

# New aims and interventions in hypertension

A health policy proposal  
by the Danish Association  
of the Pharmaceutical Industry (Lif)



The Danish  
Association  
of the  
Pharmaceutical  
Industry

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#### **Contents:**

#### **Part 1: Proposed aims and actions**

1.1 Background	page 2
1.2 Need for a hypertension action plan	page 2
1.3 Overarching civic health aims	page 3
1.4 Initiatives for achieving targets	page 4

#### **Del 2: Identifying the problem and documentation**

2.1 Background	page 6
2.2 Why hypertension?	page 7
2.3 What is hypertension?	page 9
2.4 The reasons for hypertension	page 9
2.5 Diagnosing hypertension	page 10
2.6 Treating hypertension	page 10
2.7 Costs associated with hypertension	page 11

## Part 1: Proposed aims and actions

### 1.1 Background

These political/health proposals from the Danish Association of the Pharmaceutical Industry (Lif) relate to interventions against high blood pressure. This report is part of Lif's endeavours to switch the current focus of the debate on public health from structural and fiscal aspects to *health results*, which should dictate how we organise activities in the Health Service. At the very least, this should be seen as a serious offering of new aims and new interventions with respect to hypertension in Denmark as an essential step along the way to better quality in the Health Service and better health for Danes.

High blood pressure (hypertension) is an especially widespread condition and constitutes a significant risk of illness and death. Intervention against hypertension should be considered seriously in our overall civic health programme together with interventions with respect to other widespread, serious chronic complaints.

There is a significant need and also good arguments for boosting the Health Service's efforts with respect to hypertension. In fact, in Lif's view, the arguments are so good as to be incontrovertible. And this view is not just Lif's. Other significant players such as HjerneSagen, The Danish Pharmaceutical Association, the Danish Hypertension Society and the Institute for Rational Pharmacotherapy have addressed the problem with the Minister of Health and the public.

The fact that Lif is arguing for an improvement in the quality of interventions with respect to hypertension is based on three crucial factors:

- Enhanced identification, prevention and treatment of high blood pressure would mean better, longer lives for many people. More than 1 million adult Danes have high blood pressure.
- There is widespread agreement amongst professionals in the Health Service that there is considerable under-diagnosis and under-treatment of hypertension<sup>1</sup> in Denmark.
- Enhancements in programs against hypertension would be relatively easy to implement. Diagnosis is simple, the risk factors are well known and the treatment options are good and easily available.

Accordingly, Lif takes the clear view that the present activities in the hypertension sector in Denmark are neither sufficient nor satisfactory and there is the need for new quality enhancing initiatives based on conscious decisions about the aims and interventions.

### 1.2 Need for a hypertension action plan

In recent years, there has been an increasing focus on the negative health consequences of high blood pressure and as a result, developments in the diagnosis and treatment are on the right track. But new approaches are needed if these efforts are to have the greatest possible positive impact on the health of Danes and Danish mortality rates.

***Lif's view is that a politically and fiscally binding hypertension action plan should be drawn up to form a joint basis for activities over the coming five years.***

The stakeholders behind such an action plan should reflect the breadth of these enhanced activities, including the Ministry of the Interior and Health, the Danish Regional Authorities, Local Government Denmark, Danish Medical Association, and relevant patient organizations and possibly other organizations, official bodies or those with resources who can and should make a positive contribution.

First, the action plan should contain overarching political/health aims for the efficacy of interventions on the health of Danes, for example, targets for fewer deaths as a result of hypertension. Second, the plan should

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<sup>1</sup> Danish Hypertension Society and the Institute for Rational Pharmacotherapy.

set operational targets and provide the necessary means for achieving these as part of also attaining the overarching health political aims.

The critical factor in Lif's view is that the action plan's initiatives should be based on the principles of proactive and systematic action on the part of the Health Service. This would represent a marked shift away from the way in which initiatives have been organized hitherto. Currently, preventative measures are solely focused on people's lifestyles which experience has shown are difficult to change without systematic assistance and guidance. And the Health Service is only involved when contacted by people with health problems. This approach is especially problematic for conditions such as raised blood pressure, which is often only discovered when serious organ damage occurs, such as blood clots or cardiac problems. Accordingly, activities should be organized in future so they support prevention and early detection and initiatives should be made by the Health Service.

A hypertension action plan should specifically and systematically address the following overarching problems:

1. **More people should know their blood pressure and the recommended limits.** Currently, only about half of those over forty know their blood pressure, and there are very many who do not know what would be considered as normal blood pressure. And an increase in the number of people examined constitutes a necessary, logical precondition for its being possible to diagnose more people and to initiate the treatment required.
2. **More people to be treated.** Hypertension requiring treatment is much more frequent than the number of cases currently being treated would suggest.
3. **More people to achieve satisfactory treatment outcomes.** Only about 25 % of cases currently being treated achieve satisfactory outcomes to their treatment. This is far from satisfactory and the results of treatments need to be significantly improved.

### 1.3 Overarching civic health aims

In Lif's view, the overall political health objectives for a blood pressure action plan should be as follows:

***\* In five years, 80 % of all adults over 45 should know their blood pressure compared to about half today.***

***\* Everyone with high blood pressure should be offered relevant guidance, targeted treatment and systematic follow-up.***

***\* In five years, at least 75 % of patients in treatment should achieve their desired treatment outcome compared to about 25 % today.***

***\* Over the course of ten years, the percentage of the population with high blood pressure should be brought down as close to 0 as possible. Within five years, the percentage should be halved from the current 20 % to 10 %.***

***\* In the course of 10 years, the median longevity for Danes should be extended by nine months for men and six months for women as a result of a reduction in the risk of dying from hypertension.***

***\* The number of cases of stroke should be cut by 8,000 over ten years. Within five years, the number should be cut from the present range of 12,000 - 14,000 to 10,000.***

***\* The number of deaths as a result of hypertension should be reduced to as close to 0 as possible. In the course of ten years, the number of cases should be halved from the current 2,000 p.a. to 1,000 p.a.***

## 1.4 Initiatives for achieving targets

In Lif's view, it is crucial that the Health Service's activities should be made considerably more proactive and systematic in general, and specifically for hypertension, if the intended goals are to be achieved. At the same time, the seriousness of high blood pressure should be made clearer and this should especially be reflected in the approach and actions of healthcare personnel.

Hypertension is so widespread and has such consequences that a proactive, systematic, nationwide detection and treatment process should be set up for those in the population who are over 45. In addition to helping achieve the proposed political/health aims in this area, such a process could also help even out the realities of geographical and other inequalities in health that are a feature of Danish society today<sup>2</sup>.

### ***Everyone over 45 should have their blood pressure taken at least once a year.***

85 % of the population already visit their general practitioner (GP) at least once a year. It should just be ensured that patients over 45 have their blood pressures taken as part of the consultation. This could be initiated immediately.

### ***Everyone over 45 should be asked regularly to have their blood pressure tested.***

In order to extend blood pressure monitoring to as many as possible, those over 45 who do not visit their GPs should be called in for monitoring in the way used by many dentists. Patients could be notified by telephone, or letter, e-mail or sms text message, for example by their local authority or own GP or others. Those who fail to react should be recontacted.

Blood pressure testing could in the first instance be done as part of a consultation with the patient's GP, as home or ambulatory blood pressure measurement (ABPM), by a call from the district nurse, at pharmacies or at the new municipal local health centres. If as recommended by Lif, annual health checks are brought in over time, and these receive the backing of most of the population<sup>3</sup>, it would be an ideal occasion to have blood pressure taken.

If the first reading shows elevated blood pressure, the next steps should under all circumstances take place within the general practice system, possibly by a specialist nurse, in deference to risk assessment, advice, choice of treatment and to ensure systematic follow-up. Treatment should be in accordance with current guidelines.

For individuals, knowing their own blood pressure would make it possible to search for additional information and to decide about their own situation, including actively selecting and deselecting necessary lifestyle changes and/or medical treatment. On the other hand, some responsibility does accompany knowledge of one's own health status. This might possibly keep some people from immediately wishing to accept an offer of a blood pressure measurement.

In Lif's view, in generally motivating those over 45 in the population to have their blood pressure tested and to accept any treatment required, ***it is necessary to clearly state and emphasize the consequences of hypertension, including its significance for serious disease and death and the major gains to be had from effective treatment.*** This could be done amongst other things by way of campaigns like those run recently by HjerneSagen and the Danish Pharmaceutical Association, and as indicated by the Institute for Rational Pharmacotherapy and the Danish Hypertension Society<sup>4</sup>. Lif is not calling for scare tactics but the seriousness of hypertension should in Lif's view be clearly and uniformly stated by players in the sector, especially including the Health Service and healthcare personnel.

Epidemiological studies show that about 40 % of all adults aged between 30-70 have, and/or are being treated for, high blood pressure. This is equivalent to more than 1 million adult Danes. Fewer than 668,000 are currently being treated to reduce their blood pressure, so many more need guidance and treatment, also by way of lifestyle changes and possibly drug treatment. Further, only about 25 % of those currently being treated for hypertension achieve their targets.

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<sup>2</sup> See also Lif's register-based report on the risk of mortality in the various parts of the country, December 2006.

<sup>3</sup> Lif, based on data from Statistics Denmark.

<sup>4</sup> Danish Hypertension Society and Institute for Rational Pharmacotherapy.

In order to ensure appropriate guidance, targeted treatments and systematic follow-up, in Lif's view a range of initiatives aimed at general practitioners should be instituted, including support for doctors in dealing with this process.

GPs should be offered systems to support decision making, including tools for risk assessment and treatment options. It should be ensured that guidelines on the latest, most effective treatments are always easily available to the population as well as doctors.

Doctors and patients should work together to draw up action plans when treatment is required.

It should be ensured that there is easy access to documentation on interventions for hypertension. The national agreement on general medical practice does contain elements in which the fundamental principles do to a certain extent correspond to the principles on which Lif would like to see the hypertension project structured. Accordingly, a new feature of the agreement is that it contains processual services for diabetic patients, the purpose of which is to develop and ensure the quality of treatments for the chronically ill in general practice and to give GPs a tool for systematising treatment and control procedures<sup>5</sup>. These services are remunerated on the basis of documentation for patient contacts and the GP is required to be proactive. Lif finds that it would be relevant and appropriate to develop and refine the principles contained in this model and apply them to activities to counter hypertension.

Further inspiration may be gained from UK where doctors are paid on the basis of quality indicators agreed in the contracts with local groups of GPs. Selected examples of such indicators for hypertension include:

- Individual practices can keep a register of patients with hypertension.
- The percentage of patients with hypertension, whose records contain data on smoking/non-smoking.
- The percentage of patients who have hypertension and are smokers whose records contain data on whether guidance on stopping smoking has been offered at least once.
- The percentage of patients with hypertension who have had their blood pressure regularly taken over the past nine months.
- The percentage of patients with hypertension where the most recent blood pressure measurement was 140/90 mmHg or lower (within the past nine months).

A national indicator project for hypertension, possibly as a supplement to the established NIP, could be developed to provide and extend the required documentation.

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<sup>5</sup> The national agreement on general medical practice, 2006.

## Part 2: Identifying the problem and documentation

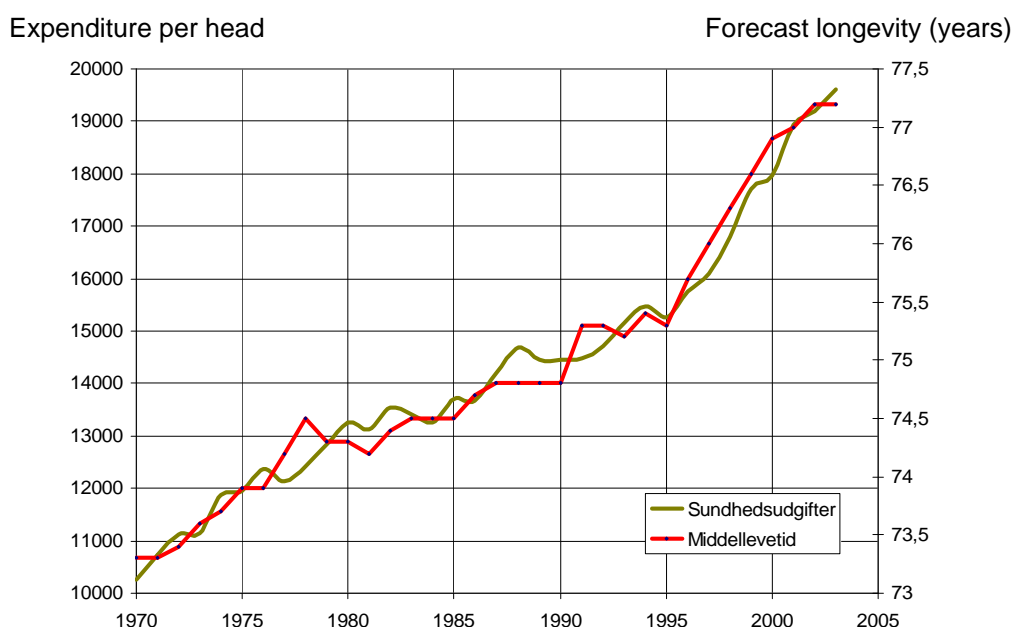
### 2.1 Background

It is a fact that Denmark has some of the worst health outcomes in Europe. Denmark is one of the western European countries with the lowest median longevity despite the fact that, after a period of no movement, the trend has been positive in recent years. In 2004, median longevity for men was 75.2 years and 79.9 years for women<sup>6</sup>.

International comparisons of mortality also reveal that there is a marked excess mortality in Denmark. Between 1995 - 1999 approximately 8,000 more 0-74 year-olds died in Denmark than would have occurred if mortality rates in Denmark were the same as in Sweden<sup>7</sup>.

There is no simple explanation for these poor health outcomes. However, it is a fact that over a period of 30 years, Danish health expenditure has only been half as much as the rest of the OECD countries and that over the years, median longevity and health expenditure have gone hand in hand, cf. Figure 1.

**Figure 1: Trend for median longevity and health expenditure, 1970 - 2005**



Source: DSI

It is also a fact that in Denmark we have noticeably lower drug usage and are much slower to adopt new health technology than the other European countries. We also lack a definite health policy to direct investment and prioritization in the health sector.

In June 2005, Lif issued a report on Danish health policy<sup>8</sup> - or rather on the lack of a real health policy here in Denmark. In the report, Lif pointed amongst other things to the general need in future for initiatives in the health sector to be based on operational targets and specific action plans. This would make it possible to establish whether an initiative was having the desired effect on the health of Danes.

This health policy report on hypertension forms part of the embodiment of Lif's strategy. The plan is for a further 2 - 4 reports on various indications to be drawn up over the next two years.

<sup>6</sup> Statistics Denmark: "Statistical Year Book 2006".

<sup>7</sup> Statistics Denmark: "Statistical Year Book 2006".

<sup>8</sup> "Towards a health policy - report by the Danish Association of the Pharmaceutical Industry", June 2005.

## 2.2 Why hypertension?

There are several good reasons for the fact that Lif's first specific health policy proposals relate to initiatives to counter high blood pressure or hypertension.

***The first reason is that improved measures to counter high blood pressure will mean longer, better lives for really many people.***

It is estimated that more than 2,000 Danes die every year from hypertension<sup>9</sup>, which equates to almost 4 % of all deaths, including more than 5 % of males and more than 2 % of females<sup>10</sup>. Hypertension has the greatest relative significance for death in the 45-64 age group where it accounts for approximately 11 % of all deaths.

Every year about 43,000 years of life are lost as a result of death from hypertension, cf. Table 1, with more than 25,000 lost years of life for males and almost 18,000 years of life for females. Males who die from hypertension lose on average more than sixteen years of life whilst females lose about 25 years of life.

**Table 1: No. Deaths and lost years of life due to high blood pressure (2002)**

Age group	No. deaths		Years lost	
	Male	Female	Males	Female
<b>0-64</b>	642	506	6,246	4,506
<b>65 +</b>	882	202	18,917	13,337
<b>Total</b>	1,524	708	25,163	17,843

Source: National Institute of Public Health: "Risk factors and public health in Denmark", June 2006.

WHO has estimated<sup>11</sup> that more than 20 % of all deaths and 11 % of the impacts of disease in developed countries are ascribable to hypertension.

High blood pressure constitutes a critical of risk factor for developing very serious and frequent organ damage such as cerebral infarction, cerebral haemorrhage, myocardial infarction, heart failure, kidney failure or blindness. Because there are rarely symptoms of high blood pressure before organ damage occurs, hypertension is also known as "the silent killer"<sup>12</sup>.

Every year, between 12,000 and 14,000 Danes<sup>13</sup> suffer a stroke (cerebral infarction or haemorrhage), approximately 4,000 die of cerebral apoplexy<sup>14</sup>, and more than 50,000 people live with the after-effects of stroke. All the evidence indicates<sup>15</sup> that more than half these cases have a background of untreated or insufficiently treated hypertension - a shameful and unacceptable fact when considering that a 10mmhg reduction in blood pressure means a 40 % reduction in the risk of dying from stroke.

Cardiac disease is the most frequent course of death in Denmark. 85 % of all cardiac deaths (approx. 15,000) are due to ischaemic heart disease (atherosclerosis of the coronary artery)<sup>16</sup>, which is also the reason for long term (chronic) heart disease and for the sudden occurrence of serious disease such as heart

<sup>9</sup> Sundhedsstyrelsen.

<sup>10</sup> National Institute of Public Health, June 2006: "Risk factors and public health in Denmark".

<sup>11</sup> Health Report 2002: "Reducing Risks. Promoting Healthy Life", Geneva, 2002.

<sup>12</sup> The Permanente Journal, Summer 2006, Volume 10, No. 2.

<sup>13</sup> On the basis of figures from the National Patients Register, the number of cases in 2005 was estimated at more than 13,000.

<sup>14</sup> Danish Hypertension Society, 1999: "Hypertensio arterialis", Explanatory Report No. 9.

<sup>15</sup> WHO and Danish Hypertension Society.

<sup>16</sup> Sandøe E., et al: "Cardiac Disease", Medical compendium, 14<sup>th</sup> issue. Edited by: Lorenzen I., Bendixen G., Hansen NE. Copenhagen, Nyt Nordisk Forlag, Arnold Busk, 1994, pp. 859-1131.

cramp and blood clots in the heart. Hypotension is often the underlying condition for patients with ischaemic heart disease from which it is estimated that about 150,000 Danes suffer.

Apart from deaths directly attributable to hypertension, median longevity for men in Denmark would be almost nine months longer and 6 months longer for women than is the case now<sup>17</sup>. It has also been calculated<sup>18</sup> that median longevity for men could be extended by 9 months and 2 years respectively if all deaths from stroke and ischaemic heart disease could be prevented. The comparative figures for women are 12 months and 1½ years respectively.

***The second reason is that there is widespread agreement amongst healthcare professionals that there is evidence of significant under-diagnosis and under-treatment of hypertension<sup>19</sup> in Denmark.***

The view amongst professionals is that only about half of those who are actually suffering from high blood pressure are aware of it.

The latest Health and sickness survey shows<sup>20</sup> that less than 15 % of respondents had themselves reported high blood pressure, cf. Table 2. In 1994, the figure was more than 6 %, and it has thus risen significantly over the past ten years.

**Table 2: Percentage of the population with self-reported high blood pressure**

	1994	2000	2005
<b>Percentage with high blood pressure</b>	6.1 %	8.5 %	14.6 %

Source: National Institute of Public Health, 2006: "Survey of health and sickness, 2005".

Interview questionnaire with response distribution.

It is estimated that on average, 20% of the Danish population suffers from high blood pressure.

**Table 3: Gender/age distribution or cases of self-reported high blood pressure, 2000**

Gender/age	Percentage with high blood pressure (%)
<b>Males:</b>	
16 – 24	0.5
25 – 44	2.3
45 – 66	11.5
67 – 79	20.9
80 +	13.0
<b>Total males</b>	<b>7.8</b>
<b>Females:</b>	
16 - 24	0.5
25 - 44	2.1
45 - 66	11.5
67 - 79	26.1
80 +	26.6
<b>Total females</b>	<b>9.3</b>

Source: National Institute of Public Health, 2001: "Survey of health and sickness, 2000".

Data for age distribution for 2005 are not available as yet.

<sup>17</sup> National Institute of Public Health, June 2006: "Risk factors and public health in Denmark".

<sup>18</sup> National Institute of Public Health: "Mortality in Denmark over 100 years", Copenhagen, 2004.

<sup>19</sup> Danish Hypertension Society and Institute for Rational Pharmacotherapy.

<sup>20</sup> National Institute of Public Health: "Survey of health and sickness, 2005".

Table 3 shows that the frequency of self-reported high blood pressure is greatest amongst women aged over 67. The percentage increases noticeably from the 45-66 age group and rises with age although it declines for men over 80 and plateaus for women in the same age group.

In 2005, just fewer than 668,000 Danes were being treated with blood pressure reducing drugs<sup>21</sup>. Only between ¼ and 1/3<sup>22</sup> reached the desired outcome, that is their blood pressure fell to the recommended level as a result of treatment.

The core factor in this connection is the importance of ensuring good compliance with lifestyle changes and medical treatment. With respect to hypertension patients, there is evidence that more than half of the patients who start drug treatment drop it entirely within one year. And for those who continue treatment, approximately half take only about 80 % of their medicine. Accordingly, around 75 % of hypertension patients do not achieve optimum control of their blood pressure.<sup>23</sup>

***The third reason is that improvements in interventions for hypertension are relatively easy to initiate. Diagnosis is simple, risk factors and treatment options are well known and the latter are easily available.***

### **2.3 What is hypertension?**

Blood pressure depends on how hard the heart is working to pump blood round the body and how much resistance there is in the blood vessels. High blood pressure is the results of the blood being forced through the arteries at a higher pressure than normal.

Blood pressure is recorded as two figures. The first gives the systolic blood pressure, which is the pressure that arises in the arteries when the heart contracts and forces blood out into the body. The second figure is the diastolic blood pressure, which is the pressure in the arteries while the heart is relaxing between two beats and is filling with blood.

In Denmark, we consider blood pressure to be high if it is above 140/90 mmHg in the resting state, that is mild hypertension (140-159/90-99 mmHg), moderate hypertension (160-179/100-109 mmHg) and severe hypertension (>180/110).

But because the increased risk of death and disease is directly proportional to blood pressure, several countries have in recent years decided to reduce the thresholds for normal readings to the lower figures; this has amongst other things been done on the basis of a professional assessment of the fact that a large percentage of the population would benefit from treatment to reduce blood pressure, including non-pharmacological treatments<sup>24</sup>.

Studies have shown that a large percentage of patients with blood pressure readings in the 120-139/80-89 mmHg range will develop hypertension<sup>25</sup> in the course of ten years. In USA, the threshold for intervention has been reduced in recent years and they have introduced the concept of "prehypertension" for blood pressure in the 120-139/80-89 mmHg range. The latest European guidelines which have not yet been implemented in Denmark refer to concepts such as "optimum blood pressure" (120/80 mmHg), "normal blood pressure" (120-129/80-84 mmHg) and "high normal blood pressure", which is 130-139/85-89 mmHg<sup>26</sup>.

### **2.4 Reasons for high blood pressure**

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<sup>21</sup> Danish Medicines Agency.

<sup>22</sup> Hjernesagen and INTER99.

<sup>23</sup> WHO: "Adherence to long-term therapies : evidence for action / [edited by Eduardo Sabaté]", 2003.

<sup>24</sup> Danish Hypertension Society, 1999: "Hypertensio arterialis".

<sup>25</sup> Danish Hypertension Society and Danish Heart Foundation, 2004: "Hypertensio arterialis".

<sup>26</sup> Danish Hypertension Society and Danish Heart Foundation, 2004: "Hypertensio arterialis".

Anybody can get high blood pressure and there may be many reasons for this. In the majority of cases, doctors cannot with certainty identify the reason(s) but it is known that a series of factors alone or in combination increase the risk of getting disease: obesity, tobacco smoking, alcohol abuse, fat/salty diet, lack of exercise, Diabetes I and II, kidney disease, high cholesterol, familial predisposition to high blood pressure, the cerebral haemorrhage or cardiac infarction and the use of certain medication such as cortisone and slimming pills<sup>27</sup>. It is also known that the risk is greater for men over 55 and women over 65<sup>28</sup>.

Awareness of these risk factors is a critical precondition for it to be possible to assess whether someone is at risk of hypertension, whether there is an indication for treatment and if so, what treatment it is thought would be most appropriate.

## 2.5 Diagnosing hypertension

The diagnostic options for hypertension are well known and will become even better. A range of (new) Danish clinical guidelines for diagnosing and treating high blood pressure have been drawn up by the Danish Hypertension Society<sup>29</sup> and also the Quality Development Committee at Århus County Council<sup>30</sup>.

One innovation in the latest guidelines from the Danish Hypertension Society<sup>31</sup> is that they emphasize that blood pressure monitoring during visits to the doctor should be supplemented with ABPM (ambulatory blood pressure monitoring)<sup>32</sup> and/or at the patient's own home<sup>33</sup>. According to the Society, it has been shown that both "day" and "home" blood pressure monitoring have significantly greater reproducibility and that they predict cardiovascular events more precisely than blood pressure readings taken in the GP's surgery. As a relatively new innovation, GPs receive payment for home APBM, whereas "day" monitoring is not a remunerated service in the National Agreement.<sup>34</sup>

## 2.6 Treatment of hypertension

The treatment options for high blood pressure constitute both non-pharmacological (non-medicinal) and pharmacological (medicinal) interventions. The choice of treatment depends on several factors: the presence of risk factors, hypertensive organ changes, other disease and the severity of the hypertension. The Danish Hypertension Society has also introduced a tool for risk assessment of patients with hypertension<sup>35</sup> which can be used in deciding on treatment.

The general recommendation is that non-pharmacological treatment by way of lifestyle changes (e.g. exercise, change of diet and less alcohol) or non-pharmacological therapy should always be considered and recommended for patients with high blood pressure. Non-pharmacological treatment is supplemented with regular monitoring of the patient's blood pressure, the frequency of which depends on the patient's level of risk. According to the Danish Hypertension Society, there is a lack of documentation, however, for whether non-pharmacological treatment does in the longer term reduce cardiovascular disease and death and they state that for the majority of patients, using this form of treatment<sup>36</sup> leads to more modest blood pressure reductions.

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<sup>27</sup> [www.netdoctor.dk/medicin](http://www.netdoctor.dk/medicin)

<sup>28</sup> Danish Hypertension Society and Danish Heart Foundation, 2004: "Hypertensio arterialis".

<sup>29</sup> [www.hypertension.suite.dk/Guidelines](http://www.hypertension.suite.dk/Guidelines)

<sup>30</sup> Sundhed.dk: Hypertension (State of the Art).

<sup>31</sup> Danish Hypertension Society, 2006: "Diagnostic ambulatory blood pressure measurement - on a 24 hour basis, at home and at the surgery".

<sup>32</sup> Ambulatory blood pressure is measured over at least 24 hours under routine conditions using a portable electronic blood pressure monitor, which takes readings at fixed intervals, e.g. every 15-20 minutes.

<sup>33</sup> Home blood pressure monitoring – readings taken by the patient at home using a patient activated electronic blood pressure monitor.

<sup>34</sup> National Agreement on General Medical Practice.

<sup>35</sup> Danish Hypertension Society and Danish Heart Foundation, 2004: "Hypertensio arterialis", pp. 4 and 5.

<sup>36</sup> Danish Hypertension Society and Danish Heart Foundation, 2004: "Hypertensio arterialis", p. 5.

Pharmacological or medicinal treatment options for hypertension consists of diuretics, alphablockers, betablockers, calcium canal inhibitors, ACE inhibitors and angiotensin II-receptor antagonists.<sup>37</sup> These are used individually or as combination treatments.

In recent years, the numbers of patients being treated with hypertension drugs have grown considerably, equating to an increase of about 7 % p.a. or of almost 1/3 between 2001 - 2005, cf. Table 4. Increasing numbers of patients are being treated with medicines from several product groups which according to the relevant professional societies and the Danish Medicines Agency, is a positive development since this enables treatment to be individualized and optimized with respect to efficacy and side effects.

**Table 4: Numbers of persons being treated with hypertension drugs, by number of product groups**

	2001	2002	2003	2004	2005
<b>Persons being treated:</b>					
<b>1 product group</b>	274,286	279,543	285,481	292,600	299,171
<b>2 product groups</b>	176,370	193,263	211,039	229,654	245,017
<b>3 product groups</b>	50,943	62,612	75,786	90,272	103,336
<b>4 product groups</b>	6,564	9,153	12,275	16,456	20,417
<b>Total</b>	<b>508,163</b>	<b>544,571</b>	<b>584,581</b>	<b>628,982</b>	<b>667,941</b>
<b>Percentage:</b>					
<b>1 product group</b>	54 %	51 %	49 %	47 %	45 %
<b>2 product groups</b>	35 %	35 %	36 %	37 %	37 %
<b>3 product groups</b>	10 %	11 %	13 %	14 %	15 %
<b>4 product groups</b>	1 %	2 %	2 %	3 %	3 %
<b>Total</b>	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>
<b>Growth in numbers being treated (from the previous year):</b>					
<b>1 product group</b>		1.9 %	2.1 %	2.5 %	2.2 %
<b>2 product groups</b>		9.6 %	9.2 %	8.8 %	6.7 %
<b>3 product groups</b>		22.9 %	21.0 %	19.1 %	14.5 %
<b>4 product groups</b>		39.4 %	34.1 %	34.1 %	24.1 %
<b>All</b>		<b>7.2 %</b>	<b>7.3 %</b>	<b>7.6 %</b>	<b>6.2 %</b>

Source: Danish Medicines Agency.

At the same time, the percentage of patients being treated with a single product declined from 54 % in 2001 to 45 % in 2005, whereas the percentage of patients, especially those being treated with three products, rose during the period. This trend is primarily the consequence of changing professional recommendations in this area over the years. Despite the increase in multiple treatments, the figures for Denmark are still relatively low compared to such other countries as USA and UK.

## 2.7 Costs associated with hypertension

The socio-economic costs arising from hypertension internationally and for Denmark are considerable. According to the National Institute of Public Health, high blood pressure constitutes one of the core risk factors with respect to consequential socio-economic impacts, that is hospital days, loss of production and premature death. Costs are partly the direct consequence of GP visits, drugs and admission to hospital for a range of diseases caused by high blood pressure. For the community, there is also the loss of production as a result of sickness and premature death.

<sup>37</sup> www.netdoctor.dk

There are no Danish reports on the total costs associated with hypertension but studies from USA indicate that the health costs of hypertension and related complications account for 12.6 % of total health expenditure.<sup>38</sup> On the other hand, there is a Danish estimate of almost DKK 2bn for socio-economic loss of production as a result of death.<sup>39</sup> Loss of production is greatest for men where it is estimated to account for 70 %, mainly in the 45-64 age group.

As noted above, high blood pressure is also the reason for the stroke and cardiac disease. The Board of Health has calculated<sup>40</sup> that every year, strokes cost the Danish community DKK 2.7bn in direct expenses. The Ministry of Health has also stated<sup>41</sup> that the Danish community could save DKK 122m from improved treatment of stroke by better diagnosis and treatment of hypertension. Disease of the cardiovascular organs is also the most demanding on resources in the hospital sector with almost 137,000 admissions annually and representing total hospital expenditure of DKK 3.8bn p.a.<sup>42</sup>

DKK 1.3bn was spent on drugs in Denmark in 2005, most of which was spent on treatment for high blood pressure, cf. Table 5. Taken together with the numbers of patients being treated, cf. Table 4, the average figure for expenditure per person in treatment was DKK 1,925 in 2005. In 2001, the comparable expenditure was DKK 2,257. There was accordingly a decline in average expenditure despite the fact that the percentage of patients receiving multiple treatment increased in the same period.

**Table 5: Expenditure on hypertension drugs**

DKKm, current prices	2001	2004	2005	% 2005
<b>Reimbursement</b>	748,519	848,637	825,819	64 %
<b>Municipal expenditure</b>	58,355	65,693	61,912	5 %
<b>User payment</b>	339,981	375,575	398,142	31 %
<b>Total</b>	<b>1,146,855</b>	<b>1,289,905</b>	<b>1,285,873</b>	<b>100 %</b>

Source: Danish Medicines Agency.

A fall in the average treatment price may be noted for most therapeutic areas between 2002 - 2006. For the whole area, the price for a DDD fell by almost 18 % from DKK 1.98 to DKK 1.63.

**Table 6: Trends in average treatment prices**

PPP/DDD	2002	2003	2004	2005	2006	2002-2005
C02 Drugs for high blood pressure	4.4	4.0	3.1	3.7	4.2	-5.0 %
C03 Diuretics	0.6	0.6	0.6	0.6	0.7	20.0 %
C07 Beta-receptor blockers	2.4	2.5	2.4	2.3	2.4	-3.7 %
C08 Calcium antagonists	3.5	3.3	1.9	1.2	1.1	-68.5 %
C09 Drugs affecting RAS (renin-angiotensin system)	3.1	3.0	2.6	2.6	2.6	-16.3 %
- of which ACE-inhibitors	2.0	1.8	1.3	1.1	1.1	-47.3 %
- of which Angiotensin II antagonists	5.2	5.1	5.1	5.2	5.4	4.6 %
<b>Total</b>	<b>2.0</b>	<b>2.0</b>	<b>1.7</b>	<b>1.6</b>	<b>1.6</b>	<b>-17.6 %</b>

Source: Danish Medicines Information

Table 7 below gives the trends for drug usage from 2002 - 2006. Declining sales may be noted in 2004 as the result of the expiry of patent rights, especially calcium-blockers.

<sup>38</sup> Hodgson TA, Cai L.: "Medical care expenditures for hypertension, its complications, and its comorbidities", Medical Care, 2001, 39:599-615.

<sup>39</sup> National Institute of Public Health: "Risk factors and public health in Denmark", June 2006.

<sup>40</sup> Board of Health reference programmes for treating stroke, 2005.

<sup>41</sup> Response to Q. 366 (general part), posed by the Folketing's Health Committee to the Minister of the Interior and Health, 8 May 2006.

<sup>42</sup> Source: DRG system, 2005.

**Table 7: Trends in the market for drugs to treat hypertension**

<b>Sales (pharmacy purchase prices DKKm)</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
C02 Drugs for high blood pressure	19.9	20.1	16.8	21.5	25.2
C03 Diuretics	115.5	121.6	131.8	139.0	152.9
C07 Beta-receptor blockers	122.2	134.3	140.4	147.6	158.8
C08 Calcium antagonists	286.6	284.6	175.8	118.4	126.4
C09 Drugs affecting RAS (renin-angiotensin system)	393.6	441.3	448.9	502.2	578.4
- of which ACE-inhibitors	166.2	166.6	138.0	139.2	152.3
- of which Angiotensin II antagonists	227.3	274.7	311.0	363.0	426.1
<b>Total</b>	<b>937.8</b>	<b>1.001.8</b>	<b>913.7</b>	<b>928.7</b>	<b>1.041.6</b>
<b>Change from previous year</b>		<b>6.8 %</b>	<b>-8.8 %</b>	<b>1.6 %</b>	<b>12.2 %</b>
<b>DDDm</b>					
C02 Drugs for high blood pressure	4.5	5.0	5.4	5.9	6.0
C03 Diuretics	211.8	215.1	222.6	226.6	230.0
C07 Beta-receptor blockers	50.0	54.1	59.8	64.7	67.5
C08 Calcium antagonists	82.0	85.6	94.1	101.3	114.7
C09 Drugs affecting RAS (renin-angiotensin system)	126.1	148.2	170.6	195.2	221.4
- of which ACE-inhibitors	82.4	94.2	109.0	125.8	143.1
- of which Angiotensin II antagonists	43.7	54.0	61.5	69.4	78.3
<b>Total</b>	<b>474.5</b>	<b>507.9</b>	<b>552.5</b>	<b>593.6</b>	<b>639.5</b>
<b>Change from previous year</b>		<b>7.0 %</b>	<b>8.8 %</b>	<b>7.4 %</b>	<b>7.7 %</b>

Source: Danish Medicines Information.