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Some features of mortality in the member states of the ECE

by

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NOTE

Any data provided under the heading "Yugoslavia" relate to the Federal Republic of Yugoslavia which, in accordance with the General Assembly Resolutions 47/1 and 47/229, cannot continue automatically the membership of the former Socialist Federal Republic of Yugoslavia.

CONTENTS

1. INTRODUCTION

The Economic Commission for Europe – ECE – has 55[1] member states in three continents, representing nearly 36 per cent of surface of the Land of Earth and about 20 per cent of the world population. Three countries: the Russian Federation, Canada and the United States have the largest territory (China is not included), and the other extreme is represented by what are in fact city-states, Monaco and San Marino, with very small territory. All the member states of the G-8 group, except Japan, belong to the ECE. GDP per capita varies between US$ 340 (Tajikistan) and US$ 41210 (Luxembourg). There are countries with a one thousand year continuity of political history and others which have just arrived on the scene – the newly independent states (NIS) of the former Soviet Union. In most countries the majority of the population belong to Christianity, in Central Asia to Islam and in Israel to Judaism. The countries of the ECE, therefore, embody an immense economic might and an exceptional economic, political and cultural diversity.

This family of 55 nations is a very diverse group indeed. Yet there is one criterion which divides them clearly into two well-circumscribed groups: the historic relation between their economy and the market. Thus the countries with an **established market economy (EME),** are clearly distinguishable from nations which until recently had a **socialist economy (FSE)**[2] in which (main) "invisible hand" was not the market but state-controlled planning.

The EME is the common denominator which links countries as diverse as the United States and Turkey, Sweden and Portugal. On the other hand the quasi-non-existence of the market, i.e. the FSE, was what Russia and the Czech Republic, Hungary and Turkmenistan all had in common. All these FSE are in transition to EME. They are in various stages of that complicated process with its concomitant effects: political and socio-economic, and of course demographic-epidemiological.

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[1] Andorra, Lichtenstein, Monaco and San Marino are not included in the analysis.
[2] Formerly socialist economies (FSE)

In principle and for purposes of methodology, the EME may be divided in terms geography, common cultural heritage, similar historical past, demographic-epidemiological development, into

- the Nordic countries - NC: Denmark, Finland, Iceland, Norway, Sweden;
- Western European countries - WEC: Austria, Belgium, France, Germany, Ireland, Luxembourg, the Netherlands, Switzerland, United Kingdom;
- Mediterranean countries - MC: Cyprus, Greece, Israel, Italy, Malta, Portugal, Spain;
- Northern America - NC: Canada, United States;
- Turkey represents a particular entity which cannot be arranged to any of the former groups.

The FSE may be grouped as follows:

- Countries of Central and Eastern Europe - CCEE: Czech Republic, (the former German Democratic Republic), Hungary, Poland, Slovakia;
- Countries of the Balkan peninsula - CBP: Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Romania, Slovenia, Federal Republic of Yugoslavia, the Former Yugoslav Republic of Macedonia;
- Baltic states - BS: Estonia, Latvia, Lithuania;
- Newly independent states-6 - NIS-6[3] (of the former Soviet Union): Azerbaijan, Armenia, Belarus, Georgia, Republic of Moldova, Ukraine;
- Russian Federation - RF;
- Central Asian Republics - CAR: Kazakstan, Kyrgystan, Tajikistan, Turkmenistan, Uzbekistan.

Northern America has the largest population: 300 million people and the Baltic states have the smallest: 7.6 million people.

[3] NIS-6 is used to denote the group of six countries, since NIS is applied to *all* newly independent states of the former Soviet Union.

Recently two important topics have aroused particular interest in studying mortality of the developed countries: the east-west mortality gap and the decline in old age mortality. These two issues will be dealt with in detail.

The east-west mortality gap has gradually developed over the last twenty-five or thirty years. It has been deepened (but not brought about) by the political and socio-economic transition since 1990. In this paper mortality will be analyzed with particular emphasis on the time trend in the 1990s. Yet the present can be only understood if the past is remembered. Therefore, where it is possible, the time trend over the five decades or so since the end of World War II will also be briefly described. However, because many data relevant in analyzing mortality in the post-Soviet states are not available before 1980, a compromise should be made. Analysis of mortality based on regional groups will be performed only from 1980 onwards. In the period before 1980 the time trend in mortality will be followed by using the data of some of the individual countries.

2. GENERAL MORTALITY

By the late 1940s and early 1950s the direct consequences of World War II were basically over. The life tables reveal a substantially higher life expectancy than the last pre-war ones, mainly as a result of much lower infant and child mortality. Countries like the war-torn Hungary, Czechoslovakia, and Finland and the (by European standards) poor Spain had similar life expectancies: between about sixty one and sixty three years. On the other hand life expectancy was 70.3 years in welfare-state Sweden and 68.1 years in the wealthy United States. Around 1960 Austria, Czechoslovakia, Finland, France, the two Germanys, Hungary, Spain, the United States, even the Soviet Union had life expectancies between 68.5 and 70.5 years. On the other hand Sweden's life expectancy was 73.6 years. But two decades later the life expectancy gap had widened significantly between the countries of East and West. In the West, life expectancy was 72.8 years in Austria, 73.7 years in Finland, 74.9 years in France and 75.6 years in Spain; and in the East it was 70.4 years in Czechoslovakia, 69.1 years in Hungary, 70.4 years in Poland and only 67.7 years in the Soviet Union. In contrast to this the difference in life expectancy was insignificant between the two Germanys. Over the same

twenty year period life expectancy increased by six years in Spain and only 0.7 years in Hungary. In the Soviet Union it was 0.9 year lower in 1980-1981 than in 1958-1959.

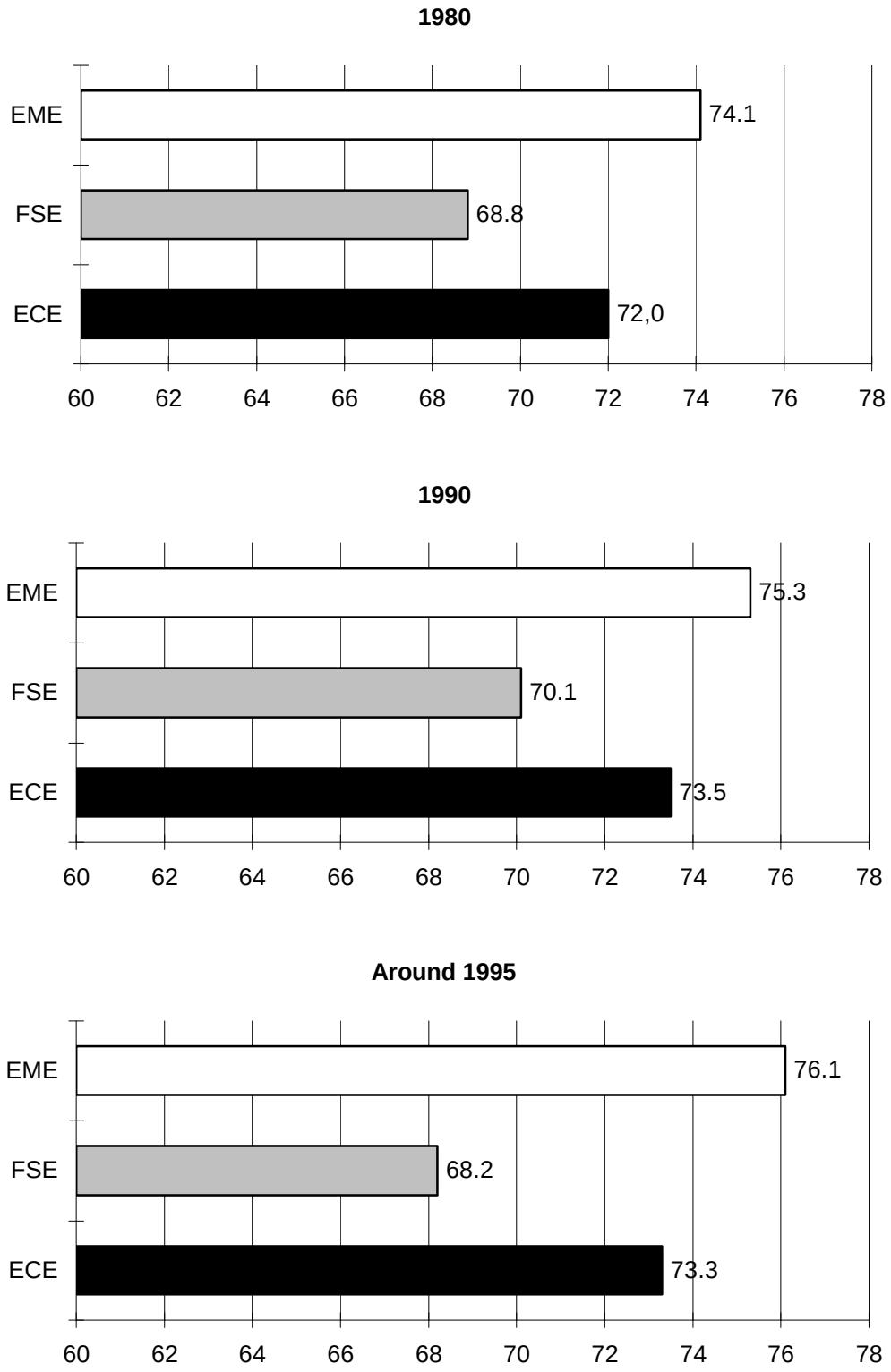
Life expectancy cannot reveal changes in mortality which have opposing effects on different segments of the population. In the FSE infant and child mortality decreased significantly (except for a brief period in the former Soviet Union) at the same time that adult (male) mortality was increasing critically. Since life expectancy tells the end result of the two opposing trends, the rise in adult (male) mortality remained hidden in terms of life expectancy until the loss due to the increase in death rates for middle aged men surpassed the gain from the decrease in infant and child mortality. Under these circumstances the diminishing growth in life expectancy indicated a critical epidemiological situation. In fact male life expectancy had already started to decrease in the late 1960s and early 1970s in Bulgaria, Hungary, Latvia, Lithuania, Russia and the Ukraine.

As a result of the divergent time trend in mortality the difference in terms of life expectancy was 5.3 years between the EME and FSE in 1980. In the next one and a half decade or so the difference grew further and by the mid 1990s the **EME had a life expectancy eight years higher than the FSE**[4]**.**

The number of deaths was about twelve million in the member states of the ECE, nearly seven million occured in the EME and five million in the FSE. The differences in the **current level of mortality** are remarkable big: crude death rates vary between 4.7 in Albania and 14.9 in the Russian Federation per thousand in 1996 and 1995 respectively. The highest life expectancy was 79.1 years in Sweden, in 1995, whilst the lowest value, 64.0 years, was found in Turkmenistan in 1994; Albania represented the median with 73.5 years in 1993. The difference between the highest and lowest life expectancy at birth was 15.1 years and the standard deviation was 4.26.

[4] Weighted averages calculated by the size of national populations.

Figure 2.1
Life expectancy at birth in the EME, FSE and ECE
1980, 1990, around 1995
Men, women together



Data from the WHO HFA data base.
Weighted averages calculated by the size of national populations.
EME – Established Market Economies; **FSE** – Formerly Socialist Economies;
ECE – Member states of Economic Commission for Europe.

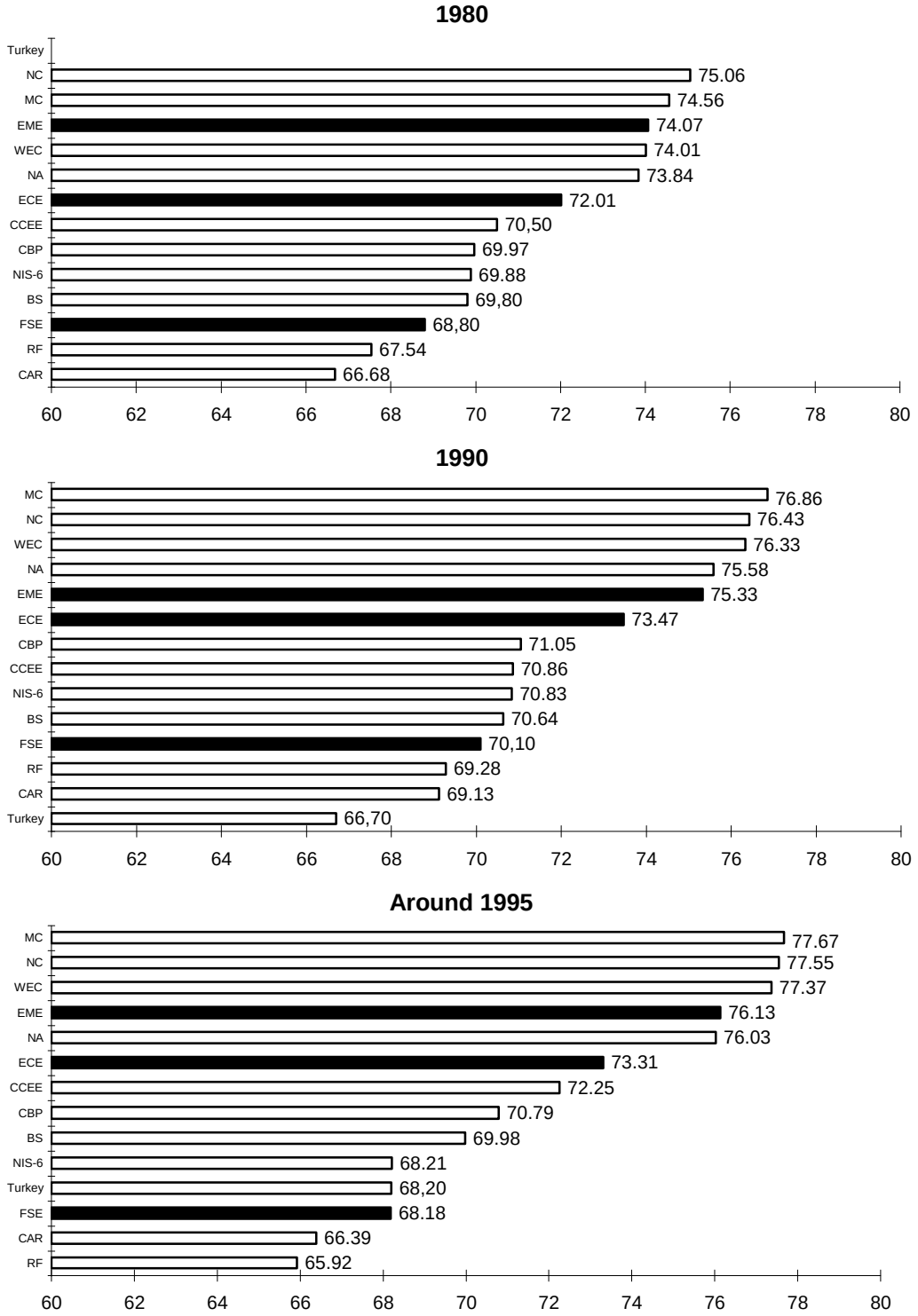
Since all the EME except Turkey, which is a class in itself, have higher life expectancy at birth than the FSE, in the rank order of 51 nations only EME can be found in the first 23 places, with the FSE following in the 24th to 51st places, with one exception: Turkey in 42nd 43rd place. The Elbe divides Europe into high and low life expectancy regions. Even in the case of Germany life expectancy is 2.5 years higher west of the Elbe than east of the Elbe.

It should be noted that neither the EME nor the FSE have a uniform mortality pattern, much less a similar time trend, but despite an **uneven epidemiological development a convergence** in terms of life expectancy can be observed among the EME. Uneven epidemiological development does not necessarily result in convergence: the overall tendency may be not to catch up, but to fall behind. Just this has been happening among the FSEs.

By the mid 1990s the EME had reached a life expectancy of 76.1 years. In the early 1990s, for the first time, the Mediterranean countries as a group had the highest life expectancy, although the advantage over the Nordic and western European countries could be measured only in a few tenths of years. On the other hand Turkey had a life expectancy 9.5 years lower than the MC.

Life expectancy in the EME has increased by 2.1 years on average over the last one-and-a-half decades. The biggest increase has occurred in the WEC group where it has been 3.4 years. The NC, which had the highest life expectancy in the early 1980s, gained only 2.5 years in terms of life expectancy between 1980 and 1995. The achievement of the MC has been almost as good as that of the WEC: 3.1 years increase, whilst in NA it was 2.2 years. The gains in life expectancy over the last fifteen years are fairly impressive considering that the baseline value in 1980 was already high and that it has been achieved to some extent as a result in improving probabilities of surviving in old age.

Figure 2.2
Life expectancy at birth in the groups of EME, FSE and ECE
1980, 1990, around 1995
Men, women together



Data from WHO mortality data base.

Weighted averages calculated by the size of national populations.

EME – Established Market Economies; **FSE** – Formerly Socialist Economies;

ECE – Member states of Economic Commission for Europe; **NC** – Nordic countries; **WEC** – Western Europe;

MC – Mediterranean countries; **NA** – North America; **CCEE** – Countries of Central and Eastern Europe;

CBP – Countries of the Balkan Peninsula; **BS** – Baltic States; **RS** – Russian Federation;

NIS-6 – Newly Independent States; **CAR** – Central Asian Republics;

The impact of uneven epidemiological development on the convergence of time trends in life expectancy can be convincingly proved by contrasting the differences in life expectancy between the EME groups and some individual countries in 1980 and 1995. In 1980 the life expectancy in the NC was 1.1 years higher than that in the WEC and 0.5 years higher than in the MC. By 1995 the MC had overtaken the NC but their advantage was a mere 0.1 and 0.3 years over the other two groups of European countries. The NA group's disadvantage compared with the group having highest life expectancy increased from 1.2 to 1.6 years.

By 1995 Finland overtook Denmark and Austria the United Kingdom in terms of life expectancy, but it was Portugal that achieved the greatest success, raising its life expectancy between 1980 and 1995 by almost four years, and decreasing its disadvantage *vis-à-vis* Sweden from 5.5 to 4.1 years; in other words the difference between the highest and lowest life expectancy country reduced by about twenty five per cent.

The increase in life expectancy over the last one and a half decade or so in the EME as a whole has proceeded at a slightly smaller annual rate since 1990 than between 1980 and 1989. It slowed down less in WEC, more in MC and NA, and quickened significantly in the NC.

It is relatively easy to explain the unexpected gains in life expectancy since the early 1980s (in some cases since the late 1960s and early 1970s) in the EME (see later). By contrast, no complete and accepted explanation exists at present regarding the time trend in mortality in the period between the early 1980s (late 1960s, early 1970s) and mid 1990s in the FSE. In general two basic questions are asked: What have been the causes and circumstances responsible for the increase in mortality? What has been the impact of political and socio-conomic transition on the time trend in mortality? An attempt will be made later to give an answer these two questions, at least to some extent. The next few paragraphs will highlight some distinctive characteristics of life expectancy time trends.

Life expectancy decreased from 68.8 years to 68.2 years between 1980 and 1995 in the FSE; consequently the gap in terms of life expectancy which was 5.3 years in 1980 between

the FSE and the EME increased to 8.0 years by 1995. The year 1990, when there was an abrupt change in the political and socio-economic system, marks a point of discontinuity in many aspects of life and it is therefore reasonable, if risky, to study time trends in mortality before and after this point. Life expectancy grew by 1.3 years between 1980 and 1990, but since then it has declined by 1.9 years. It should be noted that the gap in terms of life expectancy did not change between the EME and the FSE over the ten years to 1990.

Between 1980 and 1990 life expectancy grew in **every** group of the FSE, and since 1990 it has decreased in all groups of countries except the CCEE. The life expectancy increase in the CCEE was modest in the first ten years, but has become much more marked in the last five years or so. It was also moderate in CBP, where there was a slight decrease after 1990. Nevertheless, life expectancy over the two periods taken together grew by 0.8 years. These two groups consist of countries which were already independent (except the countries of the former Yugoslavia) before the political and socio-economic transition started. The BS, the RF, the NIS-6 and the CAR all became independent states following the collapse of the Soviet Union. **In these post-Soviet countries** the decline in life expectancy has been so rapid in the first half of the 1990s that the gains of 1980-1990 have been completely wiped out, and in all of these countries except the BS **the present life expectancy is lower than it was fifteen years ago**. (Indeed 1970 data for what are now the post-Soviet states – CAR had no data for that year – show that life expectancy in the mid 1990s was lower than it was a quarter of a century ago.) Since 1990 by far the largest decrease in life expectancy has occurred in the RF: 3.4 years, but the decline of 2.7 years in the CAR and 2.6 years in the NIS-6 are also unprecedented in peacetime in the 20th century. Only in the BS was the fall more modest: a mere 0.7 years.

In the CCEE the impact of transition on the time trend in mortality has been markedly favourable. In the Czech Republic life expectancy has increased in each year since 1990, by 2.5 years overall, and by 1996 it stood at 74.0 years; the annual rate of increase was more than twice as large between 1990 and 1996 as between 1970 and 1989. In Poland the growth in life expectancy was smaller over the last six years: 1.4 years, but the ratio of annual rates of

increase in the pre- and post-transition periods were even more favourable than in the Czech Republic. In Hungary life expectancy decreased between 1989 and 1993 and it was lower in 1993 than in 1970. However it increased over the last next years by 1.5 years and in 1997 stood at 70.6 years. In all the three countries life expectancies are higher now than they have ever been, although they are still low by international comparison within the developed world. In Slovakia life expectancy grew by 1.5 years between 1990-1993, but it dropped in 1994 and 1995. The former German Democratic Republic (GDR) counted as part of Central Europe and was therefore included in the regional average for 1980, but not for 1990 and 1995. The time trend in life expectancy is similar in the GDR to the other Central and Eastern European countries: a higher annual rate in increase since 1990 than before. Life expectancy for the CCEE in both 1990 and 1995 is slightly shorter without the GDR than it would have been with it, because the former GDR has a longer life expectancy than the other CCEE.

Data for life expectancy in the CBP are scanty mainly because of the collapse of the former Yugoslavia and the earlier isolation of Albania. Nonetheless the time trend in mortality in some countries may be evaluated. In Bulgaria and Romania life expectancy dropped after 1990; the decrease was 0.6 years in the former and 0.9 years in the latter country. These drops "may be attributed **in part** to the noticeably lower post-census population figures provided by the two countries" (Health of people in Europe. (p.4) Internet). In Croatia and Slovenia life expectancy increased, after a temporary decline, by 2.3 and 1.6 years respectively in the first half of the 1990s.

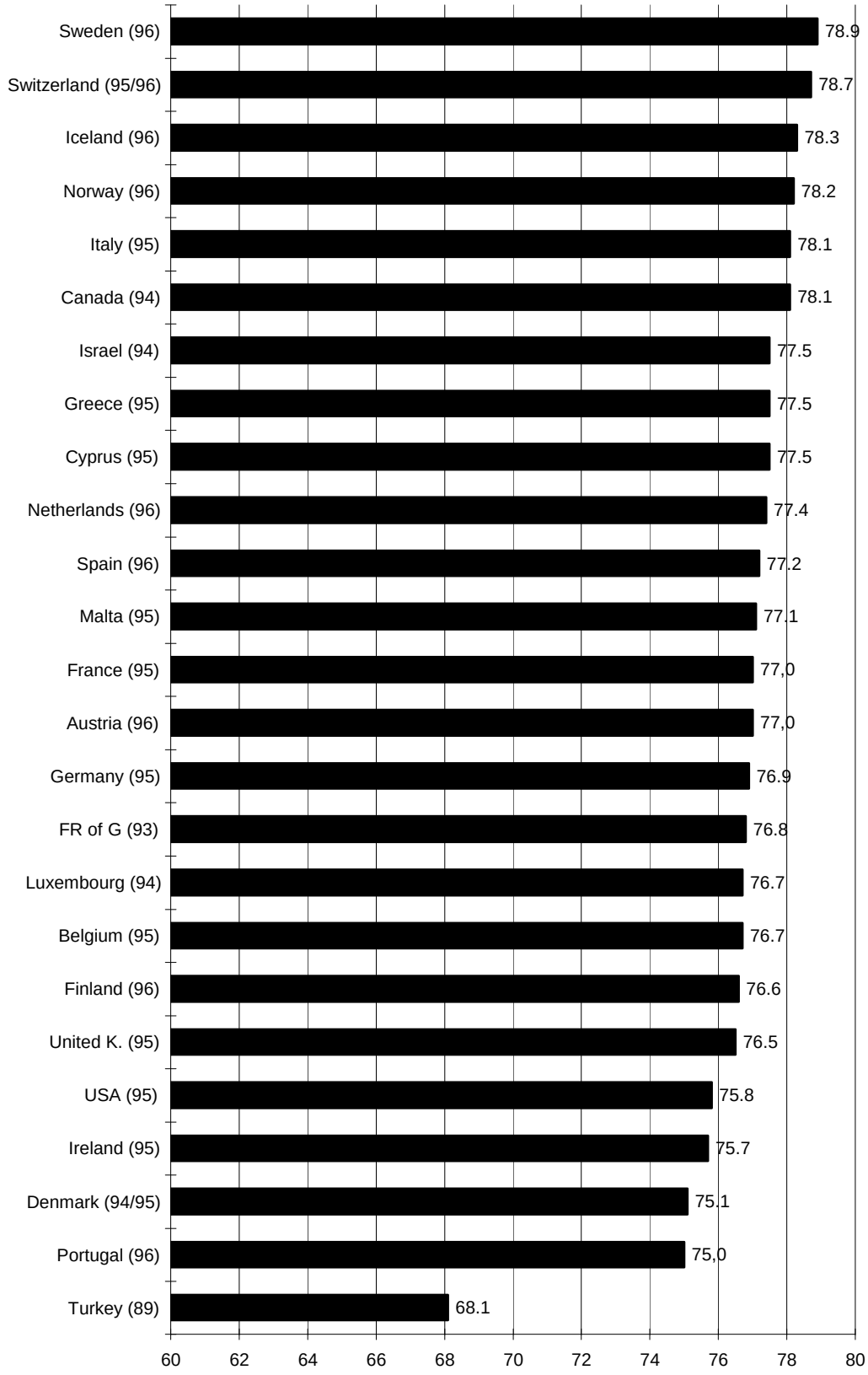
Analysis of the current level of mortality in the post-Soviet states, and its time trend, is for many reasons currently the greatest professional challenge. The Russian Federation is unlike any other country in the world, and the BS and the CAR have nothing in common except that they were member states of the defunct Soviet Union. It is a well known fact that a health crisis has developed in the former Soviet Union, which has become more serious in the early 1990s as a consequence of the political and socio-economic transition.

In most countries of the former Soviet Union the health crisis peaked in 1993 and 1994, since when it has begun to diminish everywhere except in Belarus, Ukraine and the

CAR. It is definitively on the decline in the BS where life expectancy decreased from 70.6 years to 67.4 years between 1990 and 1994, but reached 70.0 year by 1996. In the RF the lowest life expectancy occurred in 1994: 64.0 years, a drop of 5.3 years within four years, however it increased in the next two years and in 1996 was 65.9 years. Among the NIS-6 in Azerbaijan, Belarus and the Republic of Moldova life expectancy declined by 2.7-3.4 years and in Armenia by 0.9 years between 1990 and the early 1990s, but in the last two-three years it grew by 2.1 years in Armenia, 2.5 years in Azerbaijan and a little under one year in the Republic of Moldova. In Belarus the increase in life expectancy is so insignificant that it is more accurate to speak about a standstill than about an improvement of health of the population. In the Ukraine life expectancy dropped from 70.5 to 67.1 years between 1990 and 1996.

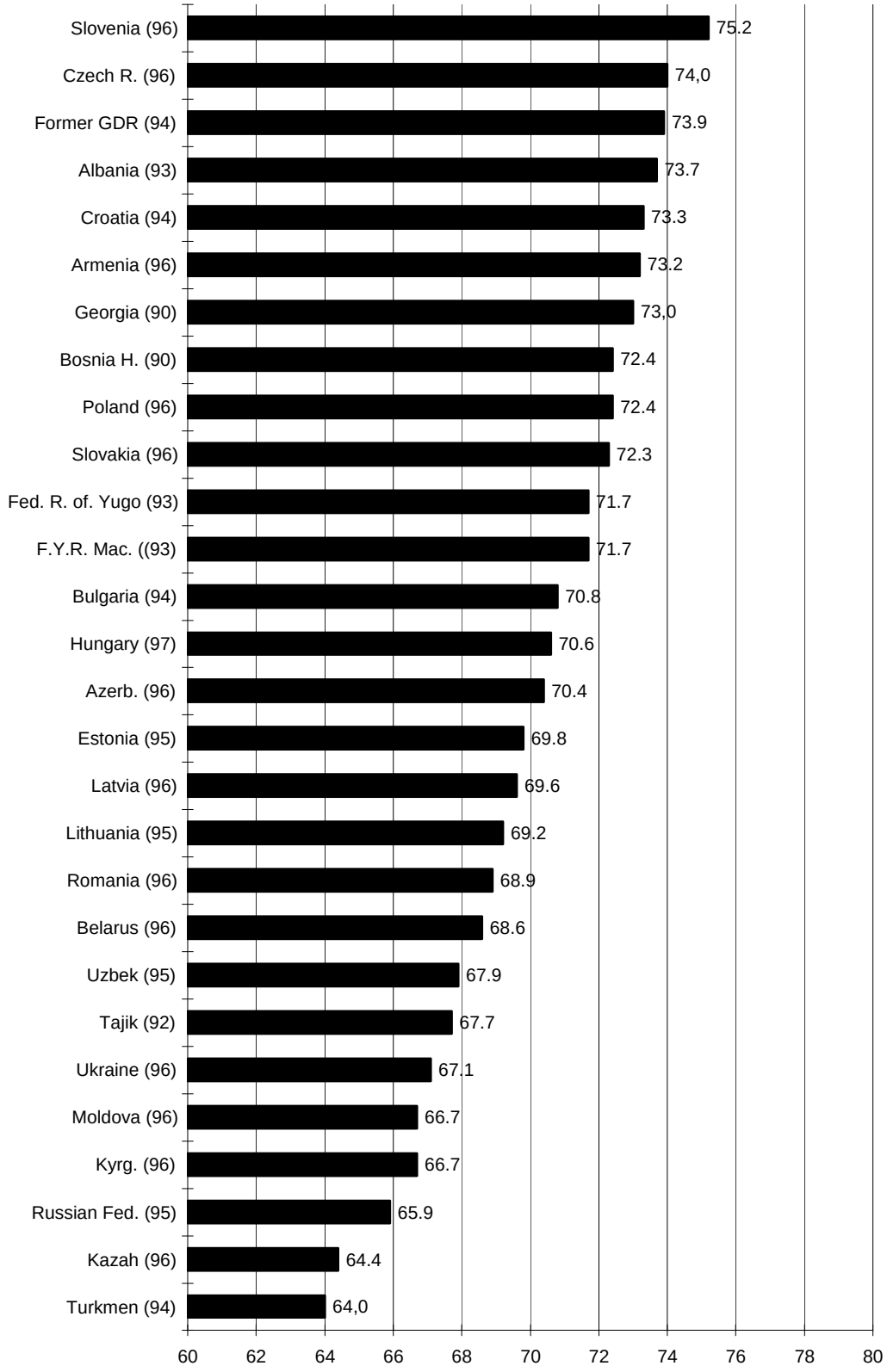
In CAR the health of the population shows a deterioration without any convincing signs of recovery: life expectancy decreased from 69.1 years to 66.5 years between 1990 and 1994. The decline was 4.4 years in Kazakstan, 3.4 years in Kyrgyzstan, 2.7 years in Turkmenistan and 2.2 years in Tajikistan and Uzbekistan respectively. It is true that in Kyrgyzstan and Uzbekistan life expectancy increased somewhat recently, but this does not change the critical health of the population.

Figure 2.3
Life expectancy at birth in the established market economies – EME
Men, women together
Around 1995



Data from WHO mortality data base.

Figure 2.4
Life expectancy at birth in the Formerly Socialist Economies – FSE
Men, women together
Around 1995



Data from WHO mortality data base, except the former GDR.
Former GDR: Recent demographic developments in Europe; Council of Europe, 1997. p.:60.

The time trend of general mortality has been analysed using life expectancy at birth. **This, although it is the mortality index most frequently used for comparing populations, has the disadvantage that it does not reveal the structure of mortality by sex and age nor the causes responsible for it, much less the effect over time of changes in these variables**. So life expectancy may increase even when age-specific mortality rises in certain segments of the population. In order to elicit these aspects of mortality it is necessary to study the various aspects of its structure and the changes in them.

3. SEX-SPECIFIC MORTALITY AND SEX MORTALITY DIFFERENTIALS

For centuries men lived longer than women. In some least developed countries males' life expectancy is still higher that of females'. Ritual circumcision, pregnancy, delivery, confinement and violence took and still does take a high toll on women's life. Also the male has been the privileged sex. Women have consequently been treated inhumanely, especially when times were hard; in extreme cases infanticide and/or homicide is committed for the sole reason that the victim is female. So lower female life expectancy is a socially determined phenomenon. In fact women fundamentally have a better chance of survival than men.

It is estimated that, other things being equal, women on average live about two years longer than men (Pressat, 1970). This two-year advantage is explained by biological factors: it is based on sex-specific chromosome structure and neuro-endocrine function; the latter is especially protective up to the menopause. At present however in every developed country women's life expectancy advantage over men is much more than two years: in the mid 1990s it was almost four years in Israel where it was the smallest, whilst in Russia it was about thirteen years. It may be inferred that the more than two years difference in terms of life expectancy between the two sexes is socially determined.

Men in the EME had a life expectancy of 72.9 years on average in the mid 1990s. Male life expectancy is the longest in the Nordic countries, then the Mediterranean countries follow with some tenths of years shorter life expectancy, and western Europe and northern America

are the next in the rank order. The scale in terms of life expectancy is very wide indeed. In Iceland male life expectancy reached 77.2 years by 1994, in Sweden it was 76.5 years in 1996. In Switzerland, Israel, Norway, Cyprus, Canada and Greece men had a life expectancy between seventy-five - seventy-six years in the mid 1990s. On the other hand male life expectancy was 72.5 years in the United States and 72.8 years in Denmark. Finally men in Turkey had a life expectancy of 65.9 years.

In the EME male life expectancy increased by 2.3 years between 1980 and 1995; the annual rate of increase was considerably lower in the first half of the 1990s than before. It is worth mentioning that since 1980 life expectancy gains have been higher among men than among women; this is the first reversal of many decades in which the female life expectancy advantage steadily widened.

In Portugal male life expectancy grew by almost four years and in Finland by more than three and a half years between 1980 and 1995. The rate of annual increase has slowed down recently in the former country and speeded up in the latter. In Denmark men gained only about one and a half year in life expectancy over the last one and a half decades, and the rate of annual growth decreased in the first half of the 1990s comparing it to that of the earlier period. In the United States men lived longer by 2.5 years in 1995 than in 1980; most of the increase in life expectancy occurred between 1980 and 1990 when the annual rate of increase was much higher than in the first half of the 1990s. The gain in males' life expectancy was one year larger than that of females' over the last one and half decade or so. The larger gain made by men was especially conspicuous in the first half of the 1990s.

Women in the ECE member states enjoy the longest life expectancy ever measured in anywhere in the EME: it is more than seventy-nine years, and in every European region the average is over eighty years. In the Mediterranean countries the average of female life expectancy was eighty-one years, in France 82.3, and in Switzerland 82.1 years according to the latest available data. Women in the United States live slightly shorter: they had a life expectancy of 78.9 years in 1995, whilst in Canada female life expectancy was 81.2 years in

1994. Denmark had the shortest female life expectancy in the EME: it was less than seventy-eight years.

In the EME female life expectancy increased by 1.6 years between 1980 and 1995; the annual rate of increase was significantly larger in the first half of the 1990s than before. Women in the MC gained almost three and a half years, in WE about three years, in NA almost two years and in the NC 1.6 years over the period of one and a half decade or so. It should be noted that female life expectancy in the NC was the highest in the early 1980s.

In Portugal, Israel and Finland the increase in female life expectancy was considerably above average. In Denmark female life expectancy decreased in the first half of the 1990s. In the United States women lived 1.5 years longer in 1995 than in 1980. Almost all the increase in life expectancy occurred between 1980 and 1990.

Men in the FSE had an average life expectancy of 63.3 years in the mid 1990s; this means that their lives were somewhat more than one year shorter than one and a half decades previously. This critical phenomenon is shown to be particularly serious when it is taken into account that the decline occurred in the first half of the 1990s. The decrease in life expectancy can be observed in every group of FSE except the CCEE, where although it also fell temporarily it increased overall between 1980 and 1995, and much more so after 1990 than before. In the CBP after a moderate increase in male life expectancy between 1980 and 1990 a slightly more than half year decrease could be observed in the first half of the 1990s.

Far the largest decline occurred in the RF and the NIS-6. In the RF, male life expectancy went down in the mid 1980s, but it recovered during the second half of that decade and it was still higher by nearly two and a half years in 1990 than in 1980. In fact the anxieties over decreasing life expectancy in 1980s were influential in Gorbachev's introduction of antialcoholism measures which temporarily arrested the declining trend in mortality. After the measures were revoked male life expectancy decreased by more than seven years within eight years, reaching the rock-bottom of 57.6 years in 1994. However it is a hopeful sign that male life expectancy increased by two years in 1995-1996. In the NIS-6 and

the BS male life expectancy increased by about one year between 1980 and 1990, but since then it decreased by three years in NIS-6 and more than one year in the BS. In the CAR men gained 2.7 years in terms of life expectancy in the 1980s, but in the first half of the 1990s this gain was almost completely lost.

As a consequence of the decline in male life expectancy all the countries of the former Soviet Union, except the three BS, had a life expectancy shorter than sixty four years for men in the mid 1990s, most of them less than sixty three years. Men in the CCEE live on average to about sixty-eight years and in the CBP to slightly more than sixty-seven and a half years.

In the mid 1990s Slovenia, the Czech Republic and Croatia had the longest FSE male life expectancies, and the Ukraine, Kazakstan and the RF the shortest.

Women in the FSE have experienced a much lesser decline in life expectancy than men in the period of political and socio-economic transition. They had a life expectancy of close to seventy-three and half years on the average around 1995. In the CCEE female life expectancy increased throughout the one and a half decades to 1995, reaching seventy-six and half years. The annual rate of increase was seventy per cent higher in the first half of the 1990s than in the earlier period. In the CBP there was a one-and-a-half year increase in life expectancy occurred between 1980 and 1990; but in the early 1990s in fact it did not change. Women in the BS have about the same life expectancy in the mid 1990s as at the beginning of the transition. On the other hand female life expectancy in the first half of the 1990s fell by two and a half years in the CAR and by nearly two years in the NIS-6 and the RF. In these three groups of countries women's lives were shorter in the mid 1990s than one and a half decades before.

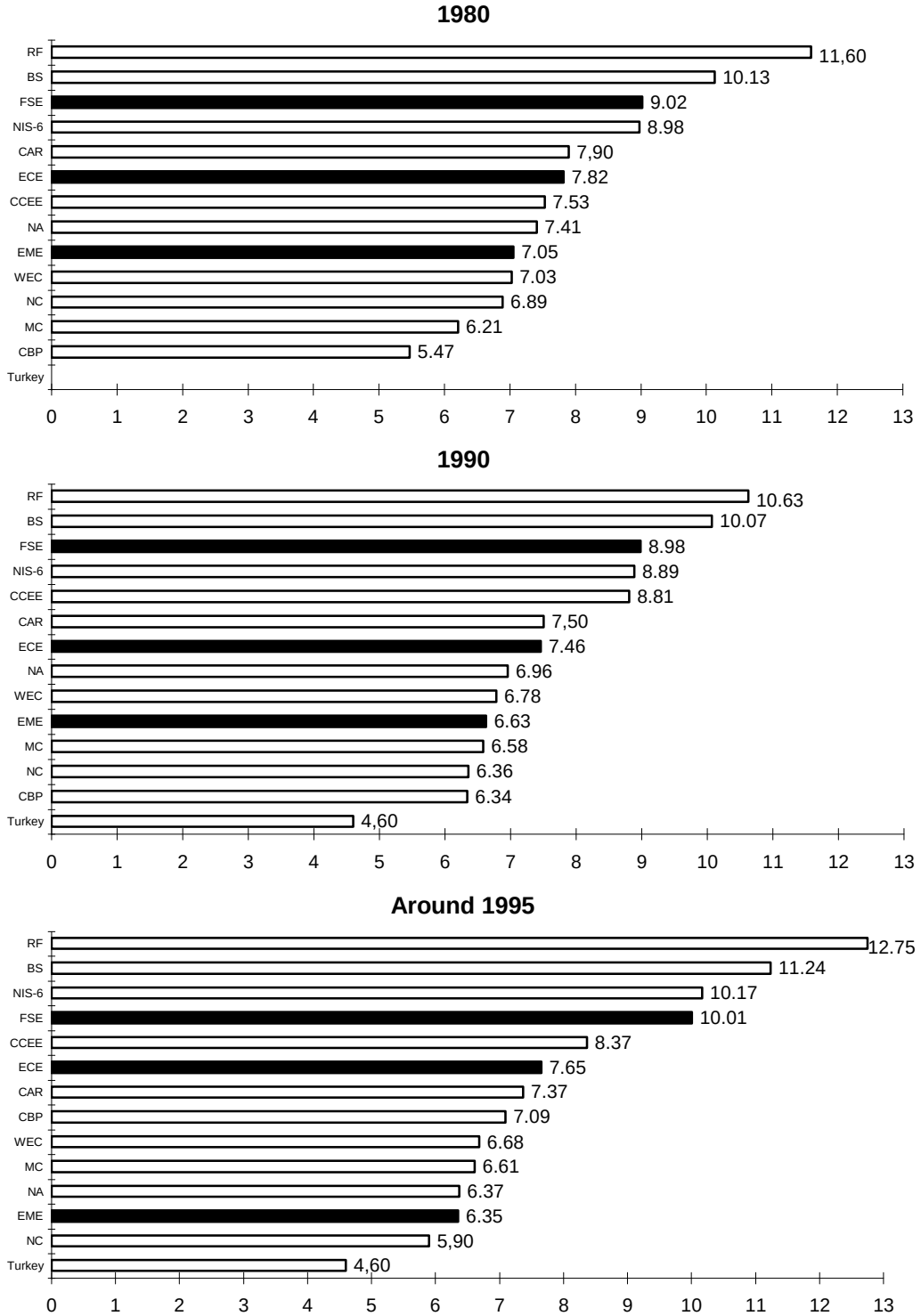
In the mid 1990s female life expectancy was seventy-nine years in Slovenia and somewhat more or less seventy-seven years in the Czech Republic, Croatia and Poland. On the other end of the scale, in Turkmenistan women had a life expectancy of about sixty-six and a half years; in the other CAR it is slightly higher than seventy years.

The East-West mortality gap has always been there, and it has been larger in the male than in the female population. In terms of life expectancy the difference between the EME and the FSE was nine and a half years in the male and almost six years in the female population in the mid 1990s. On the other hand in the early 1980s the disadvantage in terms of life expectancy of the two sexes in the East comparing it to the West was only six and a half and four and a half years respectively. Men in Russia live thirteen years less than men in the West and men in NIS-6 and the CAR ten years less. Women's disadvantage in terms of life expectancy *vis-à-vis* the West is about nine years in the CAR; it is more than six and a half and six years in the RF and NIS-6 respectively.

Sex mortality differentials in EME countries as expressed by life expectancy were in the six-to-seven year range between 1980 and 1995, with a decreasing trend throughout. In the mid 1990s the differential was smallest in the NC and largest in the MC. In Israel women had an advantage over men of only four years, whereas in France it was eight and a half years. In the FSE female life expectancy was nine years longer than male in 1980, rising to ten years by 1995. It is the smallest in the CBP, although it has increased there since the early 1980s.

In the CAR the difference between female and male life expectancy decreased from about eight years to less than seven and a half years from the early 1980s to the mid 1990s. In the CCEE the female advantage in life expectancy rose to almost nine years, but fell in the first half of the 1990s. The sex mortality differential is extremely high in the BS, the RF and the NIS-6: the life expectancy gap is in the ten-thirteen year range.

Figure 3.1
The difference between male and female life expectancy at birth in the groups of EME, FSE and ECE
1980, 1990, around 1995



Data from WHO mortality data base.

Weighted averages calculated by the size of national populations.

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It is usually said that by and large women are not healthier than men (many health interview surveys reveal a higher morbidity), but their diseases are less lethal. It is also agreed that they have gained much more from socio-economic progress in general, and from the bio-medical advances in particular, throughout the 20th century. A striking illustration of this is the radical decline in maternal mortality. This is only half of the story, of course: the high life-expectancy gap is fairly convincing evidence that the mortality of the male population is much higher than it could have been given the pace of socio-economic development and the associated health implications. Although sex mortality differentials may in certain cases be significantly influenced by occupation, the main factors are more usually related to lifestyle, proving the primacy of the social environment over the physical one, and of psycho-social behaviour *vis-‡-vis* the quality of health care services.

4. THE AGE STRUCTURE OF MORTALITY

As a result of changes in cause structure of mortality, fundamental changes have taken place in its age structure. In an earlier stage of epidemiological transition, e.g. in Hungary in the 1930s, about two-thirds of all people died before the age of sixty-five; by the mid 1990s more than two-thirds lived beyond sixty-five. At present the proportion of deaths over eighty-five years is somewhat larger than the share of infant deaths was half a century ago. This change in the age structure of mortality is a universal phenomenon: it takes place everywhere, but at different times.

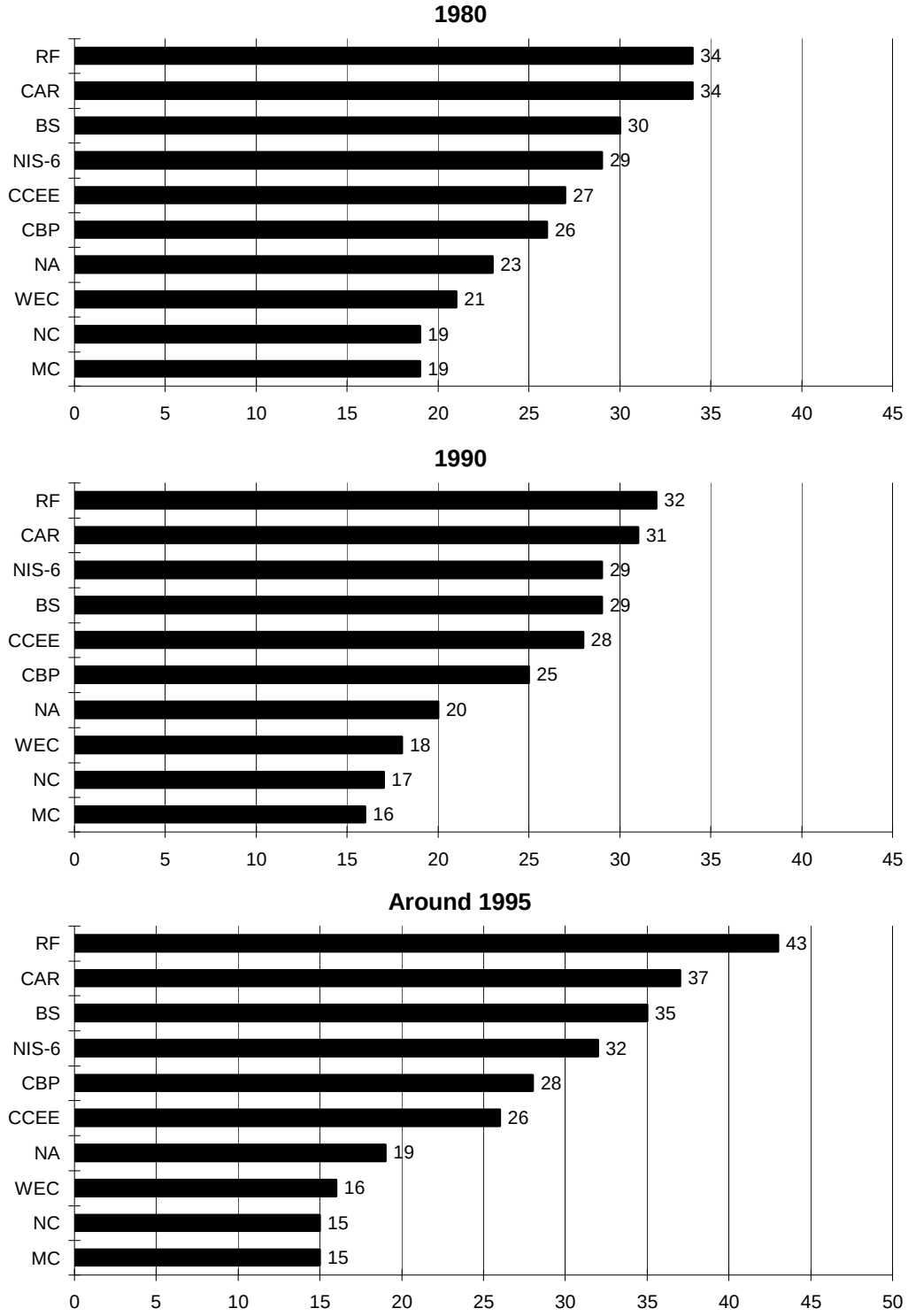
The changes in the age structure of mortality and the changes in the probability of dying - ${}_nq_x$ (between exact ages) are the two sides of the same coin. These changes, the basic components of epidemiological transition, have occurred smoothly in the West: in every age group the ${}_nq_x$ has decreased, although the decline in mortality has been steeper in some age groups than in others and also the timing was different. In other words: **at present** the probability that a new-born will reach his/her 15th birthday is 99 per cent or more. It is about 83 per cent that he/she will celebrate his/her 65th birthday, hoping then with a 41 per cent

probability that he/she will see his/her 85th birthday. This is the essence of what has happened in age specific mortality in the West since the end of World War II.

In the East the above underlying process of epidemiological transition has become inconsistent since the late 1960s. The ${}_{0}q_{15}$ steadily decreased in infancy and childhood everywhere up to 1990. It increased somewhat since 1990, except in the CCEE, but this increase was so small that it did not change the time trend over a longer period. So in the mid 1990s the probability for a new-born to reach his/her 15th birthday was about 97 per cent. In adolescence and young adulthood up to 1990 the decrease in ${}_{15}q_{35}$ was universal, but since then in the male population a larger, in the female one a smaller increase could be followed. Yet in the middle aged population the increase in ${}_{35}q_{65}$ has been steady and steep over the last three decades or so and has become much steeper in the 1990s except in the CCEE. As a result of these inconsistent changes a new-born east of the Elbe at present may expect with much less probability to see his/her 65th birthday than a new-born west of the Elbe: his/her chance is only 64 per cent. In old age the decline in mortality was modest until 1990, since then there has been a slight increase in ${}_{65}q_{85}$ in some countries and a further decrease in others. So in the FSE a 65 year old man/woman has about a 24 per cent chance to be alive at his/her 85th birthday. This is the general pattern of the time trend in age-specific mortality east of Elbe. There are substantial regional and national differences, however, both in trends and current levels of age related death rates. Presumably the most important and relevant issue is the impact of abrupt political and socio-economic change on age-specific mortality in general and on the regional patterns in particular.

In 1980 the probability of dying between the ages of 0 and 65 - ${}_{0}q_{65}$ was slightly more than twenty per cent in the EME; the lowest was in the MC and the highest in NA. Up to the age 65 the best survival chances were in Greece, the Netherlands and Spain, whereas the worst ones occurred in Portugal, Ireland and the US. The difference in terms of probability of dying between the two extreme national values was nearly seven per cent.

Figure 4.1
Probability of dying between exact ages 0–65 in the groups of EME and FSE
1980, 1990, around 1995
Men, women together
In per cent



Data from the WHO mortality data base.

Weighted averages calculated by the size of national populations.

EME – Established Market Economies; **FSE** – Formerly Socialist Economies; **NC** – Nordic countries;

WEC – Western Europe;

MC – Mediterranean countries; **NA** – North America; **CCEE** – Countries of Central and Eastern Europe;

CBP – Countries of the Balkan Peninsula; **BS** – Baltic States; **RS** – Russian Federation;

NIS-6 – Newly Independent States; **CAR** – Central Asian Republics;

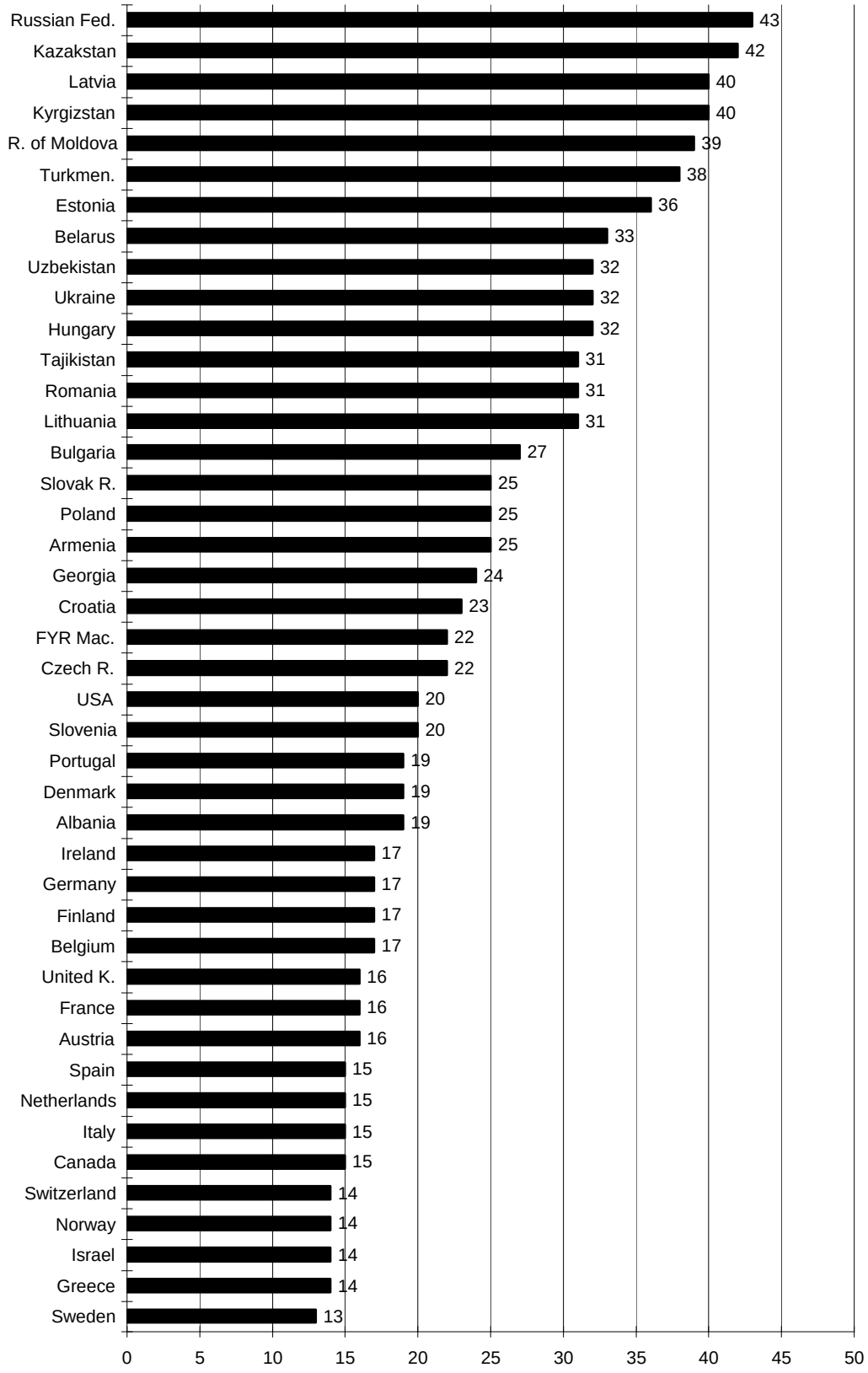
In the FSE the ${}_0q_{65}$ was about twenty six per cent in the CCEE and in the CBP and fluctuated between 29-34 per cent in the post-Soviet states. The former German Democratic Republic, Bulgaria and the former Yugoslav had the lowest and Turkmenistan, Kazakstan, the Republic of Moldova and the Russian Federation the highest ${}_0q_{65}$. It is remarkable that the ${}_0q_{65}$ in Turkmenistan was more than twice as high as that in Greece.

In the last one a half decades the ${}_0q_{65}$ decreased significantly in every EME; in the mid 1990s it was about seventeen per cent on the average. People in the MC have the lowest ${}_0q_{65}$, followed by the NC, the WEC and NA. The best survival chances are found in Greece, Israel and Norway, the worst ones in the US, Denmark and Portugal.

In the FSE opposite ${}_0q_{65}$ time trends are apparent for the two periods 1980-1990 and 1990 onwards: in the 1980s the ${}_0q_{65}$ decreased in every regional group except the CCEE, but in the 1990s it has increased significantly and has become higher everywhere that it had been in 1980, except in the CCEE where it decreased substantially.

In 1995 Albania, Slovenia, the former Yugoslav Republic of Macedonia – FYRM – and the Czech Republic had the lowest values of ${}_0q_{65}$, although the reliability and the accuracy of the data for Albania and the FYRA are questionable. Far the highest ${}_0q_{65}$ can be found in RF, where it was 43.2 per cent, in Kazakstan 41.7, in Kyrgyzstan 39.5 and in the Republic of Moldova 38.7 per cent. So in the mid 1990s the gap between the EME and some of the post-Soviet states in terms of probability of dying before the age of 65 has grown so much that in the RF, for example, the ${}_0q_{65}$ is two and a half times as high as in the EME.

Figure 4.2
Probability of dying between exact ages in 0–65 in the EME and FSE
Around 1995
Men, women together
In per cent



Data from the WHO mortality data base.

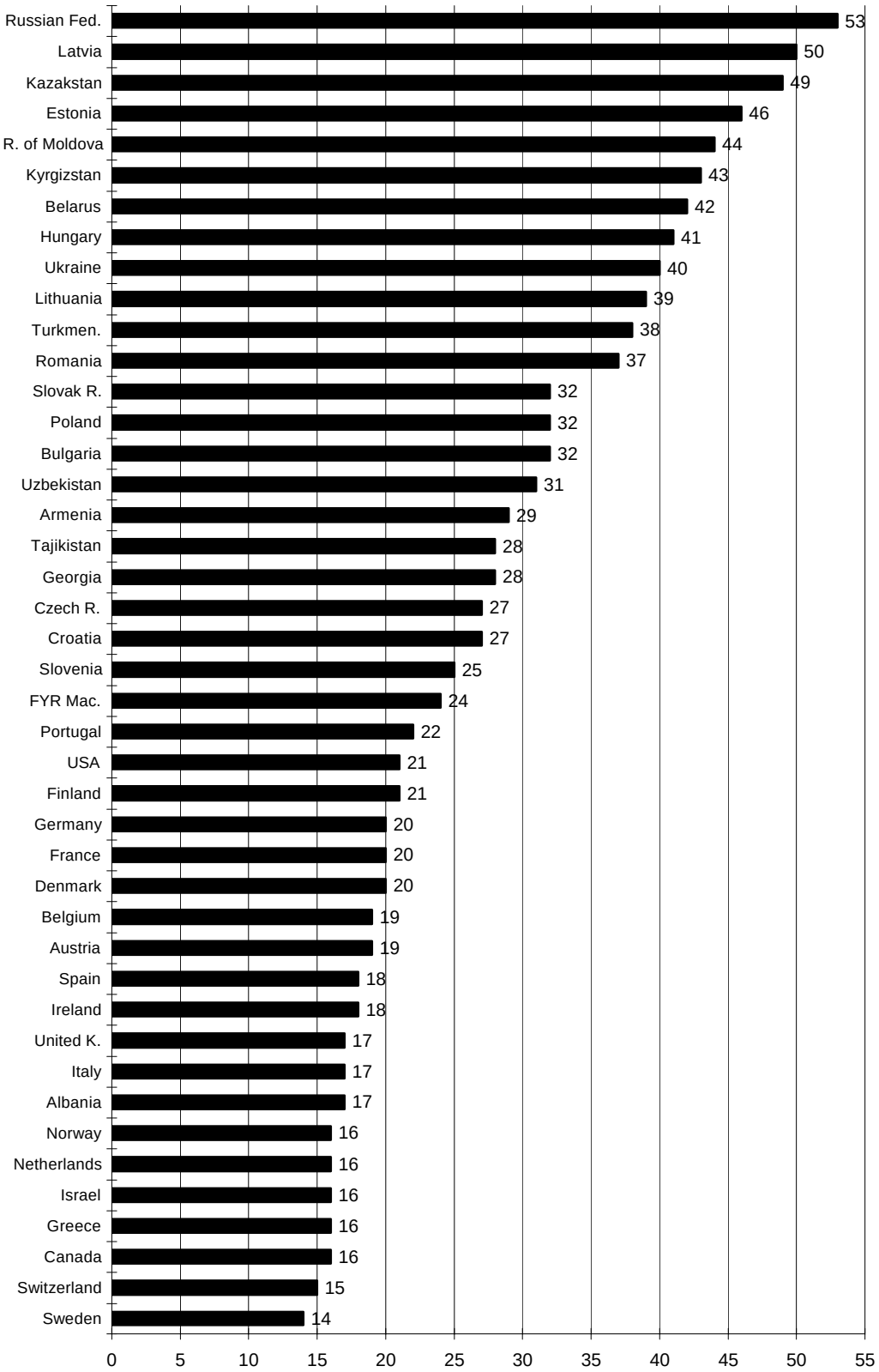
The probability of dying between the exact ages of 0 and 15 is in the range of 0.7 to 5.5 per cent in the mid 1990s; the highest value is 1.1 per cent among the EME, whereas the lowest one is 1.5 per cent among the FSE. In the 1990s the ${}_0q_{65}$ decreased in every regional group of EME and in the CCEE, but it increased in the CBP – presumably mainly as a consequence of the ethnic wars in the former Yugoslavia – and in every post-Soviet state except the BS where it did not change. The CAR represent a class of their own: their ${}_0q_{15}$ of 5.4 per cent is more than twice as high as the next highest, that of the RF.

The ${}_{15}q_{35}$ is of the same order as the ${}_0q_{15}$; it oscillated between 1.6 and 2.4 per cent in the EME and between 2.1 and 4.6 per cent in the FSE in 1980. The decline in ${}_{15}q_{35}$ was steady but fairly modest in the EME except in the MC where a slight increase occurred in the 1980s. In the FSE 1990 is the turning point in the ${}_{15}q_{35}$ time trend; there was an almost universal fall up to 1990 and a uniform rise after it, except in the CCEE. In fact the increase in ${}_{15}q_{35}$ has been so large in the 1990s that the values for the CBP, RF and NIS-6 were higher in the mid 1990s than they had been in 1980. In 1995 the ${}_{15}q_{35}$ for the total population was nearly six times as high in the RF as it was in Sweden or the Netherlands; in the male population the corresponding ratio was almost seven. To put it differently: in 1995 in Sweden and in the Netherlands a 15 year old boy had an almost 99 per cent chance reaching his 35th birthday, in the RF his probability of surviving up to 35 years was only slightly more than 90 per cent. The figure for Russia reveals a particularly serious epidemiological situation if it is taken into account that between 1990 and 1995 the chances of survival dropped by 3.5 per cent in the above age group. The recent significant increase in (male) mortality in adolescence and young adulthood indicates to a certain extent the essence of the health crisis in Russia, i.e. the extraordinary rise in adult male mortality.

The rise in middle aged male mortality was the first warning that the health (of a certain segment) of the population has grown worse in some countries east of the Elbe. In Hungary it started already in the mid 1960s in the male and somewhat later in the female population, and was much steeper and the age range broader in the former than in the latter population. For a few years the fall in infant, child, adolescent and young adult mortality

compensated and even surpassed the rise in mature adult mortality, so that life expectancy continued to increase even for men. However as a consequence of the steep rise in male mortality in mature adult age and old age, male life expectancy decreased from 67.1 years to 64.5 between 1966 and 1993. The rise in female adult mortality was moderate, however, and female life expectancy continued to increase, if only slightly.

Figure 4.3
Probability of dying between exact ages in 35–65 in the EME and FSE
Around 1995
Male population
In per cent



Data from the WHO mortality data base.

The ${}_{35}q_{65}$ for men rose from 25.6 to 42.2 per cent between 1966 and 1993 and became somewhat higher than it had been in 1920/1921. Over the same period the ${}_{35}q_{65}$ for women grew from 15.1 to 18.6 per cent, approximately to the same level as it had been in 1948/1949.

After the abrupt change in the political and socio-economic system the ${}_{35}q_{65}$ time trend became slightly steeper for men but not for women. However since 1994 the ${}_{35}q_{65}$ decreased for both men and women: in 1994 it was 38.4 per cent in the male and 17.4 per cent in the female population.

The rise and fall in middle aged male mortality in the other CCEE countries has by and large been similar to the Hungarian pattern, with the qualification that the rise was much smaller.

In 1980 the ${}_{35}q_{65}$ for Hungarian men and women were in fact fairly high by international comparison. In the EME the ${}_{35}q_{65}$ wavered between 21.8 and 25.0 for men and 10.7 and 13.9 per cent for women. Only in the then Soviet republics was its value for the male population higher, and only in the CAR was it higher in respect of the female population. By 1990 the ${}_{35}q_{65}$ for men had decreased in all regional groups in EME and FSE except the CCEE and the BS, and for women it had decreased in every regional group. At the historical turning point the highest ${}_{35}q_{65}$ among all countries east of the Elbe, for both men and women, was in Hungary. The unprecedented rise in ${}_{35}q_{65}$ since then in all FSE except the CCEE has taken place at a time when the EME have reached the lowest values ever measured. In the RF the male ${}_{35}q_{65}$ was 53.0 and the female one 21.9 per cent, whereas in the EME they were on average 19.3 and 10.5 per cent respectively. In the RF, within a few years the ${}_{35}q_{65}$ increased by 14.1 per cent for men and 5.7 per cent for women. Yet the rise in relative terms is about the same for the two sexes.

The crux of the East-West life expectancy gap is the steep rise in ${}_{35}q_{65}$. Although q_x in the post-Soviet states increased in the 1990s in every age group, the increase in other age groups is much less important in determining the actual level of life expectancy. The rise in middle-age adult mortality is a consequence of the increase in cause-specific death rates due

to certain chronic diseases, accidents and violence. Lethal chronic diseases have long latent and manifest periods, adding up to several decades. Since the life style-related risk factors which are largely responsible for these diseases become rooted in adolescence and young adulthood, deaths attributable to them are mostly likely to occur in middle age; the best example for this is smoking. Accidents and violence, frequently related to alcoholism, have their victims in epidemic proportions among young and middle aged adults. Both risk factor-dependent chronic non-infectious diseases and accidents and violence due to a reckless way of life are much more common in the male than in the female population.

5. INFANT MORTALITY

Infant mortality has always been a sensitive indicator of public health. This was especially true in the past when hygiene was poor and neither preventive measures nor effective cures were available. Usually one of the first (if not the first) signs of deterioration of health of the population is the increase in infant mortality. Socio-economic mortality differentials manifest themselves remarkably in under-one-year mortality differences, and the level of infant mortality is a reliable index of socio-economic development. Its magnitude is predominantly influenced by GDP per capita, but educational attainment is also significant. This latter independent variable is particularly relevant as regards mothers. Until recently the larger part of the increase in life expectancy occurred due to the decrease in infant (and childhood) mortality. The spectacular rise in probability of surviving between ages of 0 and one has to a certain extent been unexpected. Even the most visionary experts could not imagine a ninety or ninety-five per cent drop in infant mortality, much less within a century, but this is certainly what has happened.

Infant mortality in the member states of the ECE was between 23.2 and at least 150 per thousand live births after the end of World War II., after the direct impact of war on public health had been mostly eliminated. A significant difference existed in terms of infant mortality between the combatant and non-combatant countries, between the rich and poor countries, between the countries of East and West, between the Nordic and Mediterranean countries. In the late 1940s infant mortality was 23.2 per thousand in Sweden and 114.5 per thousand in

Portugal, 31.3 per thousand in the United States, 26,8 per thousand in the Netherlands and 99.6 per thousand in Hungary.

Over the last half-century infant mortality decreased everywhere, albeit to different extents. The reasons for the unprecedented drop in infant mortality has been by and large the same everywhere:

i. The development of hygine; the provision of good quality drinking water, the understanding of the importance and relevance of cleanliness in eliminating infectious diseases.

ii. The improvement in nutrition, particularly the realisation of the importance of breastfeeding and development of the process of (gradual) weaning.

iii. Immunization against infectious diseases, like diphtheria, whooping cough, tetanus, measles, the BCG inoculation.

iv. The introduction of efficient curative measures: antibiotics, chemotherapeutics, rehydratation therapy, intensive care and the use of its special kind for premature babies.

v. The improvement of delivery techniques.

vi. Antenatal care, including the understanding of the impact of many of the genetic disorders and intrauterine defects on the health of the infant and the prevention of them by counselling and medical technology.

vii. The change in the value of the child in general and the infant in particular as a result of low fertility.

These causes and circumstances have been responsible to various extents for the decline in mortality. From the rate of decrease in neonatal, post-neonatal and perinatal mortality it may be inferred that the most efficient measures have been those which reduce

post-neonatal mortality. These involve external causes, mainly infectious diseases. Deaths due to them are so few in the low-infant-mortality countries that their relative weight is insignificant. Conversely, wherever infant mortality is still high, the post-neonatal death rate is also high and it is due to infectious diseases. Neonatal and perinatal mortality can be reduced further by preventing (in preference to curing) genetical disorders and intrauterine diseases. In principle it may be envisaged in the future the next stage in epidemiological transition in which infant deaths are so rare that they do not represent a public health issue anymore, but individual tragedies. The human genome project when it is concluded will provide practically all means for preventing deaths due to internal causes, or more exactly attributable to genetic disorders.

The decline in infant mortality has been universal except for a temporary increase in the former Soviet Union in the mid 1970s which was then probably the first indication of the worsening of public health there. It is instructive to compare the decline in infant mortality in the countries which presumably represent best their regional group. For this comparison Sweden, France, Spain and the United States have been chosen among the EME, and Hungary, Bulgaria and, until its break-up, the Soviet Union, subsequently the Russian Federation, have been selected among the FSE.

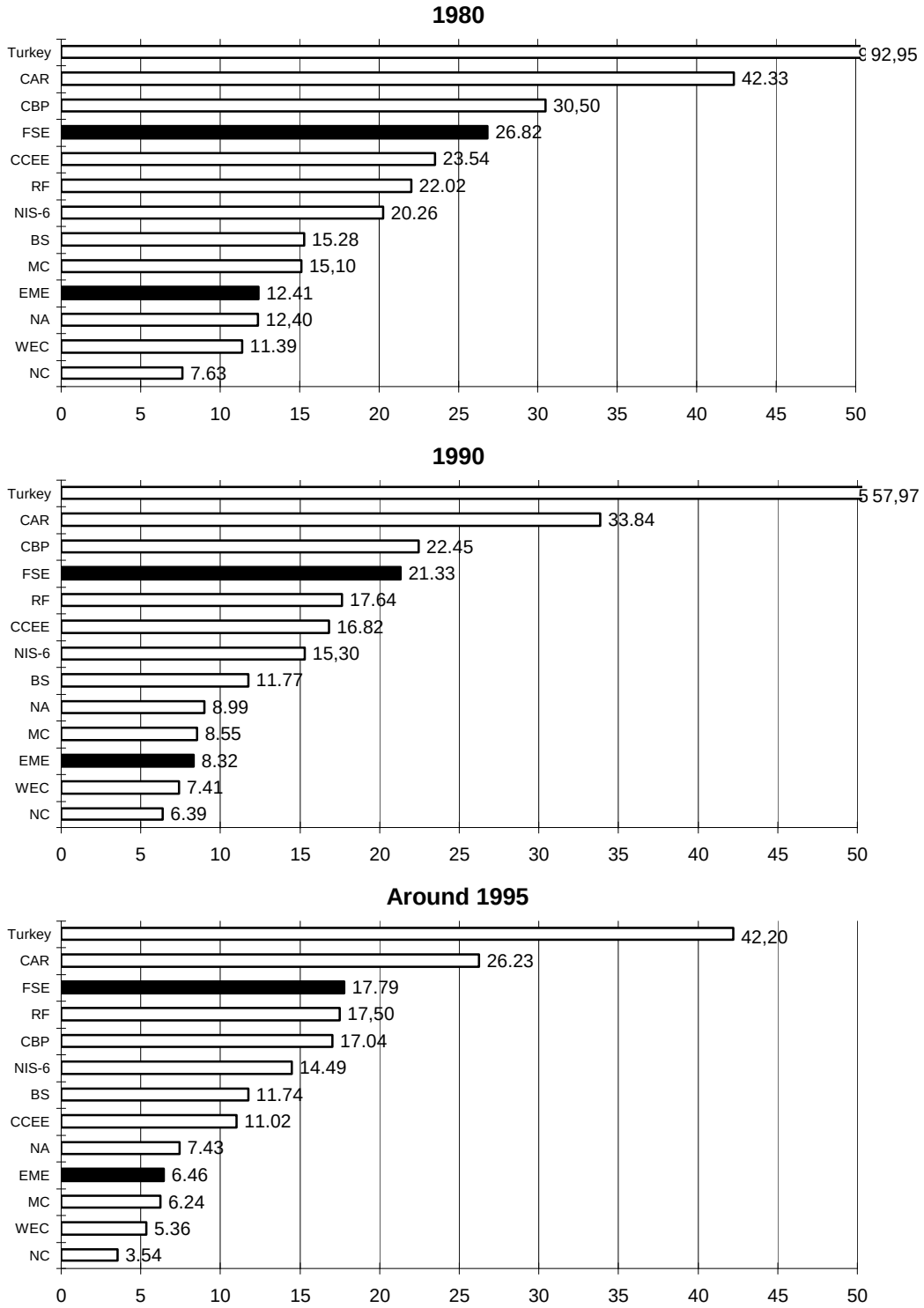
It should be noted that the level of infant mortality is influenced by the definition of live birth. The definition applied in the Soviet Union and in some of the other FSE, such as Bulgaria, differed from the internationally accepted text recommended by the WHO in such as to result in an apparently lower infant mortality rate. After 1990 all FSE adopted the WHO definition.

It is possible to contrast the time trend in infant mortality between EME and FSE, and between the regional groups, since 1980. Infant mortality[5] dropped from 12.4 to 6.5 per thousand in the EME and from 26.8 to 17.8 per thousand in the FSE between 1980 and 1995. As infant mortality was already fairly low in the EME in 1980 it decreased less in absolute terms by 1995 than in the FSE, but the decrease in relative terms was much higher. Infant

mortality still much higher in the FSE than in the EME and the gap in relative terms between the two groups widened. However the most important observation is that the political and socio-economic transition accelerated the decrease in infant mortality in the CCEE and in the CBP, but slowed it down in the countries of the former Soviet Union, except the CAR. In the BS and the RF infant mortality in the mid-1990s, is in fact about at the same level as it was around 1990; it decreased in NIS-6 between 1990 and 1995, but the annual rate of decrease was much less than in the ten-year period before.

[5] Weighted averages calculated by the actual number of live births of countries.

Figure 5.1
Infant mortality in the groups of EME and FSE
1980, 1990, around 1995
Per 1000 live birth



Data from the WHO mortality data base.

Weighted averages calculated by the actual number of live births of countries.

EME – Established Market Economies; **FSE** – Formerly Socialist Economies; **NC** – Nordic countries;

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MC – Mediterranean countries; **NA** – North America; **CCEE** – Countries of Central and Eastern Europe;

CBP – Countries of the Balkan Peninsula; **BS** – Baltic States; **RS** – Russian Federation;

NIS-6 – Newly Independent States; **CAR** – Central Asian Republics.

Infant mortality over one and a half decades fell by less than half in all the regional groups of EME, except NA where the drop was forty per cent. The biggest decrease occurred in the MC. Among the FSE, the decline in infant mortality between 1980 and 1995 was fifty three per cent in the CCEE, forty four in the CBP and thirty eight per cent in the CAR. On the other hand in the RF, BS and NIS-6 the reduction in infant mortality fluctuated between 20-30 per cent.

In the mid-1990s only a few countries remained where infant mortality was over twenty per thousand; they are all the Central Asian Republics, Albania, Romania and Turkey. As against this in most countries in Europe west of the Elbe infant mortality is less than five per thousand.

As a result of uneven epidemiological development the time trends in infant mortality of regional groups and countries within them have been converging and the differences in absolute terms have decreased significantly, but in some cases, paradoxically, inequality in relative terms has increased.

6. OLD AGE MORTALITY[6]

In the member states of the ECE about 150 million people, or 12.5 per cent of the population, is 65 or older and the oldest old account for 2.8 per cent. By 2020, according to UN estimates, the elderly will be make up 16.4 per cent, and the over-80s 3.8 per cent, of the population. There are ageing populations like Sweden where the percentage of elderly people is 17.3 and “young” populations like Tajikistan where people aged 65 years and older make up only 4.3 per cent of the total. The large and rising proportions of elderly people have arisen primarily as a consequence of the high fertility after World War II, with a secondary cause being the lower death rates at all (or most) ages, resulting in more people reaching old age.

[6] The following terms are used four component age groups: the elderly (65 years and over); the young old (65 to 74 years); the aged (75 years and over); and the oldest old (80 years and over).

The increase in life expectancy in old age is a relatively recent phenomenon, particularly in the male population. Male life expectancy at age 65 – e^0_{65m} – in the US rose by only half a year over the first four decades of the 20th century. In contrast, it has grown by two and a half years, to 15.6 years, since 1970. In the US female population, the increase in e^0_{65f} has been more evenly spread over the century and has been higher overall than in the male population, but has slowed down somewhat in the 1980s and 1990s. Nevertheless, in the US the e^0_{65f} is still 3.3 years higher than the e^0_{65m}.

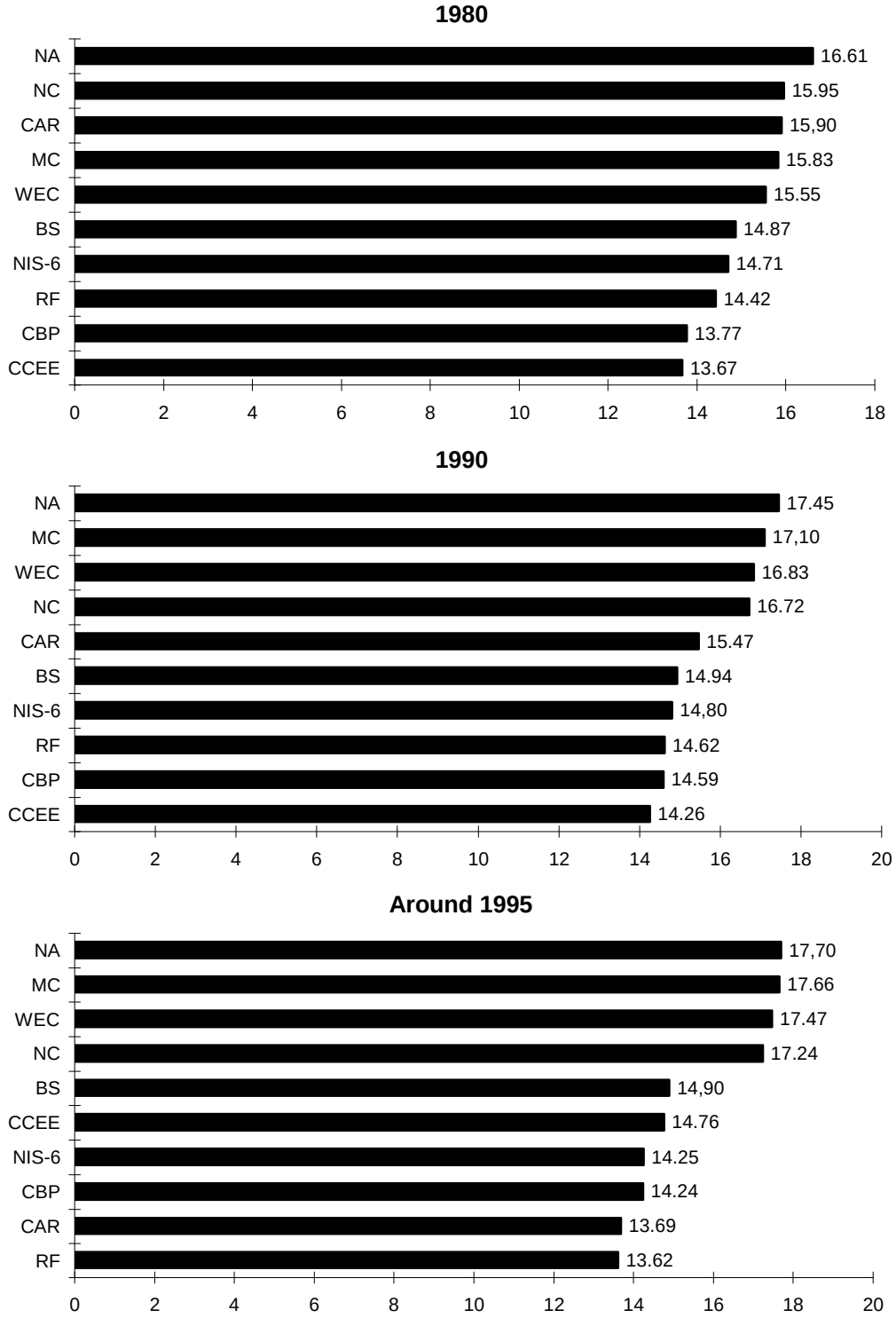
Among the EME the differences in terms of e^0_{65m+f} are very small, varying by less than one year between regional groups. The highest e^0_{65m+f} has been in NA and in the MC over recent decades. In both 1970 and 1995 the e^0_{65m+f} was slightly lower in the WEC than in the other regional groups. Over the last two and a half decades e^0_{65m+f} has risen by at least two years in every regional group, and in the MC the increase was 3.0 years. Since 1980 the e^0_{65m+f} has grown more in the MC and WEC than in the NC and NA. These rises have resulted in almost every EME country's e^0_{65m+f} standing at more than seventeen years; in some countries, such as Iceland, Spain, Sweden and Switzerland it is more than eighteen years; and in France it is 19.3 years.

Among the FSE, 1970 data on e^0_{65} are available only in the CCEE and CBP. The e^0_{65m+f} was 13.6 years in the former and 13.7 years in the latter group of countries; they increased steadily between 1970 and 1995 to 14.8 years in the CCEE and to 14.2 years in CBP. In 1980, the e^0_{65m+f} varied among the regional groups of FSE in the range 13.7-15.9 years, and in the following decade it rose slightly in the RF and NIS-6, did not change in the BS and fell off in the CAR. Since 1990 there has been a general decline in e^0_{65m+f} in every regional group except the CCEE and BS, so that by 1995 the e^0_{65m+f} stood between 13.6 and 14.9 years. The decrease in e^0_{65m+f} measured in the CAR may to some extent be the result of

more reliable and accurate registration. In the mid 1990s the e^0_{65m+f} was 17.0 in Albania, 16.3 in Slovenia, but only 12.2 in Turkmenistan and 12.6 in the Republic of Moldova. The fairly high e^0_{65m+f} for Albania might be an artefact.

Overall, the e^0_{65m} varied between 15.2 and 15.8 years among the regional groups of the EME and between 11.1 and 12.7 years in the regional groups of the FSE. Women still had a three-four year advantage in terms of e^0_{65} *vis-á-vis* men in the EME in the mid 1990s, although in many countries the gap has narrowed from year to year over the last one and a half decades. At around the same time, the corresponding advantage held by women in the FSE varied among regional groups between two and a half and four years. In the regional groups of EME, e^0_{65m} rose by 0.6-1.9 years between 1980 and 1995, compared with only 0.3-2.1 years for e^0_{65f}. The changes in the FSE were in the opposite direction: it went down by 0.4-1.8 years for men, and by 0.5-2.5 years for women over the period, mainly as a consequence of the decline in e^0_{65} in the 1990s. There are three exceptions: in CCEE and in CBP both e^0_{65m} and e^0_{65f}, and in the BS e^0_{65f}, increased over the last decade and a half or so.

Figure 6.1
Life expectancy at age 65 in the groups of EME and FSE
1980, 1990 around 1995
Men, women together



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In France and Iceland e^0_{65m} was 16.8 years, in Canada, Greece, Spain, Sweden and Switzerland it was over 16.0 in or around 1995. On the other hand men at 65 expect to live only 10.8 years in Kazakstan and less than twelve years in Belarus, the Republic of Moldova, Russia, Turkmenistan and the Ukraine. By the mid 1990s, e^0_{65f} reached 21.6 years in France, and over twenty years in Spain, Sweden and Switzerland. In contrast to this, women at 65 around 1995 expect to live only 12.5 years in Turkmenistan, 13.6 years in the Republic of Moldova, and less than fifteen years in Kazakstan, Romania and Uzbekistan.

The improvement in e^0_{65m+f} in the EME is mainly the result of the decline in mortality due to CVD, external causes of injury and poisoning, and diseases of the respiratory system. In absolute terms CVD mortality has decreased most, but in relative terms the greatest reduction has been in the mortality due to respiratory diseases. The death rate from cancer has increased in some EME and decreased in others, however neither the increase nor the decrease has been large enough to have a substantial impact on e^0_{65m+f}.

In the CCEE, just as in the EME, the lengthening of e^0_{65m+f} is mainly the result of the decrease in the rate of deaths from CVD and respiratory diseases in the elderly population. Between the early 1970s and mid 1990s, mortality due to external causes of injury and poisoning decreased in the Czech Republic and contributed to the improvement in e^0_{65m+f} to some extent, but did not change substantially in Hungary and Poland. Cancer mortality has either risen or remained about the same in the FSE. The decrease in e^0_{65m+f} in the post-Soviet states is a consequence of significant increase in mortality due to CVD and accidents and violence. Diseases of the respiratory system caused much fewer deaths in most post-Soviet states in the mid 1990s than in the early 1970s, except in CAR, where the death rate from respiratory diseases increased subsequent to 1990.

At age 75, male life expectancy in the EME was in the range of nine to ten years in the mid 1990s and was still on the rise; it is the highest in NA, followed by the MC, the WEC and

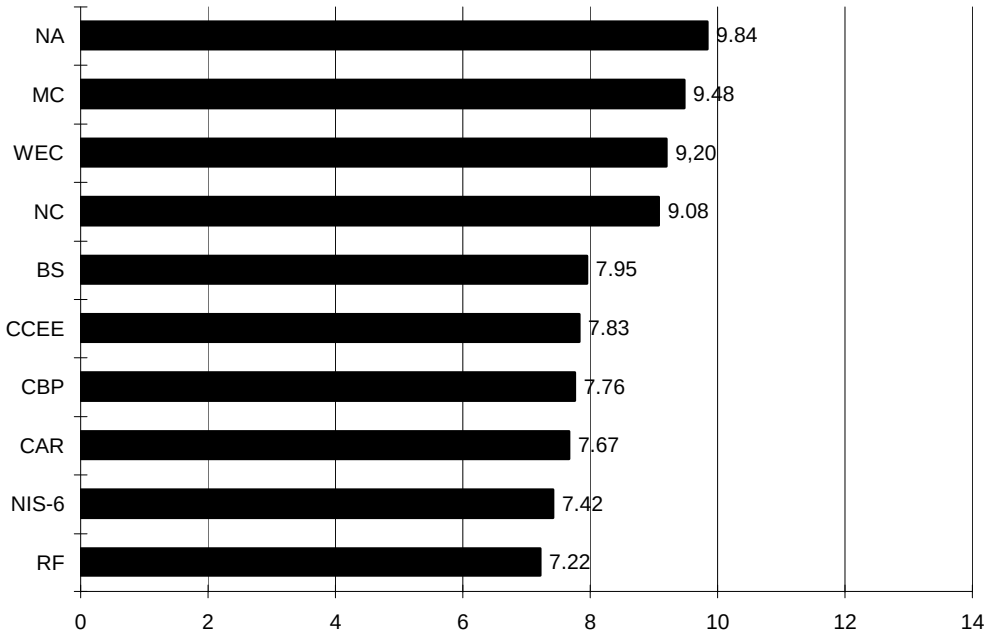
the NC. Female life expectancy at age 75 was between 11.5 and 12.5 years, the rank order being similar to that for men. Both e^0_{75m} and e^0_{75f} increased in every regional group between 1980 and 1995. The highest increases were 1.3 years in e^0_{75m} and 1.5 in e^0_{75f}; both occurred in the WEC.

Men at age 75 expect to live 1.3-2.6 years shorter in the FSE than in the EME; the range of differences between female populations east and west of the Elbe is 1.7-3.4 years. Since 1980 e^0_{75m} and e^0_{75f} have increased in the CCEE and CBP and they have decreased in most post-Soviet states.

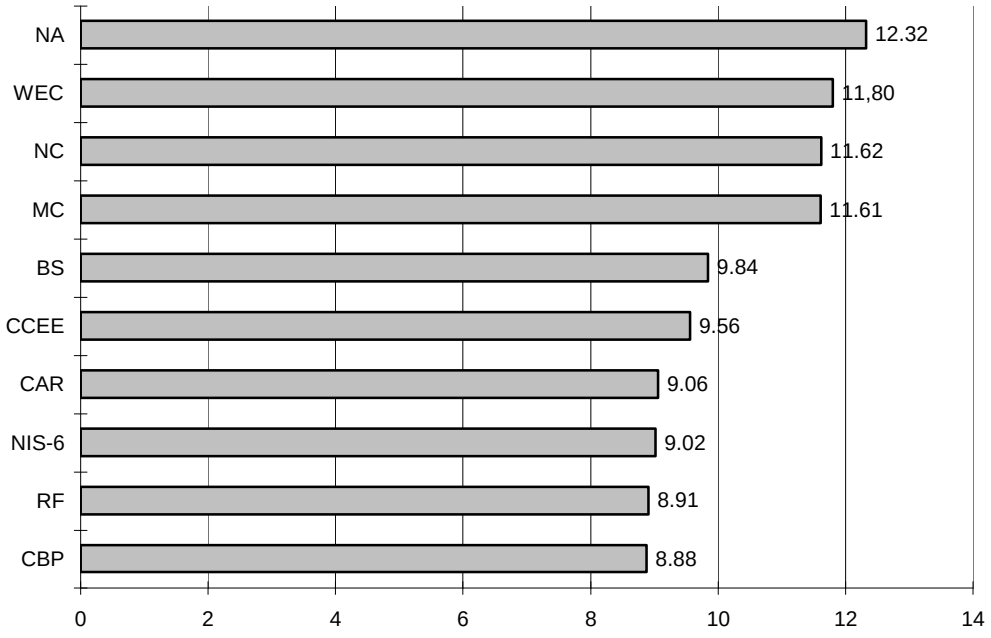
As in the case of all-age mortality, the improvement in old-age mortality is a multicausal event. Positive lifestyle changes and generally health-conscious behaviour have contributed most to the increase in life expectancy in old age. Many old people, particularly in affluent societies, nowadays choose food carefully taking into account its risks and benefits. The spread of knowledge on the impact on health of fats, dietary cholesterol, carbohydrates, vegetables, fruits, protein, salt, minerals and trace elements is striking in many EME. There is growing evidence that tobacco smoking is declining with old age. This occurs not only as a consequence of experience that smoking is not pleasurable in the presence of the obstructive pulmonary diseases which are very frequent in old age, but also as a result of the increasing awareness of the harmful effects of smoking. New types of flats are built for old people not only to serve their special needs, but to decrease the chances of home accidents, a fairly frequent cause of death in old age. Mental and physical exercise are recognised as means of promoting health. Health promotion going far beyond mere disease prevention has penetrated many of the households through the activities of the media; this emphasises both personal responsibility and social obligation in increasing healthy life expectancy. This body of knowledge is now gradually gaining momentum in some countries east of the Elbe too, predominantly in the Czech Republic, Croatia, Hungary, Poland and Slovenia.

Figure 6.2
Life expectancy at age 75 in the groups of EME and FSE
Around 1995
Men, women separately

Men



Women



Data from the WHO mortality data base.

Weighted averages calculated by the size of national populations.

EME – Established Market Economies; **FSE** – Formerly Socialist Economies; **NC** – Nordic countries;

WEC – Western Europe;

MC – Mediterranean countries; **NA** – North America; **CCEE** – Countries of Central and Eastern Europe;

CBP – Countries of the Balkan Peninsula; **BS** – Baltic States; **RS** – Russian Federation;

NIS-6 – Newly Independent States; **CAR** – Central Asian Republics;

In the EME more and more retired people move south, especially in winter. As well enjoying a good, healthy climate, they take up a certain (Mediterranean) lifestyle which has proved to be important in prolonging life.

In some countries, mainly in north-western Europe, a relatively new social network has been developing which is aimed specifically at the care of old people. It ensures that lonely, old people are regularly looked after, and can make a decisive difference in emergency situations. Its impact on causes of death amenable to social intervention is difficult to estimate.

Besides these, there has been a substantial contribution made by medical advances. The relevance of screening, particularly in older age, is generally acknowledged as effective in the prevention and timely treatment of colorectal, female breast and cervix cancer, consequently decreasing mortality caused by them. Since the advent of antibiotics and chemotherapeutics, pneumonia, which was one of the most common causes of death in old age, has become curable, and the significant decline in mortality due to respiratory diseases is mainly the result of causal therapy. Antihypertensive and anticholesterol drugs, antidiabetics, intensive therapy, modern surgery, and other medical treatments have provided successful means of intervention in the control of heart and cerebrovascular diseases. Geriatrics deals with the special medical problems of ageing, recognising that old people differ from adults not only in quantitative but also in qualitative terms. Nevertheless Alzheimer's and Parkinson's diseases and some of the diseases of the musculoskeletal system have become public health issues.

Genetic studies of longevity have started to identify the genes associated with long-life phenotypes. "The premise is that 'gerontogenes' exist – a phenotype for longevity made possible by the presence of genes that promote survival." (Olshansky, 1998). Taking into account the progress in research into ageing and old age mortality, and the growing ability to apply its results in everyday life, it is plausible to expect that within the 21st century death

rates from a combination of all causes will decline by 50 per cent, not only in childhood and adulthood, but also at ages of senescence.

Since half of female and a third of male deaths now occur after age 80 in developed countries, mortality reductions at older ages are crucial in determining change in life expectancy and the proportions of elderly people. At current mortality levels a new-born girl in most developed countries has a life expectancy of about 80 years. If improvements in death rates could be maintained at an average rate of one per cent per year, then her life expectancy would be about 90 years. Sustained two per cent progress would imply that the typical new-born girl today in developed countries would live to celebrate her 100th birthday (Vaupel and Owen, 1986; Vaupel and Gowan, 1986). There are also more pessimistic conjectures.

"The possibility of a significant extension of life expectancy and of a radical increase in the population at advanced ages heightens the need to analyse whether and how the quality of these added years of life can be enhanced. The answer is central to forecasting the impact of population ageing on health and social needs and costs, but very little is currently known about what the answer might be. Fries (1980) conjectured that morbidity is plastic and can be reduced so that the period of disability at the end of life is reduced to a year or two. Changes in lifestyle and reductions in risk factors can substantially reduce morbidity and mortality among the elderly (Manton, Stallard, and Tolley, 1991). Furthermore, scattered evidence suggests that medical and public health interventions can improve health and well-being even after age 85 (Kannisto, Lauritsen, Thatcher and Vaupel, 1994)."

7. CAUSE STRUCTURE OF MORTALITY

In the developed world, the level of mortality is determined by **cardiovascular diseases (CVD), malignant neoplasms (MN), accidents and violence**. Other lethal diseases are of course involved, at present **AIDS** is the best example, but their relative weight in mortality is insignificant. Diseases of the circulatory system, malignancies and external causes of injury and poisoning are responsible for about seventy-eighty per cent of all deaths. The predominance of the three main groups of causes of death in mortality is the result of a

multistage epidemiological transition. People have always died of heart diseases, cancer was already known in antiquity, and violence is older than civilisation. However during early historical times the largest numbers of deaths were due to famine and epidemics, and later it was endemic infectious diseases which took the greatest toll. It is true that violence has always been endemic throughout human history, but its share in mortality is difficult to estimate. The epidemiological transition in which the cause structure and consequently the age structure of mortality changed was a result of a socio-economic development which has transformed the physical and social environment around us. In fact the epidemiological transition can only be studied in a socio-economic and cultural context. It is now generally acknowledged that socio-economic development determines mortality levels, and the concept of health transition has been elaborated to characterise the interaction between them.

The cause structure of mortality in the mid 1990s is by and large similar in the East and the West, but differences remain, and recently have become more pronounced. This is particularly true regarding the post-Soviet states, whereas in the CCEE and in the CBP the cause structure of mortality is fairly close in its main features to that of the West. The differences are mainly quantitative: age- and cause-specific death rates due to CVD and external causes are usually much higher in the East than in the West because their impact on mortality starts earlier in life and causes a larger proportion of premature deaths. On the other hand no substantial difference exists between the EME and FSE in cancer mortality.

In the industrial countries, in the second half of the 20th century the rise and fall of CVD mortality, the increase in cancer mortality and the AIDS epidemic have been the decisive epidemiological events. Naturally the reduction of mortality due to the control of infectious diseases, first of all tuberculosis and pneumonia and the changes in old-age cause-specific death rates have also been important but their relevance to the mortality time trend is limited.

The high level of CVD mortality was recognized in the United States in the 1950s. In the early 1950s fifty-six per cent of all deaths in the US population were due to cardiovascular diseases. Coronary heart disease (CHD) alone caused one-third of all deaths in the male and

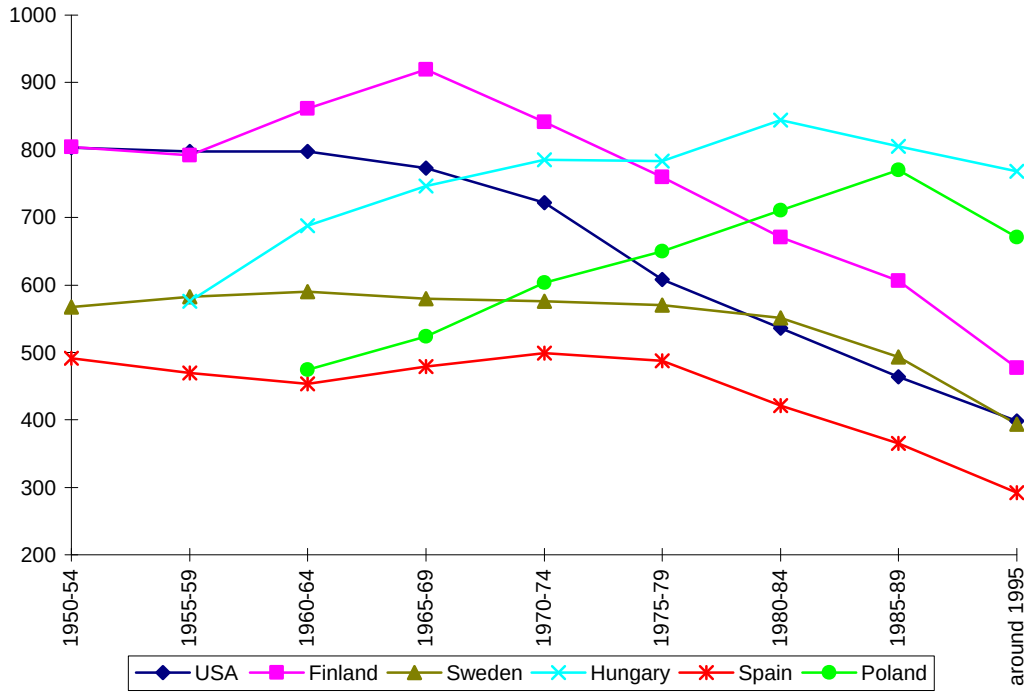
more than one-quarter in the female population; 2.5 times more men died of CHD than of cancer; in the female population the ratio of the two death rates was 1.7. The age-standardized CVD death rate was 804 per 100,000 in the male population and 569 in the female population, whereas CHD mortality was 484 per hundred thousand for men and 278 for women. (For comparison the male **all cause** mortality was 826 per 100,000 of population in the mid 1990s in Sweden and it was 511 per hundred thousand in the female population.)

In Canada, Ireland, the United Kingdom and Finland (which was an exceptional case) the CVD, and CHD death rates were similar to that of the United States, whereas mortality due to cerebrovascular diseases was considerably higher in the European countries. In many of the European countries CVD and CHD mortality were much lower than in the English speaking world and in Finland. CVD mortality was nearly forty per cent lower in France. In Spain it was almost forty per cent lower in the male and about thirty per cent lower in the female population. In Czechoslovakia and in Hungary men had about twenty-thirty, whilst women somewhat less than ten per cent smaller CVD death rates than that of US men and women respectively. In the case of CHD mortality the margin over the US population was even bigger. In France both the male and female CHD death rate was less than one fifth of the US figure, in Spain the relative rates were about one quarter for men and one third for women. In Czechoslovakia and Hungary male CHD mortality was about fifty-sixty per cent of that in the United States, and female CHD mortality was 77-78 per cent.

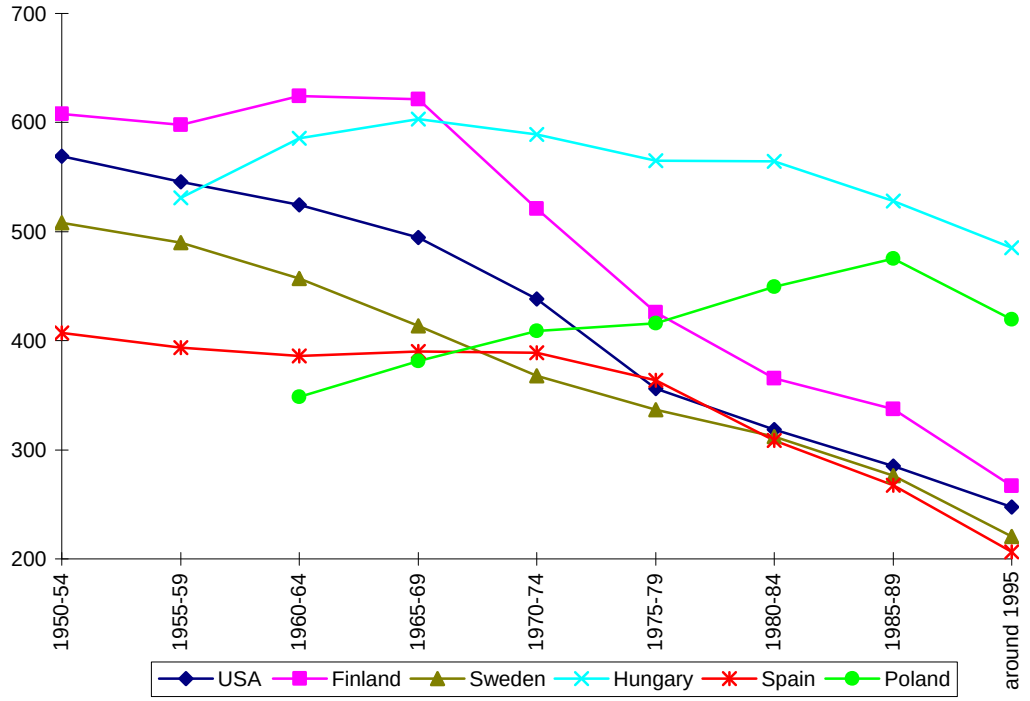
Figure 7.1

Age-standardized death rates due to diseases of the circulatory system (25-30)[a)]
in some of the EME and FSE
1950-54 – 1995
Per 100 000 population
Men, women separately

Men



Women



Data from the WHO mortality data base.
Standardized to the "European population" of the WHO.
a) ICD 9th Revision, Mortality List of 50 Causes.

In the 1950s, then, there were three recognizable patterns of CVD mortality: high death rate in the English speaking world and in some European countries, low death rate in the Mediterranean countries and an intermediate death rate in the Central and Eastern European countries.

The pathogenesis and associated risk factors of the very high CHD mortality in the United States were revealed by investigations such as the Framingham Heart Study. A new health conscious way of life has gained momentum, and health promotion and high-tech medical intervention together have changed the tide: CHD mortality started to decline in the early 1970s in the countries of high cause-specific death rate. It has not changed in the Mediterranean countries where the impact of risk factors accompanying the new relative affluency have been by and large warded off by the favourable features of olive oil culture.

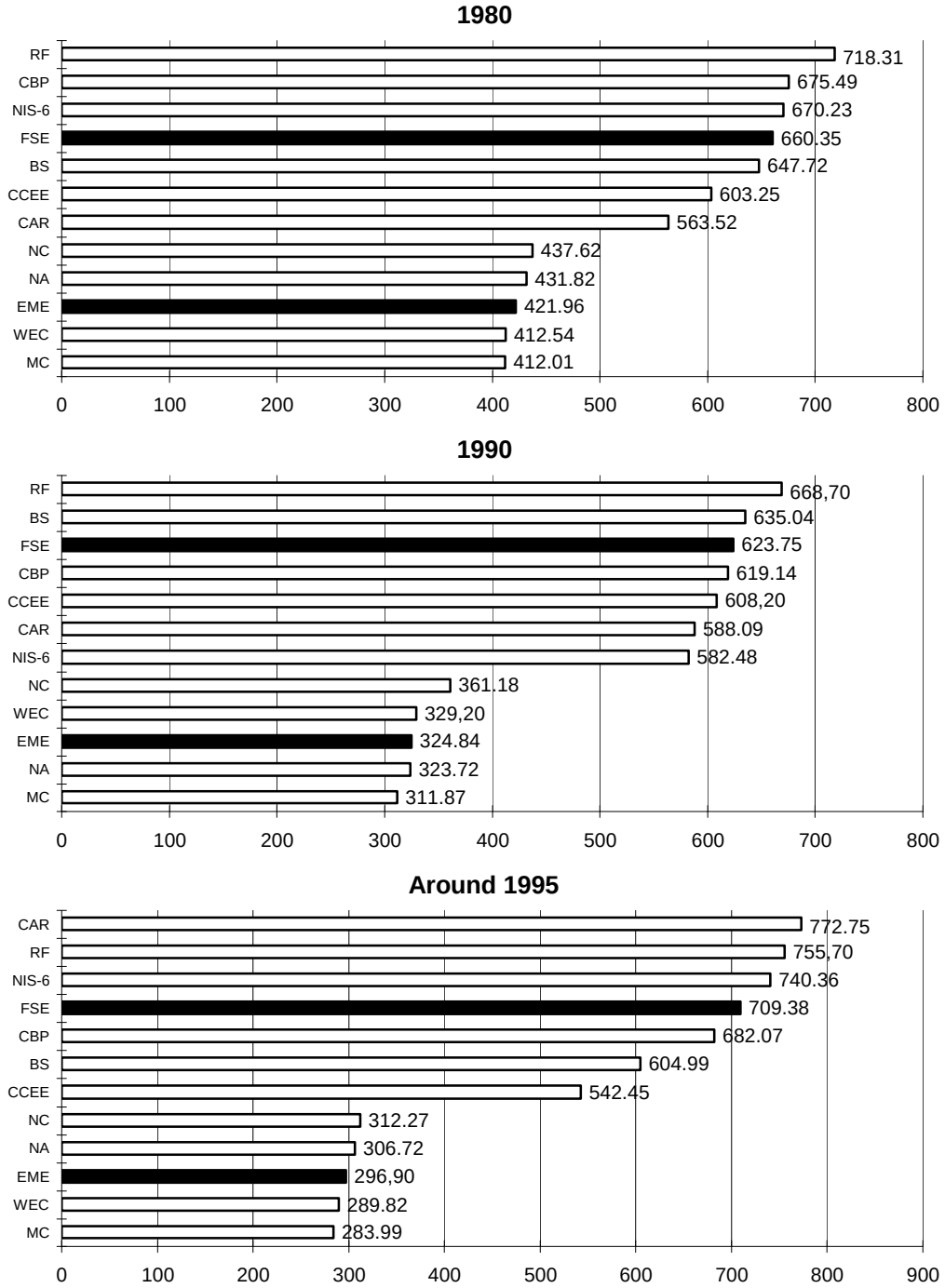
In the countries of Central and Eastern Europe CVD mortality was on the rise until the mid or late 1980s, after which it started to fall off. This was mainly the result of the decline in cerebrovascular mortality. CHD mortality, after having reached its peak in the late 1970s or the 1980s, levelled off and began to decrease only in the 1990s.

From 1980 onwards the time trend in CVD mortality can be followed not only for individual countries but for the EME and FSE as a whole and for the regional groups. In the EME over the last one and a half decades the decline in CVD mortality continued; it decreased by about thirty per cent and has reached the lowest level ever measured. In the FSE the time trend in the CVD death rate reflects convincingly upon the impact of abrupt change in the political and socio-economic system: between 1980 and 1990 CVD mortality fell off slightly, and subsequently increased significantly and reached a very high level. The death rate in the mid 1990s due to diseases of the circulatory system is less than one per thousand lower in the FSE than the all cause mortality in the EME. So the difference in CVD mortality between the EME and FSE in the mid 1990s was larger than it had ever been: the ratio of the two stood at 2.4.

No change has occurred in the rank order of the regional groups within the EME: the MC have the lowest CVD death rate, followed by the WEC, NA and the NC. In fact the decline in CVD mortality was about the same in the four regional groups. In other words it appears that the ebb in the CVD epidemic is universal in the EME. Much remains to be done to decrease CVD mortality even further, but it is unquestionable by now that the diseases have been put under control.

The decline in CVD mortality in Finland and in the United States is extraordinary: it was lessened by more than one half within three decades in the former and within four decades in the latter country. However CVD mortality is still higher in both the US and Finland that in France, Italy or Spain.

Figure 7.2
Age-standardized death rates due to diseases of the circulatory system (25-30)[a)] in the groups of EME and FSE
1980, 1990, around 1995
Men, women together
Per 100 000 population



Data from the WHO mortality data base.

Standardized to the "European population" of the WHO.

Weighted averages calculated by the size of national populations.

a) ICD 9th Revision, Mortality List of 50 Causes.

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The FSE have different time trends in CVD mortality. In 1980 the CAR had the lowest and Russia the highest cause-specific death rate. In the next decade the death rate remained about the same in CCEE and decreased in every other regional group except in the CAR, where it increased somewhat. Following the political and socio-economic transition it fell off significantly in the CCEE, slightly in the BS and increased extraordinarily in the RF, NIS-6 and CAR. In Turkmenistan CVD alone brought about nearly forty per cent more deaths per 100 000 population than all causes in the EME. The CVD death rate is extremely high in Kazahstan, Moldova, Romania, Russia, the Ukraine and Uzbekistan.

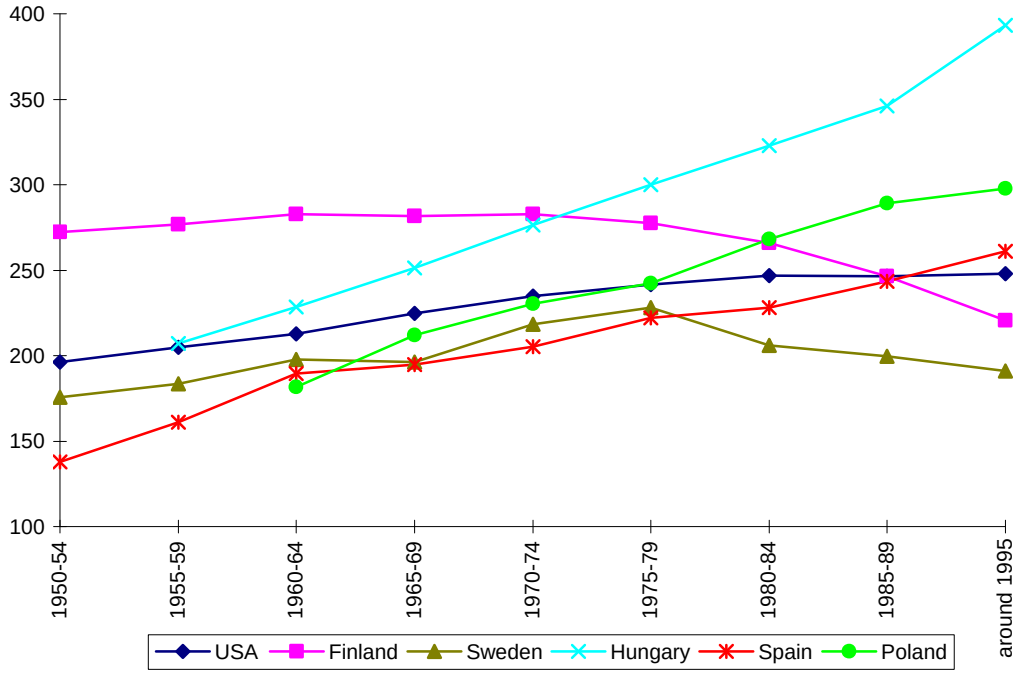
In Turkmenistan 63 per cent of all deaths is due to CVD. It is an unusually high proportion and one should be sceptical about the reliability and accuracy of the cause specific death rates in the CAR, the RF and in some other countries of NIS-6. It is probable that the contribution of CVD to mortality is overestimated in these countries. Nevertheless even if this supposition is true, the steeply rising trend in CVD mortality should be real. It is impossible to establish the reliability and accuracy of cause-specific death rates regarding some of the new states of the former Yugoslavia.

Cancer has become the number one scourge in most developed industrial countries. It is responsible for about one quarter of all deaths in the EME. No breakthrough has occurred either in prevention or cure of this very heterogeneous group of diseases except in a few localisations, despite many decades of sophisticated scientific research. Many things have been discovered regarding the causes and circumstances involved in the pathogenesis of malignant neoplasms, but the overall mechanism of the diseases' causation is still unknown. The most that may be said for the results of efforts at prevention and cure is that mortality due to cancer is not increasing further in the EME despite the ageing of society, even though cancer is mainly a disease of old age. It is on the rise in the FSE, albeit with an inconsistent cause-specific time trend in the 1990s.

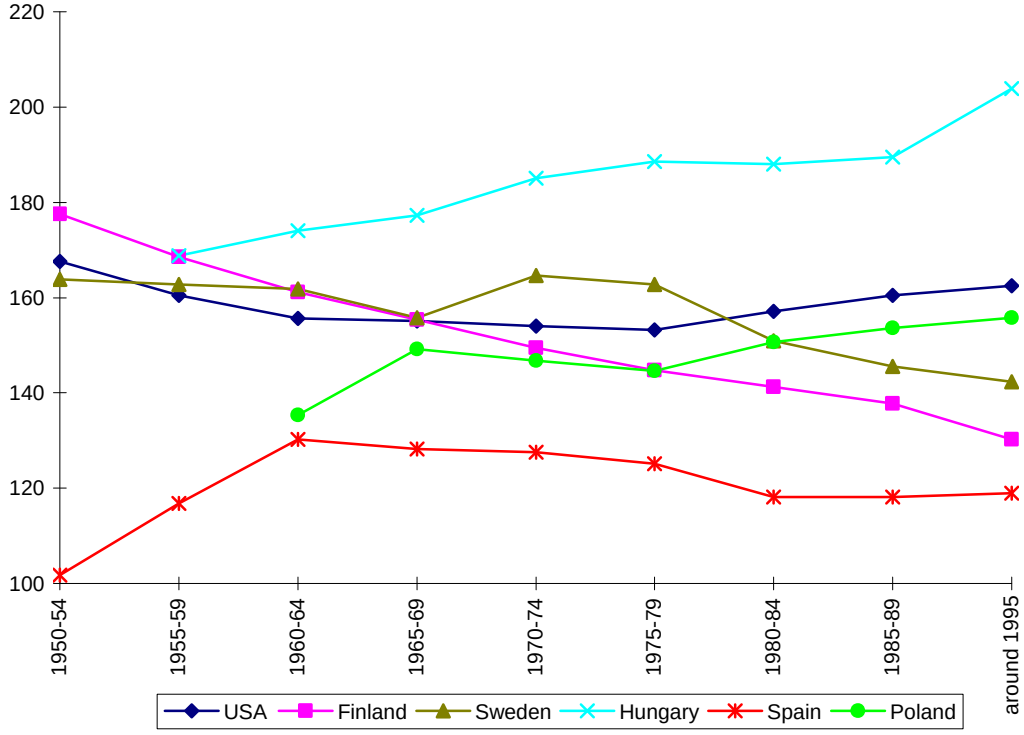
Figure 7.3

Age-standardized death rates due to malignant neoplasms (08-14)[a)]
in some of the EME and FSE
1950-54 – 1995
Per 100 000 population
Men, women separately

Men



Women



Data from the WHO mortality data base.

Standardized to the "European population" of the WHO.

a) ICD 9th Revision, Mortality List of 50 Causes.

In the 1950s the cancer death rate in many countries was between 200 and 250 per 100,000 population for males and 150-200 for females. Countries with cancer mortality in this range included Denmark, Czechoslovakia, Finland, France, Hungary, Switzerland, the United Kingdom and the United States. In Sweden and in Mediterranean countries like Greece, Italy and Spain, the cancer death rate was lower.

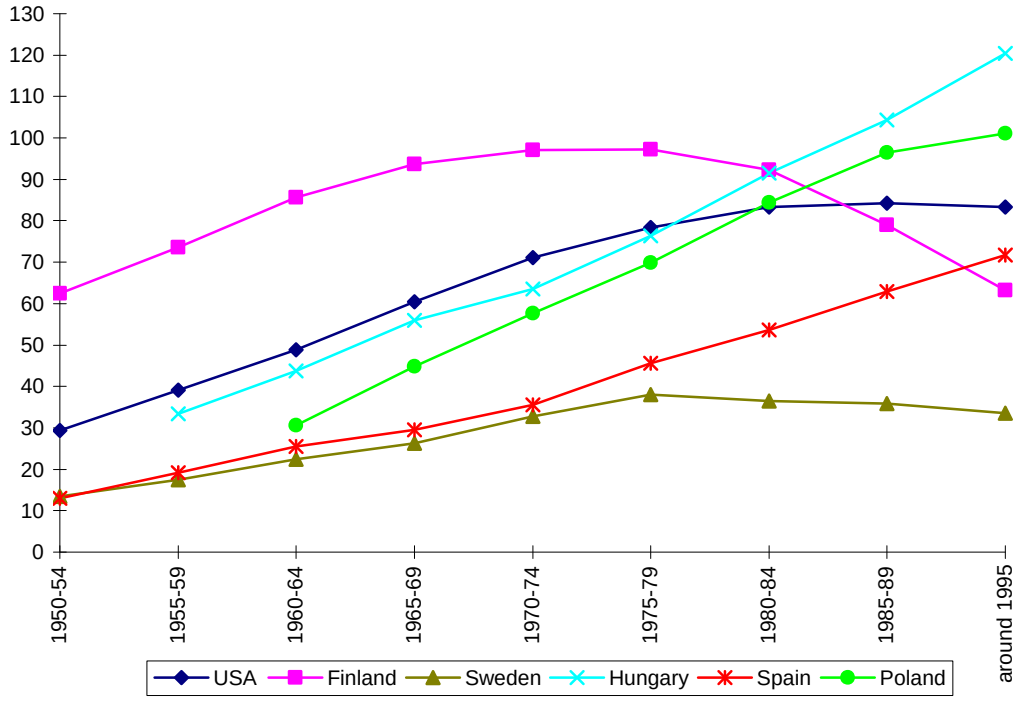
In all these countries, in fact in every member state of the ECE cancer mortality increased until the 1980s; in some countries it still increasing. On the other hand in a few countries like Finland, France, Switzerland and the United Kingdom the cancer death rate decreased considerably in the 1990s.

All cancer mortality hides both the relative weight and the time trends in mortality due to different cancers: cancer of the stomach fell off significantly everywhere whilst in many countries the death rate of colorectal cancer rose substantially. The highest mortality is due to **lung cancer** in the male population and breast cancer in the female population. The most dramatic increase over the last four decades or so has been that of lung cancer mortality.

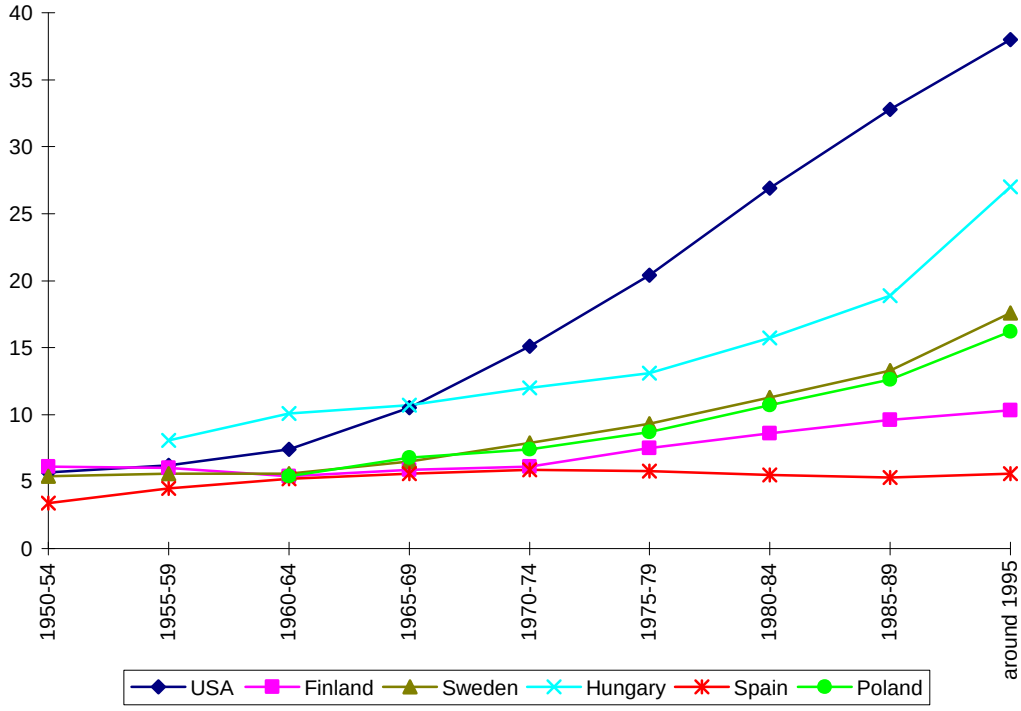
About 80-85 per cent of lung cancers are caused by **tobacco smoking**. At least two decades or more of smoking is needed for the development of lung cancer. Since the case fatality rate is over 90 per cent, almost all of the people who have lung cancer die within two-three years after the onset of the disease. However it should be noted that not all smokers contract the disease and about 15-20 per cent of those who die of lung cancer have never smoked. Nevertheless it is agreed that the lung cancer epidemic is a direct consequence of the tobacco smoking epidemic.

Figure 7.4
Age-standardized death rates due to malignant neoplasms of trachea, bronchus and lung (110)[a)] in some of the EME and FSE
1950-54 – 1995
Per 100 000 population
Men, women separately

Men



Women



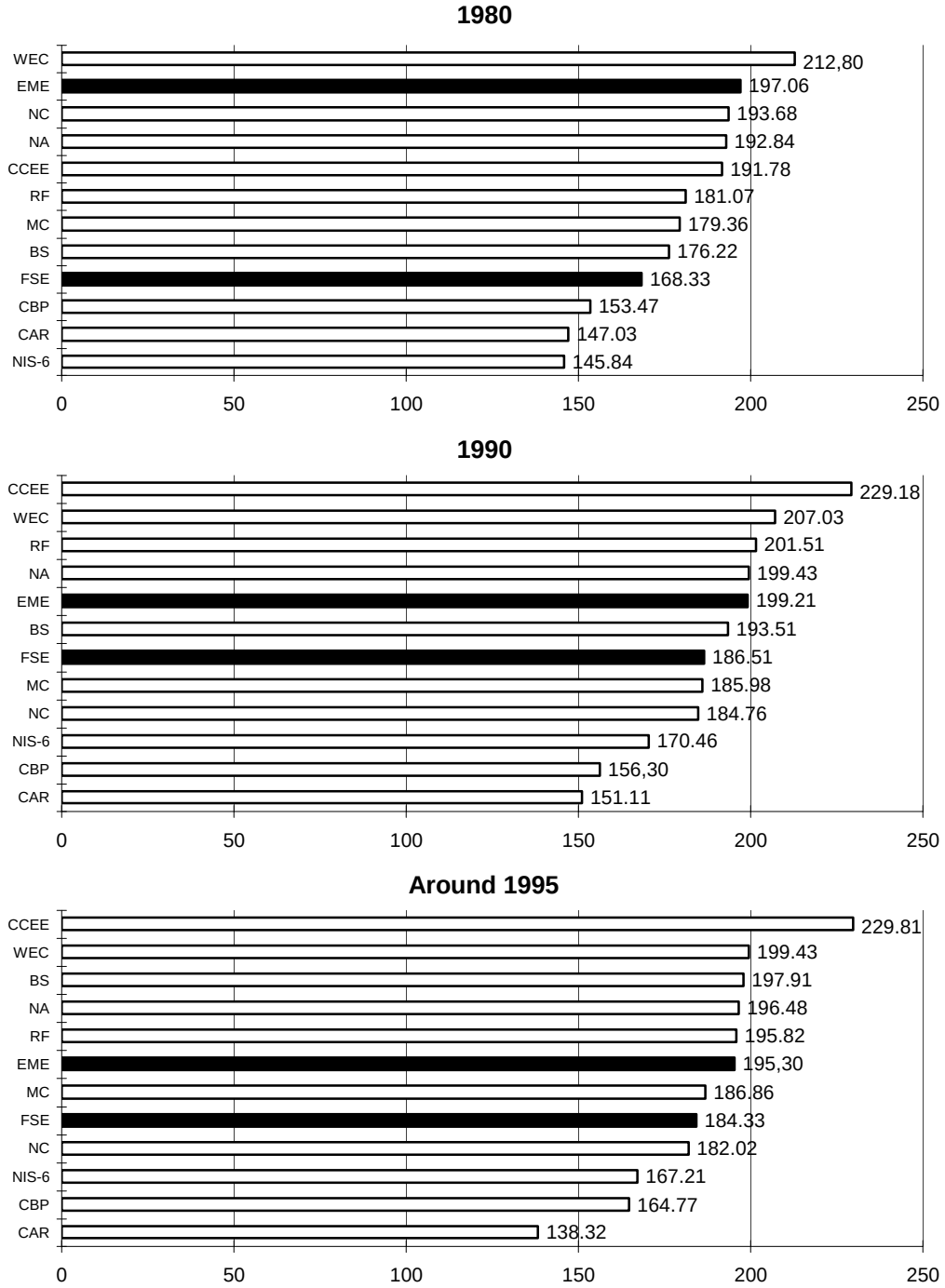
Data from the WHO mortality data base.
Standardized to the "European population" of the WHO.
a) ICD 9th Revision, Mortality List of 50 Causes.

In the 1950s in many countries, like the US, Finland, France, Hungary and Italy, as many people (or more) died of tuberculosis as of lung cancer. By now tuberculosis mortality has become insignificant and lung cancer mortality has grown to be one of the most important public health issues. In the mid 1990s the death rate in the countries where the lung cancer epidemic has spread with most vigour is about three times as large in the male population as it was in the 1950s. In the female population, in which lung cancer mortality was very low four decades ago, the increase in the death rate is extraordinary: e.g. in Denmark and in the US lung cancer mortality was nearly seven times as high in the mid 1990s as in the 1950s.

In many countries, e.g. in Hungary, the Netherlands, Poland and the US, about one third of all cancer deaths in the male population were due to lung cancer in the mid 1990s. In the male population over the last four decades or so about forty-fifty per cent of the increase in the cancer death rate is a consequence of the rise in lung cancer mortality. There are only a few countries where lung cancer mortality decreases in the male population: Finland, Switzerland and the United Kingdom should be mentioned. No decrease can be observed in the female population.

In the mid 1990s cancer mortality is slightly higher in the EME than in the FSE; the cause-specific death rate for males is somewhat higher in the FSE than in the EME, but for females it is lower. It may be inferred that lifestyle-related cancer mortality (above all lung cancer) is much lower in the female population of FSE because of a more traditional way of life.

Figure 7.5
Age-standardized death rates due to malignant neoplasms (08-14)[a)]
in the groups of EME and FSE
1980, 1990, around 1995
Men, women together
Per 100 000 population



Data from the WHO mortality data base.

Standardized to the "European population" of the WHO.

Weighted averages calculated by the size of national populations.

a) ICD 9th Revision, Mortality List of 50 Causes.

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MC – Mediterranean countries; **NA** – North America; **CCEE** – Countries of Central and Eastern Europe;

CBP – Countries of the Balkan Peninsula; **BS** – Baltic States; **RS** – Russian Federation;

NIS-6 – Newly Independent States; **CAR** – Central Asian Republics.

As a result of converging cancer mortality time trends in the EME the difference in cancer death rates between the NC, WEC, MC and NA was insignificant by the mid 1990s. Cancer mortality is lowest in the NC and almost the same in the MC, whereas it is somewhat higher in NA and the WEC. On the other hand cancer death rate differences between the regional groups of FSE have become accentuated. The highest cancer mortality can be found in the CCEE, the BS and the RF, whereas in the NIS-6, the CBP and CAR the cause-specific death rate is substantially lower. The time trends in cancer mortality over the last one and a half decades show a convincing consistency in the CCEE, the CBP and the BS, whilst they have an inconsistency in the RF, NIS-6 and CAR. It cannot be excluded that in the countries belonging to the latter three regional groups cancer mortality is underestimated.

Cancer mortality is highest in Hungary, followed by the Czech Republic and Denmark; it is also very high in Slovakia, Ireland, Belgium, Poland and Slovenia. The lowest cancer death rates exist in Albania and Uzbekistan, but they are so much lower than the averages for either the EME or the FSE that their reliability and accuracy are questionable. Among the EME, Finland, Greece and Sweden have the lowest cancer mortality. In all the CAR, except Kazahstan, and in Armenia, Azerbaijan, Moldova, Bulgaria and Romania cancer mortality is small compared to the FSE average.

One should be cautious about making conclusions regarding the relationship between modernisation and cancer mortality, but it appears that modernisation increases the cancer death rate by inducing a way of life and generating changes in the physical environment where the number of risk factors and their frequency grow decisively.

The number of deaths caused by accidents and violence is probably the most reliable, if indirect, indicator of the psychosocial behaviour of the populace in a given societal setting. Naturally the level of socio-economic development, the physical environment and climate, to mention only a few, also influence the share of violent deaths in general mortality, but most of the unintentional and all of the intentional deaths, in one way or in another, are the consequence of antisocial, asocial, or simply negligent behaviour. Unlike natural causes of

death, their frequency can and does rise suddenly and dramatically (no incubation period exists for a motor vehicle traffic accident, homicide or suicide) when the economic basis and superstructure fall apart and a situation emerges which is in a certain sense uncontrollable, and degrades the value of human life. In principle every violent death is preventable, so there is an inverse relationship between the efficiency of preventive measures and the mortality caused by violence.

Two further important remarks should be made: "fall on same level from slipping, tripping and stumbling", which is as a cause of death is mainly an event in old age, or better to say a consequence of senescence, is included in the main group of "external causes of morbidity and mortality". This entity is different in character from violent deaths caused by a head-on collision of cars, or using a rifle for homicide or suicide. The proportion of deaths due to fall on the same level as a consequence of senescence may be as low as 2.5 per cent in a society when the age structure is "young" and in the range of 20.0 - 25.0 per cent in an ageing society. Since the age structure is younger east of the Elbe, especially in the post-Soviet states, the difference in mortality due to accidents and violence between the post-Soviet states on the one side and the EME and FSE on the other is actually considerably larger than the figures show.

In some countries suicide is stigmatised, and as a result serious efforts are made to invent a socially acceptable cause of death instead of suicide. This naturally leads to underestimation of the number of deaths caused by suicide. The phenomenon is more common in the MC than in other regions, but since it is usually accident which is diagnosed as the underlying cause of death instead of suicide, the different diagnosis in most cases does not influence the number of deaths due to violence.

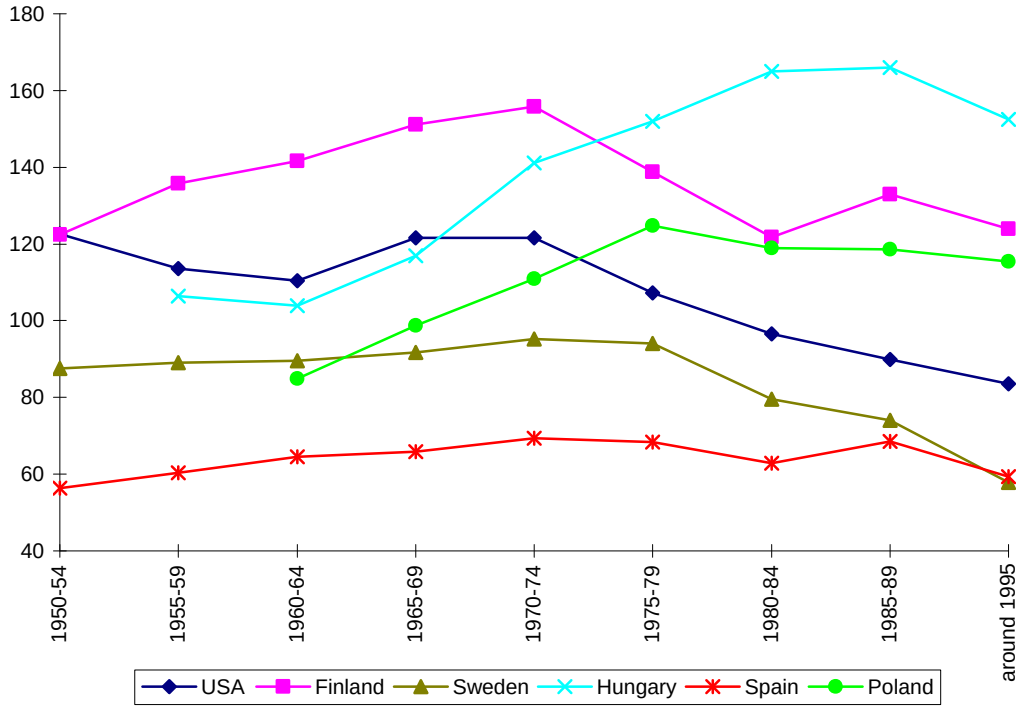
Accidents and violence are more common among men than among women (although in many cases the victim of male violence is woman), therefore accident- and violence-specific death rates are much higher for men than for women. However recently the difference in mortality caused by accidents and violence between the two sexes started to decrease mainly as a consequence of rising death rates due to external causes in the female population.

In the early 1950s in the US mortality due to accidents and violence was 123 and 50 per 100 000 population for men and women respectively; more than eight and five per cent of all deaths was caused by external causes of injury and poisoning in the male and female population respectively. They were included among the highest violence-specific death rates and shares of all deaths in international comparison. At the other end of the scale, in Spain mortality caused by violence was 56 and 21 per 100 000 population for men and women respectively; the relative weight of violent deaths was less that four and less than two per cent of all deaths in the male and female population. In most countries both the violence-specific death rates and proportions of violent deaths were somewhere between the values of the US and of Spain.

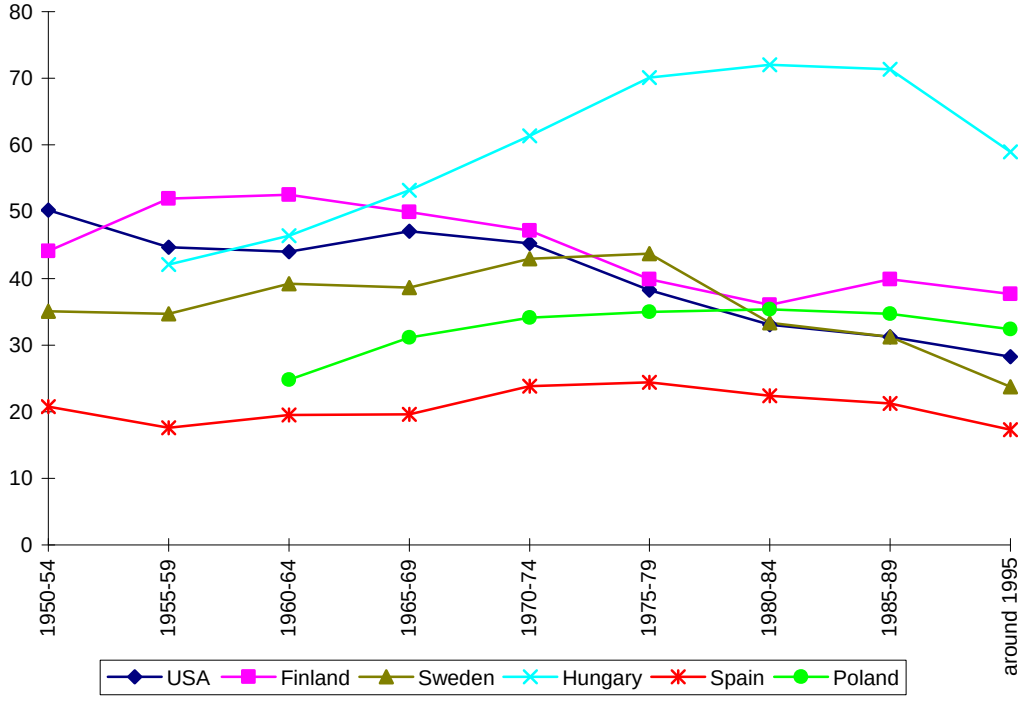
Figure 7.6

Age-standardized death rates due to injury and poisoning (E47-E56) [a)]
in some of the EME and FSE
1950-54 – 1995
Per 100 000 population
Men, women separately

Men



Women



Data from the WHO mortality data base.

Standardized to the "European population" of the WHO.

a) ICD 9th Revision, Mortality List of 50 Causes.

Over the last four decades or so mortality caused by accidents and violence decreased in most of the EME, but their relative weight in all deaths either did not change, or even increased.

There is no other main group of diseases where the relative difference in cause-specific mortality has been as large between the EME and the FSE as in accident- and violence-related mortality. In 1980 it was 70 per cent higher east than west of the Elbe; in 1990 accident- and violence-related mortality was almost twice as high in the FSE as that in the EME, and in the mid 1990s nearly three times as high. In fact the extraordinary difference in accident- and violence-specific death rates between the EME and the FSE is due to the dramatically higher rates in the post-Soviet states. The ratios of external cause-specific death rates of the CAR, NIS-6, BS and RF to the EME average are as follows: 2.0, 2.9, 3.3 and 4.4. It should be noted that the mortality due to accidents and violence in the RF is higher than that due to cancer; this is a unique epidemiological situation. By comparison with these figures, the accident- and violence-mortalities in the CCEE and CBP are much less different from the EME average.

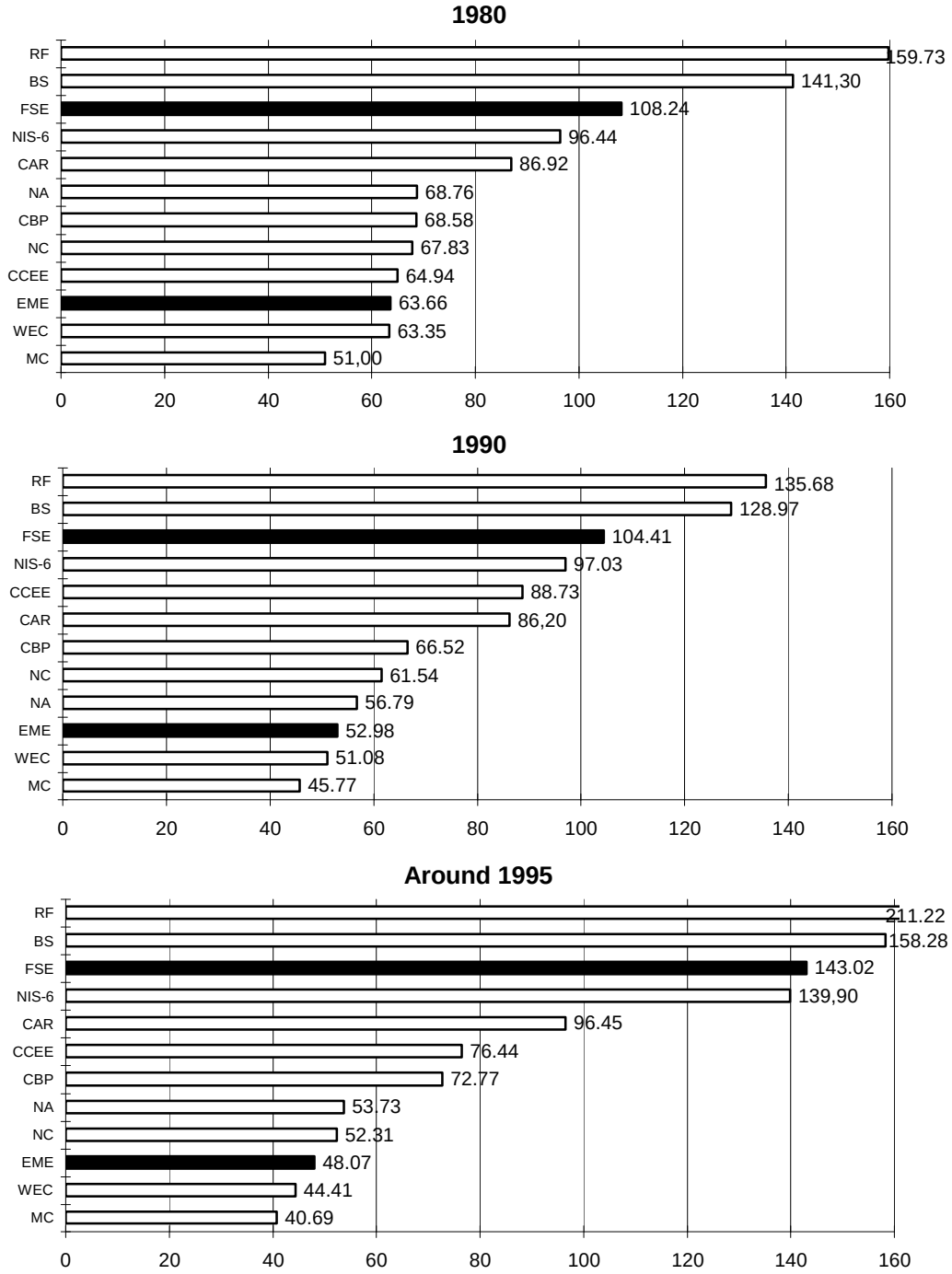
In the mid 1990s as always the death rate due to external causes was the lowest in the MC, followed by the WEC, the NC and NA; the differences in accident- and violence-specific mortality between these regional groups are insignificant.

It is true that mortality due to motor vehicle traffic accidents is higher by about one fifth and mortality caused by suicide is almost 2.5 times as high in FSE than in EME, but the death rates attributable to these causes of death still do not explain the much higher mortality east than west of the Elbe, because the two causes of death together represent only about thirty per cent of all violent deaths in FSE (and about one half in EME) in the mid 1990s.

It is notable that in the mid 1990s the EME group with the highest mortality caused by motor vehicle traffic accidents was the MC, whereas the suicide-specific death rate is the lowest there. In the NC the cases are reversed.

Figure 7.7

Figure 7.7
Age-standardized death rates due to injury and poisoning (E47-E56) a)
in the groups of EME and FSE
1980, 1990, around 1995
Men, women together
Per 100 000 population



Data from the WHO mortality data base.

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Weighted averages calculated by the size of national populations.

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NIS-6 – Newly Independent States; **CAR** – Central Asian Republics.

The unprecedentedly high death rate due to external causes in the RF in the mid 1990s is a multicausal event in which the decisive factor is probably **alcoholism**. The death rate from all external causes of injury and poisoning has increased significantly since 1987 when the antialcoholism campaign succeeded in increasing life expectancy to 69.1 years. The excessive alcohol intake can presumably be found to a greater or lesser extent in the background of all the increases in accident- and violence-specific mortality, but no cause of death rose so much in the male population (except homicide) as accidental poisoning, which was more than three times as high in 1994 as in 1987. This cause of death represents about one third of all accident- and violence-specific mortality for men, and its death rate is about twenty times as high in the RF as in the US. In fact accidental poisoning is mainly alcohol related.

8. A SPECIAL CASE: AIDS

In contrast to CVD, cancer, or accidents and violence, the epidemic of **acquired immune deficiency syndrome – AIDS –** only started in the late 1970s, and was first conclusively identified in 1981. It is a **viral** disease that impairs the immune system of the human body leaving it prey to a great variety of infections that are readily suppressed by a properly-functioning immune system. It is caused by the **human immuno-deficiency virus (HIV).** The disease is transmitted by contamination of the bloodstream with HIV-infected body fluids, particularly blood, semen, breast milk and vaginal fluid. The virus is generally transmitted through vaginal or anal intercourse, by the transfusion of virus-contaminated blood, by the sharing of HIV-contaminated intravenous needles, or by breast-feeding. Once the person is infected, the incubation period is long – an average of eight years – before symptoms appear.

World-wide, the number of HIV infected people has increased from an estimated 100,000 in 1980 to 30.6 million by the end of 1997. Infection rates are rising rapidly east of the Elbe, whereas in many industrialised countries west of the Elbe infection is falling or close to stable. It is estimated that about 40 million people world-wide will be infected by the year

2000. In 1997, 2.3 million people died of AIDS; among them 800,000 women and 460,000 children less than 15 years old.

In NA 860,000, in Western Europe 480,000, and in Eastern Europe and Central Asia 190,000 people are living with HIV/AIDS. In Canada, the US and most of the NC, WEC, MC and CCEE, data on deaths due to AIDS are fairly reliable and accurate. In most CBP and the post-Soviet states data on deaths caused by AIDS are either underestimated or not available at all. Over the last one and a half decades or so HIV infection has emerged as a leading cause of premature mortality, particularly among men aged 25-44 years, in many developed countries. In general, HIV infection rates appear to be dropping in Western Europe, with new infections concentrated among drug injectors in the Mediterranean countries, particularly Greece and Portugal. It is estimated that 30,000 Western Europeans were newly infected with HIV in 1997.

In the US, AIDS case reports indicate that the first-ever annual decrease in new cases – 6 per cent – occurred in 1996, and an even larger reduction was expected in 1997. The biggest improvement was in homosexual men. In some disadvantaged sections of society, however, AIDS continues to rise, e.g. among African-Americans and in the Hispanic community. NA estimated it had around 44,000 new HIV infections in 1997, close to half of them among injecting drug users.

Until the mid 1990s, most of the FSE appeared to have been spared the worst of the HIV epidemic. All the FSE put together had around 30,000 infections at the beginning of 1995. At that time the EME, without NA, had over 15 times as many cases. But in the last few years the FSE have seen infections increase around six-fold. By the end of 1997, some 190,000 people in the region were living with HIV infection.

The pattern of consistently low prevalence began to change in 1995 in several of the countries of the former Soviet Union. Belarus, the Republic of Moldova, the Russian Federation and Ukraine have all registered astronomical growth in HIV infection rates over the last three years, mostly related to unsafe drug injecting. Now there may be nearly four times as many infections in Ukraine alone as there were in the whole group of the FSE just three years ago.

Ukraine is the worst affected country in the region. The number of infections in 1994 was probably around 1500. Now just four years later over 70 times that many people – some 110,000 – are estimated to be infected. A similar pattern appears in the FR. The bulk of the spread has been in injecting drug users. It is assessed that around 40,000 people may currently be living with HIV.

The sex partners of injecting drug users may provide a conduit for the virus into the general population. There is no doubt that the warning signs for a widespread sexually-transmitted epidemic of HIV exist in many FSE. Although levels of HIV infection in the general population remain very low, the testing of pregnant women, blood donors and others suggests that the virus is becoming increasingly common in society as a whole.

In many countries HIV is known to have contributed to a major rise in adult death rates. Among the EME over the period 1987-1991, age-specific mortality rates for the age group 25-44 years were highest in the US for both men and women. In men the rate was 35.4 deaths per 100,000 population and in women the rate was 4.2 deaths per 100,000. The next highest rates were for Spain, at 16.9 deaths per 100,000 population in men, and for Switzerland, at 4.1 deaths per 100,000 population in women.

In the EME many people who test positive for HIV have access to combination antiretroviral therapies. These therapies were introduced in 1995 and became widespread in 1996. Their use is already having a visible impact on AIDS incidence and AIDS mortality. Monitoring of treated and untreated patients in France and Germany confirms that the new therapies can explain at least part of the drop in AIDS mortality. In the US, new therapies have drastically cut both deaths and the development of AIDS-defining opportunistic infections in patients with severely damaged immune systems.

Table 8.1
Estimated number of adults and children who have died of AIDS since the beginning of the epidemic

NA	**421 000**	**NIS-6**	**440**
Canada	11 000	Azerbaijan	<100d
USA	410 000	Armenia	–
NC	**3 600**	Georgia	<100d
Denmark	1 800d	Belarus	<100d
Finland	210d	R. of Moldova	<100d
Iceland	<100d	Ukraine	240d
Norway	500d	**CCEE**	**990**
Sweden	990d	Czech Rep.	<200d
WEC	**74 260**	Hungary	200d
Austria	1 500d	Poland	490d
Belgium	1 700d	Slovak Rep.	<100d
France	35 000d	Russian Fed.	190d
Germany	13 000d	**BC**	**300**
Ireland	360d	Estonia	<100d
Luxembourg	<100d	Latvia	<100d
Netherlands	4 700d	Lithuania	<100d
Switzerland	5 100d	**CAR**	**200**
United Kingdom	13 000d	Kazakstan	<100d
MC	**69 300**	Kyrgyzstan	–
Greece	1 300d	Tajikistan	–
Italy	31 000d	Turkmenistan	–
Malta	<100d	Uzbekistan	<100d
Portugal	3 900d		
Spain	33 000d	**Altogether**	**574 780**
CBP	**4 500**		
Albania	<100d		
Croatia	<100		
Slovenia	<100d		
FYR Macedonia	<100d		
Bulgaria	–		
Romania	4 100d		
Bosnia Herzegovina	–		
Fed. R. of Yugoslavia	–		

Country estimates marked with a "d" are based on reported AIDS cases.

Report on the global HIV/AIDS epidemic, June 1998.
UNAIDS: Unicef, UNDP, UNFPA, UNESCO, WHO, World Bank;
Joint United Nations Programme on HIV/AIDS; p.:62.

9. CONCLUSIONS

People die of disease(s) or as victims of accident or violence. These are the **causes of death**. The causes of death have been classified in the International Classification of Diseases - ICD according to **agents**: bacteria, viruses, etc. responsible for "the train of events leading directly to deaths", if the agents are known at all and "according to **circumstances** of the accident or violence which produce the fatal injury". The rationale behind this is that prevention is only feasible if the **agent/cause** is put under control. Therefore the common and traditional approach in mortality analysis has been to reveal the **frequency of causes of death** by various demographic and socio-economic indices. By and large this approach was satisfactory in the **epidemiological stage of monocausal infectious diseases** when usually one agent- one disease was the substance of the pathomechanism leading to death. In the **epidemiological stage of polycausal, chronic, noninfectious, degenerative diseases**, like heart disease or cancer **risk factors** "that increase the probability of occurrence of disease" have become relevant in interpreting the current level of and the time trend in mortality, and so it is now also customary to analyze the frequency of deaths related to lifestyle-dependent exposure to tobacco-smoking, alcoholism, unhealthy diet (e.g. cholesterol, too much sodium chloride), overweight, etc. Further subjects of study are the effects of health care (preventive and curative measures) on the nation's health, and the impact of the physical environment on health.

The causes of death may be defined as the **dependent** variables, and the risk factors, provision of health care and the physical environment as the **intermediate** variables. The political, socio-economic, and cultural setting, within which all events relevant to health take place, may be considered as **independent** variables. The causes of death and the risk factors per se are non (socio-economic) system specific. However their **frequency** is at least to some extent, system specific as are the standard of health care, the quality of physical environment and the political, socio-economic, cultural setting. So the professional challenge is to determine the links between independent, intermediate and dependent variables, or to put it

into another way: to describe how a **given political, socio-economic, cultural setting operates in determining the current level of and the time trend in mortality**.

The observation period for this scholarly endeavour is the half century which elapsed since World War II. during which life expectancy has increased more than any other time previously. In the epidemiological history of the EME and FSE over the last five decades two periods may be distinguished. In terms of mortality the **period of convergence** prevailed between the late 1940s and mid 1960s and since then it has been followed by the **period of divergence**. However the period of divergence is not consistent: there has been a **chronic, qualified** and **gradually worsening health situation** everywhere east of the Elbe till 1990 or even in the first years of the 1990s, and an **acute, general health crisis** after 1990 in the post Soviet states.

9.1 The period of convergence

The epidemiological transition started in north western Europe and it arrived with a time lag in Central and eastern Europe. Life expectancy has always been much higher e.g. in Scandinavia, the Netherlands and in the United Kingdom than in Hungary, Romania or the Russian Empire. In the first half of 20th century the East's life-expectancy disadvantage was mainly a consequence of a much higher infant and child mortality. However as a result of preventive and some curative measures infant and child mortality decreased significantly in the East and West, and since the death rate in infancy and childhood was much higher in the East the improvement in under five year mortality had more impact there than in Western Europe and North America.

It was relatively easy and inexpensive for the state to take all the measures and provide all the facilities necessary to reduce infant and child mortality. With the advent of antibiotics and chemotherapeutics pneumonia, tuberculosis and most other infectious diseases have became curable, and although some shortages of medicine occurred from time to time in the

FSE, by and large the causal therapy of infectious diseases was universally and successfully applied. So mortality due to infectious diseases declined steeply and steadily in the adult population, in both East and West. These years may also be called **the period of easily performed achievement in public health.** Life expectancy rose more markedly in the less developed than in the more developed industrial countries.The beginning of this phenomenon can be traced to the 1930s, and except the war-torn years it continued steadily until the mid 1960s. Over the first six decades or so of the 20th century **unevenness of epidemiological development** in the industrial world was in favour of the backward countries.

Furthermore as a consequence of the relative affluence that was enjoyed by all in the West except a small minority after the post-World War reconstruction period there was an abundance of "good food" i.e. red meat and other health-damaging staples and the luxury of tobacco smoking. Earlier these things were mainly available in abundance for the upper and middle classes only. But paradoxically rationing in war years and the provision of "high quality food" and cigarettes in the armed forces of the Anglo-Saxon countries facilitated the trend of "eating too well" and smoking excessively. So the epidemic of heart disease started, at first as a "manager disease", but very quickly it became a public health issue of utmost importance raising the mortality of American and European blue collar workers alike, including Finnish lumberjacks. This heart disease epidemic, much less the mortality attributed to it, was non-existent in the FSE for the first fifteen or twenty years after World War II. These are the epidemiological events responsible for the convergence in life expectancy between the East and the West until the mid/late 1960s.

9.2 The period of divergence

From the mid 1940s until 1989/1990, a state of confrontation which became known as the "Cold War" dominated the political and socio-economic history of East and West. The years since then may be characterised as the period of globalization and transition.

The period of confrontation was at the same time the period of competition between the EME and the socialist economies and ended with the total and abrupt collapse of the latter.

One of the signs betraying the weakness of socialist societies was their **inability** to arrest the rising trend of middle-age and to a lesser extent old-age mortality mainly, but not exclusively, in the male population. Strangely enough, these countries' mortality increase began when a modest consumerism was gaining momentum after so many years of deprivation, and a compromise between the populace and political regime had resulted in a certain degree of relaxation, making life (more) bearable. Furthermore, the rise in death rate occurred in the most developed FSE, namely in the former Czechoslovakia, Hungary and Poland.

This was a striking paradox. However this paradox can be the particular nature of chronic degenerative diseases and their relationship to industrialization, urbanization and even modest affluency, i.e. to modernization. At least ten or fifteen years, and sometimes, twenty years or more elapse between the beginning and the end of these diseases. The beginning almost always remains hidden and by the time the symptoms of the disease appear it is usually too late to give back to the sick his/her health. All that can be done is care and treatment including changes in lifestyle, to slow down the disease, or perhaps to stop it temporarily. So the increase in mortality in the mid and late 1960s in some FSE was mainly a consequence of events ten-fifteen, even twenty years earlier which set off major rises in the frequency of certain chronic, generative diseases ten, fifteen, even twenty years earlier. The heart of the matter was that a health damaging lifestyle started mainly among men when they were young and they died of it when they reached middle age. This occurred much more among unskilled and semiskilled blue collar workers and agricultural labourers than among middle class professionals. In fact in their teens and twenties they had no real choice to choose between a healthy and unhealthy way of life. First of all coronary heat disease - CHD and cerebrovascular disease mortality rose, much less cancer mortality. In the 1960s and for many years afterwards it neither the body of knowledge nor the means were available to intervene efficiently in the progress of CHD. The chances were only a little better in the case of cerebrovascular disease for medical intervention.

The two and a half decades or so between the mid 1960s and 1989/1990 is a history of the gradually growing gap in the performance of the EME and FSE in every faculty of life:

economic, social and epidemiological. In the first ten years after the post-World War II reconstruction period, the combined effects of developments in science and technology and changes in the economy, society, ways of life and disease prevention ushered in a new era in human history which saw the sweeping aside of concepts inherited from the pre-Second World War period. New challenges have required new responses. In this post-industrial world the EME, with some difficulties, have finally found the responses, the FSE have not.

In fact the EME were already in a position to be pace-setters, most of them having been modern societies even before World War II. The FSE except the former Czechoslovakia and the defunct German Democratic Republic were in different stages of modernization in the late 1940s and 1950s. The industrial countries of the West succeeded in improving the quality of life, spreading affluence, developing a middle class society and making achievement oriented middle class behaviour highly acceptable. It should be taken into account that an achievement oriented behaviour is inherently also a health conscious behaviour. Social policy, in one way or in another, improved the standard of living of the poor and elderly and to some extent reduced inequalities in health. In fact only a relatively small group of people remained outside the protective umbrella of the affluent society.

Epidemiological studies have revealed the relevance of health conscious behavior in disease prevention and health promotion. A general awareness has gradually emerged of the relationship between harmful habits and health.

There is no consensus on the contribution of medicine to the recent decline in mortality. Medicine is not expected to become capable of curing most localizations of neoplasms, nor of reversing the pathological processes of chronic degenerative diseases (ChDD-s), if they have already caused anatomical damage. However, medicine is seen to have a much more substantial role in decreasing mortality if it considered in a broader sense than the application of certain techniques, as an authoritative source of advice on the avoidance of harmful health practices. It cannot be denied that medicine has succeeded in slowing down the progression of ChDD-s. The frequently arising acute complications of ChDD-s in many cases can be completely cured. By postponing death in these ways the role of medicine in

decreasing age-specific mortality, in old age especially, and consequently general mortality cannot be neglected. In fact the **delay** is the key world in defining the current stage of epidemiologic transition in the West. It is called the stage of delayed chronic degenerative diseases. This stage has been in progress since the late sixties or early seventies in the countries with a market economy and an open society.

As a result of these events the differences between EME with traditionally low and high mortality have gradually diminished. In terms of life expectancy, the Mediterranean countries have now overtaken many of the countries in north-western Europe. Life expectancy in the EME reached 76.1 years on average by the mid 1990s.

No similar development can be found in the FSE. After the communist take-over a forced modernization started in the CCEE and the CBP. The automatic application of the Soviet model led the development of heavy industry being overemphasized at the expense of all other branches of economy. This was an enormously investment demanding endeavour in a region which has always been short of investment capital. In this kind of out-of-date, defence-oriented industrialization capital and labour were withdrawn from agriculture, the only branch of the economy where there had been some modest accumulation. Meanwhile huge, ineffective, socialist latifundia were organized for practical and ideological reasons. As a result of these circumstances, except Hungary, agriculture could not provide the large variety of healthy food for the population. Even in Hungary consumption of healthy food over the whole year was prohibitively expensive for a large segment of the population. All of these countries are situated in a temperate climatic zone. For the provision of fresh fruits and vegetables around the year imported agricultural products are necessary. However the CCEE imported some token tropical fruits mainly for Christmas and this was much more a means of cheap propaganda to cajole the people by sweetening the great religious holiday than to provide healthy food during winter. At present these countries are in transition and the majority of the population cannot afford the "luxury" of expensive fresh fruits and vegetables over the whole year. **Unhealthy nutrition is probably the most important single factor responsible for the increase of the mortality rate from diseases of the circulatory system.**

There is a common problem east of the Elbe: the **social maladaptation syndrome. Alcoholism** is a frequent form of escape for those people who adapt themselves badly to the rules of the game in society. The social maladaptation syndrome is not exclusively an east European phenomenon. Yet certain causes of this phenomenon are typically the features of the regional model of modernization. The massive internal migration from rural to urban areas uprooted peasants, most of whom became unskilled or semiskilled workers at new industrial plants. Intensive upward mobility elevated many valuable people to higher social strata, thus depriving the lower social strata of their natural leaders. At the same time, there was an attempt, via an elaborate system of ideology, to almost totally disrupt traditional social institutions. All this created an alienated mass of people without any guidance. without values, without leaders, without institutions. This is an unprotected, fairly large minority which contributes disproportionally to premature and avoidable deaths.

Smoking is presumably no more serious a public health problem in the FSE than in the EME. However the decrease in cigarette consumption has not yet started in this region. Indeed multinational tobacco firms look on the societies in transition as potential markets which are easily conquered because of the relative backwardness of anti-smoking legislation in the FSE. **Physical exercise** is probably less common in the FSE than in the Anglo-Saxon world and in some north and west European countries.

In principle every citizen of the FSE was eligible for "high quality health care free of charge". However as a consequence of the neglect of the health services the medical technology in the whole region is out-of date. In some countries the provision of certain medicines is irregular, many of the health institutions are overcrowded and there are long waiting lists for special treatment. The patient's payment for treatment and care in many instances for a hospital bed is fairly common in most of the FSE. The deteriorating quality of health care has become a serious social problem and an important factor responsible for many premature and avoidable deaths. Studies on the quality of medical care and on mortality from **conditions amenable to medical intervention** have revealed that a lower standard of health

care contributes to the East-West life expectancy gap; however no consensus exists regarding the degree in which this contribution may be taken into account.

The impact of the **polluted physical environment** on health is generally acknowledged. The exposure to increasingly polluted air, water, soil and food not only causes of diseases like asthma, chronic lead poisoning, but is also responsible, to some extent, for mortality due to certain respiratory diseases, some cancers, congenital malformation and perhaps some of the CVD. "Moreover, living in a polluted environment is very damaging to population's sense of well-being, instilling in people a sense of imminent threat. Under such conditions people will not be responsive to messages that tell them to modify personal habits that threaten their health over the long term, since the relevant threat is seen to be in the present not the future."[7] Nevertheless it should be taken into consideration that mortality is probably not sufficiently sensitive to measure the polluted physical environment on health.

Furthermore the FSE were closed societies where the diffusion of information was much slower than in the EME, so the spread of awareness regarding the relevance of behavioural, environmental and other factors in health promotion was impeded by indolence.

As already mentioned the FSE is a heterogeneous group. The CCEE have always been closer to the West than to the East and the CBP have similarities with the Mediterranean countries. The time trend in mortality in the CCEE prove convincingly that these countries are recovering from the shock of transition: life expectancy is on the increase and it has never been so high as it is at present, although it is still low by European standard. It is difficult to evaluate the epidemiological development in most of the countries of the Balkan Peninsula because the ethnic wars in the former Yugoslavia have made the situation chaotic and incomprehensible. However it may be concluded that in Croatia and Slovenia the time trend in mortality has been declining. In Bulgaria and Romania the health crisis which developed gradually from the late 1960s onwards and deepened after the collapse of the communist regime is still there, but recently some signs of recovery has been observed.

[7] East-West Life Expectancy Gap in Europe; Ed. byClyde Hertzman, Shona Kelly and martin Bobak; Kluwer Academic Publishers, 1996. p. 235.

Among the post Soviet states mortality in the BC has been improving recently. Even in the RF life expectancy rose in 1994 and 1995. Yet the public health issues which have emerged since 1990 are to some extent similar to those of the less developed countries. Infectious diseases like diphtheria have appeared again, and the incidence of tuberculosis has been increasing for many reasons, among them malnutrition. The health of the most vulnerable groups of the population: children, the elderly, manual workers at neglected industrial plants and peasants in rural areas is particularly suffering from the low and decreasing standard of health provision, from environmental pollution, and in general from the decline in quality of life.

In the RF alcoholism in the adult male population has become an exceptionally serious risk factor which has probably contributed more to the **acute** health crisis than any other risk factor. The incomparably high death rate due to external causes of injury and poisoning proves this conclusion. Alcohol intoxication is often to be found in the background of many accidents, homicides and suicides. It is one of the risk factors in the high CVD mortality. In NIS-6 the main features of mortality are similar to that of the RF. The CAR are closer both geographically and in public health terms to the neighbouring less developed countries than to any other groups of the FSE.

In the final analysis, the population's health and mortality are not due to biological causes. Average life expectancy at birth is determined socially. This means that mortality is, usually, lower in those societies which are wealthy, technologically developed, highly effective, firmly cohesive, health conscious and characterized by continuity of socio-economic development than in those which are poor, technologically backward, badly organized, ineffective, loosely cohesive, health negligent and characterized by the discontinuity of their socio-economic development. The EME belong to the former group and the FSE to the latter.

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