health consequences, long-term unemployment among young people is a serious risk factor for longer-term labour market exclusion and marginalisation.  

### 4.5.2 Causes of long-term unemployment

As illustrated in Figure 4.5.1, macroeconomic conditions play an important role for who is hit by unemployment, and especially by long-term unemployment. This is due to structural reasons and the cyclical ups and downs of the economy. The structural conditions are important with regard to social inequalities in health because they have to do with the long-term fall in demand for labour with no or little education. Behind this phenomenon are technological development and globalization with free movement of labour, goods and capital. It is outside the scope of this report to consider macroeconomic conditions in depth, but it can be stated that unemployment is unequally distributed in the population. The table shows that there is a gradient according to length of education, but just as important is the content of the education’s professional profile, i.e. that skills correspond to the needs of changing occupational structures.

<table>
<thead>
<tr>
<th>Education</th>
<th>2000</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory education</td>
<td>1.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Vocational training</td>
<td>1.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Higher education</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>


Another important reason for unemployment and long-term unemployment, related to the individual, is poor health – especially poor mental health. Upon unemployment, people with mental health problems can have an especially difficult time when applying for a new job in competition with others appearing less psychologically vulnerable. This is relevant also in countries which have strong protection against workers being dismissed because of long term illness. In such cases, the employers are focused on avoiding taking on labour that may have reduced work capacity due to reduced psychological resources and high absenteeism due to ill health.

### 4.5.3 Effective measures

The structural unemployment in Denmark has been low the last 15 years. There are several reasons for this: the large labour market policy reforms of 1993-94, a low international inflation rate and moderation in the formation of wages. The fact that the Danish labour market works so well, relatively, has attracted much international interest. When the Danish tradition of high labour mobility and a high level of income security in times of unemployment were combined with a very active labour market policy in the beginning of the 1990s, the term “flexicurity” became internationally known and highlighted as an interesting model in the EU and OECD. The model has rarely been discussed from a health policy perspective, however.

One component – the flexibility, i.e. the high mobility – results, as mentioned, in a high proportion of the workforce experiencing periods of unemployment, though they may be of short duration. The health effects discussed in section 4.5.1 partly have to do with the stress and uncertainty which may
be experienced at the threat of unemployment, and partly with the stressor effect of long-term unemployment. But when a large part of the labour force experiences high chances of finding a new job relatively quickly after voluntary or involuntary unemployment, some of the stress of job insecurity and short-term unemployment is presumably diminished. The fact that there has concurrently been a relatively high level of income security, even for longer periods of unemployment, may also contribute to modifying the health effects of long-term unemployment.

An important reason that the mobility is so high in Denmark is that, in contrast to most other Western European countries, it is possible to fire employees for individual reasons such as illness. The UK has a similar “flexible” labour market, but in contrast to the UK, the flexicurity model in Denmark has been combined with two other elements: a high level of income security in the case of unemployment (though with a substantial reduction for high incomes) and a very active labour market policy with compelling possibilities for re-training and education. In recent years, there have furthermore been increasing requirements about job searching activity and activation of the unemployed. The prevalent educational and re-training element in the active labour market policy has contributed to retaining unemployment among those with a low level of education. It must therefore be assumed to have contributed to a lessened inequality in the health effects of unemployment.

The Danish labour market policy model has thereby presumably contributed to reducing the inequality in health burden but this has only happened due to the balance of all three components of the flexicurity model. If income security is weakened then the stress of unemployment is increased, and if the active labour market policy is weakened, it will be more and more difficult for people with a low level of education and with fewer resources due to poor health to return to the job market after unemployment (see Measure #5.1). The flexicurity model seems, to some degree, to have improved the level of employment for young people and for women, as well as for those with a low level of education. The possibility of retraining and further education during unemployment is therefore a central component with much relevance for health inequality. (See Measure #5.2)

It is more uncertain whether this model works for those who have poor physical or mental health. That unemployment to such a large extent seems to be the cause of, as well as result of, psychological issues strongly indicates that employment efforts should be combined with a very active health professional effort to treat mental health problems (see Measure #5.5). This question is further dealt with in section 4.12, which revolves around job market factors influencing the inequality in consequences of illness.

Existing knowledge thus indicates that the following measures would be effective against health inequality:
#5.1 A labour market model combining a flexible labour market with a good income support system and active employment measures to keep down unemployment

#5.2 Opportunities for life-long learning and re-training because they help to reduce unemployment among people with a low level of education

#5.3 A low level of youth unemployment especially because the first years after school are critical for how a person manages in the job market later on

#5.4 Employment efforts that use economic incentives and demand participation in activation. The demand for activation should be balanced with the resources of the individual so as to ensure that economic and other stresses do not exacerbate the health consequences of unemployment

#5.5 Employment efforts should be combined with a health professional effort with a special focus on mental health problems
4.6 Social marginalisation as cause and consequence of illness

In the previous sections, the focus has especially been on the social gradient in health, i.e. the association between social position and risk of illness which cuts across the entire population. But as mentioned in Chapter 2, health inequality can also be perceived as the gap between one group of people who are socially marginalised and the rest of the population. This section is about social marginalisation as both cause and consequence of illness.

There are many degrees of marginalisation; from being just at risk of marginalisation due to long lasting unemployment, low income or illness, to being visibly marginalised: the homeless, substance abusers, prostitutes, etc. People who are poor or substance abusers who are still managing in society are at risk of marginalisation. In this report, the marginalised are defined as people who are socially excluded on several dimensions at the same time, i.e. they may be excluded from the job market, have lost contact with family, have difficulty managing on the housing market or may not qualify for universal social benefits.219

It is difficult to get a clear idea about how many marginalised people there are in Denmark, among things because the concept is a composite one. The Danish National Centre for Social Research has in 2009 mapped homelessness in Denmark and estimate that on a yearly basis between 11,000 and 13,000 people are affected by homelessness. The homeless are primarily men (78%) and most are young or middle aged. About a quarter of them are between 18 and 29 years old which suggests that there is a continuous in-flow of people to the homeless population. Approximately every fifth homeless person has an ethnic minority background, being especially immigrants and refugees. The majority of homeless people do not have a connection to the labour market but are recipients of social assistance or disability pension.220 In addition to the homeless, there are marginalised people with substance abuse problems, mental illness and prostitutes. The Council for Socially Marginalised People (Rådet for Socialt Udsatte) estimates that these groups altogether comprise about 70,000 people or over 1% of the Danish population. There is a significant overlap between people in the various groups as some will be mentally ill, substance abusing and homeless at the same time.221

4.6.1 The association between marginalisation and health

In the previous sections we have tried to maintain a clear distinction as to the direction of the causal relationships, but with regard to marginalised people it is almost purely a question of academic interest to which degree their marginalisation is an effect or a cause of their poor health. The social and medical circumstances overlap and are difficult to disentangle.

Because of limited knowledge regarding the health status of marginalised people, the Council for Socially Marginalised People and the National Institute for Public Health (NIPH) in 2007 conducted a comprehensive investigation into the health conditions of users of various types of shelters: drop-in centres, hostels, warming centres and similar services.222 The results are not necessarily representative for the total group of marginalised people, e.g. prostitutes are not included, but they give a recent and comprehensive account of the conditions relating to the users of these social services. In Tables 3.3 and 3.6 some results from these studies were illustrated showing the extremely high morbidity of the marginalised, especially in terms of mental illness. In the Health and Morbidity Survey of the Marginalised (SUSY Udsat) it was found that 40-60% of marginalised people
had at some point attempted suicide in contrast to only 1.2% of the respondents in the corresponding Health and Morbidity Survey for the general population conducted in 2005 (SUSY 2005) (see Table 4.6.1).

Table 4.6.1 Health conditions experienced by the groups of socially marginalised people, 2007

<table>
<thead>
<tr>
<th>Condition</th>
<th>Alcohol abusers</th>
<th>Mentally ill</th>
<th>Homeless</th>
<th>Substance abusers</th>
<th>Poor</th>
<th>Total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longstanding illness</td>
<td>64</td>
<td>70</td>
<td>52</td>
<td>67</td>
<td>67</td>
<td>39</td>
</tr>
<tr>
<td>Often stressed in daily life</td>
<td>29</td>
<td>37</td>
<td>27</td>
<td>36</td>
<td>56</td>
<td>9</td>
</tr>
<tr>
<td>Anxiety, nervousness, agitation, or panic</td>
<td>38</td>
<td>45</td>
<td>26</td>
<td>37</td>
<td>44</td>
<td>3</td>
</tr>
<tr>
<td>Deposited mood, distress (past 14 days)</td>
<td>28</td>
<td>44</td>
<td>27</td>
<td>39</td>
<td>49</td>
<td>3</td>
</tr>
<tr>
<td>Attempted suicide</td>
<td>40</td>
<td>56</td>
<td>39</td>
<td>54</td>
<td>60</td>
<td>1</td>
</tr>
</tbody>
</table>

Ann. Based on data from the Health and Morbidity Survey for Socially Marginalised People (National Institute of Public Health). “Poor” is defined as persons who have indicated that they often do not get enough to eat because they cannot afford it. The 2005 Health and Morbidity Survey is used as comparison for the total population. Source: National Institute of Public Health

The figures reflect an enormous mental health burden which is most acute for those defined as being economically marginalised or poor upon indicating that they often do not have enough food because they cannot afford it. An interview study of the experiences of marginalised people themselves has also shown that they perceive their existence to be marred by stress, loneliness, fear and low self-esteem. Furthermore, the mental stresses are associated with feeling that life is undignified, shameful and wasted.

Another vulnerable group, namely refugees on Start Help, have many characteristics in common with the marginalised groups in that they are poor and often also ill and traumatised. A study of the financial maintenance and living conditions of refugees, documents that refugees on Start Help experience much deprivation in everyday life which affects their physical and mental health. Among other things, this is illustrated by 30% not having bought medicine prescribed by a doctor due to lack of economic resources, 69% having foregone visits to the dentist, 30% having done without three meals a day and 60% not having eaten fruit or vegetables every day. Furthermore, most refugees on Start Help have refrained from renewing worn-out clothing, shoes and coats, and from visiting friends and family living more than 20km away. The report also showed that 52% of refugees on Start Help assessed their health to be poor or very poor. It is striking that the corresponding percentage in the Health and Morbidity Survey of the Marginalised was 26.5%.

4.6.2 Causes of social marginalisation

Social marginalisation does not arise suddenly. Often, a process takes place during which more and more unfortunate circumstances accumulate over time. One of the important risk factors is former marginalisation, because people who have been marginalised once have a substantially greater risk of becoming marginalised again later in life. Mental illness and substance abuse are critical factors for a large fraction of marginalised people. Changes in psychiatric care with fewer beds and limited resources to an area of care for which demand in the population seems to be rising (see also 4.11) is
thereby an important factor. Housing policy, too, has contributed by causing this group to be partly excluded from the private housing market, and allowing their rejection from many social housing opportunities on the basis of rules on deviant behaviour.

In a life course perspective, there is a clear association between marginalisation and problematic conditions while growing up. The marginalised will to a much larger extent than others have experienced childhood poverty. They will, over the life course, be exposed to a number of social events such as exclusion from job and housing market, and individual circumstances such as alcoholism, mental illness, divorce, chronic illness, or serious injury. Finally, people lower on the social ladder have greater risk of becoming marginalised, because people with poor or no vocational training have greater risk of jobs with a risky work environment and thereby greater risk of early functional decline, as well as low or no supplementary pension scheme.

Alcohol and substance abuse are a defining element in many marginalised people’s life and health circumstances. Denmark has significantly higher alcohol- and drug-related mortality than, for instance, Sweden or Norway. The reason should probably be sought in the less restrictive policies of Denmark, especially as regards alcohol. People dying of alcohol or drug-poisoning, alcohol psychosis and alcoholism etc. have often been users for a long time with a level of consumption that has made them very socially vulnerable.

For the group of vulnerable refugees, additional circumstances apply which help determine their exclusion from society in general. The Centre for Alternative Social Analysis has in a questionnaire survey investigated the primary reasons that refugees on Start Help have difficulty becoming self-supporting, and thereby risk living in poverty and not becoming integrated into Danish society. The investigation shows that the most common reasons are language and health problems, followed by lack of educational qualifications and unemployment as well as lack of a social network. Every fourth recipient of reduced social assistance (those that are affected by the ceiling for social assistance, reduction after six months and the 450-hour rule) have less than 43 DKK available per day after taxes, rent and fixed costs have been paid. These 43 DKK have to cover food, clothes, shoes, transportation, medicine and other non-fixed costs. This could be a part of the reason why every fifth homeless person is a refugee.

**4.6.3 Effective measures**
Measures related to the marginalised must intervene against the conditions that contribute to creating social marginalisation but also against the health-related problems brought about by marginalisation. Marginalised people have several social, psychological and somatic problems which mean that no intervention can stand alone. Rather, there must be sufficient coordination between the different types of social support and treatment-related and rehabilitative efforts.

A range of relevant measures will be described under other determinants (see for example 4.2, 4.4, and 4.5), reflecting the fact that general welfare investment focusing on minimising inequality is strongly expected to prevent social problems from resulting in marginalisation.

**Access to the housing market**
As described, the marginalised are at high risk of becoming excluded from the housing market. There is therefore a need for a manifest effort to secure accessible and affordable housing. At the same
time, early intervention to prevent people with few social and economic resources from being evicted from their accommodation is an important focal point. International research distinguishes between three independent intervention models vis-à-vis reinstalling homeless people in homes of their own. One is individual housing aid, another is transition housing, and the third is a differential reward / sanction system linked up with, e.g., drug abstinence.\textsuperscript{220} It is not known which methods work best under Danish circumstances.

The Council for Socially Marginalised People is calling for the construction of more special housing, i.e. inclusive housing societies that cater to inhabitants’ needs. Experience shows that small housing societies of 6-10 residences with user involvement regarding design are most appropriate for marginalised people.\textsuperscript{225} (See Measure #6.1)

**Treatment and rehabilitation of mental illness and substance abuse**

As mentioned, marginalised people often suffer from a complex mix of poverty, homelessness, serious mental illness, substance abuse and often several somatic illnesses as well. It is difficult to help this group which is in simultaneous need of social, medical and psychological assistance. Lately, there has been a tendency on the part of several treatment facilities to decline treatment to people suffering from several problems at once. Many treatment facilities for marginalised alcohol abusers and drug addicts have been closed in recent years, and exchanged by facilities for socially integrated abusers, while many psychiatric treatment facilities are closed to drug users. Similarly, drug and alcohol abuse are handled by two different municipal sectors whose treatment regimens seem to be moving away from each other, despite polydrug abuse (including alcohol abuse) among users. Their contact with the somatic healthcare system is dominated by emergency room visits and acute hospital admission (see 4.11), and they often lack steady and continuous management of their many chronic ailments. The accumulation of different risk factors is a particular characteristic for many marginalised people and it thereby follows that several fall through holes in the current system. This does not improve the possibilities of the most disadvantaged getting out of homelessness and so on.\textsuperscript{226}

Many of marginalised people suffer from longstanding and psychotic illnesses, and the contact these patients have with social psychiatry is the closest they get to “family”. But the clinical work hardly includes any ongoing monitoring of these patients’ living conditions as regards housing, employment and social network.

A large investigation by the Danish National Centre for Social Research demonstrates that there is an unmet need for social care among a large segment of the people under treatment for substance abuse.\textsuperscript{220} The users themselves request assistance regarding the handling of social physical and especially mental problems and the report by the Danish National Centre for Social Research points out that there is a mismatch between the degree of mental problems among users, the proportion of treatment hours set aside for psychological treatment and the professional composition of the staff. The majority of employees in treatment facilities are not qualified to handle psychological treatment, as they are primarily social pedagogues, social workers and nurses.\textsuperscript{220} (See Measure #6.2)

Within alcohol treatment, the Council for Socially Marginalised People calls for stricter regulation on the implementation of alcohol abuse treatment option\textsuperscript{225} – regulation which, according to the
National Board of Health, can reduce issues of variable quality and lack of evidence-base for the various types of alcohol treatment. (See Measures #6.2 and #6.3)

Outreach efforts

For marginalised people who are not users of any care facilities, outreach efforts are necessary. There is a serious lack of interdisciplinary outreach teams, street nurses and the like, who work on the terms of the marginalised. This should to a large extent be a harm reduction approach which does not seek to achieve normalisation of marginalised people, but which focuses on minimising the negative health consequences of marginalisation. Access to health rooms should also be prioritised.

The municipal schemes with support and contact people for the marginalised must be assumed to have a positive impact. An otherwise positive evaluation of these schemes points at the challenge of overcoming existing language barriers with the relatively big part of the group of marginalised people who are immigrants. In addition, cooperation with the general practitioners is unsatisfactory and there is a need for formalised cross-sectoral collaboration. In the second national survey of homelessness in Denmark, it was found that only 27% of the homeless who had been contacted during the study period had some sort of official support or contact person. This indicates a potential for scaling up coverage. (See Measure #6.4)

Furthermore, many marginalised people require support in their contact with the somatic treatment system. In this regard, the Council for Socially Marginalised People suggests that the “social nurse scheme” should be prioritised in order to ensure improved understanding of the needs of the marginalised in the hospital sector. Preliminary experiences suggest that social nurses can help to ensure an improved and less conflict-ridden treatment course, for example in the treatment of substance abusers in hospitals. However, no external evaluations of existing projects with social nurses exist.

Existing knowledge thus indicates that the following measures would be effective against health inequality:

#6.1 Ensuring socially marginalised groups better access to housing and to special housing so that those who cannot manage on the general housing market have other options

#6.2 Further training of staff in substance abuse treatment facilities and integration of substance abuse treatment with social action plans focusing on management users’ mental problems

#6.3 Monitoring social living conditions among people with chronic mental handicaps within the framework of a clinical database, along with a stronger focus on open treatment facilities for people affected by mental illness, substance abuse and marginalisation in the collaboration between municipalities and regions

#6.4 Expanding coverage of outreach efforts as well as schemes with support and contact people, so that greater and more satisfying coverage is achieved, including a formalisation of cross-sectoral collaboration
4.7 Environmental factors

The physical environment has a huge effect on people’s health with influences through air, soil, water, food, products we use, as well as through radiation and noise. The WHO has calculated that about 15% of all deaths in Western Europe (the EUR-A group of the WHO) are due to environmental factors, primarily air pollution, radiation, noise and accidents. Work environment, including work-related injuries, is covered in section 4.8. The physical environment and traffic also impact on physical activity and this is covered in section 4.9. In this section, we will specifically focus on air pollution and injuries in light of the fact that they best meet the criteria given in the beginning of Chapter 4. As regards injuries, we look particularly at injuries among children, traffic injuries, and fall injuries among the elderly. The effect of environmental factors on social inequality in health operates through both differential exposure and differential vulnerability (see figure 2.2).

4.7.1 Health effects of environmental factors

Air pollution

The health damaging elements in the outdoor air currently consist primarily of particles and nitrogen oxides. Air pollution irritates the respiratory airways causing oxidative stress and activating inflammation, which in the short term can lead to exacerbation of asthma and chronic obstructive lung disease (COLD) and in the long term to cardiovascular diseases and cancer.\(^\text{229}\) The size of the particles determines where in the airways they are deposited and thus assert their effect; the smaller the particle size the deeper in the airways they accumulate. It is therefore likely that ultrafine particles (<100nm) to some extent can cross from the lung epithelium into the blood and thereby cause more systemic damage.\(^\text{230}\)

The social inequality in health related to air pollution would for instance express itself, should there be social differences in exposure to air pollution in Denmark. At the moment, we do not have any Danish studies about whether or not this is the case, but studies from Finland, Norway and Sweden all show that less privileged groups are more exposed to nitrogen oxide (NO\(_2\)) or particles (PM\(_{2.5}\)) in their residential environments.\(^\text{231}\) Furthermore, the question of differential vulnerability, i.e. whether the effect of air pollution is stronger on less privileged groups, has been analysed in a few studies. These indicate that mortality at a given level of exposure is higher for people with lower levels of income and education. Particle pollution often causes exacerbation of symptoms related to COLD, asthma and other respiratory diseases as well as cardiovascular disease, which means that the socially skewed distribution of these diseases results in increased vulnerability for health consequences in people with low social position.\(^\text{231;232}\) Differential vulnerability is, besides the mentioned diseases, also found in the elderly, in people suffering from diabetes and in patients who are generally weak.\(^\text{230;232}\) Two mechanisms are plausible: either the air pollution interacts with other socially skewed risk factors such as tobacco smoking in the development of these diseases, or the pollution exacerbates symptoms and mortality for those who are already ill. At the present time, it is only the latter mechanism that finds support in the literature, but since the respiratory and cardiovascular diseases in question are very socially skewed (see Table 3.5), the preconditions for differential vulnerability towards the health effects of air pollution exist.
Injuries

The National Institute for Public Health monitors the frequency of injuries by registering emergency room visits and hospital admissions. More than three quarters of acute cases of bodily harm occur in the home or during leisure time and are caused by either being struck by or striking against an object, or by shocks, cuts and strains. The rest are equally distributed across traffic and occupational injuries. If only mortality is calculated, traffic accidents cause the majority of deaths (over 20%) but also poisonings (alcohol, narcotics, and pharmaceuticals) are common causes of death. Last but not least, fall injuries cause many deaths, often among already impaired elderly people.

There is a clear social gradient in the risk of injury, especially in workplace accidents, but also in traffic and fall accidents (Table 4.7.1). The inequality in injury occurrence is most prominent among men in the age group 20-49 and among women in the age group 20-29. For fall injuries among the elderly, there is no prominent educational inequality but international studies indicate a markedly higher frequency of fall accidents among elderly people living in low income areas.

Table 4.7.1 Risk of emergency room visit or hospital admission due to injury as per cent of the total population by education, 2006. Age standardised for persons of 20 years and above

<table>
<thead>
<tr>
<th>Education</th>
<th>Occupational injuries</th>
<th>Fall injuries</th>
<th>Traffic injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
</tr>
<tr>
<td>Short</td>
<td>4.4</td>
<td>1.5</td>
<td>3.6</td>
</tr>
<tr>
<td>Medium</td>
<td>3.2</td>
<td>0.9</td>
<td>2.7</td>
</tr>
<tr>
<td>Long</td>
<td>1.0</td>
<td>0.8</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Source: The Injury Register. National Institute of Public Health

For children, too, there is a higher risk of sustaining an injury if the mother has a low level of education. Based on 1998-2003 data from the Injury Register, Laursen et al. found an excess risk of traffic accidents of 41% for children of mothers with a low level of education. For serious traffic accidents leading to hospitalisation the excess risk was 73%. Home accidents among children are also strongly associated with social background factors. If the parents have low levels of education or low incomes, the excess risk is about 50%.

Danish register studies of hospital admissions due to traffic injuries and all fractures have shown that people with a low level of education have significant excess risk. For people over 60 years of age, the injury frequencies according to the figures in the NIPH injury registers exhibit only negligible social inequality and when controlled for co-morbidity, as done by Vestergaard, the direction of the association is almost reversed. This simply illustrates that fall injuries among the elderly are strongly related to a number of other ailments such as neurological disorders, cardiovascular disease, depression, osteoarthritis, and osteoporosis, which are socially skewed with more frequent occurrence in people with low levels of education.

4.7.2 Causes of environmental risk factors

Air pollution
As mentioned, population health in Denmark today is largely troubled by air pollution in the form of particles and nitrogen oxides. Particles arise by several processes. In addition to passive smoking, which will be discussed in section 4.9, it is primarily diesel vehicles that cause the air pollution in cities. Diesel vehicles, along with combined heat and power production and maritime traffic are the primary sources of nitrogen oxides. An unfortunate interaction occurs in the attempt to reduce particle emissions from cars, because certain particle filters increase the emission of nitrogen oxides, and there is currently very limited use of nitrogen-reducing catalysts.\textsuperscript{230} Nationwide, the majority of particle pollution in Denmark stems from the use of wood burning ovens and from agriculture. Further, a considerable part of the air pollution comes from other European countries, which is why sources and solutions should be sought at the European level. As mentioned, whether there might be a social gradient in the exposure to nitrogen oxides and particles in Denmark is not known, but in neighbouring countries where this has been investigated, such a gradient has been found.\textsuperscript{231}

**Injuries**

Injury inequality has to do with differential exposure (both in terms of the level and duration of exposure) to the risk of injury in traffic, during leisure time, at work, and in the home and with differential vulnerability towards the injurious effects of these exposures. Measures which, for instance, have to do with children not playing in the street, making medicines and chemicals in the home inaccessible to children, or minimising the use of dangerous work equipment, all reduce exposure. Other measures such as using safety belts or bicycle helmets do not lessen exposure to risk, but lessen vulnerability to some of the injurious effects. Yet other measures, such as reducing the speed of traffic, operate through both mechanisms.\textsuperscript{235} Not much Danish research exists to illuminate which exposures and injury mechanisms are particularly relevant to the understanding of injury inequality in Denmark. Existing international research illustrates that there are vast differences from country to country. This is probably because injuries are fairly sensitive to preventive interventions, and because the countries make very different prioritisations in this area.\textsuperscript{236} England, for instance, has very low traffic mortality, while Sweden has very low injury mortality for children and hence also small absolute inequalities.

When risk of child injury is sorted according to which products are implicated a pattern appears which illustrates that this social inequality can arise due to both greater exposure and greater vulnerability because low income families have fewer resources for investment in safety, protection and surveillance (Table 4.7.2)

<table>
<thead>
<tr>
<th>Highest Parental Income</th>
<th>Poisoning by medicines or chemicals</th>
<th>Burn on stove hot plate</th>
<th>Scalding by hot water, tea, coffee</th>
<th>Fall from playground apparatus</th>
<th>Fall from bunk bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100,000 DKK</td>
<td>1.9</td>
<td>2.4</td>
<td>2.4</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>100-199,000 DKK</td>
<td>1.4</td>
<td>1.8</td>
<td>1.4</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>200-299,000 DKK</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.2</td>
<td>0.7</td>
</tr>
<tr>
<td>&gt; 299,000 DKK</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.2</td>
<td>1 (ref)</td>
</tr>
</tbody>
</table>

If traffic accidents are categorised according to type of road user, it can be seen that 58% of those that die in traffic are either drivers of, or passengers in, cars.\textsuperscript{77} Of hospital admissions, car drivers comprise 35%, bicyclists 34% and motorcyclists including mopeds 21%. When calculating the risk according to the number of driven kilometres, motorbikes and mopeds emerge as the clearly most dangerous modes of transportation. As previously mentioned, the greatest social inequality is among young men for whom both traffic injuries, fall injuries and occupational injuries are very socially skewed. In contrast, bicycle accidents in Denmark are more common among people with longer educations, just as they are in Sweden.

The limited literature on this topic suggests that the most important risk factors for injury inequality are:

\textit{Child accidents:} fall injuries, poisonings, and burns in the home.\textsuperscript{236}

\textit{Traffic accidents:} high speed, driving under the influence of alcohol, deficient orientation and attentiveness, inadequate driving skills among young drivers, inadequate protection (seat belts, etc).\textsuperscript{237}

\textit{Fall accidents among the elderly:} socially skewed diseases and symptoms such as dementia, depression, hypertension, sight disturbances, muscle weakness, and fatigue as well as disparities in medical regulation of these conditions.\textsuperscript{238}

\textbf{4.7.3 Effective measures}

\textit{Air pollution}

In recent years there has been ever tighter regulation of particle emissions in Denmark and in Europe in general, which has had a huge effect on the reduction of air pollution. Since the health consequences of air pollution are socially skewed, a further reduction of particle pollution, especially, will have a positive effect on the health of the socially disadvantaged. As regards differential vulnerability, effective preventive efforts will most likely focus on minimising vulnerability factors. In the case of air pollution, we have, in section 4.7.1, described how chronic diseases like COLD and cardiovascular disease in particular cause increased vulnerability in people of low social standing. As such, effective interventions will be directed towards smoking, as this is the main risk factor for COLD and also a significant risk factor for cardiovascular disease. (See Measure #7.1)

\textit{Injuries}

Injuries are very much preventable, and several countries such as the UK, the Netherlands and Sweden have noticeably lower injury mortality among children and lower overall traffic mortality than in Denmark. A comprehensive review of the socioeconomic differences in injuries and potential counter measures shows that it is unclear whether different types of intervention have differential effects in different socioeconomic groups. Efforts against inequality in child injuries occurring in the home partly have to do with reducing childhood poverty (see section 4.4.3), because childhood poverty entails a lack of resources for simple protective measures such as buying bicycle helmets. In addition, the lack of resources inherent to poverty makes appropriate supervision and good caretaking of children difficult.\textsuperscript{236} Other efforts include legislation on improving passive security for children (such as ensuring safe play apparatus and building design) that must be expected to have a
positive effect on inequality. Similarly, attractive playgrounds and green areas will contribute to keeping children away from traffic. Furthermore, health nurses can, during their home visits, focus attention on making sure medicine and chemicals are inaccessible to children. (See Measure #7.3)

The WHO, in 2004, published their “World Report on Road Traffic Injury Prevention”\textsuperscript{239} which among other things deals with numerous traffic safety measures, many of which are already implemented in Denmark. Recent reviews from Sweden\textsuperscript{237} have extracted those measures which show good evidence of already having reduced traffic injuries, and thereby often inequalities too. In particular, the following measures are emphasised: unmanned speed radars, high speeding fines, more 30km/hour stretches in towns, traffic separation in residential areas, alcolocks, surveillance and higher fines for non-use of seat belts, and legislation about bicycle helmets. It must be assumed that just as in other areas, campaigns have the best effect on people with higher levels of education. Campaigns or measures directly targeted at at-risk groups, e.g. pedagogical efforts such as “Sikker Trafik Live” (Safe Traffic Live)\textsuperscript{d}, where traffic victims visit schools, including production and vocational schools, and enter into dialogue with the young people, must be assumed to have an effect on inequality. However, there is no documented scientific evidence for this.

From the traffic safety sector there is a clearly proclaimed need for promotion of local traffic safety measures, including the establishment of road safety committees and local traffic safety action plans.

The prevention of fall injuries among the elderly primarily has to do with interventions that can prevent muscle weakness and improve neuromuscular responsiveness and prevent osteoporosis, i.e. to a great extent measures to improve physical activity and make the local environment feel safe for the elderly (see also 4.10). Inequality in the treatment of various diseases important to fall injuries will be covered in section 4.11. (See Measure #7.4)

Existing knowledge thus suggests that the following measures will be effective with regard to health inequality:

\begin{itemize}
\item \textbf{#7.1} Reducing particle pollution, e.g. by demanding effective particle filters for diesel vehicles as well as nitrogen reducing catalysers. Working on solutions for the particle pollution stemming from wood burning ovens.
\item \textbf{#7.2} Establishing effective speed and alcohol control as well as use of safety belts. Development of local traffic safety action plans focusing on socially disadvantaged residential areas.
\item \textbf{#7.3} Preventing inequality in home accidents among children by improved legislation and control of dangerous play apparatus and proactive outreach enterprise during home visits by health nurses.
\item \textbf{#7.4} Ensuring the possibility of physical activity for the middle aged and elderly, including activity programs and offers of physical training such as exercise on prescription. Further, creating the possibility of physical activity in local communities.
\end{itemize}

\textsuperscript{d} http://www.sikkertrafik.dk/BogU/Live/Besoeg_folkeskolen/Hvem_er_vi
4.8 Work environment – ergonomic and psychosocial

In a historical perspective, one of the reasons for social inequality in health not being greater than is currently the case pertains to the effective reduction of occupational exposure to many physical and chemical risk factors in the work environment. Over the last 25 years, however, the development has not been unequivocally positive. Certain occupational diseases such as brain injury, skin diseases, hearing impairment and lung diseases have been reduced while musculoskeletal disorders (neck, shoulders, back) as well as mental disorders are much more frequently reported. Nor have occupational injuries been markedly reduced, though fatal accidents to some extent have. On the other hand, Denmark still has a level of fatal accidents which exceeds what has been achieved in Sweden. At the same time, there are other factors in the work environment which play a large role for health inequality today.

4.8.1 Health effects of the work environment

There are very large differences in mortality among occupational groups. Statistics Denmark’s analyses of mortality during 1996-2005 show that if the mortality of all economically active men is set to 100, the variation between employees on the lowest and highest occupational status is from 81 to 117, i.e. a factor of 1.4. The variation between individual occupations goes from a level of 55 for university teachers to 184 for sailors, 174 for fishermen, and 169 for people employed in the restaurant business, i.e. a factor of more than 3. There are also very large differences in disease occurrence between job types. This can be seen in Table 4.8.1 with some examples taken from the Occupation and Hospital Register (2000-2005) of the National Research Centre for the Working Environment (NRCWE).

Table 4.8.1 Relative risk of prescription of anti-depressants and for hospital treatment (excl. psychiatric treatment) for four diagnose-related groups. Age standardised index with all labour market active = 100

<table>
<thead>
<tr>
<th></th>
<th>Anti-depressants</th>
<th>Cardiovascular diseases</th>
<th>COLD</th>
<th>Musculoskeletal disorders</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social worker</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>228</td>
<td>103</td>
<td>74</td>
<td>99</td>
<td>74</td>
</tr>
<tr>
<td>Females</td>
<td>120</td>
<td>83</td>
<td>106</td>
<td>95</td>
<td>94</td>
</tr>
<tr>
<td>Home helper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>210</td>
<td>132</td>
<td>168</td>
<td>110</td>
<td>102</td>
</tr>
<tr>
<td>Females</td>
<td>135</td>
<td>146</td>
<td>132</td>
<td>126</td>
<td>107</td>
</tr>
<tr>
<td>Slaughterhouse worker</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>109</td>
<td>116</td>
<td>122</td>
<td>140</td>
<td>150</td>
</tr>
<tr>
<td>Females</td>
<td>84</td>
<td>151</td>
<td>147</td>
<td>144</td>
<td>129</td>
</tr>
<tr>
<td>Carpenter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>78</td>
<td>83</td>
<td>99</td>
<td>130</td>
<td>140</td>
</tr>
<tr>
<td>Females</td>
<td>159</td>
<td>130</td>
<td>116</td>
<td>137</td>
<td>98</td>
</tr>
<tr>
<td>Bus driver</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>121</td>
<td>151</td>
<td>186</td>
<td>123</td>
<td>115</td>
</tr>
<tr>
<td>Females</td>
<td>121</td>
<td>176</td>
<td>212</td>
<td>153</td>
<td>162</td>
</tr>
<tr>
<td>Construction worker</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>113</td>
<td>126</td>
<td>131</td>
<td>119</td>
<td>128</td>
</tr>
<tr>
<td>Females</td>
<td>84</td>
<td>113</td>
<td>163</td>
<td>149</td>
<td>127</td>
</tr>
<tr>
<td>All labour market active</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Females</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>University teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>97</td>
<td>52</td>
<td>55</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>Females</td>
<td>76</td>
<td>52</td>
<td>89</td>
<td>67</td>
<td>84</td>
</tr>
</tbody>
</table>

Source: National Research Centre for the Working Environment, Danish Work Environment Cohort and Department of Public Health,
These few examples illustrate the significant differences in the risk of hospitalisation and treatment of different diagnostic groups between the different types of jobs. The general pattern is that the same occupational group often has increased risk of treatment for several different diseases. This is illustrated by Table 4.8.1 and a more systematic analysis shows that when the disease risks of all industries are compared, there are particularly large differences in the risks of depression, cardiovascular disease and musculoskeletal disorders.\textsuperscript{241,242} The significant disparities in disease risk among the different industries remain after control for inequalities in socioeconomic position. But the variation between industries in terms of hospitalisation, especially for respiratory diseases and injuries, is markedly reduced. It is also clear from the table that the most vulnerable occupations, as regards hospitalisation, are those that require only a short education, while the picture is somewhat different as regards prescription of psychotropic drugs. Here, the risk is particularly big for occupations with large psychological work demands like social work and similar occupations. The numbers can, however, be influenced by the fact that people with short educations generally have a worse chance of being treated for depression (see section 4.11).

The Prevention Fund (Forebyggelsesfonden) has, based on an assessment of the risk of disease, sick days and early retirement, prioritised the following industries especially; all of which are characterised by a number of physical work environment issues: construction work; transportation; industrial work for the production of textiles, paper, furniture, and foodstuffs; slaughterhouse work; cleaning; restaurant work; day care institutions; retirement homes; and home care and hairdressing.

The causes of injuries, heart disease, mental illness and musculoskeletal disorders related to the work environment are well studied, and there are recent Danish and international reviews of the epidemiological evidence. These reviews\textsuperscript{243-245} conclude that moderate epidemiological evidence exists for the influence of high psychological demands, lack of social support at work and iso-strain (i.e. the combination of high demands and low influence and support) as risk factors for cardiovascular disease in men and maybe also partly for women.\textsuperscript{246} Nevertheless, the results are not quite consistent, which could be due to methodological problems, since working conditions are often measured subjectively.\textsuperscript{247} It should be noted that part of the potential effect of the psychosocial work environment is explained by the effect operating through health behaviour, for instance alcohol intake, smoking, physical inactivity and overweight.

Damaging noise is a further risk factor, but of quantitatively lesser importance, for hypertension, while vibrations can lead to permanent damage to blood flow – the so-called “white fingers”.

A current review\textsuperscript{248} concludes that there is strong evidence for an association between the development of depression on the one hand, and experiencing high demands at work, low personal control, low social support and bullying and interpersonal conflict on the other. The association goes both ways in that when suffering from even mild stages of depression, a person is likely to assess his/her working environment more negatively, even as a negatively assessed working environment increases the risk of depression. The results of epidemiological depression studies are thus highly influenced by the fact that both work environment and depression are often measured at the level of the individual by use of questionnaires.\textsuperscript{249}
Numerous reviews of epidemiological and experimental studies have shown that both ergonomic and psychosocial conditions in the work environment are risk factors for musculoskeletal disorders. For back disorders this specifically has to do with heavy lifts, working positions where the person is frequently bent over forwards or rotating, heavy physical work and whole-body vibrations. For neck-shoulder trouble frequent repetitive movements, lifted arms, use of high force and hand-arm vibrations are important. In addition, psychosocial conditions such as job dissatisfaction, long working hours, emotional demands, low degree of social support and of influence also increase risk. Despite many interventions to improve work environments with regard to these issues, a growing segment of the population is troubled by back pain – this is referred to as the ergonomic paradox. Musculoskeletal disorders also have many causes outside of the work environment, but the consequences of the symptoms for functional and work ability are heavily influenced by the physical and psychosocial work environment.

The risk of serious occupational injury is especially large in agriculture, construction and in the transportation sector, while slaughterhouses have incredibly many but less severe injuries. For women, occupational injuries are high within the health and social sectors. There is a large selective shortfall of occupational injuries reported to the Danish Working Environment Authority, while emergency room statistics are more representative. From this source, Table 4.8.2 below illustrates the number of emergency room visits for occupational injury in the year 2006 by educational level.

Table 4.8.2 Number of emergency room visits and hospital admissions for occupational injuries per 1000 inhabitants by age, sex and education

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20-39 years</td>
<td>40-59 years</td>
<td>20-39 years</td>
<td>40-59 years</td>
</tr>
<tr>
<td>Short</td>
<td>77</td>
<td>37</td>
<td>27</td>
<td>14</td>
</tr>
<tr>
<td>Medium</td>
<td>49</td>
<td>31</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Long</td>
<td>12</td>
<td>10</td>
<td>11</td>
<td>7</td>
</tr>
</tbody>
</table>

*Source: The Injury Register, National Institute of Public Health*

The table shows the distinct social inequality in occupational injuries which is especially pronounced in young men but also exists in young women. As we shall see later (Table 4.11.3), the risk of leaving the job market after injury (occupational injuries as well as other injuries) is 4-6 times higher in people with a short education. Injury inequality is thus very prominent, both in terms of sustaining the injury in the first place but also in the social consequences of the injury.

The distribution of important ergonomic and psychosocial exposures according to the social group of the employees is shown in Table 4.8.3.
Table 4.8.3 Physical and psychosocial work environment 2005. Percentage experiencing selected work environment conditions

<table>
<thead>
<tr>
<th></th>
<th>Unskilled workers</th>
<th>Skilled workers</th>
<th>Functionaries</th>
<th>Leading functionaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy lifts</td>
<td>22</td>
<td>28</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Sharply bent back</td>
<td>26</td>
<td>43</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Push and pull movements</td>
<td>39</td>
<td>25</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Monotonous repetitive movements</td>
<td>21</td>
<td>10</td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>Influence</td>
<td>38</td>
<td>50</td>
<td>53</td>
<td>72</td>
</tr>
<tr>
<td>High skill discretion</td>
<td>59</td>
<td>73</td>
<td>75</td>
<td>83</td>
</tr>
<tr>
<td>Frequent fast work</td>
<td>53</td>
<td>58</td>
<td>59</td>
<td>57</td>
</tr>
<tr>
<td>Emotional demands</td>
<td>17</td>
<td>23</td>
<td>36</td>
<td>38</td>
</tr>
</tbody>
</table>

Source: National Research Centre for the Working Environment, Danish Work Environment Cohort

In the table a very clear gradient after educational level is seen for heavy lifts, vibrations, repetitive movements, and bent or twisted working positions. In the same way for some of the psychosocial dimensions, namely influence and possibilities for development, there is a strong gradient benefiting those with longer educations. On other psychosocial dimensions, such as social support, there is no major difference, while qualitative, cognitive and emotional demands are distinctly more common among the well-educated. Employment uncertainty and anxiety about being fired etc. is also more common among those with low levels of education. Quantitative demands may have to do with a high speed of work (intensive demands) or a long working day (extensive demands). It seems the former is more prevalent among those with short education, while the latter is more common for those with long education.253

Altogether, this means that the work environment of people with a short education is characterised by a range of physical and ergonomic conditions which cause injury and musculoskeletal problems, and by a psychological work environment characterised by low influence, few development possibilities and fewer cognitive and emotional demands.

Exposures related to the work environment, which from an inequality perspective ought to be prioritised in the choice of interventions, are those that explain the largest proportion of the inequality. Which exact exposures should be prioritised depends on how socially skewed they are, and how large an aetiological fraction they make up of the total disease burden. The next step has to do with how many people are exposed, and how large the health effect is. Calculations regarding registered sickness absence (sickness absence lasting over three weeks)254 show that physically strenuous work (lifting, pushing, and strenuous working positions) make up a large part of the total sickness absence (20-30%), while low influence, emotional demands, and lack of predictability make up somewhat less (10-20%). In combination with the fact that ergonomic conditions are particularly socially skewed, this shows that there should be a continued focus on physical work environment (ergonomics and injuries) in the efforts to reduce social inequality in occupational health.

In comparison to disease burden inequality, a very central feature of both psychological and ergonomic work environment conditions is that they do not just influence the risk of illness but also
have a large influence on the ability to work, when a person has already fallen ill, regardless of the cause of illness. This is illustrated by the fact that the same physical and psychological work environment conditions are of great importance both for the incidence of sickness absence and for the possibility of returning to work after, or with, illness.248,250 See also 4.12.

4.8.2 Causes of the development in work environment

Globalisation, technical development and intensive efforts regarding work environments are all of importance to how the work environment appears and develops in the Danish job market. The Danish Working Environment Authority 255 highlights some important societal changes that affect the development in work environments:

- An aging population and staff shortage in the care sector mean increased physical and psychological demands in the health- and social care sectors. This sector is also, to an increasing degree, subjected to large administrative changes with implications for the psychological work environment, job insecurity, etc.

- The service sector is characterised by quantitative and emotional demands as well as certain ergonomic stresses, and as this sector is growing, more people are becoming exposed.

- Outsourcing to other countries entails that repetitive industrial jobs become fewer and fewer and thereby some of the problems regarding repetitive work movements and low influence disappear. The development in terms of work speed and more routine work in the care sector may, however, pull in the opposite direction.

- Developments in the industrial sector presumably also entail a continued reduction in exposure to risk of injury, but developments in agriculture, construction and transportation play a bigger role.

- A specific occupational health problem is job insecurity (see also 4.5).

- Regulation of work environments has for a long time encountered the problem that current ergonomic and psychosocial conditions in the work environment are not specific to a given technology or process but are thoroughly integrated in the work assignments themselves. At the same time, it is difficult to set clear norms and limit values and thereby regulatory measures have been less effective.

- From an inequality perspective, there seems to be a decline in psychosocial problems that are especially common among people with a short education, such as low influence and small possibilities for development; at the same time many psychological demands are increasing, also among those with a low level of education.

- With regard to ergonomic demands, development has meant a reduction in repetitive movements while other physically demanding work functions such as heavy lifts will continue to present a substantial problem, especially among those with short educations.

Productivity development relies, to an increasing extent, on the responsibility, creativity, social competencies, motivation, and commitment of employees. From having been leadership styles mainly applicable to people with long educations, this has now become applicable to those with
short education too, and thus to a much larger part of the workforce.\textsuperscript{256} It also means that a good work environment and a strong competitive are becoming one another’s mutual preconditions and not one another’s opposites. At the same time, there is a threshold where work characterised by development, high demands and few limits becomes a burden rather than a stimuli.

\textbf{4.8.3 Effective measures}

Work environments naturally comprise a wide range of chemical and physical exposures but have today, thanks to effective preventive efforts and other things, a much reduced quantitative importance, also for health inequality. It is therefore well-founded that the Danish Working Environment Authority in its report \textit{Future Work Environment 2020}\textsuperscript{255} prioritises three work environment issues in the coming years:

- Psychological work environment
- Ergonomic influences
- Occupational injuries

This prioritisation has not been made with a view to reducing social inequalities in health, but there are epidemiological reasons for this prioritisation, also in relation to health inequality, because mental disorders, musculoskeletal pains and heart disease quantitatively play a big role in disease burden inequality (see Table 3.5).

Occupational health policy initiatives normally fix exposure limits and implement measures, using the different mechanisms available to work environment regulation, when sufficient epidemiological evidence about the effect of a given exposure on disease and about the dose-response relationship is established. In the ergonomic and psychosocial areas, it becomes more complicated. Partly, there is uncertainty in some fields about the epidemiology, but primarily there is a much larger uncertainty about the effects and implementation of the different mechanisms.\textsuperscript{256,257} This means that there is a greater need for experimental randomised trials to test specific interventions and associated measures. The two recent reviews of the NRCWE scrutinizing the evidence about different types of interventions targeting musculoskeletal problems and mental health, they use this experimental evidence as foundation for the recommendations for future measures.

As regards ergonomic work environment conditions, the NRCWE recommends that prevention of sickness absence requires

- the securing of work places where employees are satisfied with the layout of the workplace rather than specific ergonomic interventions;
- that patients with musculoskeletal problems stay physically active. To be even part-time employed is better than being inactive. That the work place and working conditions be adapted to having people with musculoskeletal disorders continue working to the highest extent possible, even though it may not be 100% (see section 4.12).

As regards mental health, the NRCWE recommends

- ensuring expansion of employees’ control over their own work and the improvement of social support, but without this simultaneously leading to higher work demands;
that stress management be established in work places (using cognitive methods) to improve mental wellbeing. The effect is best, however, in those who are well in control of their work situation.

Other than this last example, which indicates a differential effect across social groups, very little is known about differential effects and differential implementation. As a principle, it must be assumed that the intervention has the same effect across groups. For this reason, it is necessary to focus on implementing the measures in workplaces that have many employees with low levels of education. (See Measures #8.1 and #8.2)

Even with this knowledge about the effects of the interventions, the problem of implementation remains. One of the reasons effective measures are difficult to implement, is that psychosocial work environment is increasingly determined by specific work assignments and employee motivation. If a good work environment and a competitive profile are one another’s mutual preconditions more than opposites, then it is a strong driving force in the efforts to improve work environments, but at the same time it requires that these efforts be integrated in the leadership of the enterprise in question and that they do not remain as a “side car” to the core services. This is also one of the intentions behind the new Law on the Working Environment 2010.

Occupational health regulation, like all structural prevention, utilises legal, economic, and norm-generating mechanisms where the two former partly operate through the latter. But in addition, the new occupational health challenges require, as stated by the Danish Confederation of Trade Unions (LO).

“Regulation needs to be changed from focusing purely on the elimination of risk factors, which must be avoided in order to achieve a safe and healthy working life, to also focus on how to create the conditions for a work environment wherein employees thrive... Legislation should be supplemented with softer forms of regulation that focus on creating positive incentives for behaviour change in the occupational health work of enterprises”

The Danish Working Environment Authority, in its report “Future Work Environment 2020”, has discussed the development and use of a wide range of measures. As with many other determinants in this report, there is large uncertainty about the effect of many of these measures as regards the prioritised areas: psychological and ergonomic work environment, and in particular there is large uncertainty about whether there are differential effects, and how large may be the problems of implementation.

Workplace assessments have been shown to be an effective tool which needs to be adapted to the specific challenges that a focus on psychological work environment, musculoskeletal stressors and injury risk presents. (See Measure #8.3)

Integration of measures for improved work environment and health behaviour are central to reducing health inequality for two reasons. Firstly, the increasing accumulation of both types of risk factor among those with short education increase the risk of interaction (differential vulnerability), and secondly, the differential effectiveness of interventions against occupational risk factors will presumably benefit from such integration. (See Measure #8.4)
Existing knowledge thus suggests that the following measures will be effective with regard to health inequality:

#8.1 Designing workplaces in a manner to ensure employees’ well-being and satisfaction and including specific ergonomic improvements

#8.2 Ensuring guidance for patients with musculoskeletal disorders and providing possibilities for their staying physically active, which makes their chances of managing a job better than inactivity at home

#8.3 Workplace assessments in small enterprises and in industries with low educational demands

#8.4 Integration of measures for improved work environment and improved health behaviour, the implementation of which especially targets groups with the highest work demands and the worst health behaviour
4.9 Health behaviour
Many of the illnesses presented in Table 3.5 are characterised by the fact that the risk of sustaining these illnesses is greater the more one is exposed to an unhealthy diet, smoking, excessive consumption of alcohol and physical inactivity. Inappropriate health behaviour and related biological risk factors such as obesity, high cholesterol, and hypertension are increasingly concentrated among the socially disadvantaged. This means there is differential exposure (see Figure 2.2, arrow II) to the different risk factors, but also a risk of differential vulnerability (arrow III), because the socially disadvantaged are exposed to several interacting behavioural and environmental risk factors for the same illnesses.

4.9.1 Health effects of tobacco, alcohol, unhealthy diet and physical inactivity

**Tobacco smoking**
Tobacco smoking has a wide range of damaging health effects even at low levels. Daily smoking increases the risk of ischaemic heart disease and stroke 2-4 times and the risk of lung cancer and COLD 15-20 times. This excess risk is irrespective of social group. Further, smoking increases the risk of numerous other types of cancer, atherosclerosis of periphery blood vessels, osteoporosis and hip-fractures as well as increased risk of infertility, still birth, low birth weight and sudden infant death syndrome.

There is an interaction between smoking and several other risk factors for cardiovascular disease and cancer which is also socially skewed. This implies that the health impact of smoking is stronger, in absolute terms, among socially less advantaged groups. Since both prevalence and effect of smoking are socially skewed, it becomes of great importance to health inequality in the Danish population. As appears from Table 3.5, many of these tobacco-related illnesses are of particular importance to social disparities in disease burden.

**Alcohol consumption**
The consumption of alcohol also entails the risk of numerous diseases (liver cirrhosis, cancer, breast cancer, gastrointestinal diseases, stroke, alcohol dependency, alcohol psychosis and other damages) alcohol poisoning, traffic injuries and violence. Even small amounts of alcohol entail an increased risk of cancer and liver cirrhosis, especially in women, and the new limit for maximum recommended alcohol intake of seven units a week for women still implies a 10% higher risk of breast cancer. On the other hand, the risk of death from heart disease is 20% smaller for a weekly alcohol intake of seven units for women and fourteen units for men compared to teetotalism. At the higher risk threshold of 14 units per week for women and 21 for men, overall mortality is elevated in both women and men. In addition to this, alcohol is an important risk factor for depression, and all of the effects of alcohol abuse on spouses and children must also be taken into account.

With regard to social inequality, there is a seemingly paradoxical pattern where the overall consumption of alcohol in Denmark is equally distributed, or rather somewhat higher among those with a high level of education, while several of the mental and somatic health effects are socially skewed in the opposite direction. A part of the explanation is differences in drinking patterns: the well-educated drink more often, and in moderate amounts, while those with shorter education drink
relatively more when they drink (binge-drinking). Detailed studies from both Finland and Sweden have shown, however, that the effect of alcohol consumption on hospital admissions and mortality for alcohol-related illnesses is stronger on people with a low level of education (see Figure 4.9.1).

Figure 4.9.1 Excess mortality (hazard ratio) due to alcohol consumption (grams per year) of manual and non-manual workers

Exactly which circumstances create this differential vulnerability to alcohol is only partly known. Social conditions during childhood, working conditions and income later in life all seem to play a role. Differential vulnerability, which is relevant both for alcohol and as mentioned above in relation to tobacco, has been found for physical inactivity, stress, overweight and many other risk factors.

Physical inactivity

There is evidence of physical inactivity being a risk factor for cardiovascular disease, obesity and type-2 diabetes, while physical activity has been proven to reduce the risk of several types of cancer: colon cancer, breast cancer, cervical cancer, and also impact the progression of especially breast cancer. Physical activity reduces the risk of back pain and arthrosis, while physical inactivity increases the risk of fall injuries due to weakened neuromuscular response and osteoporosis. A growing number of research results indicate that physical activity may prevent and shorten periods of depression. As described in section 4.10, physical activity can also partly hold back the fall in physical and cognitive function experienced by many older people. With regard to the amount of physical activity, it seems there are positive health effects of 2-4 hours of weekly exercise whereas the health benefits do not increase with additional physical activity. On the other hand, new research indicates that sedentary activities (such as watching television, sitting at a desk, or playing computer) increase the risk of heart disease through a separate mechanism. With regard to social inequality, the picture is complicated by the fact that people with a low level of education often have physically demanding jobs, while they are less physically active in their spare time. However, it
is still unclear whether there is a paradox such that physical activity at work increases the risk, while physical activity during leisure time reduces the risk of several diseases.\textsuperscript{274}

**The composition and quantity of the diet**

It is especially the dietary contents of fat, fruit and vegetables, sugar (in beverage form), and salt that have been in focus in preventive and treatment efforts. Diet affects risk of cardiovascular disease, overweight and diabetes as well as several cancers: oral, throat, oesophageal, stomach, colon and rectal as well as breast cancer. In comparison to the effects of tobacco and alcohol on specific diseases, dietary effects are weaker – often with a relative risk of 1.1. The issue of differential vulnerability is thereby less relevant for dietary habits. The current dietary recommendations are: fruit and vegetables (>600g/day), more fish (>2-300g/week), less saturated fat particularly from dairy products and meat (<10% of energy intake), less sugar (<10% of energy intake) especially in the form of beverages, and less salt (<6g/day sodium). Data from many studies suggest that people with a low level of education and income eat in a way that is further from the dietary recommendations than that of people with high levels of education.

**Obesity**

The energy surplus of a positive energy balance is created by external conditions through increased energy intake and reduced energy expenditure. The sequence has not been scientifically ascertained – whether the process begins with an increased intake of energy, increasing weight and thereby an ensuing fall in physical activity and energy expenditure, or whether there is a biologically driven increased accumulation of energy in the fatty tissue.\textsuperscript{275} We live in a very obesogenic environment with easy access to abundant, tasty, sweet and fatty food as well as calorie-dense beverages. This occurs in combination with a society where the majority of people easily make do with very limited physical activity at work, at home and during transit. We are not genetically configured to cope with all these temptations. The model in Figure 2.1 has been used in research on disparities in obesity,\textsuperscript{276} and the social differences in physical activity and the consumption of energy rich food presumably explains a great deal of this inequality, not least because they often occur together and may thereby increase one another’s respective effects. This does not prevent other factors from playing a role, for instance psychosocial stress mechanisms. In addition, there is the stress that may be triggered by the response of the environment to a person’s obesity.

**4.9.2 Causes of health behaviour**

Several of the mentioned patterns of behaviour are very socially skewed (see Table 4.9.1) and have become so to an increasing extent. For instance, the proportion of the population who are everyday smokers has been reduced, but concurrently, smoking inequality has increased significantly over the last 20 years or more. When inequality measured as the slope index of inequality (SII) is of the same order as the population prevalence it means that the inequality is very pronounced. For smoking in 2010, the SII was 27.7% while 20.9% of the population were smokers. This means that smoking is about three times as common among people with the lowest versus the highest level of education. On the other hand, alcohol consumption exhibits a small, albeit falling, excess consumption among more well-educated groups. For obesity (BMI $\geq$30), both prevalence of and inequality is rising, while the changes in the pattern of physical inactivity are less clear-cut. The national health profile 2010 defined an unhealthy diet as containing too little fruit, vegetables and fish and too much fat, especially saturated fats. Here, too, socioeconomic inequality is very pronounced. Data from the
western suburbs of Copenhagen show that all educational groups changed their diet for the better during the period 1995-2006, but social disparities persisted at the end of the period so that healthier dietary habits were observed among those who had higher levels of education.

Table 4.9.1 Inequality in health behaviour calculated as the difference (in percentage points) between highest and lowest level of education*, as well as the prevalence (%) of this behaviour in the total population

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Daily smoking</td>
<td>17.9</td>
<td>17.8</td>
<td>27.6</td>
<td>30.7</td>
<td>27.7</td>
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<tr>
<td>Population</td>
<td>44.1</td>
<td>39</td>
<td>34</td>
<td>29.6</td>
<td>20.9</td>
</tr>
<tr>
<td>Alcohol &gt; 14/21 units per week</td>
<td>-</td>
<td>-5.6</td>
<td>-5.7</td>
<td>-3.6</td>
<td>-1.5</td>
</tr>
<tr>
<td>Population</td>
<td>-</td>
<td>10.7</td>
<td>11.7</td>
<td>14.3</td>
<td>10.6</td>
</tr>
<tr>
<td>Obesity (BMI≥30)</td>
<td>10.2</td>
<td>8.6</td>
<td>10.3</td>
<td>14.6</td>
<td>16.9</td>
</tr>
<tr>
<td>Population</td>
<td>5.5</td>
<td>7.6</td>
<td>9.5</td>
<td>11.4</td>
<td>13.4</td>
</tr>
<tr>
<td>Inactive leisure time</td>
<td>12.4</td>
<td>16.4</td>
<td>17.6</td>
<td>18</td>
<td>18.7</td>
</tr>
<tr>
<td>Population</td>
<td>21.2</td>
<td>15.5</td>
<td>16.3</td>
<td>12.9</td>
<td>15.9</td>
</tr>
<tr>
<td>Unhealthy diet</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>Population</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>22.2</td>
</tr>
</tbody>
</table>

* The composition and size of the educational groups changes much over time; therefore the difference between them is calculated as the slope index of inequality which takes these changes into account

# Data from 1987-2005 is based on The National Institute of Public Health's Health and Morbidity Surveys, while data from 2010 is derived from The National Health profile (Sundhedsprofil 2010) which is collected via a different method. Especially the population prevalences are therefore not comparable between 2010 and earlier years

Source: Calculated by the Department of Public Health, University of Copenhagen based on the 1987-2005 Health and Morbidity Surveys and The National Health Profile 2010

The structural determinants of smoking

Unlike many of the other determinants, smoking is not a more or less unintentional side effect of societal development but a form of dependency-generating consumption intentionally introduced and maintained by strong commercial interests. The EU commission in its report ‘Tobacco or Health’ (2004) has, similar to the WHO’s global initiative, highlighted the fact that even though the marketing of tobacco to the public has been restricted somewhat in the rich countries, the tobacco industry has for many years been able to use its economic and political resources to hinder and delay structural preventive efforts, especially at the EU level. This has contributed to pushing back a range of national level interventions due, in part, to large price differentials between countries and subsequent cross-border trade, which limits the usefulness of the otherwise most effective intervention measures against accessibility – excise duties and legislation.

A range of structural and social determinants of smoking are also found at the individual and local levels. The habits of parents and friends, especially, influence whether young people start smoking; industry marketing is targeted especially towards socially disadvantaged youth, and points of tobacco sale are often more accessible in disadvantaged neighbourhoods. People from socially disadvantaged backgrounds start smoking earlier and smoke more and for that reason find it more difficult to stop smoking later on. They have lower self-efficacy, higher level of stress, and work conditions that make smoking an accessible coping mechanism. This means that tobacco is becoming a social stigma in the rich part of the world.
The structural determinants of alcohol

For alcohol the same circumstances as for tobacco are at play as regards the strength of the industry, marketing, accessibility, and the influence of parents, friends and colleagues. It seems, however, that a high level of income is associated with more alcohol consumption whereas the opposite is the case for tobacco. Furthermore, alcohol consumption is a deeply engrained part of Danish culture and social life. In contrast to the tobacco epidemic, which is assumed to have reached its peak in the western world, the alcohol epidemic is not similarly on its way down, which explains the high tolerance towards alcohol consumption. On the other hand, alcohol dependency does not only have more serious health effects for less privileged groups but also more serious social consequences for employment and household economy (see also 4.12). Despite moderate intake of alcohol not conferring the same social stigma as tobacco, the psychosocial consequences of large and longstanding misuse are all the more great.

The structural causes of dietary habits and physical activity

These risk factors also have to do with marketing and accessibility. For instance, it is well documented that advertisements and commercials, especially for sweets targeted at children, and the placement of foodstuffs in supermarkets are of great importance to the level of consumption. Also, the choice of food in cafeterias and the size of plates, bottles and bags have a pronounced effect on dietary habits. Moreover, unhealthy foodstuffs such as energy-dense foods with high contents of sugar, saturated fats and salt are relatively cheap, whereas fish, vegetables and fruit are more expensive and, in some places ( thinly populated areas, poor neighbourhoods), less accessible. Access to healthy food at work is closely connected with the type of industry and occupation and is for instance not easily available for long-distance drivers. Finally, everyday stress and ignorance about how dietary recommendations can be implemented in daily life lead to quick fixes such as fast-food, rather than spending time cooking.

Structural determinants of physical activity mainly have to do with creating urban spaces that make it easier to take the bicycle than the car, and which promote the choice of taking the stairs rather than the escalator. Also, distance to green areas must be short. The widespread use of computer games, internet and television has increased the amount of sedentary leisure time. Another contributing factor is the fact that many work environments are designed so that nearly all activity can be conducted while stationary at the desk and the PC.

Cholesterol

There are no nationwide figures for social disparities in cholesterol levels. Regional data from population surveys have shown a reduction in the proportion of people who have a total cholesterol count higher than 5mmol/L in the period 1978-2006. No association with length of education was found for men, nor for women in the beginning of the period. In later years, however, a distinct disparity emerged for women, with fewer well-educated women (more than four years of further education) having a too-high cholesterol count compared to women without vocational training. The proportion of men with low HDL cholesterol appeared to rise over the period 1978-2006. In 1978, there was no difference between men with and without vocational education, but in the 1980s and 1990s those without vocational training had a higher proportion with low HDL cholesterol – a difference that was equalised in 2006. The proportion of women with low HDL cholesterol remained
constant throughout the period for women with a vocational education, while it increased for women without vocational training. For women there has, as such, been a progression towards increased social inequality.

Blood pressure

There are no national numbers for social disparities in blood pressure either. The same regional data show that, for men in the period 1978-2006, a social differentiation has developed from no disparities in 1978 to a situation in 2006 where over 10 percentage points more men without vocational training had hypertension than did men with vocational education. For women, there is no apparent social inequality in hypertension.\textsuperscript{277}

4.9.3 Effective measures

Measures for healthier behaviour with regard to tobacco, alcohol, physical activity and diet can, as listed in the introduction to Chapter 4, be divided into structural and individual-oriented approaches. From an inequality perspective, this categorisation has special relevance because it also designates with whom responsibility for the effort rests – with the individual, which is the case for the individual-oriented approaches and mass campaigns,\textsuperscript{284} or with the political administrative system, which is the case for structural approaches. In the former, efforts from the individual are required to change health behaviour, while in the latter an active effort on the part of the individual is not necessarily required. While responsibility for an individual’s health behaviour rests with both the individual and with society, responsibility for inequality in health behaviour is to a much greater extent that of society. In Denmark, prevention has for many years been dominated by mass campaigns and the individual-oriented approach. This has given rise to the hypothesis that this strategy is a contributing factor to the increased social inequality in health, since socially privileged people have more resources to effectuate the necessary efforts to changing health behaviour than do people who are more socially disadvantaged. In general, the literature on the subject is sparse with regard to differential vulnerability,\textsuperscript{285,286} differential effect and differential implementation of each type of risk factor and preventive measure.\textsuperscript{122}

Smoking

A ban on tobacco advertisement, smoking bans in work places and higher prices on tobacco have the potential to reduce social inequality in smoking.\textsuperscript{287} Results from Australia,\textsuperscript{288} the US\textsuperscript{289,290} and UK,\textsuperscript{291} but not from South Korea,\textsuperscript{292} show that an increase in duties on tobacco reduces social inequality in smoking. This has to do with the fact that price elasticity is greater among people with low incomes. The inconsistency in results is probably because the smoking epidemic is young in Korea as opposed to in Australia and the UK. When smoking prevalence falls, there are, however, signs of a reduction in the effect of price regulation.\textsuperscript{293,294} This may be because only the very nicotine dependent smokers remain.

Smoking bans in public places have reduced the proportion of people exposed to passive smoking and have potentially also led to a reduction in smoking prevalence.\textsuperscript{295,296} Most studies have shown that smoking bans have reduced the incidence of acute myocardial infarction (AMI)\textsuperscript{297} and one study has furthermore shown a tendency toward a larger reduction in AMI in lower social classes than in higher social classes.\textsuperscript{298} Furthermore, there is evidence that smoking bans in public places result in fewer young people taking up smoking.\textsuperscript{299,300}
Mass campaigns play a part in increasing the social inequality in smoking, which is supported by some but not all observational studies from Denmark (see Table 4.9.1) where the leading strategy for many years has been that of mass campaigns.

The observed increase in social inequality in smoking in Denmark has presumably been carried forward by the individual-oriented approach, the concept of which was that people should themselves contact smoking cessation courses. A proactive individual-oriented approach – as in the Inter99 study in Glostrup – does not seem to create social inequality via a differential effect, since there was a tendency towards the intervention having a greater relative effect among people with short education. On the other hand, there can be a problem with differential implementation because the socially most disadvantaged are less likely to participate in this type of study. It has nonetheless been shown that the socially disadvantaged can be motivated by more proactive and outreach efforts.

Smoking prevention thus seems to be a good example of the fact that an overall prevention strategy is effective if the underpinning strategy is structural in nature and is supplemented with individual-oriented measures and information. Especially for people with low incomes, it is important to combine taxes and duties with other measures. (See Measure #9.1)

Alcohol

While the greater part of the population that smokes, is overweight, physically inactive, or eats an unsuitable diet wishes to change the conditions for the better, this is not seen in people with a level of alcohol consumption above the low-risk threshold, in that only about a fifth of this group wishes to change their behaviour. The proportion wishing to change behaviour among the highly educated is 28%, while the proportion among those without further education is 17%. Since many Danes drink more than the low-risk limit and since there is no great social inequality in consumption, prevention measures should focus on reducing the proportion of people who have risky alcohol intake in such a way as to not create social inequality. Higher alcohol prices are seen as being one of the most effective ways of regulating alcohol consumption, and a study of alcohol advertisements in 20 countries has shown a positive effect of banning advertisements. A reduction in the supply of alcohol in the local environment is similarly effective – this can be at workplaces, schools, clubs, and sports centres, or can be done by reducing the number of sales outlets and the time period in which alcohol can be bought. The Government’s increasing of the age limit for buying alcohol from 15 to 16 years in 2004 had an effect on alcohol sales among young people, but not on alcohol consumption. This contrasts with international findings and may have to do with the fact that adults and parents do not signal that alcohol use among children and adolescents is unacceptable. For these measures, there is no solid data on whether they increase or reduce potential social inequality.

It has been shown that screening followed by brief counselling of citizens drinking more than the high-risk limit, but who have not yet reached dependency, can reduce alcohol consumption. There are no data about effects in relation to whether social inequality is diminished or increased. (See Measure #9.2)
**Diet, physical activity, weight, cholesterol and blood pressure**

Taxation of beverages with added sugars (soft drinks, juice, cordial) has been shown to have a pronounced effect on sales and in a systematic review on price elasticity for the sale of foodstuffs a variation from 0.27 to 0.81 was noted. Take-away food, soft drinks, juice and meat were the foods most sensitive to changes in price (0.7-0.8). However, there are no data about the effect on social inequality, though normally price elasticity will be greater for people with low incomes. The price elasticity for dairy products and other sources of saturated fats is more uncertain. Folic acid fortification in the US has led to a reduction of 67% in the absolute social differences in serum Folate. In countries such as Norway and Sweden that have introduced D-vitamin fortification, there are no data on social differences, but a similar effect to that of folic acid fortification must be expected.

Access plays a critical role. Since many adults and children eat a large part of their food at the workplace and the institution respectively, the supply of food in cafeterias is of great importance. Several studies document the fact that choice, placement and price have a large influence on intake of fruit, vegetables and fats. The literature does not contain information about whether these initiatives lead to less social disparity but since practically all children go to school, they may be assumed to have an effect on social disparities in dietary habits.

The effect of mass campaigns on social inequality in dietary habits is also not known, but since mass campaigns have been the predominant strategy in Denmark to get people to eat more healthily, and since there is growing social inequality in dietary habits, they must be assumed to have a negative effect. There are no results about this, since the large neighbourhood interventions from the 1970s did not register socioeconomic information.

Similarly, there is only poor knowledge about the effect of individual dietary counselling on social inequality. A systematic review concludes that individual counselling does not seem to increase social inequality. In the population-based Inter99 study from Denmark, the conclusion was that an individual-oriented dietary intervention based on tailored information, motivation and support, and a maintenance program reduced social inequality in unhealthy dietary habits over a five year period. In this type of investigation there will be people who do not wish to accept the offer of dietary counselling, and as it is well-established that those who do not participate more often come from lower social classes, the effect at the population level is uncertain. As such, the same issue applies here, that differential implementation is a greater problem than differential effect.

Several studies indicate that changes in the physical environment that invite physical activity result in citizens moving about more. The findings are summarised in a NICE report. The report does not, however, focus on changes in social disparities, but there is no reason to assume any differential effect, and if the physical interventions are made in socially disadvantaged areas they must be assumed to have an effect on inequality. The effect on social inequality of individual counselling is not clear, since only one article on this subject could be identified. That study showed no increase in social inequality in physical activity following an individual-oriented strategy, but the same reservation applies, as applies to the findings about the effect of individual-oriented strategies on dietary habits.
Secondary factors in relation to the balance between diet and physical activity, such as blood pressure, cholesterol count and obesity, have not been clarified with regard to the effect of interventions on social inequality. Several countries, including Denmark, are working to reduce salt content in processed foods so that the salt intake can be reduced and approach the WHO-recommended 5g /day. A reduction in salt intake will lead to a fall in blood pressure. There is no knowledge about social disparities in salt intake, but the social disparity in blood pressure among men could be indicative of increased salt intake, for instance via fast food. There is large inequality in adherence to treatment with statins and antihypertensive treatment, indicative of the fact that the individual-oriented strategy against high cholesterol counts and high blood pressure could increase social inequality if staunch efforts to retain patients in treatment are not made. (See Measure #9.3)

As has been pointed out throughout this report, our knowledge about differential effects is very limited and our knowledge about differential implementation often indicates that individual-oriented measures do not reach those that need them most, while structural measures for the whole population potentially reach everybody. Our knowledge about differential vulnerability, however, indicates that efforts which reduce the level of exposure equally in all groups will have a stronger disease preventive effect in groups with short education due to their concurrent exposure to other interacting risk factors. The suggestions below thus correspond to many of the well-founded recommendations for structural measures suggested by the Prevention Commission for improving overall population health, as we expect them to also have an effect on health inequality.

#9.1 The following measures are expected to have an effect on inequality in tobacco smoking:

- Increasing the duty on tobacco
- Tightening legislation with smoking bans indoors everywhere, except inside private homes
- Enforcement of the sales ban to persons under 18 years of age
- Active outreach counselling and recruitment for smoking cessation courses specifically targeting persons with a low level of education, low income, mental illness and with no labour market affiliation

#9.2 The following measures are expected to have an effect on inequality in alcohol injuries:

- Increasing the duty on alcohol
- Increasing the age limit for sale of alcohol to 18 years and improve the enforcement of age control both for sale and serving of alcohol
- Banning alcohol advertisements in all media
- Restricting sales outlets and selling times
- Limiting the number of alcohol serving licenses, especially in residential areas and near educational institutions
- Tightening the rules about alcohol consumption in schools and other educational institutions
**Active outreach counselling and provision of alcohol treatment for persons with low levels of education, low income, mental illness and with no labour market affiliation**

#9.3 The following measures are expected to have an effect on social inequality in diet, physical activity, high blood pressure and high cholesterol counts:

- Increasing the duty on sugary foods, especially soft drinks, and on saturated fats in dairy products and meat
- Making clear dietary information of the ‘keyhole symbol’-type mandatory
- Reducing the content of salt in ready-made foods
- Physical activity for at least an hour during the school day using a structure that ensures that children have outdoor school yards that invite physical activity during break times
- Physical measures for increased physical activity targeting disadvantaged residential areas and designed to benefit children, the middle-aged and the elderly
- Measures to restrict children’s sedentary leisure-time activities by the television and the computer
- Developing health policies in workplaces and at schools which ensure that the healthy choice is the easy choice, for instance in cafeterias
- Undertaking particular efforts in the primary sector to ensure that treatment for hypertension and high cholesterol is sustained as long as necessary, especially in people with short education and low income
4.10 Early functional decline

Functional ability can be a measure of health in itself but also a determinant of later health. Early functional decline among the middle-aged and the elderly is an area less studied from a health inequality perspective. As a determinant, functional decline is included in this review to generate awareness about its potential importance and to complete the life course perspective described in this report.

With increasing age, the risk of age-dependent illnesses and functional decline leading to need for treatment, rehabilitation, and care also increases. Functional decline is partly a consequence of illness, partly an age-related process, which does not always imply that a disease can be identified as the cause of decline. This increased risk results from an increasing accumulation over the years of the damaging effects of early risk factors as well as the age-dependent deterioration of numerous biological functions that contribute to maintenance and repair. Most of the biological functions of the human body decline after the age of 30 or 40 years by about 0.5-2% annually. It must be assumed that there are large individual variations in the level from which the decline commences, depending on which biological functions are in question. It must also be assumed that there are certain individual variations in how quickly this decline occurs in each individual depending both on genetic variations and on the environmental factors the individual is exposed to.

There are many different indicators of functional decline. Objective indicators employed are e.g. lung function, grip strength, mobility measured as walking speed, tooth loss and measurement of cognitive function (for instance clock drawing test and MMSE⁶). More subjective measures such as fatigue and self-rated age, apparent age as perceived by others, and self-rated disability have also been shown to be of importance. In addition to these, there are molecular measures such as telomere length (an indicator of how many times a cell has divided) which are also associated with mortality, age-related diseases, physical activity and self-rated early aging. A specific expression of fragility in old people is measured as a combination of BMI<18.5, low walking speed and grip strength as well as fatigue and low physical activity.

Even though the literature is not comprehensive on the matter, there is some indication of these indicators being socially skewed. Where socioeconomic position has been shown to have an effect on the functional ability of the elderly, it is, not least in Danish studies, often the current economic assets of the person, rather than education or income that is more strongly associated with functional ability.

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⁶ MMSE = Mini mental state examination
Data from Statistics Denmark show that at the age of 65, Danish men and women have a remaining life expectancy of 16.9 and 19.6 years respectively. In general for the elderly, the same pattern as for the population as a whole is seen: those with a low level of education have shorter remaining life expectancy and the difference between people with a low and high level of education has been increasing over the past 15 years. There is no clear social bias in how much of their remaining lives the 65 year olds live with and without longstanding limiting illness and disability. However, for self-rated health there is a clear gradient (see Figure 4.10.2).

Source: From the examination of 75 year olds in the 1914 Glostrup cohort

4.10.1 The health effects of early functional decline
A range of studies have investigated objective measures of physical functioning such as lung function, grip strength, walking speed, getting up from a chair, and balance time as predictors of later health, functional decline and mortality. There have also been systematic reviews of the evidence of their effect on health. Consistent evidence for an effect on mortality has been found while the evidence for other health-related consequences is weaker. Lung function, however, is related to most of the other measures of functional ability and to most of the health-related consequences. Most studies have shown that poor grip strength and slow walking speed are associated with increased risk of bone fracture and cognitive decline. Subjective measures, such as self-rated fatigue after exercise and activities of daily living respectively, have in Danish and other studies been shown to be associated with subsequent functional decline and death, also after controlling for other risk factors. Fatigue could also predict hospital admission and the need for home help five years later. Permanent fatigue from age 75 to 80 years especially and dramatically increased the risk of functional decline after the age of 80. A few international investigations have shown similar results after a shorter period of follow-up. Several studies have demonstrated that self-rated health among the middle-aged can predict functional decline later in life and mortality, also for those who objectively have good physical and cognitive functioning.

Overall, there is evidence that functional disability among the middle-aged predicts functional ability, need for help, and death when they get older, and that this functional decline is socially skewed. This raises the question of whether efforts to improve functional ability among the socially disadvantaged, when these are in middle-age, will have a preventive effect on functional decline in old age, and whether such efforts might already affect the social inequality in functional ability when this age group is still middle-aged.

4.10.2 Causes of functional decline
It is still unclear why some people age earlier or faster than others but it is probably a mix of genetic factors, lifestyle, environmental factors, living conditions and disease that is at play. Far from all mechanisms are understood. An exception to this is aging in people who are heavy smokers. As tobacco has damaging effects on a range of biological functions which increase the risk of serious illness and subsequent early death, it is likely that these biological functions deteriorate earlier and faster than in other people. For instance there is no doubt about the fact that lung function in smokers deteriorates earlier and faster than in non-smokers.

There seem, moreover, to be signs of the commencement of aging which appear early in the middle-aged of low socioeconomic position and an unhealthy life style. Compared to similarly-aged people with higher socioeconomic positions and healthier lifestyles, these early-aging people have shorter telomeres, poorer lung function, beginning mobility restrictions, and lower grip strength. In addition, they become more quickly tired during exercise, have an appearance that is perceived by others to be older than their actual age, have a self-rated perception of early aging and begin to lose their teeth earlier. Furthermore, they often have signs of metabolic disturbances suggestive of the so-called metabolic syndrome which highly increases the risk of diabetes and cardiovascular diseases. As described in section 4.1, there is evidence of a range of childhood factors influencing health and functional ability later in life. This association also holds for the middle-aged and elderly. Several studies, especially a large British study of the 1946 birth cohort, have shown that low gestational-weight-for-age was associated with grip strength in adulthood regardless of later
increases in weight and height. Good motor development and a high cognitive level during childhood also have a positive influence on physical functioning in 50-year olds. High socioeconomic status during childhood has similarly been found to be associated with good physical functioning in 50-year olds. In another longitudinal study, socioeconomic indicators in childhood were associated with both the level of functional disability and changes herein over time, also when controlled for socioeconomic indicators in adulthood. A Danish study has shown that 50-year old men who had belonged to a low social class both as children and in adulthood had a higher risk of poor self-rated health, functional disability, higher levels of fatigue, and poor dental status. Especially poor dental status was related to childhood social position. Dental status is an important parameter because of its importance for nutrition in the elderly, who generally have a higher risk of nutritional deficiencies and weight loss (for women especially).

The conditions that lead to functional decline accumulate across the life span but can also appear abruptly in the form of sudden illness resulting in disability. As such, successful aging primarily has to do with maintenance and absence of disease. Disease prevention in general is beyond the scope of this report but is an inherent component of all sections in this chapter. This goes for living conditions, lifestyle, and the physical environment.

In relation to functional decline, maintaining physical activity is of overshadowing importance. But maintenance also has to do with the psychosocial and cognitive aspects of life. For instance, a Danish study of older people has shown that single 75-80 year olds with low social participation have a higher loss of mobility three years later than those with high social participation.

4.10.3 Effective measures
A wide range of intervention studies have been conducted, showing that the so-called complex or multi-factorial interventions targeting older adults may contribute to maintaining their functional level for a longer time, thereby delaying functional decline, hospital admissions, dependency on external assistance, placement in retirement homes and the risk of fall injuries. Also, preventive home visits have, in a Danish study, been shown to have a beneficial effect on mobility. The three year intervention study, conducted in 34 municipalities which offered preventive home visits for 75-80 year olds, demonstrated a reduced level of functional restriction among the elderly after three and four-and-a-half years of follow-up respectively, which was independent of the wealth and economic assets of the participants. As such, it is positive that preventive home visits are now upheld by law in all municipalities and there should be room for municipalities to offer more than one visit a year for those older people who might need it. As noted, there are large differences among the elderly as regards functional ability and a differential effect of preventive home visits must be assumed with their having the greatest effect for those people who have the greatest need of support. At the same time, it is clear that older people with fewer resources will have need for support more often than those with many resources to attain the same beneficial effect. The intervention study about preventive home visits further showed that there was a difference in the acceptance of home visits depending on how citizens received the invitation. (See Measure #10.1)

Training intervention studies have also been shown to have a good effect on functional ability. Strengthening of muscle power, walking speed, balance and lung function can improve mobility to a degree high enough to delay functional decline. But none of these seem to have looked at whether the effect of training differs between groups of elderly with different educational or wealth levels.
However, some studies have shown that the effect is largest for those with the lowest level of mobility, wherefore it is to be expected that older adults with a low education or low fortune will benefit the most from such training interventions. A problem here, however, is that these training studies only attract the most motivated and probably best educated. There is therefore a risk of strong differential implementation. (See Measure #7.4)

Especially people with a low level of education who smoke, are physically inactive and overweight are characterized by early signs of aging and functional decline, and they also perceive themselves to be older than peers.\textsuperscript{335,362} A particular high-risk strategy towards these groups may as such be indicated. The structural measures described in section 4.9 for increasing physical activity and reducing smoking are also relevant in this perspective with a look to preventing early functional decline.

In addition to this, opportunistic screening by general practitioners and during preventive home visits for a range of subjective aging indicators may be expected to be a useful tool to catch the early signs of functional decline. It could also be about checking objective conditions such as lung function and physical and cognitive functioning. As a result of these observations and measures of function suggestions about activity programmes, training, exercise on prescription, etc. could be made.

Finally, there is a need for particularly proactive and stimulating measures to motivate and retain older people with various chronic diseases in a rehabilitative process. (See Measure #10.3)

Problems related to dental and nutritional status can partly be countered by expanding dental care plans for the elderly. In the Nordic countries, pilot projects with such plans have been conducted and, e.g., the pilot project in Ballerup, Denmark demonstrated an almost doubling in the use of regular dental services.\textsuperscript{363,364}

With the knowledge that already exists regarding tooth loss and functional decline, and with the positive experiences of subsidized dental services for the elderly in pilot municipalities, a special effort can be made to improve regularity in older people’s use of dental services. Special dental plans for the middle-aged and for older adults with low levels of education and low income should be considered. For this, special invitation procedures and information materials can be developed. (See Measure #10.4)

Existing knowledge thus suggests that the following measures will be effective with regard to health inequality. However, it is central to focus on implementation reaching everyone through proactive and sustained efforts:
#10.1 Preventive home visits available to all older people with differential interventions corresponding to differential needs and with a specific focus on reaching economically less privileged elders

#10.2 Ensuring the possibility of physical activity for the middle-aged and elderly, including activity programmes, training, and exercise on prescription. In addition, there should be possibilities for physical activity at workplaces and in the local environment

#10.3 Visits to the general practitioner used to screen for early functional decline with the purpose of referring those in need to individual-oriented interventions

#10.4 Subsidising dental services for the elderly so that they receive more regular dental care service
III. Determinants affecting consequences of illness

While the determinants covered in sections 4.4-4.10 are circumstances affecting the risk of becoming ill and experiencing functional decline, the following two determinants (4.11-4.12) have to do with circumstances that create social inequality in the consequences of illness including survival, disability and labour market participation. As regards the model in Figure 2.2, we are here dealing with mechanisms IV and V and type D measures.

4.11 Health services utilization

An important factor determining the result of a given referral or treatment, subsequent to contact with the health system, is the interaction between the user and health services. This interaction can be perceived as a negotiation with two important factors at play: on the one hand is the user’s experience from earlier contacts, expectations of help, knowledge about the meaning of symptoms, and knowledge about what the health system has to offer. Here, the user’s education, social status, communication skills etc. play a critical role. So do the social network and support received by patients during illness, after admission etc. A recent review has demonstrated a substantial excess mortality for many diseases for people with a weak social network and few support options during illness. The health system is designed according to the picture of what is an ideal patient, who understands where the right entrances are, how the referral system works, which rights the patient has and which demands the system makes.

The organisation of the health system is thereby decisive for the intake of patients. It is not simply about knowing the right ways in, but also about waiting times, geographic distances, capacity bottlenecks, exclusionary indicators (e.g. rejection of substance abusers), and user payment. A very large proportion of health services (e.g. use of specialists) is generated via referrals within the system and, here, the assessment of the health professional regarding the patient’s problems, prognoses, and compliance plays an important role, as does the assessment of a patient’s coping capacity. Also important is the argumentation of the patient and his/her relatives. The resources of the individual are thus of great importance in meeting with the health system. On the other hand, it is the responsibility of the health system to organise the enterprise in such a way that those who have fewer resources can also find their way, and to provide them with the additional support they need to achieve equitable treatment results.

4.11.1 Inequality in consequences of illness

The following two tables illustrate the fact that not only the risk of illness, but also survival after serious heart disease or cancer differs according to the educational background of the individual.

Table 4.11.1 Admissions (per 100,000) and mortality (%) due to acute myocardial infarction for 35-64 year olds by sex and education. Age standardised. 2004-05.

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Males</th>
<th></th>
<th></th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short</td>
<td>Medium</td>
<td>Long</td>
<td>Short</td>
</tr>
<tr>
<td>Admission due to AMI (per 100,000)</td>
<td>295</td>
<td>233</td>
<td>172</td>
<td>98</td>
</tr>
<tr>
<td>Death same day (%)</td>
<td>9.3</td>
<td>6.8</td>
<td>4.9</td>
<td>10</td>
</tr>
<tr>
<td>Death within 30 days (%)</td>
<td>5.0</td>
<td>3.1</td>
<td>3.1</td>
<td>5.3</td>
</tr>
</tbody>
</table>
Table 4.11.2 Inequality in incidence and 5-year survival of selected cancers for males and females over 30 years of age. Ratio between short education and medium/long education (=1), 1994-2006

<table>
<thead>
<tr>
<th>Cancer</th>
<th>Male incidence</th>
<th>Male 5-yr survival</th>
<th>Female incidence</th>
<th>Female 5-yr survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer</td>
<td>1.53*</td>
<td>0.7*</td>
<td>1.85*</td>
<td>0.9</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>1.37*</td>
<td>1.3</td>
<td>1.23*</td>
<td>1.06</td>
</tr>
<tr>
<td>Colon cancer</td>
<td>0.93</td>
<td>0.91</td>
<td>1.02</td>
<td>0.94</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>-</td>
<td>-</td>
<td>0.8*</td>
<td>0.92*</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>0.81*</td>
<td>0.8*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>All cancers</td>
<td>1.1*</td>
<td>0.77*</td>
<td>1.02</td>
<td>0.81*</td>
</tr>
</tbody>
</table>

Ann. (*) denotes that the inequality between educational groups is statistically significant, p<0.05


Already in Table 3.2 did we see that the occurrence of disease consequences, measured as the permanent reduction of functional ability and restrictions in activity, is more socially skewed than the occurrence of illness. This may be due to the fact that several of those factors, e.g. in the work environment, which affect the risk of becoming ill, also affect the course of illness and the possibility of returning to work.

In Table 4.11.3, the prevalence of economical inactivity (on early retirement, disability pension or social assistance) after hospital admission for a range of disease groups is shown. If the table is read vertically, it is, not unexpectedly, apparent that injury or illness increases the risk of a person being outside the job market. More surprising is how much larger the risk is, if the person has been under treatment for a mental rather than a somatic disease. Reading the table horizontally shows that women have a higher risk than men, but most pronounced are the very large educational differences.

Table 4.11.3 Risk (%) of being out of work* 3 years after admission for injury cancer, cardiovascular disease and mental illness for 25-59 year olds by education. Age standardised. 2006

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Compulsory education</td>
<td>Higher education</td>
</tr>
<tr>
<td>Total population</td>
<td>24.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Admitted, injury</td>
<td>25.9</td>
<td>5.0</td>
</tr>
<tr>
<td>Admitted, cancer</td>
<td>38.9</td>
<td>7.9</td>
</tr>
<tr>
<td>Admitted, cardiovascular disease</td>
<td>45.2</td>
<td>13.1</td>
</tr>
<tr>
<td>Prescribed psychotropic drugs</td>
<td>57.9</td>
<td>14.0</td>
</tr>
<tr>
<td>Admitted, mental illness</td>
<td>70.6</td>
<td>37.6</td>
</tr>
</tbody>
</table>

*includes early retirement, disability pension and welfare recipients
Source: Department of Public Health, University of Copenhagen, based on Statistics Denmark registers

For men with medium to long further education, hospital admission for injuries and cardiovascular disease increases the risk of being outside the workforce by 1.3 and 9.6 percentage points respectively, and by 33.9% upon admission for mental illness. For men with short educations, the
equivalent counts are 1.4 percentage points for injuries and over 20 percentage points for cardiovascular disease. For the mental illnesses, the increase in risk is 45 percentage points. This means that among those who have both been admitted for mental illness and have a low level of education almost three in four are outside the workforce, while for the higher educated the respective proportion is one in three. For the somatic illnesses, too, the educational inequality is large.

The fact that a person with a short education is much more likely to be out of the job market after illness is not necessarily a problematic and unjust inequality. If we perceive ability to work as an interaction between the functional ability of the individual and the demands of the job it can be particularly reasonable and health-wise well-motivated that people in occupations characterised by high physical and psychological demands often leave their jobs when experiencing a loss in functional ability (see also 4.12). On the other hand, these results showing that those who have a low level of education have a risk of being outside the workforce that is higher by 20-45 percentage points raise the question of whether there is inequality in access to and effect of rehabilitation.

The reasons for Denmark’s significant inequalities in consequences of illness such as work cessation and mortality are complex and may in principle have to do with one or more of the following four explanations:

- Inequality in the occurrence of several of the determinants related to work environment, income, longstanding unemployment, and health behaviour which not only affect the risk of becoming ill, but which may also affect the course and consequences of illness (see sections 4.4-4.9)

- Co-morbidity affects the consequences of a given illness and since many illnesses are socially skewed in the population this may also affect survival and functional ability in relation to the individual illness (see Chapter 3)

- Ability to work must be seen in relation to both job demands and functional ability. Since both are socially skewed, the consequences of their interaction in terms of sickness absence and work cessation become very socially biased (see section 4.12)

- The use of health care services including rehabilitation may also play a role. Provision of, access to and use of services may be unequally distributed, indications for treatment and when during the course of illness such treatment is initiated may vary, and in addition, the quality and effectiveness of treatment interventions may differ (see section 4.11).

4.11.2 Inequality in the use of health services

Treatment, rehabilitation and care in the health system greatly influence the consequences of illness for the population. This is for example expressed by the improved survival of persons with ischemic heart disease and the improved functional ability of the elderly in later years. This means that systematic social inequalities in use of health system services have a potentially large influence on inequality in the consequences of illness. Unequal use of preventive services will in the same way affect disease incidence. Chapter 3 describes the large and partly growing social inequalities in morbidity and mortality. When investigating what the population’s use of health system services means in relation to social inequalities, four processes are important:
• It is not all morbidity that represents an actual need for treatment, because there are some disorders for which treatments with the ability to influence quality of life, functioning and survival simply do not exist. But the perception of what works is not a scientific constant – it is always subject to change, new methodology, different professional assessments, etc. Nor is the assessment socially neutral because a patient’s social circumstances may affect the appraisal of whether a given treatment will be beneficial and should be offered to the patient.

• A need has to be translated to demand and in this both knowledge and expectations of the patient play a big role. A very large part of the demand is generated within the health system itself through referrals and such, but also the supply, which affects the expectations and demands of the patient, factors in. These circumstances are socially and geographically skewed and therefore inequalities also arise when need is translated to demand.

• To which degree demand actually leads to use of health services depends among other things on user fees, waiting times, geographical distance, personal resources, socio-cultural factors etc.

• Finally, inequalities can arise in what impact the use of health services has on the course and consequence of illness. Inequalities in quality, compliance, sickness behaviour, and self-care all play a role, as does self-efficacy.

**Ethical principles**

It is a founding principle of the Danish health system that regions and municipalities must fulfil the need for easy and equitable access to the health system, high-quality treatment, coherence, freedom of choice, short waiting times, etc (Sundhedsloven §2; i.e. §2 of Danish Healthcare Legislation).

Every health system must furthermore handle the conflict inherent in the fact that modern medico-technological development has made more interventions possible than resources allow for, if the expenses of the health system as a percentage of GNP are not to increase radically. The way in which this conflict is handled should, from an equity point of view, take the following three ethical principles into consideration:

• That people with equal needs get equal treatment – this is often termed horizontal equality

• That people with the highest need be prioritised before people with lesser needs – corresponding to vertical equality

• That the relationship between the costs and health effects of different measures be taken into consideration in the supply of health services – cost-effectiveness

These three principles can conflict with one another and demand different types of priorities. For instance, this happens by letting the doctor assess each patient’s need of treatment, whereby a professional needs-assessment is made, and those evaluated as having the greatest need of treatment are prioritised. Another way is to instate user payment in order to reduce unnecessary use of health services, or to exclude certain types of services (e.g. cosmetic surgery etc.) from the
publically financed system. It is not easy to prioritise in accordance with all three principles, and at the same time meet the ever increasing demands of users about individualised treatment, freedom of choice, shorter waiting times, and demands about “service for money”. Several of the conditions that create inequality in the use of health services have to do partly with unintentional effects of the prioritisations made to balance the above-mentioned principles and demands.

There is very little Danish research on inequality in access to, and the use and effects of the health services. At the overall level, the OECD and the EU have for many years conducted large international comparative surveys, with the objectives of describing need for and use of various health services, and of assessing whether factors other than need, such as education and income, affect the use of services. The results have for many years been fairly stable regardless of which data material has been used. The latest analysis, based on data from 2004, shows that when the analysis takes need into consideration (via indicators such as age, sex, self-rated health and functional ability), Denmark demonstrates a very limited effect of income on the use of general practitioner. This confirms earlier Danish findings. With regard to the use of specialists with private practice, people with higher incomes have a markedly greater use than the rest of the population. This is a pattern also found in Norway and Sweden but not in the Netherlands or the UK. Inequality in the use of specialist practitioners is most pronounced in Portugal, Finland, Ireland and Italy, where user fees and private insurances have played an important role since 2004. Later studies based on EU surveys have confirmed this pattern and have found that more detailed measurements of need and income entail more pronounced findings of inequality in the use of specialists. The findings are confirmed by data from the Danish Health and Morbidity Surveys (DHMS) (see Table 3.2) and by the analyses conducted by NOMESCO (the Nordic Medico-Statistical Committee) on DHMS data from the year 2000. In these, it is apparent that people with short education (<10 years) have 20-30% lower probability of having visited a doctor (regardless of which type) when taking self-rated health into account, than people with further education (>12 years). Current Danish data further show that even though the use of the services of private practitioners corresponds well to the needs of different income groups, there is markedly lower use among those with extremely low incomes, i.e. people with an annual income of less than 73,000 DKK. A recent Danish study shows that there is no under-utilisation of specialist services among immigrant groups.

In addition to these more general analyses of inequality in the use of health services there are numerous studies illustrating inequality in the use of more specific services. The inequality is especially pronounced in the use of preventive services. For instance, there is pronounced inequality in preventive child examination attendance at the general practitioner. The probability of not having a mammography scan is about 25% higher for an unskilled woman compared to a functionary at a lower or intermediate level, but at the same time it is very high for women in leading positions and among women inactive on the labour market and the self-employed. In this, there is, as such, a more U-shaped correlation when measured against the woman’s own social position. Measured against the husband’s social position, the results for Denmark correspond to what is found internationally: that wives of unskilled workers, those that are out-of-work, and the self-employed have a higher probability of not attending mammography screening regularly. Strong social inequalities have also been found for cervical and colorectal cancer screening. Social inequality in coverage is more pronounced for opportunistic screening than in nationwide programmes.
Section 4.6 described the large excess morbidity among socially marginalised adults in Denmark. In
Figure 4.11.1, the excess frequency in the use of various services is illustrated. A four times as high
frequency of emergency room visits and hospital admissions among marginalised people probably
corresponds to their excess need. Their relatively low use of general practitioner and other out-
patient services reflects a use of health services characterised by the fact that while acute crises
elicit health service contact, long-term treatment and rehabilitation of the many chronic diseases,
which this group suffers from, do not seem to work very well. Figure 4.11.1 also shows that within
the past year, marginalised persons have visited emergency rooms or been admitted to hospital 3-4
times as often as the rest of the population. Here again, the use of services always should be
adjusted for need.

Figure 4.11.1 Excess use (relative risk) of health services among socially marginalised persons who have had at
least one contact with the health services in the previous year

![Excess Use of Health Services](chart.png)

Ann. The excess use is measured against the background population's use of health services, which here is given a reference value of 1.
*Source: National Institute of Public Health - Health and Morbidity Survey for Marginalised People 2007*

For more specific illnesses, there are social inequalities in usage and effect of a wide range of
treatments, such as both invasive treatment and the use of statins and beta-blockers in the
treatment of ischaemic heart disease. This can also be a contributing factor to inequality in
survival (see Table 4.11.1). It has also been shown that participation in a broad rehabilitation
programme after heart infarct is lower among people with low incomes. Similarly, the tendency
towards early interruption of anti-depressive treatment prescribed by the general practitioner is
more common in people with a low level of education.

A large British review concludes that in public tax-financed health systems there is a general
tendency, when controlling for need, to see:

- Specialist services more often being used by people with a high social position
- Preventive services more often being used by people with a high social position
- Acute services (emergency room visits, emergency doctors etc) more often being used by
  people with a low social position
- The services of general practitioners not exhibiting any clear-cut social gradient
4.11.3 Causes of inequality in the use of health services

The causes of inequality in use and quality of health services have to do with several different factors. System characteristics that are of importance to health system inequality are organisational, economic, time-related, geographic and socio-cultural.\[^{15}\]

**Organisation and structure**

An important structural aspect of the health system is how the resources are distributed between the primary and secondary sectors, between prevention, treatment and rehabilitation and between the medical specialties – somatic and psychiatric. From an inequality perspective, as highlighted in this report, there is a special need to focus on the use of preventive services, rehabilitation and the treatment of mental illnesses (see sections 4.1, 4.9, 4.10, and 4.12).

The Danish health care system has a structure whereby private practitioners, private and public hospitals and municipalities are supposed to work together on cases, where patients need longer courses of treatment and rehabilitation. There is a shortage of knowledge about how these processes pan out for different social groups. To the degree that strong negotiation is required by the patient to achieve coherence in long-term courses of treatment and rehabilitation, there is likely to be inequality as to which patients are offered, receive and complete treatment. Especially in light of the fact that there are large inequalities in for instance return-to-work, which is one of the results of rehabilitation, there may be particular cause for investigating and monitoring whether aspects of the collaboration between practitioner and patient are creating inequality.

The focus, in recent years, on waiting time guarantees, free choice of hospital, so-called ‘cancer packages’ (fast track referrals), etc. has contributed to a relatively sizeable expansion of resources to somatic hospital treatment, whereas the same does not hold true for the psychiatric field. It has been shown that especially mental illness is of great importance to social inequality in health and to the fact that so many leave the job market early (see section 4.12). Danish Regions\[^{384}\] has in a review (‘Shared care for non-psychotic illnesses 2009’)\[^{384}\] indicated that of the 20% of the population which during a year has mental but non-psychotic illness, probably half do not receive adequate treatment. Danish Regions also indicates that international experience suggests the need for closer collaboration between the primary sector and psychiatry in order to achieve better treatment for the individual (see also Measure #12.4).

**Market reforms and waiting times**

Already twenty years ago, political demands for increased productivity, freedom of choice and shorter waiting times at the same time, led to a range of market reforms within the publically financed health systems in England and Sweden among others.\[^{385}\] Denmark did not at that time implement equivalent attempts at reform, and several of the initial reforms have later on been modified without this having led to effects on inequality in the system.\[^{386}\] While many countries have tried to increase outsourcing and the share of private delivery in their health services, most countries have been more cautious about increasing the share of private financing. This is due to a fear of undermining the solidarity and willingness to pay in the tax-financed public health systems. With regard to this, Denmark has seen a rise in employer-financed private health insurance since

\[^{15}\] The interest organisation of the five regions in Denmark
2002, when these health insurances were tax-exempted. The number of employer-financed health insurances has increased to cover 37% of the workforce in 2010. In other countries, there has also been an increase in employer-financed, but taxable insurances. These have a more restricted scope, however – in Sweden for instance, only 8% of the workforce are covered. In Denmark, the combination of waiting time guarantees and an expanded freedom of choice of hospital has created the conditions for a significant expansion of private hospital enterprise. It is these two factors that seem to be critical to the reduction in waiting times over the period 2002-07. The private health insurances, on the other hand, do not seem to have had any effect on waiting times so far. Rather, a change in the indications for planned surgery has occurred so that now treatment is initiated earlier on and for new groups.

From an equity perspective it is a key factor that people who now have tax-exempted health insurance are from the groups that have least need of treatment, i.e. young, well-educated, and employed – primarily in the private sector. On the other hand, a growing number of children and people employed in the public sector are also being offered employer-financed insurances, and certain trade unions arrange self-paid insurances to their members. This does not change the fact, however, that those who are outside the workforce, for instance because of failing health, are not covered. Since this is primarily the case for people with a low level of education, there is an in-built inequality in this fact.

From an inequality perspective there has been good reason to focus on health service waiting times. Several studies of waiting times and delayed assessment of cancer patients have been conducted in Århus. The studies show that for socioeconomically less privileged persons, more time passes between initial contact with the general practitioner and the instigation of specific cancer diagnostic investigations. Socioeconomics do not seem to have any significant effect on the time between the patient’s first perception of symptoms and their seeking medical attention. This confirms the earlier finding that, in the referral process between general practitioner and specialist, selection processes occur in which socioeconomic factors play a role for waiting times, etc. One of the decisive factors is presumably the communication between doctor and patient wherein the doctor more easily communicates with highly-educated people rather than people with low levels of education. This is potentially a contributing factor to the results in Table 4.11.2 where the incidence of cancer is a little higher among those with low levels of education, while their survival is significantly lower.

Studies from the European SHARE-project (2004) show that education plays a role for waiting times to health care among the elderly. In southern Europe it is especially the waiting times for specialist consultation which are associated with education, while in Denmark and Sweden it is more the waiting time for elective surgery that is affected by educational level, with those who have longer educations experiencing only a third of the waiting time of those with shorter educations.

As regards the health insurances, the groups who have benefited most from the insurances are not those that already had longer waiting times before the expansion of the insurances. The proportion of the population that has supplementary health insurance is demonstrated in Table 4.11.4.
The percentages in the table are based on whether a person is covered by a supplementary health insurance. This could be due to being a member of Sygeforsikringen Danmark (Health Insurance Denmark)'s group 1 or 2, or as a group 5 member with expanded treatment and operation coverage. It could be due to other supplementary health insurances paying for treatment, admission or operation at private hospitals, or an expanded care and treatment insurance, which, e.g., covers expenses for recreation, alcohol treatment, home care or similar. Finally it could be a coverage that elicits the payment of a fixed sum of money in case of life-threatening illness. It is apparent that there has been a significant increase since 2000 and that there are still twice as many among those with a long education who have insurance as there are among those with a short education.

User payment

The services of the Danish health system are primarily free of charge at the point of use but user payment for medicines, dentists, opticians, physiotherapists, psychologists, etc. comprise about 15% of the total health expenditure according to OECD – a figure which has increased from 11% in 1980. User payment has a large effect on the use of health care services. This is illustrated quite clearly in the Danish context by the use of dental services. Even though oral health has improved for all population groups in later years, the share of older people without a functional natural set of teeth was 33% among the well-educated compared to 79% among people with a short education in 2005. Even so, the proportion who had visited a dentist in the past three months was 48% among the well-educated and 24% among those with short education. The costs to the user of dental services are more or less proportional to income, while the need is more or less inversely proportional to income.

The Danish Economic Council and the Tax Commission have recently discussed user payments for certain health services. In Denmark, user payment is concentrated to dentists, physiotherapists, psychologists and user fees for medicines. Physiotherapy and psychological treatment are often part of rehabilitation for people with long-term sickness absence. But an income restricted to sickness benefit does not afford payment for these services and there is therefore a risk of this group transferring to disability pension instead of being rehabilitated to the job market. In England, user payment is also limited to dentists and medicine while the other Scandinavian countries have spread out user payments onto several health services without their exceeding approximately 15% in total.

Two arguments are put forward for user payments. One is that it can be an important contribution to financing and can relieve the pressure on tax-financing of the public health system. If, for instance, user payment be raised to cover 30% of costs, and the inequality in need corresponds to the current (free) use of general practitioner in different income groups, it would mean that the lowest income quintile would have to pay about 6% of its disposable income for user payments, while people in the highest income quintile would have to pay just about 1% of their income. Such a
shift from proportional income taxation to regressive taxation of illness does not correspond to the principles of equal and easy access to the health system for all. The Welfare Commission argued for creating a ceiling for user payments corresponding to 1% of the income, which would, however, heavily reduce the contribution to health system financing.

The second argument is that user payment makes the user think twice before seeking medical attention and thereby refrain from using services that are not found to be effective. The argument is that this may free up resources for more effective interventions. For this to work, a prerequisite is that the individual has sufficient knowledge to opt out of ineffective interventions, but research has shown that this is not the case. The large so-called RAND-experiment and many natural experiments have shown that user payment to a large extent gets people, especially those with low incomes, to refrain from using relevant health services. The population’s price elasticity to user fees for health services varies a lot in international studies, but is often about -0.2. This means that a 100% increase in price leads to a 20% decrease in use of the service. At the same time, the effect on consumption is often the same regardless of whether services are effective or not and it thereby becomes very uncertain whether the user fees actually sort away the inappropriate usage.

Limiting user payment to certain services (such as is done in Denmark) can have an effect on the use of other services (re-admissions etc.), which are then increased because a person refrains from using prescribed medicines etc. Simple analyses of total medicine consumption in Denmark do not suggest any large effect of user payment on low income groups, but for certain – especially preventive – measures, e.g. use of statins, there does seem to be an effect. Studies of the use of health services among immigrants illustrate that there is a clear under-use of dental services with user payment, which is not found for services without user payment.

**Geography**

It is well known that the supply of health services measured in terms of geographical distance to practitioners, emergency rooms, hospitals and more, is important to the use of health services. This can lead to social inequality with regard to who gets referred to or uses the existing services in the health system. In addition, several geographical areas with low incomes and high morbidity have difficulty recruiting general practitioners.

The pattern of the location of medical specialists in Denmark is geographically skewed. Figures from the National Board of Health indicate that in 2010 there were about 1200 specialist practitioners in Denmark giving a density of specialists of 21.6 per 100,000 inhabitants. The density varies a lot according to region: from 34 per 100,000 in the Capital Region to 13 and 15 per 100,000 in the Regions of Southern Denmark and Northern Jutland respectively. An impressive 30% of all specialists in the country reside in just four municipalities north of Copenhagen – Gentofte, Lyngby-Tårnøby, Rudersdal and Hørsholm as well as in Frederiksbjerg and Østerbro in Copenhagen. This gives a density of specialists of 104 per 100,000 in these areas. The four suburb municipalities are among the richest and healthiest in the country. This distribution can thereby contribute to the social inequity in the use of specialists but probably not account completely for the disparity.
Socio-cultural factors

Part of the explanation behind unequal referral patterns, waiting times and use of specialists etc. may have to do with the social and cultural communication difficulties between highly educated doctors and low educated patients. Furthermore, highly educated patients tend more to demand a second opinion, more advanced diagnostics, etc. With a growing group of immigrants, the cultural meeting with the Danish health system has also drawn attention. In Chapter 3, we noted that non-western immigrants have a somewhat lower mortality than ethnic Danes but at the same time in some respects a larger morbidity. A new review of European studies of immigrants’ use of somatic treatment shows that in several Nordic countries, a tendency exists towards higher use of emergency rooms but also use of general practitioners. At the same time, there is lower usage of preventive screening. These findings are confirmed by recent Danish analyses. A similar review of immigrants’ use of psychiatric treatment provides a rather mottled picture. The tendency is that immigrants’ contact with the psychiatric services does not function as well as for other population groups. Immigrants often use psychiatric emergency rooms, but their usage of outpatient visits, psychotherapy, and psychiatric rehabilitation is much lower. It can thus be concluded that people with a different cultural background seem to have difficulties finding the right entrance to the health system. Along with the problems there may be in communication between patient and doctor, this may be a contributing factor to the lower use of long-term rehabilitative services. But there is no definite knowledge about this.

The analysis of specific problems of inequality in the Danish health system, described above, can be summarised in the following eight points:

1. There is a lack of monitoring of social and ethnic inequalities in the use of health services. This is the case for prevention, treatment and rehabilitation efforts and for the treatment courses that are a mix of municipal and regional measures.

2. A strong, well-developed and easily accessible primary sector seems to be important for easy and equitable access to the health system, but the failure to recruit doctors to low-income areas is problematic.

3. The use of both primary and secondary preventive services is very socially distorted.

4. There is a marked social bias in the use of specialist services, which may partly be due to a very skewed geographic distribution of specialists, but may also reflect the fact that the primary sector does not act strongly enough on the specialised needs of patients with fewer resources.

5. Both from an inequality perspective and from a general effectiveness perspective, much speaks against the expansion of user payments. It is particularly inappropriate to have user payments for psychologists and physiotherapists, which are of particular relevance to the types of illness (mental illnesses and musculoskeletal disorders) which dominate sickness absence and disability pension among disadvantaged citizens.
6. Introduction of employer-financed health insurances has created the preconditions for large inequalities in waiting times for patients with equal needs (horizontal inequality), and a shift in indications, e.g. for elective surgery, which also threatens the principle of vertical equality.

7. Lack of resources in psychiatric services and of an optimal collaboration between regional psychiatry, primary sector, municipal job centres and social psychiatry are problems which are particularly burdensome for less resourceful groups.

8. Long-term patient care for those in need of rehabilitation connected to chronic somatic or mental illness comprises many elements where inequality may very easily develop.

4.11.4 Effective measures against inequality in the health system
Based on the above section, there is basis for highlighting eight corresponding action areas to strengthen the contribution of the health system towards reducing health inequality with the following measures:

#11.1 Targeted monitoring of the need for and use of various health services by socio-demographic groups. Special attention should be given to monitoring of municipal preventive and rehabilitative services

#11.2 Recruitment of doctors to the primary sector in socioeconomically disadvantaged areas

#11.3 Improved integration of the work of practitioners in the local municipal health work

#11.4 Proactive measures to ensure that disadvantaged groups are reached by effective preventive programmes for pregnant women, children and the elderly as well as ensuring detection of early stages of cancer, diabetes, cardiovascular disease and depression

#11.5 From an inequality perspective, user payment should be avoided for services which are of special relevance to mental illness and musculoskeletal disorders

#11.6 A more geographically equal distribution of specialists by better regulation of the right to establishment of specialist practice

#11.7 Prioritisation of the psychiatric services, including psychiatric rehabilitation, and developing a stronger cooperation between psychiatric services, primary sector, and municipal services, which play a large role for the marginalised and for those who, due to mental illness, have reduced work ability

#11.8 Special focus on interventions for disadvantaged groups who are often lost in long-term patient care with rehabilitation. This is especially relevant for the mentally ill
4.12 The exclusionary labour market

Denmark has, similar to the other Scandinavian countries, a very high level of employment among both men and women. Approximately 85% of the 25-54 year age group are employed. Among the older 55-64 year olds, employment is about 60% which is about ten percentage points lower than in Norway and Sweden. On the other hand, Denmark has a considerably higher level of employment for young people under 25 years of age. Data also show that over the past 20 years, Denmark has had 25% of the working age population on different types of income transfer schemes (see Table 4.12.1). Like many other OECD countries, we have over the past several years experienced a gradual increase in the number of people leaving the workforce due to health problems. In Denmark, the number of people on health-related income transfers (disability pension, flex jobs, sickness benefit, rehabilitation, sheltered employment) has increased over the period 2001-09 with 15% to almost 400,000 people. In addition to this, about 410,000 people who are unemployed are on social assistance, under activation or receiving early retirement, which are not actual health-related benefits.

Table 4.12.1 Number of year-round recipients (thousands) of social welfare. 18-66 year olds for 1980-2000, and 18-64 year olds for 2001-2010

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployment benefit</td>
<td>152</td>
<td>211</td>
<td>124</td>
<td>121</td>
<td>134</td>
</tr>
<tr>
<td>Sickness benefit / maternity leave</td>
<td>70</td>
<td>73</td>
<td>89</td>
<td>93</td>
<td>127*</td>
</tr>
<tr>
<td>Social assistance / rehabilitation</td>
<td>107</td>
<td>141</td>
<td>117</td>
<td>117</td>
<td>98</td>
</tr>
<tr>
<td>Activation / supported employment / flexjobs</td>
<td>19</td>
<td>74</td>
<td>105</td>
<td>89</td>
<td>144</td>
</tr>
<tr>
<td>Disability pension</td>
<td>172</td>
<td>245</td>
<td>258</td>
<td>237</td>
<td>244</td>
</tr>
<tr>
<td>Early retirement benefit</td>
<td>54</td>
<td>94</td>
<td>179</td>
<td>179</td>
<td>125</td>
</tr>
<tr>
<td>% of 18-65(66) year olds</td>
<td>18.1</td>
<td>25.1</td>
<td>24.7</td>
<td>25</td>
<td>25.4</td>
</tr>
</tbody>
</table>

* Of these, 59,000 on maternity leave
Source: The Economic Council 2005 and Statistics Denmark

4.12.1 Health and employment

As touched upon in section 4.5, recipients of unemployment benefit comprise a group which for many reasons has several health problems, not least mental health problems. When calculating the prevalence of hospital admissions for various diseases and the prescription of medicines, it can be seen that several of the groups mentioned in Table 4.12.1 have poorer health, not just those who are recipients of health-related benefits. By the help of medical registers it is possible to calculate the risk of being admitted to hospital and of having medicines prescribed for the different groups who are not employed (see Table 4.12.2).
Table 4.12.2 Excess risk (odds ratio) of hospital admissions etc. among 25-64 year olds outside the workforce. Age standardised. Reference=1 for employed persons. 2007

<table>
<thead>
<tr>
<th></th>
<th>Disability pension</th>
<th>Early retirement</th>
<th>Social assistance</th>
<th>Unemployed</th>
<th>Sickness benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitted for cancer</td>
<td>Males 1.7</td>
<td>1.2</td>
<td>1.3</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>Females 1.4</td>
<td>0.9</td>
<td>1</td>
<td>0.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Admitted for</td>
<td>Males 2.1</td>
<td>1.1</td>
<td>1.8</td>
<td>1.2</td>
<td>2.3</td>
</tr>
<tr>
<td>cardiovascular</td>
<td>Females 2</td>
<td>1.1</td>
<td>1.6</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Admitted for mental</td>
<td>Males 28.6</td>
<td>2.2</td>
<td>16.1</td>
<td>3.8</td>
<td>11.3</td>
</tr>
<tr>
<td>illness</td>
<td>Females 19.5</td>
<td>1.9</td>
<td>8.6</td>
<td>2.2</td>
<td>4.8</td>
</tr>
<tr>
<td>Admitted</td>
<td>Males 6.3</td>
<td>1.2</td>
<td>5.5</td>
<td>1.8</td>
<td>4.7</td>
</tr>
<tr>
<td>for psychotropic</td>
<td>Females 4.4</td>
<td>1.1</td>
<td>3.9</td>
<td>1.5</td>
<td>2.4</td>
</tr>
<tr>
<td>drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admitted</td>
<td>Males 1.4</td>
<td>0.9</td>
<td>1.6</td>
<td>1.1</td>
<td>1.6</td>
</tr>
<tr>
<td>for injuries</td>
<td>Females 1.6</td>
<td>0.9</td>
<td>1.7</td>
<td>1.1</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Source: Department of Public Health, University of Copenhagen, based on Statistics Denmark's registers

As expected, it can be seen here that disability pensioners and recipients of sickness benefit have a high excess risk of all diagnoses but particularly psychiatric diagnoses. This is also, and to nearly the same degree, the case for recipients of social assistance, while it is much less for those who are unemployed and on early retirement. It should be noted that twenty years with an effective labour market policy (see section 4.5.3), a longstanding economic boom and numerous political initiatives and policy measures in this area have not been able to limit the rate of increase in, nor even reduce the number of, people outside of the workforce. In relation to labour market research and debate and when seen from a health perspective, health-related issues have not been much taken up. At the same time, health research and debate have similarly not dealt with the reasons behind this development.

4.12.2 Causes of inequality in employment among the sick

That this development is of special interest as regards inequality in the consequences of illness is apparent from Table 4.11.3. The fact that illness leads people to leave the labour market is neither surprising nor in itself problematic. That mental disorders seem to have a much larger effect than somatic disorders is more noteworthy. But just as striking and problematic is the very large difference that education makes. Even bearing in mind that people with short education often have larger physical work demands and a lower ability to comply with these demands at a given level of health, the educational differences in Table 4.11.3 are very large.

Another way of illustrating this is to look at the employed percentage of people with and without illness and short education. In Figure 4.12.1, we have calculated, with data from the Health and Morbidity Surveys, the percentage of people who are employed, according to educational level and the occurrence of longstanding limiting illness. It can be seen that for those with more than twelve years of education, employment among people with longstanding limiting illness is 15 percentage points less than among those without illness, while the corresponding difference among those with a short education is 35 percentage points. A clear trend over time is not seen. It should be noted that in these surveys (based on interviews) the drop-out of those who have mental problems is very large.
Figure 4.12.1 Per cent employed 25-59 year olds by education and existence of longstanding limiting illness (LLI). Age standardised.

Measured in this way, Denmark has managed to retain a relatively high level of employment among people with longstanding illness and short education compared to the UK, which is the other country in Western Europe with a flexible labour market with the option of dismissing people because of poor health. The labour market in the UK was considerably deregulated in the 1980s and 1990s as regards security of employment, salary conditions, etc. One would think that people with reduced working ability and low levels of education would do better when the demands to employers were lowered, but in the UK over this period, employment fell dramatically for the sick and those with low levels of education. Denmark has, just like Norway and Sweden, maintained a relatively high level of employment among the sick and those with short educations and the effect of education is less in the Scandinavian countries than in the UK. Data based on the EU’s SILC studies give a somewhat different pattern with Denmark having a lower employment among the sick and those with short educations than Sweden and Norway do. But here the drop-out rate and thereby the uncertainty is larger. The results underscore what was also suggested in section 4.5, that if the flexibility in the “flexicurity model” is not combined with the two other elements (a high level of income security in case of unemployment and possibilities for re-training and education), then the model is problematic for those who have a reduced state of health.

It may perhaps be seen as paradoxical that a growing proportion of the population receives health-related benefits in a period where mortality in this group has fallen by a third and life expectancy thereby has increased more than three years. Upon closer scrutiny, the development may not be as paradoxical as all that. Mortality is an important indicator of population health but only reflects a limited spectrum of disorders. The recent fall in mortality is to a very large extent the result of better
survival in three diagnosis groups: cardiovascular diseases, injuries, and cancer, while excess morbidity among disability pensioners etc. to a large extent is dominated by other ailments, not least mental illness and musculoskeletal disorders which only marginally affect mortality.

When, instead, we look at how the population perceives its own health and ability to manage activities of daily living, a quite different picture emerges. Table 4.12.3 illustrates that 6.2% of the population in 1987 answered that they had poor or very poor health. In 2005, the proportion was 5.1%. The two last columns, which measure absolute inequality (slope-index of inequality), show that in 1987 there was a difference of 12 percentage points between those with the longest and those with the shortest educations. In 2005, this difference was 15 percentage points, which means that those with the shortest educations had poorer health.

Table 4.12.3 Per cent 25-64 year olds with selected health problems and work environment strains 1987-2005. Prevalence and education-related inequality. Age standardised.

<table>
<thead>
<tr>
<th></th>
<th>Population prevalence</th>
<th>Inequality*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1987</td>
<td>2005</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor self-rated health</td>
<td>6.2</td>
<td>5.1</td>
</tr>
<tr>
<td>Long-term restrictions in activity due to illness</td>
<td>4.6</td>
<td>6.2</td>
</tr>
<tr>
<td>Sleep disorders</td>
<td>10.1</td>
<td>18.3</td>
</tr>
<tr>
<td>Fatigue</td>
<td>10.4</td>
<td>30.0</td>
</tr>
<tr>
<td><strong>Work environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Often heavy lifts</td>
<td>28.7</td>
<td>30.9</td>
</tr>
<tr>
<td>Often bent or twisted working positions</td>
<td>28.7</td>
<td>31.2</td>
</tr>
<tr>
<td>Often cannot finish all work tasks on time</td>
<td>18.8</td>
<td>29.0</td>
</tr>
<tr>
<td>Poor influence over work</td>
<td>13.9</td>
<td>14.4</td>
</tr>
</tbody>
</table>

* The composition and size of the educational groups changes much over time; therefore the difference between them is calculated as the slope index of inequality which takes these changes into account. The number specifies the difference between those with shortest and longest education. A negative number indicates that a larger proportion of those with long education experience the given factor compared to those with low education.

**Source:** Calculation on data from National Institute of Public Health - Health and Morbidity Surveys performed by the Institute of Public Health, University of Copenhagen

The table hereby illustrates three important points. The proportion of the population with poor self-rated health has fallen somewhat while the proportion that experiences being restricted in daily activities at work because of illness has risen by a third and at the same time the inequality has doubled. The proportion that has been bothered by sleep disorders and fatigue has almost tripled and here inequality has also grown. The physical work demands are reported as unchanged while there is a clear rise in the inequality of what proportion performs heavy lifts. The proportion that often cannot finish all work tasks on time is high among those with a high level of education but has risen proportionally in all groups and the inequality is thereby unchanged. For those that report low influence over their work, inequality has reduced. When the proportion that has illness causing restrictions in activity is increasing it may be a result of failing health but also of rising work demands. It may be perceived as difficult to live up to demands and thereby one’s ability to work feels reduced in light of the imbalance between health and demands. In the same way, more people with fatigue and sleep problems may express an increasing imbalance between demands at work and in daily life and the individual’s physical and psychological resources.
The growing pressure on the health-related income transfers has come gradually over several years and it is a development which has attracted great political attention in many countries, partly because it means increased pressure on public budgets and partly because the development over time threatens society’s supply of labour. This is why many countries, including Denmark, have had political debate about how and where the boundaries should be drawn between those that have a sufficiently reduced ability to work to merit being covered by income transfers and those that do not.

From a public health perspective, the development is problematic because it indicates an increasing imbalance between health and demands. From an inequality perspective it is of particular interest that the development towards increasing imbalance illustrated in Table 4.12.3 is particularly pronounced among those who have a low level of education. The development seems to reinforce the “differential consequences of disease” (Figure 2.2), i.e. the phenomenon that disease consequences such as disability and reduced work ability and their potential social and economic consequences particularly affect people with low levels of education (see also Table 4.11.3).

What effect this has on health inequality depends on whether labour market exit and the conditions under which this happens diminish health-related quality of life and functional ability. This may depend on the health problem in question and on the economic conditions of a life outside the workforce. A recent French study of all employees in the national French gas and electricity company (GAZEL-study) is relevant because it very clearly shows that both physical and psychological fatigue, as well as symptoms of depression, was reduced already within the first year after retirement. This improvement was particularly apparent for those suffering from a chronic disease. In relation to this, it is relevant that it is mental illness that dominates the excess morbidity among those who exit the labour market in Denmark. With the knowledge of the effect of economic stress (see section 4.4), it is also clear that to the extent that exiting the job market involves significant economic deprivation it will be bad for health. In this regard, it is relevant that it is especially those people who leave the job market with psychological problems and substance abuse who experience serious socioeconomic consequences after job loss etc.

4.12.3 Effective measures
Making the job market more inclusive of people with poor health and a short education requires improving work environments (see section 4.8) and creating more workplaces with flexible work demands. There is little evidence on effective methods for return to work. Measures should probably focus on education and on preventing and treating those health problems that particularly affect working ability. Multi-pronged interventions are needed in which companies engage in job adaptation, local employment centres undertake social measures, and general practitioners offer health interventions. A better coordination between practitioners, the workplace and potentially the employment centre is needed. Attention should be paid to the importance of continuing with daily activities and early, albeit perhaps gradual, return to work with economic compensation. The treatment of long-term symptoms and disability is best conducted through a multi-pronged approach that, besides medical treatment and work adaptation, includes psychological treatment and rehabilitation, based on targeted use of cognitive behavioural therapy.
Existing knowledge thus suggests that the following measures will be effective with regard to health inequality:

#12.1 Adaption of physical demands to the individual, since physical demands are of particular importance to individuals with functional limitations and poor mental health, especially depression. The psychological work environment is important to retain people with musculoskeletal disorders

#12.2 Expansion of access to different types of jobs with flexible work demands (flex jobs etc), especially for the large group of people with reduced psychological well-being

#12.3 Individual interventions within the framework of active labour market policy focusing on the possibilities for further education, including for those who do not have optimal health status

#12.4 Multi-pronged interventions with companies engaging in job adaptation, job centres delivering social interventions, and health interventions provided by the general practitioner and specialists. Better coordination between practitioners, the workplace and potentially the job centres needs to be established

#12.5 Strengthening of coordinated and composite interventions with the aim of improving prevention and treatment of anxiety and depression to improve the probability of job retention

#12.6 Creating options for physical exercise who are easily accessible, especially with a view to limiting musculoskeletal pain and to improving depression

#12.7 Paying specific attention to the group that does not fulfil medical criteria for disability pension but which at the same time is too psychologically and physically tired to cope with the demands of working life, and ensuring that this group has other options
5. Cross-sectoral cooperation for reduced health inequality

Chapter 1 describes the fundamental challenge that Denmark has a growing social inequality in health that neither an easily accessible health system nor a well-developed welfare state seems to have been adequate solutions for. A socioeconomic inequality lower than that of many other countries and a health system with relatively easy and equitable access has not prevented Denmark from having an inequality in mortality which is at least as large as that of comparable countries. The objective of this report is thus to shed light on what it takes to more effectively convert Denmark’s low socioeconomic inequality to lower health inequality, and what it takes to stop the trend of growing health inequality.

Chapter 4 described a wide range of determinants which in the international literature have been underlined as important factors for social inequality in health. Some of them are about aspects of social policy and the health system which, despite Denmark’s still relatively favourable situation, may be sources of health inequality. But many determinants are connected to sectors quite different from the health sector such as school, labour- and housing markets, the environment, and so on. The review has documented that there are factors which fulfil the criteria put forward in the introduction to Chapter 4: that they have an effect on health, that their occurrence or effect is socially skewed in the Denmark of today, and that they are modifiable by mainstream policies. It is not a list presenting any great surprises. Many determinants have already been taken up by the different policy areas, but for quite different reasons than their health effects. What, then, is it that makes Denmark not able to convert its low socioeconomic inequality to a correspondingly low health inequality? Is it the prioritisations, the evidence and the coordination or implementation and dosage that are the problems? In the following, international experiences regarding the reduction of health inequality and the prioritisation of efforts are described.

5.1 Why is it so difficult? The English experience.

In Chapter 1, it emerged that England is the country that for the longest time and most persistently has had a scientific, political, administrative and professional focus on reducing health inequality. This may be due to awareness of the absence of a universal welfare state which the Scandinavian countries, for a long time, have wagered as being sufficient to solve the problem. In connection with the English post-2010 review, the Danish working group has gone through the possible explanations for the fact that these efforts, which have been particularly intense over the past 15 years, have not by far achieved the expected effects. Certain points are of relevance also to Denmark:

- Even though expert reports have stressed measures against social determinants, policy initiatives have, in practice, targeted individuals and behavioural factors, e.g. via smoking cessation courses.
- While the problem has been discussed in terms of the social gradient in health, initiatives have often been targeted at smaller, socially marginalised groups.
• Initially, universal programmes and services have primarily been utilised by more advantaged groups.

• Though there have been attempts to prioritise preventive and rehabilitative measures, acute curative care is taking up an increasing part of the health budget.

• Far too many initiatives constitute single temporary projects in local deprived areas. Only seldom do they have to do with influencing other central policy areas with health policy potential, i.e., mainstreaming.

• Effective efforts not only require incorporation of many different policy areas but also a common political and administrative target setting, management and coordination.

• Some of the chosen indicators of larger health equality (e.g. reduced inequality in life expectancy) cannot be expected to show evident improvement for many decades. Monitoring determinants and their social distribution is therefore also necessary.

• For most of the proposed, and partly implemented, interventions, evidence of their effect based on randomised intervention studies is lacking.

A range of negative experiences have accumulated, all of which are already recognised in Danish health sector debates. It would have been easier had there been positive experiences to be garnered from the international community in terms of countries that have been successful in reducing health inequality. The positive experiences do exist with regard to developments in mean population health, for instance higher life expectancy, but it is more difficult to point to positive international experiences vis-à-vis reducing inequalities.\(^{17}\)

With the existing knowledge in hand, it is relatively easy to point out that the lagging behind of life expectancy in Denmark can be explained by the lack of implementation of effective structural measures to limit tobacco and alcohol consumption, which other Nordic countries have carried out. But in terms of inequality, the other Nordic countries do not do decidedly better as was clear from Table 1.1. Second to England, Norway has the most coherent action plan against health inequality, but no conclusions can be drawn at this stage due to the short time that has passed since political decisions were made.\(^{400}\)
5.2 Prioritising the determinants

Chapter 4 has not given much sense of which role the various determinants play quantitatively – neither in terms of explaining the existing inequality nor for clarifying the potential of changes in the determinants to influence future health developments and inequalities. The assessment is complicated, partly because the many factors play into the causal process at several different points, partly because they influence the occurrence, distribution and consequences of many different diseases.

The factors form part of an intricate causal network, as described in Chapter 2, influencing one another’s prevalence and effect. The National Institute of Public Health and the National Board of Health have previously in their report about Risk Factors and Public Health calculated the influence of a wide range of risk factors on the disease burden. That calculation pointed to the very dominating role of tobacco smoking for the health of the Danish population. Table 3.5, which shows which illnesses create inequality in the disease burden in Denmark, also suggests the enormous importance of smoking, since COLD, lung cancer, and cardiovascular diseases play such a large role. If attributable fractions were calculated for the impact of various risk factors on the total disease burden, just as in the Risk Factor report but grouped according to educational level, a result would be reached showing that tobacco “explains” about 40% of disease burden inequality. For many of the other determinants described in Chapter 4, this calculation is much more uncertain, but the figure is probably between 5-20% for each of them, such as early child development, alcohol, physical inactivity, obesity, and psychosocial work environment. For some, such as unemployment and air pollution, it is probably less than 5%. Since they influence one another’s occurrence and effect, the sum of these proportions become more than 100%. Even though the uncertainty in these numbers should be stressed, there is probably no doubt that tobacco plays the decisive role for Denmark’s overall high mortality, but is probably also an important part of the explanation behind the higher inequality in mortality in Denmark, as compared, for instance, with Sweden. At the same time as the prevalence of certain important determinants such as smoking is diminished, an accumulation of many interacting risk factors occurs in the less privileged groups, and thereby the vulnerability to – and effect of – each individual risk factor increases. This combination of clustering and interaction could explain some of the rise in inequality.

It is important to remember that the current disease burden inequality reflects historical prevalence and distribution of determinants. Therefore, the challenge for health policy is not just to impact the current but also the future pattern of determinants and thereby reduce future disease burden inequality. In addition, the occurrence and distribution of the determinants change over time. Unemployment and poverty have increased in later years (especially for those with short education), smoking is declining (especially for the well-educated), while physical inactivity and obesity are rising (especially for those with short education), and so on.

To strengthen the implementation of preventive efforts, quantitative epidemiological assessment of the future potential of the determinants would be useful, but such an analysis (Health Inequality Impact Assessment- HIIA) is beyond the scope of this report. The English experience and debate raises the fundamentally important question of whether it is more effective to influence social determinants earlier in the causal chains, such as unemployment and child poverty, compared to
influencing the determinants further downstream in the chain, such as tobacco smoking and hypertension. There is, however, no epidemiological evidence that one should be better than the other. Causal chains can be broken wherever. The prioritisation will be determined by the effectiveness of given measures. This does not preclude measures against several of the determinants that are further downstream in the causal chain from reducing the effect of the determinants further back (see section 4.9).

If the situation required measures against health inequality to be prioritised within one and the same sector budget, it would be critical to prioritise just a few determinants and highly cost effective measures. But this review shows that a very large spectre of policy interventions is relevant and can be achieved without the different policy measures necessarily having to compete for resources. Rather, the case is probably such that health policy would gain stronger legitimacy and be more effective if all relevant policy areas contributed to reducing social inequality in health.
5.3 Measures against health inequality – a life course perspective

In section 1.4, it was highlighted that the understanding of the causes of social inequality requires a life course perspective, where exposures in the early, more vulnerable phases of life may assert an effect much later on, and where a wide range of risk factors throughout life affect one another’s occurrence and effect in complicated causal networks. The paradoxical cross-sectional picture given by the international comparison in Table 1.1 is not satisfactory from an inequality perspective. But it is important to remember that current health inequality is influenced by the circumstances 30-60 years ago when the current adult population were children. The temporal perspective is thus important both for understanding existing health inequality and for prioritising between measures. It is therefore relevant briefly to summarise the measures suggested in sections 4.1-4.12 in a life course perspective.

- **0-8 years:** The foundation of many important functions occurs already during pregnancy. Screening for behavioural, physical and social risk factors by midwives is of great importance to the child’s and the later adult’s health (#1.1). Helping to ensure an infant’s close emotional contact with its parents, already in the early phase of transition between maternity ward and the home, and in the first 18 months in general, can be done by the proactive supportive work carried out by home-visiting health nurses (#1.2). Securing good material and social conditions for the child has to do with minimising childhood poverty and providing services that include optional parent support groups (#1.5). The preventive child health examinations should focus particularly on reaching those children who are behind in their language, emotional and social development (#1.4). Focused efforts in pre-school and the first years of school to achieve reading skills for all children have been shown to be greatly influential on how they cope later in life, in school and on the labour market.

- **9-18 years:** During the school years, the possibility exists of reducing health inequality by focusing on support for disadvantaged and vulnerable children and by creating a school that is actively motivating also for those who are not motivated to school work by their parents. If children can be given a sense of success in reaching the goals they set themselves and in the experience of everyday victories, their self-confidence and self-efficacy can be developed (#2.2). In this way, their motivation to do well up until and including a youth education is encouraged. At the same time, one prevents their getting into unhealthy risk behaviour such as smoking, drinking, taking drugs and physical inactivity. The inclusiveness of youth education programmes for those who have difficulties finding their place as well as easy access to training places are important (#2.3). It is in this age group that dependency-generating contact with tobacco, alcohol and drugs is made, and where the norm-generating structural measures have a particularly large effect (#9.1-#9.2). It is also during the school years that efforts to stimulate physical activity are important (#9.3). Maintaining youth unemployment at a very low level is also important (#5.2).

- **19-44 years:** This is a period of life where much has to be achieved: beginning a career, starting a family, having children and establishing a home. In this age group, the occurrence of fatigue and sleep problems increases. The combination of workplace-, home- and economic demands can generate a high level of stress in all social groups. The increase in
psychiatric symptoms is most pronounced in people with a short education however. Creating a working life with flexible physical and mental demands, well-being, possibilities for development and having an influence on, and support for, how to live up to the demands is important (#5.1). This is an age group for which it makes sense to combine interventions for improved work environment with interventions for better health behaviour (#8.4). It is also in this age group that economic stress can be pronounced and where measures against poverty are important (#4.2). Many in this age group are affected by mental disorders entailing a road back to work that can be long and difficult. Securing effective treatment of mental illness and coordinated efforts on the parts of job centres, employers and practitioners is critical. For people that have experienced severe social consequences of long-term mental handicap or abuse, support for a social life with some kind of employment, and acceptable economy, own housing and treatment of both mental and somatic disorders becomes of great worth to public health (#8.1-4).

- **45-74 years:** In this age group, those that have had heavy physical work start to feel it. The need for a job market with flexible demands increases so that those with reduced work ability can continue in the workforce (#12.2). Physical activity and dietary habits with less fat and salt and more fruit and vegetables become extra important (#9.3). Several risk factors and early signs of disease such as hypertension, serum lipids imbalance, overweight and diabetes and certain types of cancer become more common and it is, as such, important that the general practitioner is aware of this, especially among patients with a low level of education (#11.3). Early signs of aging and functional decline should direct attention to need of and possibilities for physical activity (#10.2).

- **75 year +:** Signs of functional decline are so normal in this age group that preventive home visits should focus on detecting these (#10.3). It is also in this age group that the need for treatment and rehabilitation becomes large and where access to health system services becomes essential (#11.1-7). The ability of the health system to integrate efforts from hospitals, private practitioners and the municipality becomes central, especially for the patients who have difficulty arguing for their needs (#11.8). Extra attention to inequality is required in the long chronic patient plans that include rehabilitation etc.
5.4 Aims and strategies
One of the strategic considerations in prevention, which was also mentioned in the English review, is the choice of a universal population-targeted strategy versus an individual high risk strategy and a strategy directed towards specific target groups such as unskilled workers, residents of socially very disadvantaged areas, and similar groups. How do the proposed measures (Chapter 4) relate to the principle of universalism, and are these the measures and policies that are needed to change the development in the direction of less social inequality?

The choice of measures to tackle inequality in health depends on the aim, target group and strategy. Firstly, there is the distinction between the two broad goals: tackling the gradient or the gap? (See Chapter 2). Secondly, there is the distinction between population strategy, target group-, and individual high risk strategy in prevention efforts.

Table 5.1 Target and strategy for measures against health inequality with examples of combinations

<table>
<thead>
<tr>
<th></th>
<th>Gradient</th>
<th>Gap</th>
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</thead>
<tbody>
<tr>
<td>Population strategy</td>
<td>I: Structural prevention with legal, economic and normative measures</td>
<td>II: Universal social policy with equal access to services &amp; income protection</td>
</tr>
<tr>
<td>Target group strategy</td>
<td>III: Structural prevention in low-income areas</td>
<td>IV: Social measures including special housing and employment interventions for marginalised people</td>
</tr>
<tr>
<td>Individual high risk strategy</td>
<td>V: Screening, counselling, and treatment in the primary sector to citizens of all ages at particular risk</td>
<td>Social and health professional measures for at-risk children &amp; marginalised groups, incl. the mentally ill</td>
</tr>
</tbody>
</table>

I: The usage of certain measures in structural prevention can be seen as a type of universal prevention policy, since it protects against a range of risks and creates the foundations for healthy living for the whole population regardless of individual risk. This goes, e.g., for legislation impacting early child development, health behaviour, work environment, local community and the physical environment.

II: Universal social policies and labour market policies are key influences on the income distribution. They limit unemployment and restrict the size of the group of socially marginalised people.

III: Broad health policy efforts targeted at many of the determinants but localised to one or a few disadvantaged residential areas will hardly shift the gradient in the total population. But a focused effort can have a large local influence and can revitalise inter-sectoral health policy efforts in a situation where extensive implementation of measures may be difficult.

IV: Interventions towards vulnerable groups that are not targeted the individual but are more structural in nature have to do with ensuring better housing possibilities, and employment conditions for the chronically ill.
V: Midwives, health nurses, day care institution staff and teachers, but of course also practitioners of medicine and social work have a specific duty to identify children and adults at particular risk and take the initiative towards providing the at-risk groups the help they need. This requires that the foundations and resources for implementation exist. The obligation to see those who are at particular risk is universal, but measures should only be implemented for those who have a high risk.

VI: The socially marginalised live at-risk lives in terms of exacerbation of illness and social problems. Ensuring that they receive the necessary social, economic, somatic and psychological assistance is a particular challenge. This is especially the case for children growing up under marginalising conditions.
5.5 Implementation
Not only in efforts to reduce health inequality, but in health policy in general, it has long been recognised that health-oriented policies must engage and coordinate between many policy sectors. Unfortunately, it has proven exceptionally difficult to implement this recognition in practice. From this report, as from the CSDH report, it should be clear that cross-sectoral composite efforts are central to stopping the process of increasing health inequality.

A key question is which preconditions need to be in place for such a cross-sectoral coordination to succeed – in the EU put forward as the need for health in all policies (The Treaty of Lisbon, article 168) or more precisely as in the Healthy Cities Network: Health Equity in All Policies.

Both Finland and Norway have, in later years, been pioneering nations in this field, and several reports have tried to assemble the experiences of a range of countries. An approach which has shown good results is to identify policy areas where the respective sectors have similar goals. This report has provided numerous examples of the fact that the goal of reduced health inequality coincides with goals in other policy areas – early child development, more young people finishing a youth education, lower unemployment, and a less exclusionary job market, larger workforce, etc. Clarifying that these measures are valuable both in and of themselves and for reducing health inequality creates a situation where both objectives are strengthened.

However, this requires that common goals be formulated for the future development of the chosen determinants, the measures to be implemented, and who should be responsible for which determinants. In this, the prevention sector suffers from the fact that, outside of the clinical field, there is a lack of systematic categorisation and “dose”-description of relevant interventions. Agreeing on common goals for the different determinants requires, above all, political coordination across authorities and policy areas. Close dialogue about a common cross-sectoral health policy would also be greatly facilitated by clarity as to which measures are relevant and the degree of implementation for different target groups. In Appendix A, each of the twelve determinants is listed, including the policy goal connected to the determinant and proposed measures to achieve that goal. This is followed by a range of suggestions for indicators by which the development and the distribution of the determinant, as well as the implementation of suggested policy measures, can be monitored.
Appendix A

For each of the twelve determinants, a table is presented showing objectives, policy measures and recommended indicators of the development and distribution of the determinant as well as of implementation of policy measures.

<table>
<thead>
<tr>
<th>Determinant 1: Early childhood development</th>
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<tr>
<td>Early childhood development is impacted as early as during foetal life, and parents with low levels of education have greater risk of having children with low birth weight. The cognitive, verbal, social and emotional stimulation of the child has a huge influence on the child’s further development and schooling, and thus affects the child’s social position as an adult. A lack of stimulation in early development can influence the child’s physical and mental health later in life.</td>
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Objectives:
- To reduce social inequality in the early cognitive, verbal, emotional and social development of children
- To reduce social inequality in birth outcomes

Policy measures:
- #1.1 Antenatal care comprising interventions that reach all women early in pregnancy and which can prevent preterm birth, low weight for gestational age, smoking of pregnant women, damaging occupational environment, etc.
- #1.2 Maternity visits by health nurses offered as a universal service to all families. At the same time, extra attention is given to reaching the socially and psychologically disadvantaged families, including families with substance abuse problems
- #1.3 Active outreach measures to ascertain that children with restricted social and cognitive development attend the preventive child health examinations at the general practitioner
- #1.4 Complete coverage and active recruitment of children with special needs through day care institutions and kindergarten class
- #1.5 Elimination of childhood poverty to prevent the long-term irreversible consequences that poverty has for children

Indicators of the determinant:
- Birth weight, gestational age at birth, and infant mortality, by parental education and income
- Per cent of infants breast-feeding at the age of four months
- Result of school readiness test at the age of six and reading skills after first grade, by parental education and income
- Indicators of early childhood development corresponding to the Canadian EDI should be considered for the Danish context

Indicators of implementation:
- Health nurse services, by parental education and income
- Preventive child health examinations, by parental education and income
- Per cent children in day care institutions, by parental education and ethnicity
- The use of day care institutions and pre-schools by children in need
### Determinant 2: Uncompleted schooling

Young people not obtaining at minimum a youth education have difficulties gaining a foothold on the job market and thereby high risk of long periods of unemployment, poverty, and early exit from the labour market. A low level of education is associated with accumulation of risk factors for poor health and high risk of dying at an early age.

#### Objectives:
- To reduce the percentage of young people exiting the educational system without a youth education
- To reduce the effect of parental economic, cultural, and social capital on the chances of their children to obtain a qualifying education

#### Policy measures:
- **#2.1** A proactive effort to ensure that all children acquire basic competencies, including reading, during the introductory period of school attendance
- **#2.2** An actively motivating school, also for the children who are not as well stimulated from home, which mixes socially disadvantaged with advantaged children and gives the children opportunities for experiencing successes in daily life thereby developing their confidence and self-efficacy
- **#2.3** Counselling efforts for socially disadvantaged pupils and those with poor academic skills, which focus on the cohesion between different options and support measures
- **#2.4** Programmes of study that focus on practical learning targeted at young people who cannot complete a normal academic school programme
- **#2.5** Focus on the development of a socially, pedagogically and supportive environment for the individual, especially in technical schools
- **#2.6** Securing access to training places from all vocational schools

#### Indicators of the determinant:
- The absolute effect of parental education on children’s educations
- Percentage with poor performance in national 9th grade examinations, by parental education
- Percentage of young people exiting the educational system before turning 18 years old without a youth education
- Percentage of young people between the ages of 15-17, not in work nor attending a programme of study
- Percentage of young people seeking, but not finding, a training place, by ethnicity

#### Indicators of implementation:
- Social segregation at the school (class) level measured as the mix of pupils with various socioeconomic backgrounds
- Number who seek, but do not find, a training place
- Services for young people not able to complete a youth education
- Number of referrals for preventive support measures for vulnerable youth from day care institutions, schools and health care staff
- Percentage of people with short education participating in adult education programmes
- Number attending adult education programmes and further education
- The distribution of resources among schools and youth education programmes
### Determinant 3: Residential segregation

There is a significant variation in life expectancy between the poorest and richest municipalities and areas of town. In particular, this is because the labour and housing markets sort people geographically according to income, employment and health. People referred to social housing often have poor health and low income. Residential areas dominated by people with few resources risk becoming socially disadvantaged communities influencing the health and later social position, especially of children and young people.

#### Objectives:
- To reduce social segregation in the composition of communities
- To reduce segregation in local institutions and organisations for children (day care, schools, sports clubs, etc.)

#### Policy measures:
- **#3.1** Urban planning that mixes housing with different forms of tenure and that ensures a proportional distribution across municipalities of social housing in order to counteract segregation
- **#3.2** Urban regeneration projects combining physical, organisational, financial and social measures which ensure that prices correspond to housing quality and which improve the physical surroundings to create attractive residential areas
- **#3.3** Appealing day care institutions, schools and youth education in the ghettos of less privileged areas to promote the development of children and adolescents and prevent the effects of segregation on them.

#### Indicators of the determinant:
- Per cent of children growing up in communities (parishes or similar) with > 10% poor or > 25% outside the workforce
- Geographical variation in proportions of social housing

#### Indicators of implementation:
- Composition of different types of tenure for new housing construction
- Degree of integration of physical and social measures in urban renewal efforts
- Degree to which compensatory resource allocation for day care institutions and schools is need-based
## Determinant 4: Income and poverty

The difference in life expectancy between the richest and poorest fourth of the male population is ten years, while it is six years for women. The strong relation between income and life expectancy is the expression of cumulative effects of a long chain of causality, where social background and early development affect both income and health through factors such as health behaviour, work environment, and employment; and where health also affects income.

### Objectives:
- To reduce income inequality
- To reduce poverty, especially in families with children

### Policy measures:
- #4.1 Ensuring that income inequality does not increase, e.g. through regulation of income transfers, taxation scales, etc.
- #4.2 A universal social policy where as many as possible are covered by universal social services to limit social disparities and poverty
- #4.3 Ensuring a level of social assistance which does not lead to deprivation, relating to dietary habits and expenses towards medicine etc., with health consequences
- #4.4 A yearly calculation of a yearly minimum income for healthy living
- #4.5 Elimination of child poverty to prevent the long-term irreversible effects that poverty has on children

### Indicators of the determinant:
- Income inequality measured as the Gini-coefficient
- Per cent poor measured using OECD criteria, by educational background
- Per cent poor children
- Per cent who are poor three years in a row
- Percentage on reduced social assistance

### Indicators of implementation:
- Number of coordinated social and health services for children in poverty-stricken families
- Development of an updated deprivation-based poverty threshold for a healthy living
### Determinant 5: Longstanding unemployment

There is a strong, well-documented association between unemployment and poor health, especially mental health problems. The strong association is due to the fact that poor health increases the risk of unemployment, and also that longstanding unemployment increases the risk of several negative health consequences, especially depression. The association is stronger among people with a low level of education.

**Objective:**
- To reduce longstanding unemployment, especially among people with short education and people with increased psychological vulnerability

**Policy measures:**
- #5.1 A labour market model combining a flexible labour market with a good income support system and active employment measures to keep down unemployment
- #5.2 Opportunities for life-long learning and re-training because they help to reduce unemployment among people with a low level of education
- #5.3 A low level of youth unemployment especially because the first years after school are critical for how a person manages in the job market later on
- #5.4 Employment efforts that use economic incentives and demand participation in activation. The demand for activation should be balanced with the resources of the individual so as to ensure that economic and other stresses do not exacerbate the health consequences of unemployment
- #5.5 Employment efforts should be combined with a health professional effort with a special focus on mental health problems

**Indicators of the determinant:**
- Per cent long-term unemployed, by education, occupation and age
- Number of unemployed persons shifting to social assistance
- Per cent of unemployed persons who return to work

**Indicators of implementation:**
- Employment measures combined with health care measures, including treatment of mental illness and alcohol problems
- Per cent unemployed participating in re-training and adult education programmes
### Determinant 6: Socially marginalised people

Socially marginalised people are excluded on a variety of dimensions at the same time, e.g. excluded from labour market, out-of-touch with family, difficulty managing on the housing market, and may not qualify for universal social services. Marginalisation is both a cause and consequence of illness. The socially marginalised have a very high morbidity, especially in terms of mental illness.

**Objective:**
- To reduce burden of disease for the socially marginalised, i.e. people marginalised from the labour market, housing market, family, and universal social services

**Policy measures:**
- #6.1 Ensuring socially marginalised groups better access to housing and to special housing so that those who cannot manage on the general housing market have other options
- #6.2 Further training of staff in substance abuse treatment facilities and integration of substance abuse treatment with social action plans focusing on management users’ mental problems
- #6.3 Monitoring social living conditions among people with chronic mental handicaps within the framework of a clinical database, along with a stronger focus on open treatment facilities for people affected by mental illness, substance abuse and marginalisation in the collaboration between municipalities and regions
- #6.4 Expanding coverage of outreach efforts as well as schemes with support and contact people, so that greater and more satisfying coverage is achieved, including a formalisation of cross-sectoral collaboration

**Indicators of the determinant:**
- Mortality among people outside the workforce who have been admitted due to psychiatric diagnoses incl. substance abuse
- Number of homeless people
- Income and employment among people who have been admitted due to psychiatric diagnosis in the previous year
- Number who for more than three months have lived in shelters, hostels and other temporary accommodation
- Number discharged from psychiatric wards or from prison who do not have fixed accommodation

**Indicators of implementation:**
- Number of beds in psychiatric treatment facilities and waiting times for treatment
- Number of evictions of tenants due to psychologically deviant behaviour
- Number of places for treatment of combined psychiatric, abuse, and social problems
- Number of marginalised persons with a stable public support or contact person
## Determinant 7: The physical environment

There is great inequality in illnesses due to air pollution. This has to do with the fact that people with a low level of education more often have diseases, the symptoms of which are exacerbated by air pollution. In relation to injuries (child injuries, traffic injuries and fall injuries among the elderly), the inequality has to do with unequal exposure to risk and unequal vulnerability to the bodily harm ensuing from the injury.

### Objectives:
- To reduce the exposure to particles and nitrogen oxides
- To reduce social inequality in injuries by reducing the incidence of injuries for people with a low level of education

### Policy measures:
- **#7.1** Reducing particle pollution, e.g. by demanding effective particle filters for diesel vehicles as well as nitrogen reducing catalysers. Working on solutions for the particle pollution stemming from wood burning ovens.
- **#7.2** Establishing effective speed and alcohol control as well as use of safety belts. Development of local traffic safety action plans focusing on socially disadvantaged residential areas.
- **#7.3** Preventing inequality in home accidents among children by improved legislation and control of dangerous play apparatus and proactive outreach enterprise during home visits by health nurses.
- **#7.4** Ensuring the possibility of physical activity for the middle aged and elderly, including activity programs and offers of physical training such as exercise on prescription. Further, creating the possibility of physical activity in local communities.

### Indicators of the determinant:
- Exposure to particles and nitrogen oxides, by geographical area
- Frequency of admission for injuries involving children, traffic injuries and falls, by socioeconomic background

### Indicators of implementation:
- Percentage of diesel vehicles with particle filters
- Number of traffic controls for speeding and driving under the influence of alcohol
- Percentage of elderly people who, after falls, are offered rehabilitation programmes
### Determinant 8: Work environment

There are very large differences in disease risk and mortality among different occupational groups, especially regarding depression, cardiovascular disease, and musculoskeletal disorders. Social inequality in diseases associated with the work environment comes about because people with short education more often have physical work environments characterised by conditions that create higher risk of injury and musculoskeletal disorders, and a psychological work environment characterised by low influence, few possibilities for development and larger job insecurity.

#### Objectives:
- To reduce ergonomic work exposures in the shape of heavy lifts, twisted work positions, repetitive movements, etc.
- To increase job influence and work-related development opportunities
- To reduce the number of occupational injuries

#### Policy measures:
- **#8.1** Designing workplaces in a manner to ensure employees’ well-being and satisfaction and including specific ergonomic improvements
- **#8.2** Ensuring guidance for patients with musculoskeletal disorders and providing possibilities for their staying physically active, which makes their chances of managing a job better than inactivity at home
- **#8.3** Workplace assessments in small enterprises and in industries with low educational demands
- **#8.4** Integration of measures for improved work environment and improved health behaviour, the implementation of which especially targets groups with the highest work demands and the worst health behaviour

#### Indicators of the determinant:
- Percentage daily exposed to heavy lifts over 20kgs, bent and twisted work positions, repetitive movements, etc.
- Percentage exposed to low job influence and few work-related development opportunities
- Number of occupational injuries

#### Indicators of implementation:
- Integration of psychosocial work environment in leadership development
- Number of monitoring visits at workplaces with high levels of sickness absence and many violations of occupational health regulation
- Integrated measures for improved work environment and health promotion
### Determinant 9: Health behaviour

Unhealthy behaviour with regards to tobacco, alcohol, diet and physical inactivity along with overweight and heightened blood lipids and hypertension accumulate in less privileged groups. Since these risk factors strengthen each other’s respective effects on a range of public health diseases, health behaviour plays an influential role on the increasing inequality in mortality.

### Objectives:
- To reduce overall tobacco consumption and inequality in the percentage of daily smokers
- To reduce overall alcohol consumption, especially among young people
- To reduce the percentage of people with sedentary leisure time and low levels of physical activity
- To reduce the percentage of people who have a low consumption of fruit/vegetables and increase the percentage who have a low usage of saturated fats

### Policy measures:
- **#9.1** The following measures are expected to have an effect on inequality in tobacco smoking:
  - Increasing the duty on tobacco
  - Tightening legislation with smoking bans indoors everywhere, except inside private homes
  - Enforcement of the sales ban to persons under 18 years of age
  - Active outreach counselling and recruitment for smoking cessation courses specifically targeting persons with a low level of education, low income, mental illness and with no labour market affiliation

- **#9.2** The following measures are expected to have an effect on inequality in alcohol injuries:
  - Increasing the duty on alcohol
  - Increasing the age limit for sale of alcohol to 18 years and improve the enforcement of age control both for sale and serving of alcohol
  - Banning alcohol advertisements in all media
  - Restricting sales outlets and selling times
  - Limiting the number of alcohol serving licenses, especially in residential areas and near educational institutions
  - Tightening the rules about alcohol consumption in schools and other educational institutions
  - Active outreach counselling and provision of alcohol treatment for persons with low levels of education, low income, mental illness and with no labour market affiliation

- **#9.3** The following measures are expected to have an effect on social inequality in diet, physical activity, high blood pressure and high cholesterol counts:
  - Increasing the duty on sugary foods, especially soft drinks, and on saturated fats in dairy products and meat
  - Making clear dietary information of the ‘keyhole symbol’-type mandatory
  - Reducing the content of salt in ready-made foods
  - Physical activity for at least an hour during the school day using a structure that ensures that children have outdoor school yards that invite physical activity during break times
  - Physical measures for increased physical activity targeting disadvantaged residential areas and designed to benefit children, the middle-aged and the elderly
  - Measures to restrict children’s sedentary leisure-time activities by the television and the computer
  - Developing health policies in workplaces and at schools which ensure that the healthy choice is the easy choice, for instance in cafeterias. Undertaking particular efforts in the primary sector to ensure that treatment for hypertension and high cholesterol is
sustained as long as necessary, especially in people with short education and low income

<table>
<thead>
<tr>
<th>Indicators of the determinant:</th>
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<tbody>
<tr>
<td>- Percentage who smoke daily and smoke &gt;15 cigarettes per day</td>
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<tr>
<td>- Per cent exposed to passive smoking</td>
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<tr>
<td>- Per cent drinking more than 14/21 units of alcohol a week and often drink more than five units per occasion</td>
</tr>
<tr>
<td>- Per cent eating less than 600g fruit/vegetables daily</td>
</tr>
<tr>
<td>- Per cent who drink soft drinks daily</td>
</tr>
<tr>
<td>- Percentage with BMI between 25 and 30 and with BMI over 30</td>
</tr>
<tr>
<td>- Percentage who are physically inactive during their leisure time and the percentage who are at least moderately physically active (four hours per week)</td>
</tr>
<tr>
<td>- Data for all indicators should be divided according to level of education</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators of implementation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Real price development of tobacco, alcohol, sugar and saturated fats</td>
</tr>
<tr>
<td>- Number of controls for enforcement of age limits</td>
</tr>
<tr>
<td>- Number of serving licences by parish/similar</td>
</tr>
<tr>
<td>- Number of preventive consultations at the general practitioner</td>
</tr>
<tr>
<td>- Number of smoking cessation services by parish</td>
</tr>
<tr>
<td>- Number of schools with policies against alcohol, unhealthy diets and physical inactivity</td>
</tr>
<tr>
<td>- Structural interventions to increase physical activity by parish</td>
</tr>
</tbody>
</table>
### Determinant 10: Early functional decline

Loss of functional ability is partly a consequence of illness, partly an age-dependent process, albeit one that occurs earlier and faster in less privileged groups. There is an association between functional decline in the middle-aged and functional ability, need for help, and death in the elderly.

**Objective:**
- To reduce inequality in functional decline among people over 64 years of age by focussing especially on the functional ability of those with low levels of education and few economic resources

**Policy measures:**
- #10.1 Preventive home visits available to all older people with differential interventions corresponding to differential needs and with a specific focus on reaching economically less privileged elders
- #10.2 Ensuring the possibility of physical activity for the middle-aged and elderly, including activity programmes, training, and exercise on prescription. In addition, there should be possibilities for physical activity at workplaces and in the local environment
- #10.3 Visits to the general practitioner used to screen for early functional decline with the purpose of referring those in need to individual-oriented interventions
- #10.4 Subsidising dental services for the elderly so that they receive more regular dental care service

**Indicators of the determinant:**
- Functional ability among >74 year olds – cognitive and physical, by income / economic assets
- Physical activity among >64 year olds, by income / fortune

**Indicators of implementation:**
- Number of preventive home visits focusing on early functional decline, by income / economic assets
- Number of publically provided options for physical activity for the elderly in communities, by parish
- Number of elderly referred to physical activity by the general practitioner
### Determinant 11: Health services utilization

The treatment, rehabilitation and care provided by the health service have a major impact on the consequences of illnesses in the population. But despite the principle of equal and free access to health services, there is a socially skewed distribution of services that is not related to need. For instance, people with higher incomes have higher usage of specialist practitioners and of preventive services, while participation in rehabilitation programmes after myocardial infarction is lower among people with a low level of income. Economic, geographic, time-related, organisational, and sociocultural barriers can explain the unequal usage.

**Objective:**
- To reduce inequality in need-related use and effect of health services

**Policy measures:**
- #11.1 Targeted monitoring of the need for and use of various health services by socio-demographic groups. Special attention should be given to monitoring of municipal preventive and rehabilitative services
- #11.2 Recruitment of doctors to the primary sector in socioeconomically disadvantaged areas
- #11.3 Improved integration of the work of practitioners in the local municipal health work
- #11.4 Proactive measures to ensure that disadvantaged groups are reached by effective preventive programmes for pregnant women, children and the elderly as well as ensuring detection of early stages of cancer, diabetes, cardiovascular disease and depression
- #11.5 From an inequality perspective, user payment should be avoided for services which are of special relevance to mental illness and musculoskeletal disorders
- #11.6 A more geographically equal distribution of specialists by better regulation of the right to establishment of specialist practice
- #11.7 Prioritisation of the psychiatric services, including psychiatric rehabilitation, and developing a stronger cooperation between psychiatric services, primary sector, and municipal services, which play a large role for the marginalised and for those who, due to mental illness, have reduced work ability
- #11.8 Special focus on interventions for disadvantaged groups who are often lost in long-term patient care with rehabilitation. This is especially relevant for the mentally ill

**Indicators of the determinant:**
- Use of somatic and psychiatric health services, including patient plans and rehabilitation, by education and income
- Distance to emergency room and specialist practitioner, by education and income
- Expenses for health service user fees, by income
- Access to private health insurance, by income
- Inequality in the proportion of people who have needed but not sought help

**Indicators of implementation:**
- The establishment of a monitoring system of inequalities in the use of health care services, including patient plans and rehabilitation
- Geographic density distribution of doctors, including specialist practitioners, in relation to socioeconomic indicators
- Coverage of preventive services
- Distribution of resources between somatic care and psychiatric care and between the primary and secondary sectors
**Determinant 12: The exclusionary labour market**

In Denmark, about 25% of the working-age population are recipients of various types of income transfers, and an increasing proportion is on health-related benefits. A significant excess morbidity, especially for mental illness, exists regardless of the type of income transfer. Increasing work demands and indications of imbalance between demands and population health are especially prominent among people with a low level of education.

**Objective:**
- To reduce social inequality in the risk of leaving work due to reduced work ability by combating the health problems that lead to reduced work ability, and by creating more flexible work demands

**Policy measures:**
- #12.4 Multi-pronged interventions with companies engaging in job adaptation, job centres delivering social interventions, and health interventions provided by the general practitioner and specialists. Better coordination between practitioners, the workplace and potentially the job centres needs to be established
- #12.5 Strengthening of coordinated and composite interventions with the aim of improving prevention and treatment of anxiety and depression to improve the probability of job retention
- #12.6 Creating options for physical exercise that are easily accessible, especially with a view to limiting musculoskeletal pain and to improving depression
- #12.7 Paying specific attention to the group that does not fulfil medical criteria for disability pension but which at the same time is too psychologically and physically tired to cope with the demands of working life, and ensuring that this group has other options

**Indicators of the determinant:**
- Incidence of long-term sickness leave and disability pension, by education and diagnoses
- Percentage of the those who are absent due to illness for more than eight weeks who have returned to work two years later, by education and occupation

**Indicators of implementation:**
- Multi-pronged interventions where employment efforts are combined with health professional interventions, especially in the area of mental health
- Number of flex jobs and other workplaces with flexible work demands for people with reduced mental or physical work ability
Appendix B
Explanation of terms

Absolute inequality
Inequality measured as the difference between groups.

Budget method
A method of defining poverty according to the available amount of money compared with a standard budget for a given household size in a given year.

Child benefit
Child benefit (børnefamiliedyse) is paid for all children under 18. In special cases, parent or child may also be entitled to one or more types of child allowance (børnetilskud) depending on economic deprivation or on retirement or decease of one or both parents.

Concentration index
A measure of relative inequality (the ratio between groups) which takes into account all groups and their relative sizes.

CSDH

De-commodification score
A measure of the coverage of social policies in relation to the elderly, the unemployed and the sick.

Deprivation method
A method of defining poverty according to the deprivation experienced as result of limited economic resources.

Differential consequences
Refers to a situation wherein the same illness or injury has different consequences (in the form of survival or functional ability) in different groups.

Differential effect
Refers to an intervention having different effects in different groups.

Differential exposure
Refers to a situation wherein different groups have different exposures to a given factor.

Differential implementation
Refers to a situation wherein the same intervention is implemented differently in different groups.

Differential vulnerability
Refers to a situation wherein the effect of a given exposure varies between groups.

Early retirement
60-65 year olds who are members of an unemployment insurance fund can obtain an early retirement allowance, regardless of whether they are currently employed or unemployed. To qualify, a person must have been a member of an unemployment fund for at least 25 years out of the last 30.
The European Region of the World Health Organization is divided into three sub-regions (A, B and C) based on patterns of child and adult mortality. Countries in the EUR-A group have the lowest levels of mortality.

A flex job is employment on special terms, offered to persons with permanent reduced working capacity to retain their labour market affiliation, if possible. The person receives wage according to the trade union agreement in force, but the salary is supplemented (up to 2/3) by the state and administered by the municipalities.

Expression used about the general practitioner indicating that the general practitioner is the user’s first point of contact with the health services.

A measure of income inequality between individuals. The value '0' indicated complete equality while the value '1' indicates maximum inequality - that one person has all the income.

Refers to the fact that the association between the social position of an individual and their risk of illness crosses the entire population.

Population surveys conducted by the National Institute of Public Health. The total population surveys were conducted in 1987, 1994, 2000, 2005 and 2010, while the Health and Morbidity Survey for Marginalised People was conducted in 2007 in various types of shelters.

Income transfers where eligibility is determined on the basis of health status, for instance disability pension, flex jobs, sickness benefit, rehabilitation, and protected employment.

Home care is offered on the basis of individual needs and free of charge in order to allow elderly people to stay in their own homes as long as possible and to prevent the individual from further loss of physical and mental health.

Indicates that people with the same level of need are treated equally.

Rent subsidies for people living in rented accommodation; for pensioners rent allowance is offered regardless of the type of housing tenure.

Income transfer scheme offered to immigrants and refugees for the first three years of their stay in Denmark. The introductory allowance is an absolute minimum for survival. Receipt of this allowance is contingent on participation in a three-year integration programme for foreigners.

Report published by the National Institute for Health and Clinical Excellence, UK

Prevention strategy targeting the total population and not just selected individuals or groups.
Preventive child examinations Publically provided health examinations at the general practitioner (0-5 years), childhood vaccinations, school examinations by doctor and health nurse, and home visits by the health nurse in a child's first year of life.

Preventive home visits Every municipality has the obligation to offer each citizen, who has turned 75 years old and live in their own home without personal or practical help, at least two preventive home visits every year. The purpose of the preventive home visits is to enable both the elderly citizen and the municipality to make use of those offers available that can help the elderly sustain physical and social skills and prevent loneliness, loss of feeling of security etc.

SHARE The Survey of Health, Aging and Retirement in Europe; http://www.share-project.org/


Slope index of inequality A measure of the absolute inequality (e.g. the difference between the highest and lowest educated) which takes into account all groups and their respective sizes.

Social assistance Welfare benefits for which a person is eligible when he/she is temporarily without sufficient means to meet needs due to particular circumstances (e.g. sickness, unemployment). Eligibility is restricted by criteria related to residence, economic assets, participation in activation measures, etc.

Social housing Access to social housing in Denmark is universal, with 25% of housing units reserved for people with special housing needs. Social housing stock is owned by non-profit organisations and subject to detailed public regulation.

Social stratification Refers to the hierarchical social categorisation of people in society.

Socially marginalised In this report, socially marginalised is a term applied to adults who are socially excluded on several dimensions at the same time: they may be excluded from the labour market, have lost touch with family, have difficulties coping on the housing market and may not be entitled to social welfare.

Socially vulnerable In this report, socially vulnerable is a term applied to children who at some point in their childhood have received social support measures due to social problems.

SSP Refers to the formalised collaboration between school, social services and police working for improved integration of deviant youths.
<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
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<tr>
<td>Start Help</td>
<td>Income transfer scheme offered to current residents of Denmark who have not lived in Denmark for seven out of the past eight years and who do not have the financial means to sustain themselves. Actively seeking a job and participating in activation measures are prerequisites for receiving Start Help. Start Help is also offered to refugees and immigrants who have completed a three-year integration programme. The rate is an absolute minimum for survival.</td>
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<tr>
<td>Unemployment benefit</td>
<td>Unemployment insurance is elective in Denmark by paying membership contribution to a specific unemployment insurance fund. In order to qualify for unemployment benefit, a person must be out of work, have registered with a public employment service, be actively looking for work and be available for the labour market.</td>
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<tr>
<td>Universal prevention</td>
<td>Preventive efforts targeting the total population</td>
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<tr>
<td>Universalism</td>
<td>Refers, here, to the equity principle in the Danish welfare system, that allows everybody in the country equal rights to public services.</td>
</tr>
<tr>
<td>Vertical equality</td>
<td>Refers to the health system principle about treatment according to need, with those who have the greatest need being treated first.</td>
</tr>
<tr>
<td>Youth education</td>
<td>Corresponds to upper secondary education and can be both general and vocational. Vocational youth education is provided by commercial and technical schools, while general youth education is provided by the so-called 'Gymnasium'.</td>
</tr>
</tbody>
</table>
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