

9. Blood Pressure

Risk of CHD is directly related to both systolic and diastolic blood pressure levels. Meta-analysis of prospective data on over one million adults has shown that for adults aged 40 to 69 years, each 20mmHg increase in usual systolic blood pressure, or 10mmHg increase in usual diastolic blood pressure, doubles the risk of death from CHD¹. At older ages the increase in risk of death from CHD is smaller, around 50% increase for every 20mmHg increase in usual systolic or 10mmHg increase in diastolic blood pressure in adults aged 80 to 89 years.

The World Health Report 2002 estimates that around 11% of all disease burden in developed countries is caused by raised blood pressure, and that over 50% of CHD and almost 75% of stroke in developed countries is due to systolic blood pressure levels in excess of the theoretical minimum (115mmHg)².

More recently the INTERHEART study estimated that 22% of heart attacks in Western Europe and 25% of heart attacks in Central and Eastern Europe were due to a history of high blood pressure, and that those with a history of hypertension were at just under twice the risk of a heart attack compared to those with no history of hypertension³.

The 2004 British Hypertension Society guidelines for hypertension management recommend that drug treatment should be considered for individuals with blood pressures of 140/90mmHg or over, and that optimal blood pressure treatment targets are a systolic blood pressure of less than 140mmHg and a diastolic blood pressure of less than 85mmHg (and lower still, at 130/85mmHg, in people with diabetes). The optimal blood pressure level is now classified as <120/<80mmHg⁴ (Table 9.1).

Both drug treatment and lifestyle changes - particularly weight loss, an increase in physical activity, and a reduction in salt and alcohol intake - can effectively lower blood pressure.

Overall levels

Rates of hypertension have dropped slightly in England since 1998, for both men and women at all ages. The largest decreases have occurred at older ages. For example, 73% of women aged 65 to 74 had hypertension in 1998 compared to 66% in 2006 (Table 9.2 and Figure 9.2).

In 2006, 31% of men and 28% of women in England had hypertension (defined here as a systolic blood pressure of 140mmHg or over, or a diastolic blood pressure of 90mmHg or over) or were being treated for hypertension. Around three-fifths (58%) of men and nearly half (46%) of women with hypertension were not receiving treatment. Of those that were treated, around half remained hypertensive (Table 9.3).

The prevalence of hypertension increases with age in both sexes. For example, only 1% of women aged 16 to 24 are hypertensive, compared to 40% aged 55 to 64 and two-thirds aged 65 to 74 (Table 9.3 and Figure 9.3).

National and regional differences

Data from the Scottish Health Survey suggest that the prevalence of high blood pressure is similar in England and Scotland. In 2003, 34% of English men and 30% of English women were hypertensive compared to 33% of Scottish men and 33% of Scottish women⁵ (Table 9.4).

Data from Wales and Northern Ireland are not comparable with those for England and Scotland, as they are not based on direct blood pressure measurements. In Wales, the Welsh Health Survey 2004/05, showed that 19% of people reported being treated for raised blood pressure. In Northern Ireland, the Northern Ireland Health and Social Wellbeing Survey 2001, found that 19% of men and 27% of women reported having been informed by a health professional that they had high blood pressure (Table 9.5).

For men in England, the lowest levels of hypertension are found in the East of England (28%), and the highest levels are found in the North East (35%). The situation is similar for women, where the lowest levels are found in the East of England (23%) and the highest levels are found in Yorkshire and the Humber (30%) (Table 9.6).

Socio-economic differences

The prevalence of hypertension in men does not seem to vary by income quintile. In 2006, the prevalence was around 30% for each quintile. This is not the case for women where the prevalence of high blood pressure in the lowest income quintile is a third higher than in the highest income quintile (Table 9.7).

Ethnic differences

Data from the Health Survey for England show that in 2004 the proportion of men with high blood pressure in Bangladeshi men was half that of the general population; in Pakistani and Chinese men the proportion was two thirds that of the general population. Pakistani and Chinese women were half as likely to have high blood pressure compared to women in the general population (Table 9.8).

The prevalence of untreated hypertension was lower among Pakistani, Bangladeshi and Chinese men and Indian, Pakistani, Bangladeshi and Chinese women than in the general population⁶.

International differences

Data from the World Health Organization⁷ show a wide range in mean systolic blood pressure throughout Europe. For men in 2002, the lowest systolic blood pressure was found in Turkey (117.6 mmHg) and the highest in Georgia (139.7 mmHg). For women in 2002 the lowest was Denmark (114.8 mmHg) and the highest was Georgia (134.6 mmHg). Mean systolic blood pressure in the UK in 2002 was 132.2 mmHg for men and 121.2 mmHg for women (Table 9.9 and Figures 9.9a and 9.9b).

Trend data from the World Health Organization's MONICA Project show that between the mid-1980s and mid-1990s the majority of populations included in the study experienced a decline in average systolic blood pressure. Compared to other cities in the study, declines in average systolic blood pressure were moderately high in Glasgow but low in Belfast, where no significant decline occurred⁸.

1. Prospective Studies Collaboration (2002) Age-specific relevance of usual blood pressure to vascular mortality: a meta analysis of individual data for one million adults in 61 prospective studies. *The Lancet*; 360: 1903-1913.
2. World Health Organization (2002) *The World Health Report 2002. Reducing Risks, Promoting Healthy Life*. World Health Organization: Geneva.
3. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, McQueen M, Budaj A, Pais P, Varigo J, Lisheng A, on behalf of the INTERHEART Study Investigators (2004) Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART Study): case-control study. *The Lancet*; 364: 937-952.
4. Williams B, Poulter N, Brown M, Davis M, McInnes G, Potter J, Sever P, Thom S; the BHS guidelines working party, for the British Hypertension Society (2004) British Hypertension Society guidelines for hypertension management 2004 (BHS-IV): summary. *BMJ*; 328: 634-640.
5. *The Scottish Health Survey (SHS) uses the same methods as the Health Survey for England.*
6. See Table 7.3, page 32 in *The Health of Minority Ethnic Groups - headline tables (2005) Health Survey for England 2004*. NHS Health and Social Care Information Centre.
7. World Health Organization (2005) *The SuRF Report 2. Surveillance of chronic disease Risk Factors – Country level data and comparable estimates*. WHO Global Infobase (www.who.int/ncd_surveillance/infobase/web/surf2/start.html).
8. WHO MONICA Project (2003) *Monica monograph and multimedia sourcebook*. Edited by Hugh Tunstall-Pedoe for the WHO MONICA Project. WHO: Geneva.

Table 9.1 *Blood pressure recommendations and hypertension definition for the United Kingdom*

<i>Recommendations</i>	
Systolic blood pressure – general population	No greater than 140mmHg
Systolic blood pressure – diabetes or chronic renal failure sufferers	No greater than 130mmHg
Diastolic blood pressure – general population	No greater than 85mmHg
Diastolic blood pressure – diabetes or chronic renal failure sufferers	No greater than 80mmHg
<i>Hypertension</i>	
Definition	Systolic blood pressure greater than or equal to 140mmHg, and / or diastolic blood pressure greater than or equal to 90mmHg
Threshold for drug treatment	Sustained levels of systolic blood pressure greater than or equal to 160mmHg, and / or diastolic blood pressure greater than or equal to 100mmHg

Table 9.2 *Prevalence of high blood pressure by sex and age, adults aged 16 and over, 1998 to 2006, England*

	1998	2000	2001	2002	2003	2005	2006
MEN	%	%	%	%	%	%	%
All ages	41	40	41	37	38	39	39
16-24	16	12	20	14	11	9	10
25-34	21	21	18	17	13	17	18
35-44	26	27	23	24	21	26	18
45-54	42	41	41	36	37	33	35
55-64	60	54	58	53	53	53	51
65-74	70	70	68	62	65	64	63
75 and over	73	65	70	71	67	69	68
<i>Base:</i>							
All ages	5,401	2,552	4,840	2,161	4,108	1,916	3,924
16-24	594	260	516	947	370	185	335
25-34	984	424	711	308	557	243	473
35-44	981	510	917	445	806	312	715
45-54	981	429	877	348	699	351	663
55-64	766	378	786	335	736	367	739
65-74	665	323	660	287	577	264	592
75 and over	430	228	373	184	363	194	407
WOMEN							
All ages	33	33	35	34	32	29	31
16-24	4	4	5	4	2	1	1
25-34	7	6	7	6	5	4	3
35-44	13	10	12	12	10	10	10
45-54	31	31	34	33	24	23	26
55-64	52	52	54	52	47	42	42
65-74	73	75	74	70	68	62	66
75 and over	78	81	79	79	77	73	73
<i>Base:</i>							
All ages	6,483	3,046	5,813	2,668	5,075	2,392	4,838
16-24	692	268	582	1,145	479	216	411
25-34	1,142	516	896	380	715	325	602
35-44	1,190	621	1,144	554	994	429	965
45-54	1,164	562	1,056	440	837	453	810
55-64	896	419	866	408	889	431	870
65-74	751	366	716	324	617	298	638
75 and over	648	294	553	274	544	240	542

Notes: Informants were classified as having high blood pressure if their systolic blood pressure was 140mmHg or over or their diastolic blood pressure was 90mmHg or over, or they were taking medicine prescribed for blood pressure. All data are presented unweighted for analysis of trends. The measurement of blood pressure in the Health Survey for England series changed in 2003; the results presented here for 2003, 2005 and 2006 have been adapted for comparison with the earlier measurement methods.

Source: National Centre for Social Research (2008) Health Survey for England 2006. Adult trend tables.
<http://www.ic.nhs.uk/statistics-and-data-collections/healthand-lifestyles-related-surveys/health-survey-for-england/health-survey-for-england-2006-latest-trends>
 Accessed 15th February 2008

Figure 9.2a Prevalence of high blood pressure, by age, men aged 16 and over, 1998 to 2006, England

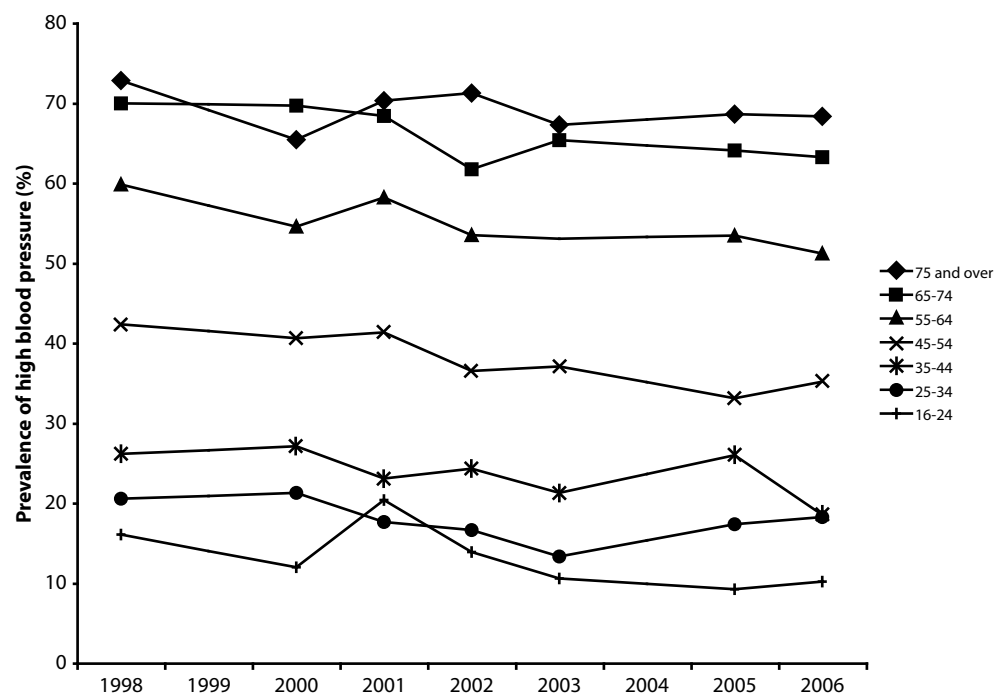


Figure 9.2b Prevalence of high blood pressure, by age, women aged 16 and over, 1998 to 2006, England

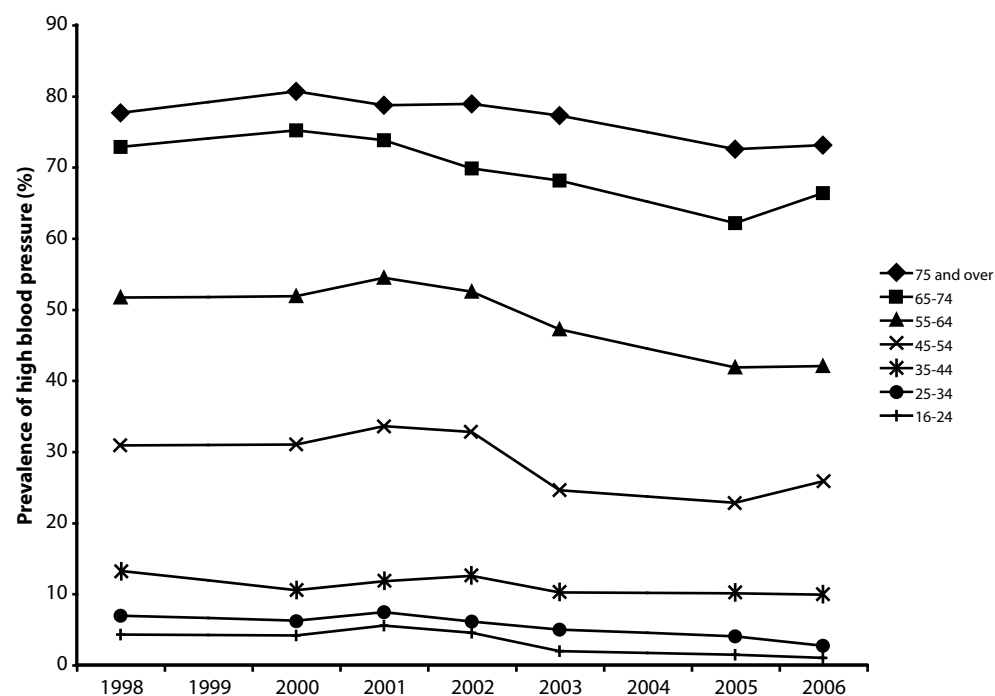


Table 9.3 *Blood pressure levels by sex and age, adults aged 16 and over, 2006, England*

<i>Blood pressure level</i>	<i>All ages</i>	<i>16-24</i>	<i>25-34</i>	<i>35-44</i>	<i>45-54</i>	<i>55-64</i>	<i>65-74</i>	<i>75+</i>
	%	%	%	%	%	%	%	%
MEN								
Normotensive untreated	69	94	84	84	66	53	40	34
Normotensive treated	7	-	0	1	6	11	22	19
Hypertensive treated	6	-	0	1	6	10	16	22
Hypertensive untreated	18	6	16	14	22	26	23	26
<i>All with high blood pressure</i>	<i>31</i>	<i>6</i>	<i>16</i>	<i>16</i>	<i>34</i>	<i>47</i>	<i>60</i>	<i>66</i>
<i>Unweighted base</i>	<i>3,924</i>	<i>335</i>	<i>473</i>	<i>715</i>	<i>663</i>	<i>739</i>	<i>592</i>	<i>407</i>
<i>Weighted base</i>	<i>4,175</i>	<i>604</i>	<i>666</i>	<i>799</i>	<i>694</i>	<i>630</i>	<i>458</i>	<i>325</i>
WOMEN								
Normotensive untreated	72	99	97	90	74	60	37	31
Normotensive treated	8	1	1	2	6	12	20	20
Hypertensive treated	7	0	-	1	3	8	17	27
Hypertensive untreated	13	1	2	6	17	19	27	22
<i>All with high blood pressure</i>	<i>28</i>	<i>1</i>	<i>3</i>	<i>10</i>	<i>26</i>	<i>40</i>	<i>63</i>	<i>69</i>
<i>Unweighted base</i>	<i>4,838</i>	<i>411</i>	<i>602</i>	<i>965</i>	<i>810</i>	<i>870</i>	<i>638</i>	<i>542</i>
<i>Weighted base</i>	<i>4,492</i>	<i>583</i>	<i>641</i>	<i>851</i>	<i>700</i>	<i>680</i>	<i>504</i>	<i>535</i>

Notes: Data are weighted for non response.

Informants were classified as having high blood pressure if their systolic blood pressure was 140mmHg or over or their diastolic blood pressure was 90mmHg or over, or they were taking medicine affecting blood pressure. "Treated" means taking medication prescribed for high blood pressure.

Source: Joint Health Surveys Unit (2008) Health Survey for England 2006. Cardiovascular disease and risk factors. The Information Centre: Leeds.

Figure 9.3 *Prevalence of high blood pressure by sex and age, adults aged 16 and over, 2006, England*

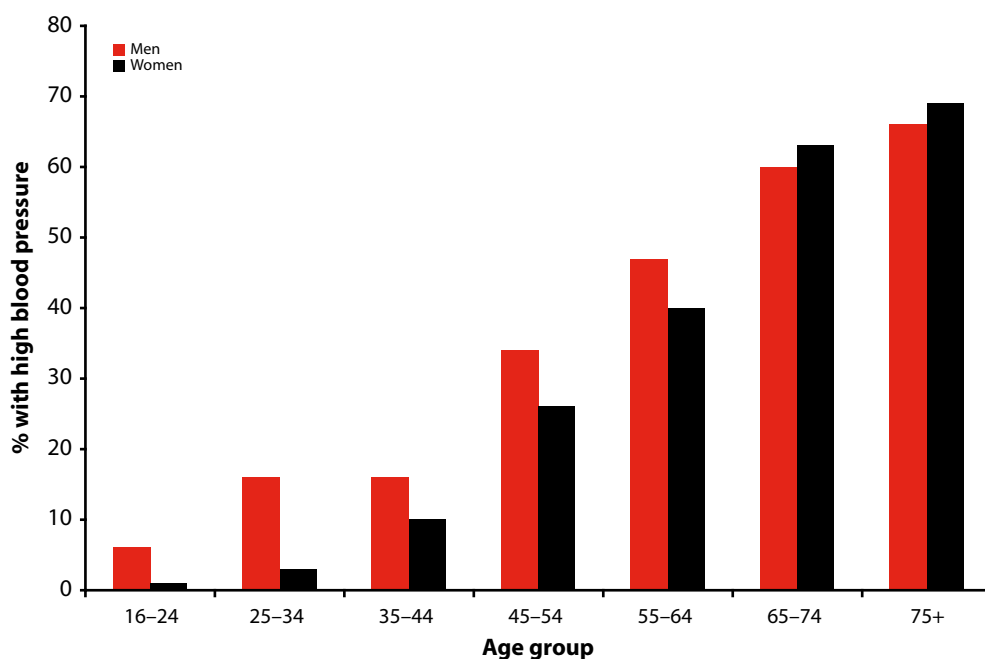


Table 9.4 *Blood pressure levels by sex and age, adults aged 16 and over, 2003, Scotland*

<i>Blood pressure level</i>	<i>All ages</i>	<i>16-24</i>	<i>25-34</i>	<i>35-44</i>	<i>45-54</i>	<i>55-64</i>	<i>65-74</i>	<i>75+</i>
	%	%	%	%	%	%	%	%
MEN								
Normotensive untreated	67	88	86	79	73	48	39	23
Normotensive treated	6	0.7	-	3	4	14	14	14
Hypertensive treated	6	-	0	1	6	7	17	29
Hypertensive untreated	21	11	14	18	17	31	30	35
<i>All with high blood pressure</i>	<i>33</i>	<i>12</i>	<i>15</i>	<i>21</i>	<i>27</i>	<i>51</i>	<i>60</i>	<i>77</i>
<i>Weighted base</i>	<i>2,032</i>	<i>294</i>	<i>296</i>	<i>403</i>	<i>350</i>	<i>314</i>	<i>226</i>	<i>149</i>
<i>Unweighted base</i>	<i>1,933</i>	<i>142</i>	<i>209</i>	<i>369</i>	<i>328</i>	<i>377</i>	<i>301</i>	<i>207</i>
WOMEN								
Normotensive untreated	67	98	95	83	72	51	32	23
Normotensive treated	7	-	-	2	6	13	19	15
Hypertensive treated	9	-	-	1	4	13	23	32
Hypertensive untreated	17	2	6	14	17	24	27	30
<i>All with high blood pressure</i>	<i>33</i>	<i>2</i>	<i>6</i>	<i>17</i>	<i>27</i>	<i>49</i>	<i>68</i>	<i>77</i>
<i>Weighted base</i>	<i>2,382</i>	<i>315</i>	<i>348</i>	<i>440</i>	<i>373</i>	<i>340</i>	<i>285</i>	<i>281</i>
<i>Unweighted base</i>	<i>2,538</i>	<i>181</i>	<i>299</i>	<i>493</i>	<i>454</i>	<i>478</i>	<i>351</i>	<i>282</i>

Notes: Adults aged 16 and over with a valid blood pressure reading and data on medication.

Informants were classified as having high blood pressure if their systolic blood pressure was 140mmHg or over or their diastolic blood pressure was 90mmHg or over, or they were taking medicine affecting blood pressure. "Treated" means taking medication prescribed for high blood pressure.

Source: The Scottish Executive (2005). The Scottish Health Survey 2003. The Stationery Office: Edinburgh

Table 9.5 *Prevalence of high blood pressure by sex and age, adults aged 16 and over, 2004/05, Wales*

	<i>All ages</i>	<i>16-24</i>	<i>25-34</i>	<i>35-44</i>	<i>45-54</i>	<i>55-64</i>	<i>65-74</i>	<i>75+</i>
	%	%	%	%	%	%	%	%
MEN								
	17	1	2	5	16	31	43	47
<i>Base:</i>	<i>7,132</i>	<i>914</i>	<i>886</i>	<i>1,219</i>	<i>1,202</i>	<i>1,241</i>	<i>991</i>	<i>679</i>
WOMEN								
	20	1	2	4	16	28	49	57
<i>Base:</i>	<i>8,198</i>	<i>1,003</i>	<i>1,064</i>	<i>1,437</i>	<i>1,356</i>	<i>1,364</i>	<i>1,044</i>	<i>930</i>

Notes: Data refer to adults who are currently being treated for high blood pressure, and are not based upon blood pressure measurements. Because of differences in data collection techniques, these results are incomparable with prevalence estimates for England and Scotland collected by the Health Survey series.

Source: Welsh Assembly Government (2006) Welsh Health Survey 2004/05. Welsh Assembly Government: Cardiff.

Table 9.6 *Blood pressure levels by sex and Government Office Region, adults aged 16 and over, 2006, England*

	North East %	North West %	Yorkshire & the Humber %	East Midlands %	West Midlands %	East of England %	London %	South East %	South West %
<i>GHQ12 score</i>									
MEN									
Normotensive untreated	65	69	69	68	68	72	69	69	74
Normotensive treated	9	4	5	8	7	7	9	8	4
Hypertensive treated	5	6	7	7	6	5	9	3	5
Hypertensive untreated	21	21	19	18	18	16	13	20	16
<i>All with high blood pressure</i>	35	31	31	32	32	28	31	31	26
<i>Unweighted base</i>	219	579	435	385	425	478	322	379	702
<i>Weighted base</i>	211	547	427	367	454	500	577	402	692
WOMEN									
Normotensive untreated	72	73	70	71	75	77	76	73	74
Normotensive treated	8	6	7	9	8	7	6	7	8
Hypertensive treated	7	8	8	9	6	6	7	5	6
Hypertensive untreated	12	13	14	11	10	11	11	15	12
<i>All with high blood pressure</i>	28	27	30	29	25	23	24	27	26
<i>Unweighted base</i>	275	734	525	473	517	532	391	530	861
<i>Weighted base</i>	225	637	447	370	479	496	582	498	758

Notes: Data are weighted for non response. Informants were classified as having high blood pressure if their systolic blood pressure was 140mmHg or over or their diastolic blood pressure was 90mmHg or over, or they were taking medicine affecting blood pressure. "Treated" means taking medication prescribed for high blood pressure.

Source: Joint Health Surveys Unit (2008) Health Survey for England 2006. Cardiovascular disease and risk factors. The Information Centre: Leeds.

Table 9.7 *Blood pressure levels by sex and equivalised household income, 2006, England*

<i>Blood pressure level</i>	Highest %	2nd %	3rd %	4th %	Lowest %
MEN					
Normotensive untreated	70	72	68	70	69
Normotensive treated	6	4	7	6	8
Hypertensive treated	5	7	6	6	6
Hypertensive untreated	18	17	18	17	17
<i>All with high blood pressure</i>	30	28	32	30	31
<i>Unweighted base</i>	801	742	694	582	461
<i>Weighted base</i>	873	802	690	566	500
WOMEN					
Normotensive untreated	77	75	73	71	70
Normotensive treated	8	6	7	9	9
Hypertensive treated	5	6	7	8	6
Hypertensive untreated	10	13	13	12	15
<i>All with high blood pressure</i>	23	25	27	29	30
<i>Unweighted base</i>	791	854	873	855	650
<i>Weighted base</i>	732	786	794	775	607

Notes: Equivalised household income is a measure that takes account of all individuals within a household that are dependent upon the income.

Data are weighted for non response. The weighted base is the base for age-standardised percentages. For method of age-standardisation see source.

Source: Joint Health Surveys Unit (2008) Health Survey for England 2006. Cardiovascular disease and risk factors. The Information Centre: Leeds.

Table 9.8 *Prevalence of high blood pressure by sex and ethnic group, adults aged 16 and over, 2004, England*

	General population	Black Caribbean	Black African	Indian	Pakistani	Bangladeshi	Chinese	Irish
<i>High blood pressure</i>	%	%	%	%	%	%	%	%
MEN	32	38	25	33	20	16	20	36
<i>Weighted base</i>	4,420	169	136	361	159	53	63	667
<i>Unweighted base</i>	4,108	155	123	265	162	99	153	240
WOMEN	29	32	19	18	15	19	16	29
<i>Weighted base</i>	4,702	249	183	442	207	83	66	923
<i>Unweighted base</i>	5,075	243	154	320	207	144	166	328

Notes: Adults with a valid blood pressure reading and data on medication.

Informants were classified as having high blood pressure if their systolic blood pressure was 140mmHg or over or their diastolic blood pressure was 90mmHg or over, or they were taking medication for high blood pressure.

Comparative data for the general population are not available for 2004 so data have been taken from 2003 survey.

Source: Department of Health (2005) Health Survey for England 2004. The Health of Minority Ethnic Groups. The Stationery Office: London.

Table 9.9 *Mean systolic blood pressure estimates and projections for 2002, 2005 and 2010 by sex, adults aged 15 and over, all available countries, Europe*

Country	MEN			WOMEN		
	2002	2005	2010	2002	2005	2010
Albania	128.8	128.8	128.8	125.1	125.1	125.1
Austria	128.6	127.9	126.8	122.4	121.6	120.2
Belarus	134.2	134.2	134.2			
Belgium	127.2	127.2	127.2	118.9	118.9	118.9
Bosnia and Herzegovina	130.1	130.1	130.1	130.7	130.7	130.7
Bulgaria	132.4	132.4	132.4	125.2	125.2	125.2
Cyprus	127.7	127.7	127.7	123.4	123.4	123.4
Czech Republic	129.8	129.1	128.0	123.1	122.2	120.6
Denmark	122.2	121.6	120.6	114.8	114.1	113.1
Estonia	131.4	131.4	131.4	121.7	121.7	121.7
Finland	131.4	130.3	128.5	124.6	123.2	121.0
France	129.3	127.2	123.9	124.6	122.5	119.2
Georgia	139.7	139.7	139.7	134.6	134.6	134.6
Germany	134.4	134.4	134.4	130.0	130.0	130.0
Greece	130.5	129.8	128.6	124.1	123.2	121.7
Hungary	133.7	133.7	133.7	126.1	126.1	126.1
Iceland	124.9	124.9	124.9	117.9	117.9	117.9
Israel	127.5	126.8	125.7	121.1	120.2	118.8
Italy	128.8	127.4	125.0	121.8	120.3	118.0
Lithuania	136.7	136.7	136.7	133.8	133.8	133.8
Luxembourg	125.8	125.1	124.0	120.8	120.0	118.7
Malta	132.3	131.6	130.4	128.1	127.2	125.8
Netherlands	130.5	129.8	128.7	121.6	120.8	119.5
Poland	128.6	128.6	128.6	123.3	123.3	123.3
Portugal	126.7	126.1	125.1	124.4	123.6	122.3
Romania	126.8	126.8	126.8	122.0	122.0	122.0
Russian Federation	129.4	129.4	129.4	127.4	127.4	127.4
Serbia and Montenegro	132.7	132.7	132.7	129.9	129.9	129.9
Spain	123.1	122.5	123.3	117.6	117.0	115.9
Sweden	130.8	130.8	130.8	125.0	125.0	125.0
Switzerland	126.2	125.4	124.0	115.4	114.0	111.9
Turkey	117.6	117.6	117.6	118.8	118.8	118.8
Ukraine	127.2	127.2	127.2	125.3	125.3	125.3
United Kingdom	132.2	130.9	128.7	126.6	125.3	123.1
Uzbekistan	121.4	121.4	121.4	121.2	121.2	121.2

Notes: Values age-adjusted to the WHO Standard Population.

Mean SBP is measured in mmHg.

Standard deviation available upon request, contact infobase@who.int

Source: World Health Organization (2005) *The SuRF Report 2. Surveillance of chronic disease Risk Factors - Country-level data and comparable estimates*. WHO Global InfoBase (<http://infobase.who.int>)

Figure 9.9a Mean systolic blood pressure estimates, men aged 15 and over, all available countries, 2002, Europe

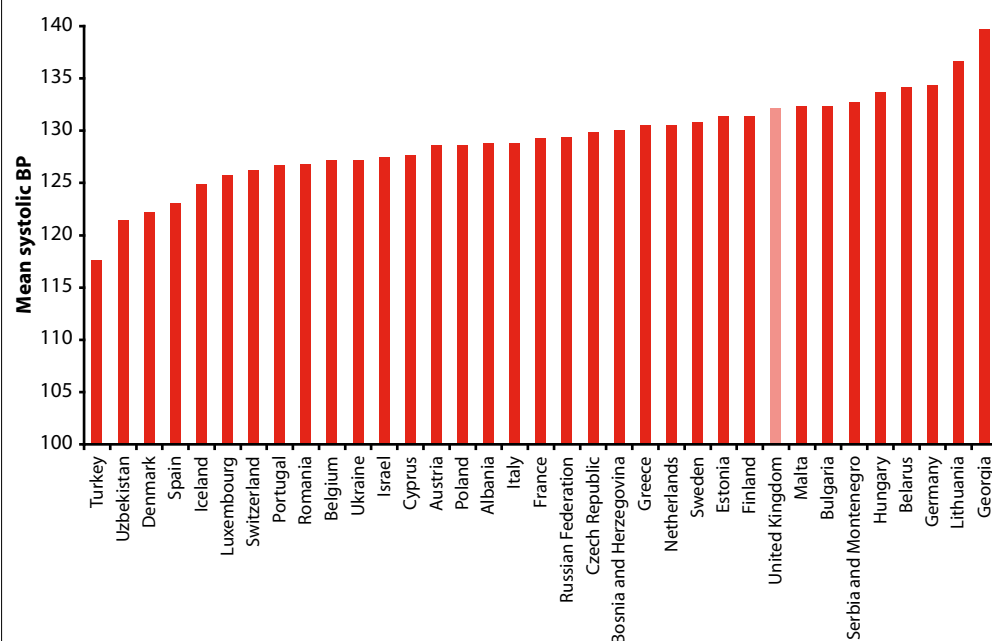


Figure 9.9b Mean systolic blood pressure estimates, women aged 15 and over, all available countries, 2002, Europe

