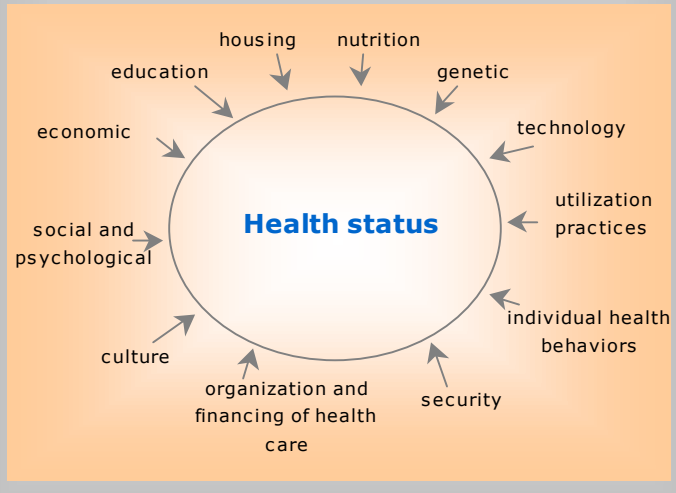
3.2 DETERMINANTS OF HEALTH

The differences in life expectancy and early mortality from cardiovascular and oncological diseases between Slovakia and the European Union cannot be explained by only differences in the quality of health care. True, all former communist countries, including the Slovak Republic, have been investing but insufficiently into fund-intensive devices, technologies and drugs needed for early diagnosis and treatment of oncological and cardiovascular diseases. Key for the prevention of these diseases and the overall improvement of the health status is a number of factors. The origin of most diseases is to be found in the disturbed relationship between the human organism and the environment where the human lives.

In holistic terms, health is a result of the action of various factors of social, economic, general and working environment, and the principal precondition for contented life of humans. All diseases are associated with a number of so-called risk factors whose presence and/or absence will decide whether or not a disease develops. Risk factors are specific for every disease, but on the other hand, there may be the same risk factors underlying several diseases. In some cases, a factor may be a risk factor with respect to one disease while being protective with respect to another disease. Common to all the risk factors is that they occur within a defined environment that either supports their presence, thus enabling them to act, or tends to abolish them. The environment becomes one of the major determinants of health. Naturally, environment in this respect is understood broadly, as not only including natural/ecological environment. Thus, determinants of health are characteristics and parameters that affect the presence and development of risk factors for diseases.

The best-known groups of health determinants include demographic and biological determinants (age, sex, nationality, etc.), socio-economic determinants (lifestyles, education, social contacts), environment (both general and working), and health care. Graph 3.7 shows a different view on the most important determinants of health.[77]

Graph 3.7
Factors Influencing Health Status



Source *: Souhtby (1998).*

The following text of this chapter examines selected key determinants of health.

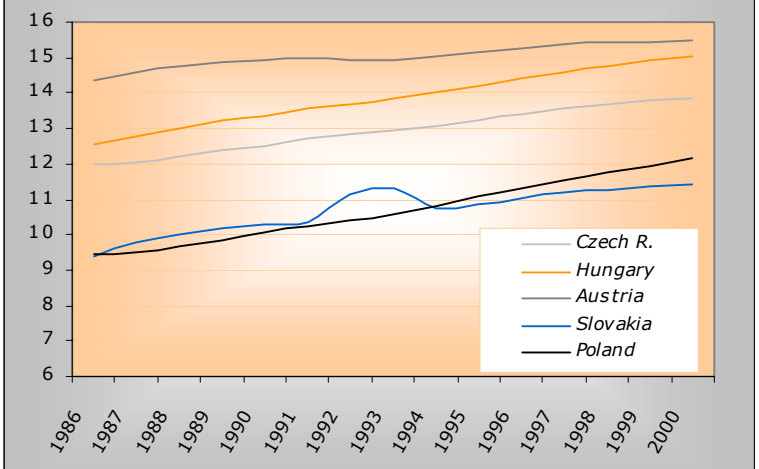
3.2.1 Demographic Structure of the Population

Demographic conditions were discussed in the preceding section. Among the demographic parameters, age, aging index, and population increment are the most important ones from the viewpoint of health, the older the population, the higher the risk of diseases, and contrariwise, the healthier the

[77] Estimates of the weight of the different factors and their effect on human health differ in analyses of both domestic and foreign authors. According to several sources, crucial determinants include lifestyles and behavior, followed by environment, genetic and biological factors and health care services. The estimated share of health care on health ranges between 10-20 percent. See e.g. Aday – Begley – Slater (1993) or Ághová et al. (1993).

population. Graph 3.8 illustrates the trend of the population aging, by showing proportions of the population aged 65+, compared to neighboring countries.

Graph 3.8
Aging Population (share of population aged 65+, in %)



Source *: WHO database.*

It is evident from the Graph that the proportions of males and females aged 65+ in the Slovak Republic are the lowest of all the neighboring countries. The proportions of those aged 0-14 years in the population are still highest for Poland and the Slovak Republic; the two countries however also show the most rapid decrease among all the countries monitored. This trend suggests a reduction of the younger population and at the same time the low proportions of older population groups in the presence of the generally known high morbidity and death rates during so-called midlife for Slovakia do not present optimistic forecasts for future development.

Table 3.2
Developments of Live Births and Natural Increments in Slovakia

Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Live births per 1,000 inhabit.	15.1	14.9	14.1	13.8	12.4	11.4	11.2	11.0	10.7	10.4	10.2	9.5
Natural increment	4.8	4.6	4.0	3.9	2.8	1.6	1.7	1.3	0.8	0.7	0.4	-0.2

Source*: Statistical Office of the Slovak Republic.*

The huge reductions of live births, along with the natural increment values approaching negative values, and the still high mortality of productive-age individuals may affect future development of life expectancy in Slovakia.

3.2.2 Lifestyles and Nutrition

Lifestyle is generally considered as a decisive factor of the health condition; its contribution toward health condition in general has been estimated at 50 percent (some sources state as much as 60-70 percent[78]). Behavioral patterns such as nutritional habits, physical activity and smoking or heavy alcohol consumption together with the prevalence of risk factors such as elevated blood pressure, high serum cholesterol or overweight influence premature mortality, especially from

Box 3.2
Smoking in Slovakia

According to a school questionnaire survey performed in 1993-1994, 19 percent of boys and 5 percent of girls aged 15 smoked at least once a week. These prevalence figures were among the lowest in the survey, in which 23 countries or regions participated. However, the study performed four years later reported that the prevalence had reached the average of reference countries, at 26% for boys and 18% for girls. The same survey observed that the median number of cigarettes smoked weekly was higher than in most reference countries: 15 cigarettes for boys and 30 for girls. (Source: WHO: Health Behavior in School-Aged Children)

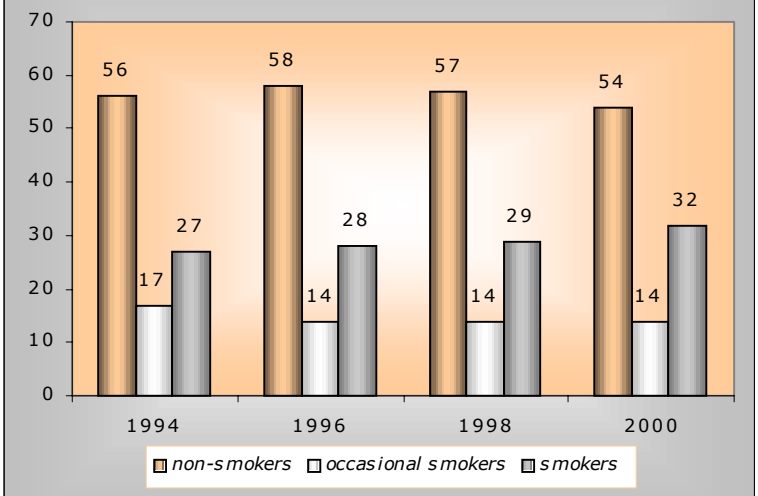
According to a 2000 survey conducted by the Statistical Office of the SR there were 54 percent non-smokers, 32 percent regular smokers and 14 percent occasional smokers in Slovakia. Smoking prevalence in younger age groups is somewhat higher: 48 percent non-smokers, 29 percent smokers and 23 percent occasional smokers. Data on intensity of smoking indicate that as much as 41 percent smokers consume 11-20 cigarettes daily, while 34 percent smoke 6-10 cigarettes daily. A positive fact is that 73% of the smoking population was trying to quit smoking.

[78] See e.g. Ághová et al. (1993).

cardiovascular diseases and cancers. Unhealthy behavior also contributes to a wide range of other chronic illnesses and thus affects the quality of life in general.

According to 1998 data, there were 39 percent of men and 19 percent of women classified as regular *smokers* in Slovakia. The annual consumption of cigarettes per person in Slovakia was stable and below both the EU average and the average of CEE countries in the 1980s. In the following decade, however, Slovak consumption increased from 1,600 cigarettes in 1991 to 2,300 in 1998-1999. This increase was one of the most marked in Europe. Since the share of regular smokers is lower in Slovakia compared with most candidate countries, it may be concluded that the proportion of heavy smokers is high in Slovakia.

Graph 3.9
Smoking in Slovakia in 1994-2000 (in %)



***Source** : Statistical Office of the SR.*

According to some authors, tobacco consumption causes 30 percent of malignant diseases.[79] Mortality for trachea, bronchus and lung cancer can be used as an indicator of the trends and country positions related to the deaths caused by smoking. Compared to the EU rate, the Slovak standardized death rate for trachea, bronchus and lung cancer was 50 percent higher for males, but still 10 percent lower for females in the late 1990s.

The registered *alcohol consumption* in Slovakia equaled the EU average in the early 1980s. Consumption has since fallen in both Slovakia and the EU, but this decrease has been more marked in Slovakia. Comparisons of alcohol consumption are, however, difficult, as data reliability is variable across Europe and do not include consumption of illegally imported and home produced alcohol. Local studies report large social class differences in alcohol consumption (see Table 3.3). Twelve percent of respondents with university education reported daily consumption of beer, 7 percent daily consumption of wine and less than 2 percent daily consumption of spirits, the corresponding proportions among respondents with elementary education were considerably higher at 35 percent, 20 percent and 18 percent, respectively. According to a school questionnaire survey performed in 1997-1998, 16 percent of girls and 30 percent of boys drank beer, wine or spirits at least once a week. Along with the Czech Republic, this was the highest prevalence among the candidate countries.

Tightly connected with the health condition of the population are also *issues of nutrition*. Nutritional habits are rooted in cultural traditions and food production. Nevertheless, in recent decades changes have occurred with increasing globalization, as food markets have opened up, transport has become more rapid and more efficient techniques for conserving food have been developed. These factors together with increased mobility and increases in purchasing power are some of the reasons why the historically different nutrition patterns in Europe appear to converge. In this connection, the positive impact of the changed socio-political circumstances becomes evident. An inadequate structure of nutrition was typical of Slovakia's population during the Communist stage (in particular high proportions of fats of animal origin, sugars and alcohol), whereas the economic transition and the change in the overall structure of diet have resulted in an overall improvement in the food structure. An exception to this has been a reduction in the consumption of milk and dairy products. Table 3.3 shows significant differences in eating habits between social classes. Diet of respondents with low levels of education

[79] Source: Doll – Peto (1981).

usually contains more animal fats, less fruits, vegetable oils and milk products; such a composition of diet cannot be unequivocally ascribed to lower purchasing power.

Table 3.3
Influence of the Level of Education on Eating and Other Habits of Males

Daily/almost daily consumption (v %)	Elementary education	Secondary without GCE [a]	Secondary with GCE [a]	University education
hot breakfast	35.7	47.9	52.4	58.0
hot lunch	61.4	75.6	77.0	81.4
hot dinner	32.7	45.1	49.0	50.3
milk and milk products	38.2	41.6	45.0	52.3
animal fats	51.0	48.7	46.2	40.4
vegetable oils and margarine	29.6	34.2	41.8	47.7
fruits diverse	31.8	42.7	51.6	61.1
tropical fruits	6.1	9.5	10.6	16.6
vegetables	29.6	44.0	45.0	51.8
beer	35.2	33.0	20.6	12.4
wine	19.7	12.4	9.2	6.8
heavy alcohol	17.6	12.0	5.5	1.5
newspaper	24.9	46.6	59.0	66.3

Note*: a. General certificate of education. Survey included 1,533 respondents from two Slovak districts, aged 25-55 years.*
Source*: Demeš – Ginter – Kováč (1998).*

Apart of tobacco and alcohol consumption, untimely mortality risk factors include *high blood pressure,*

Box 3.3
Risk Factors of Premature Mortality (CINDI survey in Banská Bystrica, 1998)

High blood pressure (systolic pressure above 160 mmHg – and/or diastolic pressure above 95 mmHg) represents one of the major risk factors of coronary heart disease and stroke, and causes about one-third to one-half of all deaths of diseases of the circulatory system. The survey conducted under the program CINDI[1] in 1998 in a population sample of 2,046 individuals aged 15-64 years using random selection suggested that the prevalence of arterial hypertension with blood pressure values exceeding 160/95 Torr is 22.9% and 13.2% for men and women of the said age group, respectively. The narrower age group of 25-64-year-olds showed prevalence values of high blood pressure of 27.7 percent and 16.2 percent for males and females, respectively. Borderline values of blood pressure between 140-160/ 90-95 were measured for 21.7 percent and 13.2 percent males and females of the 15-64-year-old group, respectively, the corresponding figures for males and females of the age group 25-64 years were 23.8 percent and 15.3 percent, respectively. Taking stricter criteria of blood pressure values as recommended by cardiologists after 1998, with the standard values of blood pressure being below 120/80, the prevalence of borderline and high blood pressure values would be much higher. A study on a population sample of 24,000 citizens of Slovakia on three generations levels involving responses of voluntary respondents to questions of a targeted questionnaire supported the results of the representative survey of the CINDI program. Previous analyses confirmed that hypertension shows higher incidences in males of younger age groups, whereas it is women that suffer from hypertension that prevail in higher age groups.

High levels of blood fats and glucose. The CINDI program survey from 1998 suggested that the prevalence of high values of total cholesterol (exceeding 6.5mmol/l) for males and females aged 15 - 64 years is 20.3 percent and 21.8 percent, respectively. For the group of 25 – 64-year-old males and females, the corresponding figures are 25.1 percent and 26.1 percent. Risk-level values of total cholesterol (ranging between 5.2-6.5mmol/l) were measured in 36.1 percent and 35.8 percent of the 15 – 64-year-old males and females, respectively. In the group of 25 – 64-year olds, the prevalence for males and females were almost identical (41.2 percent and 40.7 percent, respectively). High levels of triglycerides (exceeding 2.0mmol/l) were measured for 25 percent and 15 percent of 15-64-year old males and females, respectively. In the age group 15 – 64 years, prevalence of persons with high glucose levels (exceeding 6.5mmol/l) were 7.7 percent and 3.9 percent for males and females, respectively. Risk-level values of glucose (ranging between 5.7-6.5mmol/l) were measured for 7.6 percent and 4.3 percent males and females aged 15-64 years. Elevated glucose levels and diabetes mellitus are among secondary risk factors that co-act in the development of atherosclerosis, in particular through affecting cholesterol levels. They are less significant from the viewpoint of primary prevention since they start to increase only after all the other risk parameters – mainly triglycerides and cholesterol – already are quite high, and the atherosclerotic process is already underway.

Excessive body weight and obesity. Obesity as a risk factor for coronary heart disease rather significantly combines with other risk factors, including diabetes, hypercholesterolemia, hypertension and weak physical activity. Influencing the body weight therefore is of importance mainly with respect to persons of younger age groups. Obesity that is connected with the „western" type of nutrition rich in fats, enhances the so-called central obesity that significantly speeds up processes of atherosclerosis. The table below shows prevalence of excessive body weight (BMI 25-29) and obesity (BMI exceeding 30) in males and females, respectively (CINDI, 1998).

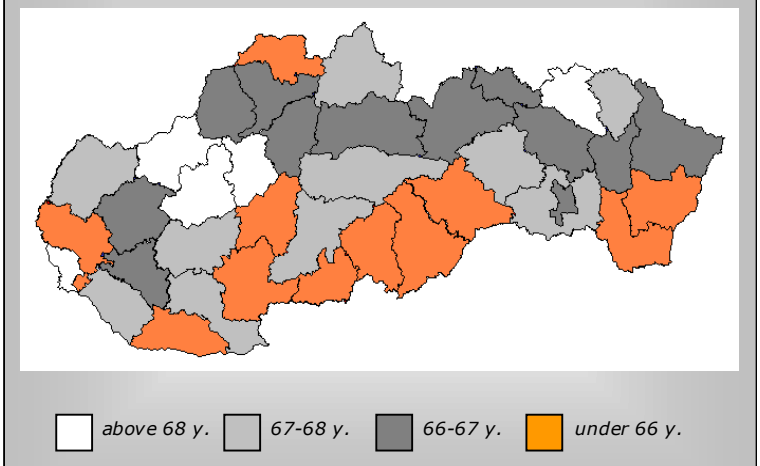
Age group	Obesity (BMI)		Excessive body weight (BMI)	
	Males	Females	Males	Females
15 - 64 years	16.0%	17.6%	40.7%	32.9%
25 - 64 years	19.5%	20.8%	46.7%	37.3%

high cholesterol level and obesity, as also suggested by analyses of the World Health Organization (see Box 3.3). Naturally, the indicated factors jeopardize human health all over the world. Prevalence of several of the factors, however, does not explain the whole extent of the growth of cardiovascular and oncological mortality in Slovakia. For instance, Slovaks show twice as high early mortality from lung cancer as do Swiss people, but in the recent past, consumption of cigarettes used to be higher in Switzerland. As incidences of hypertension and high cholesterol levels were also not diametrically different from those in the EU countries[80], it may well be that some additional, less understood risk factors started to act in Slovakia that may have enhanced the action of the traditional risk factors. Among such "new" risk factors is likely the chronically *low intake of protective factors from vegetables and fruits* that protect the body against the action of free oxygen radicals. Those extremely reactive substances play an important role in the pathogenesis of vascular as well as neoplastic diseases. Their threat is additionally enhanced by a high alcohol consumption, in particular consumption of concentrated distilled spirits, high consumption of cigarettes and the polluted environment, hence factors that have been and still are highly present in the territory of the Slovak Republic.

The chronically *unfavorable mental condition* of the population is a poorly explored factor that may negatively impact upon Slovakia's population and its health condition. Combined with the long-term pressure of totalitarian power, the inability to cope with problems induced by the transition to market economy (e.g., high growth of unemployment) must have been reflected in the mental condition of the population. The prevalence of the chronically stressed, depressed, anxious and frustrated persons most probably increased in Slovakia. Unfulfilled expectations of a rapid raise of the standard of living after 1989 made many individuals to become disillusioned and to lose hopes for a better life. Such a situation results in hostility, aggressiveness, and unfavorable changes of life habits (such as increasing alcohol, cigarette and psychopharmacology consumption).

Slovakia is an attractive country with respect to the study into the reasons for the stagnation of the health condition since its small territory allows to observe significant differences in life expectancy; there are districts in Slovakia, only few dozens of kilometers distant, in which differences in life expectancy in men exceed four years. So far, no data are available from the newly established districts for which relatively low population numbers prevented evaluation on a yearly basis. Of the previous structure of districts, latest averages are available for 1993-95. Graph 3.10 shows that the districts Bratislava-city, Trenčín, Topoľčany, Prievidza, and Bardejov were the leading ones with respect to life expectancy in men in 1993-95. The shortest life expectancy was reported for men in the southern districts of Slovakia and for the district of Čadca.

Graph 3.10
Regional Distribution of Male Life Expectancy (y. 1993-1995)



***Source** : Ginter (1998).*

Similar, although slighter differences applied to women. An almost continuous belt extends along the southern part of Slovakia, from district Dunajská Streda up to Trebišov, with women showing the shortest life expectancy. It is conspicuous that the shortest life expectancy concerns mostly agricultural districts, with life expectancy being longer for industrial centers with more polluted environment (Bratislava, Košice, Upper Nitra). These surprising facts were subject to a multifactor analysis using 1991

[80] Source: Ginter (1996).

census data. The findings say that key with respect to life expectancy of men in the individual districts are proportions of men with only elementary education. Among the main reasons for short life expectancy in Slovakia therefore is unhealthy lifestyle that a prevailing proportion of the male population has adopted, in particular, population groups with low education level.

The aforementioned sociological survey using Gallup's method conducted on a representative sample of 1,533 men aged 25-55 years in two districts of Slovakia (Trenčín, Levice) demonstrated a significant influence of education on lifestyle and mental condition. Consumption of alcohol and cigarettes increased with the decreasing level of education, and consumption of foods containing protective factors (milk, vegetable oils, fruits, vegetables) decreased in parallel. In addition, more frequent observation found a passive attitude to life and a pessimistic assessment of the future by relatively young men with only elementary education. The differences showed most markedly in the Roma population. Table 3.4 summarizes a portion of the data obtained from a representative sample of men living in the multi-ethnical district, Levice (65 percent Slovaks, 30 percent Hungarians, and 5 percent Roma).

Table 3.4
Lifestyle – Differences Between Slovaks, Hungarians and Roma in the District of Levice

Indicator	Slovaks	Hungarians	Roma
Number of respondents	655	314	47
Average age (age) ± SD	37.9 ± 8.5	38.4 ± 8.3	38.0 ± 8.4
Upper secondary or tertiary education (%)	35.3	31.2	6.4
Share of unemployed (%)	6.0	7.6	38.3
Average number of children ± SD	1.57 ± 1.02	1.59 ± 0.97	2.49 ± 1.50
Positive answer in %			
I am father of more than 2 children	13.9	13.7	51.1
I am a smoker	50.2	53.2	78.7
On daily, or almost daily basis, I consume:			
milk and dairy products	43.6	44.6	25.5
fruits	43.5	48.0	19.2
vegetables	42.8	54.5	31.9
beer	28.8	23.9	49.0
distilled spirits	10.2	9.6	23.4
I have frequent conflicts with other people	13.3	14.0	34.0
I am unable to influence my future	10.7	10.8	27.7
The quality of my sleep is bad	8.1	9.6	17.0
I feel that my health condition is bad	7.8	7.0	21.3

***Note**: Survey included 1,533 respondents from two Slovak districts, aged 25-55 years.*
***Source**: Demeš – Ginter – Kováč (1998).*

Lifestyle is also influenced by behavioral patterns common to a person's social group and by more general socio-economic conditions. Evidence is growing that, at least in most western European countries, improvements in lifestyles have largely been confined to the socially and economically stronger population groups, who have better prospects to adopt health-promoting changes in behavior.

The way of life is thus determined by the purchasing power of the population that is tightly linked with the real wages level. Real wages, compared with the preceding year, have been decreasing in 1996-2000 and as late as 2001 a positive turn occurred, which will likely not last long, due to necessary deregulation of prices and changes in indirect taxes. The correlation between GDP and longevity is generally acknowledged; higher GDP being usually associated with longer life expectancy. Using 1995 data for countries of the WHO European Region, the correlation coefficient between gross domestic product expressed in purchasing power parity and life expectancy equals to 0.866 and 0.845 for males and females, respectively. The indicators of economic development of Slovakia are not overly favorable from the viewpoint of their impact upon health. Lower purchasing power usually means more negative lifestyles, diet of lower quality and higher incidence of negative habits such as smoking, alcohol consumption, drugs, and passive attitudes. In addition, the economic parameters have a significantly negative impact upon mental health. Increasing psychosomatic stress results in higher incidence of depression and other mental illnesses that frequently also get reflected in cardiovascular morbidity and mortality, as well as in injuries, suicide rates and crime rates.

An important, although insufficiently examined factor of health is the *social contacts* of people with their environment – family, colleagues, community, etc. Several foreign studies have confirmed that people with limited or missing social contacts (loners) have had during their lives higher morbidity rates

Box 3.4
Disparagement of Mental Health

Prevalence of mental health illness in Slovakia is comparable with that found in EU countries, however, the developments both in treatment of mentally ill and the organization of mental health services is falling behind. This is largely due to the historical legacy of socialism where mental health was not considered to be a priority in terms of funding and organization of the system. The care of mentally ill had a custodial rather than therapeutic character (large psychiatric hospitals and asylums, pharmacological interventions) and was isolated from both domestic and foreign developments. In several socialist countries violation and abuse of human rights in mental institutions has taken place. There is a lack of epidemiological studies that would assess the service needs based on actual levels of disease and also a lack of mental health reform strategies. Mental disorders are still subject to disparagement and often lead to social isolation and exclusion. (Source: Study on the Social Protection Systems, 2002)

than people enjoying close and frequent social ties with their surrounding.[81] Other representative surveys from the US found two to three times higher mortality rates and life expectancy differences of nine years between individuals with the fewest close friends, relatives and social connections and those with high levels of social connectedness.[82] It is believed that people with poor social connections more often suffer from an accumulation of negative social factors such as unemployment, family problems, exclusion from friends' circles, problems with the law, etc. The mentioned studies have pointed out the fact that feeling connected with other people is extremely important for physical and mental health. Suicide, alcoholism and mental illness rates are much higher among people living alone.

A present-day form of weakening social contacts is the constantly widening "voluntary solitariness" of a growing number of mainly young people who decide for a life without a partner and/or descendants. Such a choice is often associated with the notion of better economic background and a more carefree life. As long as the lack of immediate family contacts is not balanced with ties to other social groups (friends, workfellows, clubs, etc.), it may be assumed that such an isolation negatively impacts upon the health status of the individual. There is a marked long-term trend of growing numbers of single's households in Slovakia (see Table 3.5). This trend is apparently connected with changes in lifestyles, but also with improving housing conditions and lastly also with demographic changes, mainly the growing numbers of widowed women in old age.

Table 3.5
Households of Singles as Percentage of Total Number of Households

Year	1950	1970	1980	1991	2001
Monomial households	5.8	11.9	19.8	21.8	30.0

Source*: Population and housing census. Statistical Office of the SR.*

3.2.3 Education

Education is among the most significant determinants of health. Investments into education are also investments into health. It may be thus assumed that a the drop in expenditures on education and training will prompt, in turn, pressure upon increasing expenditures on health care.

The most important impact upon health is probably given by the borderline between elementary and secondary education. The more learners continue their training in secondary schools, the better the chances for a healthy population. In an epidemiological case study analyzing the relationship between psychosocial risk factors and cardiovascular diseases, experts explored a significantly higher risk of cardiovascular diseases incidence in individuals with elementary education compared to those with secondary and university education.[83] From this aspect, it might be of interest to look at the numbers of learners during the recent years who did not continue their studies after completing elementary school. In 1990, they comprised 2.4 percent of all learners finishing elementary school studies, whereas they represented as many as 10 percent in 1999. This negative development is underlined also by data on early school leavers not continuing in education and training after finishing primary education (see Table 3.6).

[81] An example is the study of 972 Johns Hopkins medical students who were classified in personality tests into one of five types. Thirty years later when checking their health status, it was found that students classified as loners had sixteen times more cancer than people who vented their emotions to friends.
[82] Source: Social Ties and Good Health. http://www.attitudefactor.com/socialties.htm
[83] Source: Štefanovič – Egnerová et al. (1998).

Table 3.6
Early School Leavers Not in Education or Training (in thousands)

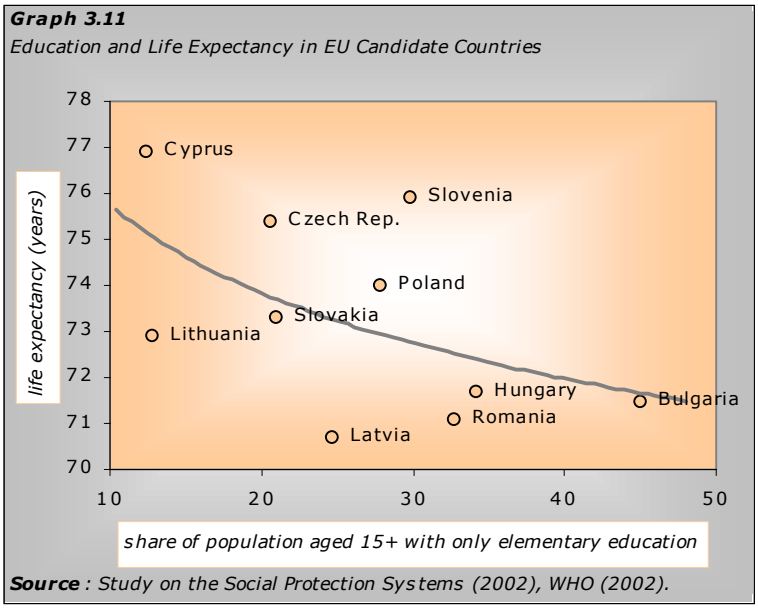
Indicator	Total				Men				Women			
	1998	1999	2000	2001	1998	1999	2000	2001	1998	1999	2000	2001
Population aged 18-24	657.2	660.0	656.7	652.3	334.4	336.1	334.2	332.5	332.8	323.9	322.4	319.8
Persons aged 18-24 with ISCED 0-2 not attending further education [a]	44.1	39.0	32.7	38.8	24.0	20.7	17.8	22.3	20.2	18.6	14.9	16.5
of which												
employed	8.2	7.6	5.7	5.1	5.9	5.0	3.1	2.8	2.3	2.6	2.7	2.2
unemployed	17.5	15.6	14.1	18.9	11.6	10.5	9.8	13.7	5.9	5.0	4.4	5.2
in military service	1.1	0.4	0.9	1.3	1.1	0.4	0.9	1.3	-	-	-	-
economically inactive	17.4	15.5	12.1	13.6	5.4	4.8	4.2	4.5	12.1	11.0	7.9	9.1

***Note**: a. ISCED 0-2 levels correspond to preschool education, first and second levels of primary education.*
***Source**: Labor Force Survey. In: Report on the Implementation of conclusions and priorities of the document of the Joint Assessment of Employment Priorities in the SR for 2001, Ministry of Labor, Social Affairs and Family of the SR.*

Despite the decreasing share of this age group (18-24 years) on the total population during the last three years, no reduction of persons with low levels of education occurred within the respective population. Half of the early school dropouts are unemployed. Insufficient education decreases their opportunities in the labor market, but it also reduces responsible attitudes with respect to life, increases social risks, worsens general living conditions and thereby also the health status.

A comparison of educational structure of the population with health indicators (e.g., life expectancy) suggests – despite different levels and quality of educational systems – a positive correlation (see Graph 3.11).

Graph 3.11
Education and Life Expectancy in EU Candidate Countries



***Source**: Study on the Social Protection Systems (2002), WHO (2002).*

With respect to education, also interregional differences should be pointed out. The proportions of the population with completed elementary education in Slovakia range between 21.6 percent for the region Bratislava and as many as 36.25 percent for the region Nitra.[84] The differences and possibly their further intensification will result in differences in the condition of health. Therefore, mortality shows significant correlation with the proportions of the population with elementary education in the regions, being traditionally highest for the region Nitra, followed by regions Banská Bystrica and Košice. On the contrary, lowest mortality rates are reported from Bratislava and Žilina regions which have the lowest shares of population with only elementary education, and, at the same time, high proportion of tertiary educated inhabitants. Similar interregional differences may also be identified with respect to infant

[84] Source: Labor Force Survey, Statistical Office of the SR. Data from 2000 for population aged 16+.

mortality, with the values showing a West-East gradient. Evidently, the factor of education is intensified also by the factor of ethnic structure, particularly by the low average level of education of the Roma population.

Apart from providing educational activities, schools and other educational facilities impact on the health status also by shaping lifestyle patterns of the young generation. Similarly as the working environment for adults, the school environment has a great influence on the formation of lifestyle habits of the young generation. Among these functions performed by schools is for instance leisure time activities and school catering (see chapter 2.3.1).

3.2.4 Employment

The position in the labor market represents an important socio-economic determinant of health. The consequences of unemployment on health are rather extensive, starting with mental illness up to cardiovascular diseases. The negative effect of unemployment may either be direct manifesting itself in the development of depression, anxiety, loss of self-confidence; or indirectly connected with worsened quality of life, inadequate dietary habits, a variety of negative habits (alcohol consumption, smoking, drugs, crime, etc.). The unemployment trend in Slovakia is generally unfavorable.

High rates of sick leave are among interesting manifestations of unemployment in Slovakia. Table 3.7 shows data on unemployment rates and average length of inability to work per employee per year. Regional comparisons suggest that in districts with high unemployment rates employees are more often on sick leave than they are in districts with low unemployment numbers. Disparity in morbidity between the regions can however not fully explain the marked differences in sick-leave records. It is very likely the effect of shadow sick-leave, which is financially favorable with respect to low average wages, tolerance shown by employees, profitability for doctors of such arrangements, as well as the insufficient control of entitlement for sick-leave payments.

Table 3.7
Unemployment and Short-time Inability to Work

Year	Unemployment rate (%)	Hospitalization per year per 100,000 persons	Visits in dispensaries per person per year	Inability to work per employee per year (in days)
1990	1.5	16.41	13.61	17.1
1991	11.8	16.90	13.11	20.9
1992	10.4	17.44	13.23	23.2
1993	14.4	18.89	12.82	23.2
1994	13.7	18.95	12.38	23.5
1995	13.1	19.10	8.59 [a]	23.3
1996	11.3	19.55	4.4 [a]	24.0
1997	11.8	19.89	13.54	23.3
1998	12.5	20.32	16.43	23.5
1999	16.2	19.35	16.37	23.5
2000	18.6	18.06	16.05	26.6

***Note**: a. probably incorrect data.*
***Source**: WHO database – Health for All, July 2001, Statistical Office of the Slovak Republic, Institute of Health Information and Statistics.*

Since 1996, Slovakia has been ranked first in Europe in the figures concerning inability to work; this concerns the number of days of sick leave per employee as well as the number of medical consultations per person per year during recent years.

3.2.5 Environment

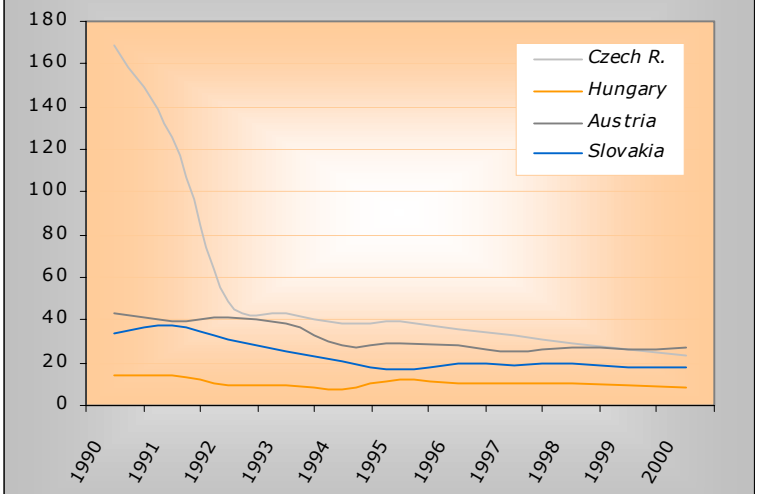
The environment represents an additional significant health determinant. What is understood under environment is more than just the ecological aspect of environment. The following text deals with the working and general environment.

Working Environment

The role of the working environment is given by the fact that people spend on average at least one-third of their daily time at the workplace. Risks present at workplaces represent an important health determinant. The numbers of hazardous workplaces keep decreasing. The work-related major risk factors include ionizing radiation, noise, chemicals and vibrations.

Graph 3.12 illustrates the trend of the development of the incidence of occupational diseases, as compared to the neighboring countries.

Graph 3.12
Occupational Diseases (per 100,000)



***Source** : WHO database.*

The incidence of occupational diseases and also the number of work-related injuries keep decreasing, which places Slovakia among the countries with lower incidences.

General Environment

The knowledge and evaluation of the effects of environmental factors on human health (mental and physical) is a rather broad topic that requires multidisciplinary approach.[85] It is based on the knowledge of the quality of the environment, the internal environment (both working and non-working), through external environment in urbanized areas, through natural environment. A good quality of environment that markedly influences human health represents a sum of decent quality of air, water and food. To keep the human organism balanced, the substances taken have to be optimally utilized, and there also must be a harmonic relationship with the environment requiring mental balancing and healthy lifestyle.

Polluting substances derived from industry, agriculture and other sources are foreign to the human body and may threaten or harm human health, depending on their nature and quantities.

As mentioned in the publication *General Environment of the Slovak Republic*[86]*,* it is the polluted or damaged environment combined with lifestyles, the level of the health care and the physical (genetic) predisposition that clearly influence the worsened condition of health and increased mortality of people in some regions. It, nevertheless, is the environmental aspect that clearly predominates in several localities, contributing – through harmful substances – to carcinogenic, teratogenic,[87] and other negative influences upon human health and longevity. Exact surveys statistically proved that environmental pollution is the cause of 60-90 percent of cancer diseases.[88]

[85] Source: Reichrtová (1996).
[86] Source: Ministry of Environment of the SR (1993).
[87] Causing abnormal development of the fetus.
[88] Source: Blumenthal (1995).

Regional Aspects of Environment

The significant regional disparities in Slovakia do also apply to health parameters and parameters of life expectancy.[89] Differences between regions whose population has a prospect to live longer and those where the prospects are to live but shorter lives, have reached an already high extent, and tend to increase rather than to decrease.

Based on surveys of populations dying untimely it may be stated that there are large interregional differences in mortality indicators. The difference between the district with the lowest proportion of those dying "earlier" and the district with the highest proportions of them is rather pronounced: there are 13 percent of inhabitants dying untimely in the best district in this respect (Turčianske Teplice) whereas the proportions are more than double in the worst district (Kežmarok, 26.6 percent). This means that more than a quarter of the population of that particular district die while still children or during the active stage of life. Apart from the already mentioned Turčianske Teplice in Central Slovakia and Sobrance in Eastern Slovakia, it is the population of districts that are located in the western part of Slovakia that have the best prospects to live to reach retirement age. On the contrary, the districts Kežmarok, Poprad, Sabinov, Spišská Nová Ves and Košice, along with the districts Levoča, Prešov, Gelnica and Trebišov are characterized by high death rates of the pre-productive and productive age population.

Box 3.5
Inadequate Awareness of the Condition of the Environment on the Part of the Population Affected

Among the reasons why attempts to markedly improve the condition of the general environment in Slovakia and thus to also make a contribution towards an improvement of the health condition of the population, have been failing is that the population underestimate environmental pollution (in other words, their sensitivity threshold in this respect is rather low). According to the representative survey conducted by the agency FOCUS in 1996, the respondents perceive their general environment in a more favorable light that does not correspond to the reality. Only 34 percent of respondents aged above 15 years believe to live in an environment harmful to health, although the proportion of the population living in an environment that negatively impacts upon their health is considerably larger (depending on the degree of the destruction of the environment, these figures range between 43 and 55 percent of the Slovak population). On the other hand, as many as 62 percent of the population do not feel threatened by the condition of the general environment in their locality, although less than half of the population live in an environment of high and/or adequate level.

A regional environmental survey of Slovakia conducted in 1997 defined five degrees of environmental quality based on a comprehensive evaluation of the condition of air, groundwater and surface waters, soil, rock and minerals, biota and additional factors with direct or mediated effects on the health condition of the population, and thus five types of regions of the country with different levels of environment (see Table 3.8).

Table 3.8
Regional Quality of Environment

Degree	Environmental level	Share of population	Share on total area of Slovakia
I.	high-level environment	12.2%	31.5%
II.	adequate environment	27.1%	40.5%
III.	slightly disturbed environment	18.0%	16.0%
IV.	disturbed environment	18.2%	6.7%
V.	strongly disturbed environment	24.5%	5.3%

***Source**: Slovak Environmental Agency.*

Environmental Risk Factors and Their Regional Context

Environmental risk factors may be characterized as the major reasons for negative environmental impacts upon the health of the population. Below, we shall present a brief overview of some of them, along with an outline of some regional and local aspects of their action.

Radioactivity

Long-term monitoring of radon radiation suggests that 10-15 percent of the total annual incidence of pulmonary cancer is due to radon irradiation.[90] Among the other aspects of radioactivity action in the environment, we should mention repeatedly identified contamination of surface and groundwater with tritium. The operation of two nuclear power plants in Slovakia, the not entirely resolved issue of the broken down NPP A1 at Jaslovské Bohunice, and the unresolved issue of handling of radioactive wastes

[89] Source: Michálek (2001).
[90] Source: Ministry of Environment of the SR (2001).

and the entire so-called rear fuel cycle all represent a risk of elevated doses of radioactive radiation in Slovakia's territory.

Noise

Measurements performed by State Health Institute of the Slovak Republic suggested that approximately 43 percent of Slovakia's population were exposed to excessive noise [exceeding 55 dB(A)] from road and railway transport in 1999, thereof 9.5 percent were exposed to noise exceeding 65 dB(A) stemming from the above sources, that level being officially recognized as noise levels negatively impacting upon the vegetative nervous system.

Chemical Substances

Point sources of arsenic release into the air and waters are mostly linked with the production and processing of minerals for energy generation and other purposes (Upper Nitra, Žiar nad Hronom, Jelšava – Lubeník, Central Zips, Košice, cement factories, magnesite factories) as well as with some significant industrial plants with chemical production.

Point sources of the release into the air and waters of cyanides and other chemical substances damaging reproduction, in the form of wastes are connected with mainly large residential and industrial agglomerations (Banská Bystrica – Zvolen, Košice, Central Váh river region, Upper Nitra, Žiar nad Hronom, Central Zips, Žilina, Ružomberok, Trnava, Senica). Point sources of the release into the air and waters of chemical substances in the form of wastes classified as "Chemical substances with carcinogenic potential for humans" are most frequent in the districts of Trenčín, Trnava, Nitra, Banská Bystrica a Žilina.

Foreign Substances in the Food Chain

So-called coordinated targeted monitoring whose objective is to identify, under real conditions of agricultural production and consumption of this production in selected localities the interrelationship between the degree of contamination of agricultural land, feeding waters, plant and animal production showed 205 out of 2,820 samples analyzed (i.e., 7.2 percent) to have exceeded the set limits for at least one of the contaminants monitored. Samples contained higher than allowed levels of nitrites (5.3 percent), nitrates (3.2 percent), mercury (5.9 percent), cadmium (1.8 percent), chrome (0.1 percent) and nickel (1.3 percent). Most samples with cadmium levels exceeding admissible ones came from the districts Žiar nad Hronom, Žarnovica and Kežmarok, those with higher than admissible levels of mercury were from the districts Spišská Nová Ves, with lead from the districts Žiar nad Hronom and Žarnovica.

Threat to the Ozone Layer

Measurements performed by the Slovak Hydrometeorological Institute in 1999 showed average annual values of total atmospheric ozone 2.3 percent above the long-term average. From the viewpoint of biosphere effects, most significant was the largest negative deviation (-7.4 percent) measured in June when the Sun stays on the sky over longest periods of time and the path of the sunrays across the ozone layer is the shortest.

Box 3.6

Regional Disparities: Examples of Environmental Impacts on the Health Condition of Children

The relationship between the condition of the general environment and the condition of health, in this case of the population of children, has also been confirmed by the results of a targeted survey of the health condition of children as the most sensitive age-group of the population. The health condition of children living permanently in the worst polluted localities of Slovakia – as compared with children from less polluted region (surroundings of Nitra) suggested a clear disadvantage for children from exposed regions. Selected groups of 7-10-year-old children living for at least 5 years in regions Bratislava, Žiar nad Hronom, Lower Orava, Upper Nitra, Jelšava-Lubeník, Rudňany and Košice were monitored by the hygienic service and pediatricians since 1983, and children from Ružomberok, Strážske and Sereď-Šaľa since 1987. Altogether, approximately 10,000 pupils were monitored.

The highest incidences were recorded for allergies and diseases of the respiratory tract, with the situation with respect to the above diseases being worse in environmentally disturbed regions than in the control region, and the difference persisted over long periods of time. Also, the diseases required longer treatment times. The incidences in pupils were almost three times higher for Rudňany and Strážske than for the reference region.

Similarly, diseases of the digestive system had clearly higher incidences for industrial areas as compared to the reference one (except Sereď and Šaľa). Also, higher incidences were recorded for diseases of the nervous system and sensory organs, with the worst situation concerning Bratislava, Lubeník, Upper Nitra and Rudňany. Ranking fourth were diseases of the skin and subcutaneous tissue, being in Bratislava as high as 5 times the incidence in the reference region in mid-90s.

Overall, morbidity of children from polluted regions is higher. Moreover, the time needed to treat such diseases is longer in these regions, and there are more recurrences. At the same time, unfavorable alterations have been identified in unspecific immune defense as well as alterations in blood hemoglobin.

Waste

Total production of waste has shown stagnating tendencies in recent years. The largest source of waste is agriculture, and the largest producer of hazardous waste are industries. In the 1990s, the quantities of hazardous waste showed decreasing tendencies, whereas quantities of municipal and so-called special waste tended to grow.

Accidents, Natural Disasters and Floods

Slovak Environmental Inspection recorded 98 reports of extreme worsening or threats to waters in 1998; in 24 cases, this followed scenes of dying fish in rivers and streams. The most frequent reason was leakage of petroleum products. Frequencies and intensities of floods, including losses caused (both to property and human life and health) were highly above the standard in recent years. There was a dramatic increase in the amounts of annual losses due to floods in 1998-1999 (by approx. SKK 3.5 billion). The number of individuals affected by floods amounted to 38,523 in 1999. High material and environmental damage was the result of another wave of floods in the summer months of 2002.

Inadequate Quality of Food

Inadequate quality of food may also be considered as a risk factor, although not of merely environmental nature. According to the *Report on Agriculture and Food Industry*[91], as many as 7.6 percent of samples out of 80,999 samples of food products analyzed for quality in 2000 by Food Surveillance Authorities of the Slovak Ministry of Agriculture were found not to meet the requirements of the law, i.e., an increase by 2.1 percent as compared to 1999. Inadequate quality concerned domestic products as well as imported products, with domestic products of inadequate quality making up as many as 9.3 percent of all domestic products tested. There was a slight improvement with respect to products of animal origin as compared to the preceding year, but plant and mixed origin products were found inadequate in as many as 15.6 percent of the cases (a year-to-year worsening by 6.7 percent).

The Report stated that there were some positive changes in the consumption of foods with respect to recommended doses; meat consumption decreased as did that of eggs and animal fats, whereas consumption of fruits and fish increased. On the contrary, negative changes were noted with respect to the consumption of vegetables, potatoes, milk and diary products, as well as legumes. A marked increase in sugar consumption is an undesirable phenomenon. Overall, there was a reduction of the intake of nutrients in 2000 as compared to the preceding year. Undesirable low was the intake of calcium, vitamin B1, vitamin B2 and vitamin C in the diet. The largest excess concerned consumption of protein (by 35.3 percent) and fats (by 31.8 percent).

3.2.6 Housing

Housing conditions have a direct impact on the mental and physical state of health. The housing stock in Slovakia is relatively new, with two-thirds of the dwellings built after the Second World War; however, its condition is dissatisfactory with respect to its age. About half of the units are family houses of a relatively decent standard, the other half is situated in residential dwellings of uneven quality with a considerable proportion being subject to deterioration due to used construction technologies and neglected maintenance.

Statistical records show that indicators such as average size of dwellings and living space per inhabitant are constantly growing. According to preliminary results of the 2001 population and housing census, indicators of habitation and equipment of households show considerable regional differences (see Table 3.9).

Differences are even more pronounced on the district level. Some districts of the Košice and Prešov regions (e.g., Gelnica, Kežmarok, Stará Ľubovňa) have housing indicators which are substantially worse than their neighboring districts (e.g., regions of Košice). Aggregate data indicate that a part of the housing stock is yet not equipped with flush toilets and almost a tenth of the dwellings lack a bathroom or shower. Many dwellings do not meet basic sanitary standards. This concerns mainly residences in Roma settlements in the eastern and southern districts of Slovakia, which often lack official permits for usage.[92] A large part of the housing stock, mainly in residential houses built with concrete panel technology, require investment into reconstruction. The costs of reconstructing the eroded housing stock are estimated at several hundreds of billions crowns.

[91] Source Government of the SR (2001).
[92] See also chapter *Poverty of Roma* in the National Human Development Report Slovak Republic 2000.

Table 3.9
Indicators of Habitation (2001)

Region	Average number of				Share of occupied dwellings equipped by (%)	
	permanent residents per 1 dwelling	m^2 of living floor space per occupied dwelling	rooms per occupied dwelling	m^2 of living space floor per person	public water-supply [a]	bathroom or shower
Bratislavský	2.74	51.10	2.95	18.7	95.8	96.8
Trnavský	3.24	59.90	3.35	18.5	89.8	93.5
Trenčiansky	3.16	53.20	3.13	16.8	74.2	93.6
Nitriansky	3.08	59.00	3.29	19.2	82.7	90.6
Žilinský	3.41	55.10	3.22	16.1	85.4	93.1
B.Bystrický	3.04	54.10	3.07	17.8	89.2	90.3
Prešovský	3.73	59.10	3.40	15.9	73.6	92.1
Košický	3.34	57.90	3.31	17.3	77.5	93.0
Slovakia	*3.21*	*56.10*	*3.21*	*17.5*	*83.4*	*92.8*

Note*: a. Share of inhabitants supplied with water from public water-supply.*
Source*: Statistical Office of the Slovak Republic.*

However, in comparison with other transition countries, basic sanitary equipment of dwellings is rather positive (Table 3.10).

Table 3.10
Quality of Housing in Selected Transition Countries (% of total housing stock)

Country	Water-supply	Flush toilet	Bathroom/shower
Bulgaria	83.4	57.7	44.9
Hungary	84.4	75.6	79.6
Poland	90.6	78.6	78.6
Slovakia	92.7	80.0	89.0
Slovenia	97.5	90.1	87.1

Source*: UN ECE: Annual Bulletin of Housing and Building Statistics for Europe and Northern America (Geneva, 1996 a 1998).*

Housing fulfills an important social function; it is the main precondition for a functioning family and household. The state of housing is a visible indicator of living standards of the population and the economic and social development in general. In this context, it is necessary to remind that the unfavorable condition of the housing stock is mainly a consequence of the socialist concept of housing construction. The more it is noteworthy how most of the households succeeded to create decent and sound living conditions inside of the outwardly unpleasant and uniform buildings.[93]

3.2.7 Democratic Stability and Health

The long years of the totalitarian regime (1948-1989) created preconditions for negative trends in the condition of health of the population. Stress, inadequate access to information, insufficient awareness of responsibility for one owns health, excessive reliance on care provided by the State, destruction of the environment, presence of foreign substances in the food chain, incorrect dietary habits, excessive consumption of alcohol and tobacco products, all these factors had direct impact on health and life expectancy parameters.

An inverse, although not very pronounced trend can be observed along the liberalization of social conditions during the 90s, with the average-age curve starting to increase again. Improved availability of better medications, a more ready diagnosis of severe diseases using state-of-the-art instrumentation, improvements in a majority of environmental pollution parameters, slight improvement of dietary habits and some other factors show a positive impact.

A stable democratic development represents a precondition favorable for not only economic development in general but also a specific precondition for the necessary reform of the public health system without which efficient spending of public funds is not possible. The standard of meeting the requirements of people in this respect at the same time significantly impacts on the support to the

[93] Source: Vagač – Strapec (1997).

democratic establishment as such. It has been empirically confirmed that satisfaction with one's own life, in which health plays a non-negligible role, while being an indicator of subjective quality of life (well-being), represents a significant predictor of the stability of democracy, exceeding indicators such as satisfaction with the political system as such. Explanation may be sought in e.g. an comprehensive international survey conducted in 43 countries that has shown that politics is a marginal phenomenon of the life of most people. Even if health has not been mentioned explicitly, it is obvious that it is included as one of the factors determining subjective physical and mental well-being. Subjective well-being is determined by mainly satisfaction with family life, marriage, job, home, friends, and leisure time. Interest in politics finds itself at the end of the hierarchy of factors "rather important for life." Family has been named as being important by 83 percent, whereas politics has been that important for only 13 percent of respondents.[94] Domestic surveys have confirmed that these findings also apply to Slovakia.

3.2.8 Health Care Services

Health care services are estimated to participate on the health status of an average human with approximately a 10-20 percent share.[95] Health care thus has a significant, although probably not the most important influence on human health. At least four fifths of efforts to improve health conditions should be oriented towards prevention of diseases with the use of "non-health care" factors. The development mainly in the second half of the 20th century however has lead to the situation of people becoming aware of the value of health as late as they become patients, i.e. health care clients. Public then has a general inclination to associate health exclusively with public health care, which should be moreover accessible for everybody, of best quality, and cheap. It is but understandable that such a situation is not sustainable and requires a reform of the system, but also a reform of thinking. These reasons contribute to the fact of health care being a specific and sensitive factor of health (see chapter 3.3).

[94] Source: Inglehart (1997).
[95] See introduction to chapter 3.2 Determinants of health.