

## Bulgarian Population in Transitional Period

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In the transition period from a communist to market-oriented economy, Bulgaria faces several public health challenges. One of them is the decline in population (estimated fall from current 8.25 million to around 6 million in 2045), mainly due to emigration and pronounced fall in fertility. Infant mortality is still relatively high (over 15/1,000 live births), and the incidence of tuberculosis is on the rise. Total mortality shows a steady upward trend from 12.1/1,000 in 1990 to 14.3/1,000 in 1998. Trends in ischemic heart disease are comparable to those in other Central and Eastern European countries, but stroke mortality is notably higher. This calls for detailed epidemiological studies of risk factors, such as salt consumption, as well as preventive programs for detection and control of high blood pressure. The problems of smoking and alcohol abuse should be addressed by a coordinated public health and legal measures.

**Key words:** Bulgaria; cardiovascular diseases; health status indicators; public health, smoking

Bulgaria is situated in the north-eastern part of the Balkan Peninsula. Its capital, Sofia, is located in the western part of the country. After World War II, it became one of the countries of the Communist Block. With disintegration of the Communist Block in 1989, Bulgaria changed its political and economical orientation. It became a multi-party liberal democracy, governed by a single chamber with 240 directly elected parliamentarians for a turn of 4 years and a directly elected president for 5 years. It is classified by the World Bank as a "heavily indebted lower middle income country", but social and educational indicators are much more favorable than the average for countries in this income group; for example, life expectancy (71 years) is slightly above the group average of 68 years (1). Basic indicators of the country are given in Table 1. The decline in population in the 1990s is notable, mainly due to emigration at the beginning of the decade and a significant fall in fertility as the decade progressed. World Bank projections show a fall from the current total of 8.25 million population to around 6 million in 2045, even if the total fertility rate recovers from its current level of 1.1 to 2.0 by 2035 (1). The recent increase in the proportion of population aged over 65 will accelerate if the population pyramid continues to shrink at the base due to successive small birth cohorts. According to the World Bank estimate, the proportion over 65 would rise from its current level of 16% to around 28% by 2050.

The transition from a planned to a market economy has been so far less successful than the average for the Central and Eastern Europe. Although a small

minority has prospered, average household incomes have declined substantially. The World Bank's estimate of a 15% decline between 1989 and 1998 in purchasing power-adjusted gross national product (GNP) per person (Table 1) substantially understates the declines in real income experienced by those in the bottom half of the income distribution who were previously protected by heavy consumer subsidies for housing, utilities, and basic commodities. It is only in 1998, when output has begun to recover and simultaneously inflation got under control, that the prospect for reversing this decline in living standards emerged. Promoting a recovery in living standard through continuing these positive macroeconomic trends accompanied by structural reforms and programs to reduce poverty is now one of the greatest challenges facing the Government. According to the analysis of the World Bank, over 36% of the Bulgarian population is living in poverty. Not surprisingly, poor people spend a larger amount of their budget on food and consume a larger amount of cheaper staple grain commodities (3).

Life expectancy in Bulgaria throughout the 1990s was similar to that of Central European countries, but better than in the former USSR countries.

### Health Services

The Bulgarian health care system was highly centralized, based on public sector provision and tax financing. The reforms, which took place in the early 1990s, had three main components, as follows: 1) a law was adopted to permit private health services, 2)

**Table 1.** Selected demographic, economic and social indicators, Bulgaria, 1970-1998 (1,2)<sup>a</sup>

Indicator	1970	1975	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Population (millions)	8.490	8.721	8.862	8.941	8.877	8.718	8.632	8.540	8.472	8.435	8.400	8.356	8.312	8.257	8.211
annual change (%)	0.66	0.48	0.41	0.18	-1.16	-1.81	-0.99	-1.07	-0.80	-0.44	-0.42	-0.53	-0.53	-0.66	-0.05
over 65 (%)	9.6	10.9	11.9	11.3	12.7	13.0	13.3	13.6	13.9	14.2	14.5	14.8	15.1	15.5	16.0
rural (%)	48	43	39	36	34	34	33	33	33	32	32	32	31	31	31
Crude death rate (per 1,000)	9.1	10.3	11.1	11.4	11.9	12.4	12.7	12.6	12.9	13.2	13.6	14.0	14.6	14.3	13.6
Crude birth rate (per 1,000)	16.3	16.6	14.5	13.3	12.6	12.1	11.1	10.4	10.0	9.4	8.6	8.7	7.7	7.9	8.8
Total fertility rate	2.2	2.2	2.0	2.0	1.9	1.8	1.6	1.5	1.5	1.4	1.2	1.2	1.1	1.1	1.2
Life expectancy (female)	73.6	74.0	74.3	74.5	75.1	74.8	74.7	74.5	74.6	74.9	74.9	74.6	74.4	74.6	75.1
Life expectancy (men)	68.7	68.7	68.6	68.5	68.6	68.1	68.0	68.0	67.7	67.2	67.1	67.1	67.2	67.4	68.4
Adult illiteracy rate (% of those aged over 15)	7.5	6.3	4.9	3.7	3	2.8	2.7	2.5	2.4	2.3	2.1	2	1.9	1.8	1.7
GNP per capita, PPP (current international \$)	-	-	2,699	3,810	5,541	4,920	4,575	4,901	4,970	5,170	5,426	4,907	4,555	4,683	-
Unemployment rate (%)	-	-	-	-	-	1.7	11.1	15.3	16.4	12.8	11.1	12.5	13.7	12.2	16.0
Health service expenditure per capita, PPP (current international \$)	-	-	-	-	-	220	222	281	263	229	223	197	205	193	-
% public	-	-	-	-	-	100	96	94	93	93	91	81	81	79	-

<sup>a</sup>Abbreviations: GNP – gross national product; PPP – purchasing power parity; data not given where not available (-).

many responsibilities for health care services were devolved to local municipalities, and 3) independent medical associations were re-established. The Health Insurance Act, passed in June 1998, set up a National Health Insurance Fund, which will eventually become the major purchaser of health care services through contracts with providers. Collection of contributions began in July 1999 and health care insurance scheme in primary health care was introduced in July 1, 2000 through contracts between the regional health insurance funds and health care providers. The resources available for medical services are very modest in comparison to high-income countries – about US\$200 per person per year (Table 1).

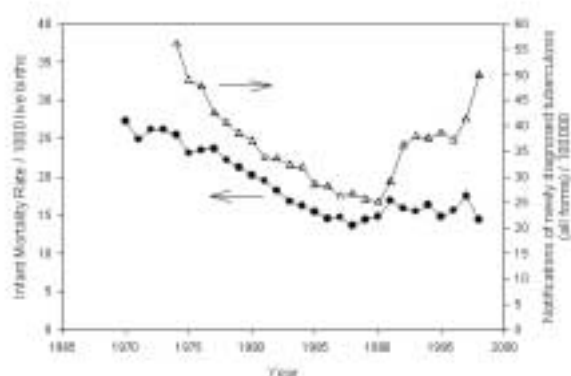
Since 1972, the National Public Health law has made the Ministry of Health and other state institutions responsible for the prevention and cessation of illicit drug use and control of tobacco and alcohol consumption. It is forbidden to directly advertise tobacco and alcohol; smoke in workplaces with non-smokers; sell tobacco, alcohol, and related products to persons under the age of 18 years; and sell these products within 200 meters of schools and health institutions. However, state enforcement of this law is weak and tobacco and alcohol are being indirectly highly advertised by transnational companies (4).

### Persistence and Resurgence of Traditional Public Health Problems

The rate of improvement in traditional public health indicators, such as infant mortality and tuberculosis incidence, started to slow down in the mid 1980s (Fig. 1), reflecting probably economic and political stagnation in the latter years of the previous regime. Trends in these indicators became less favorable during the 1990s, with a notable rise in newly recorded cases of tuberculosis. Both indicators have been less favorable in rural areas.

### Chronic Disease Mortality Dominated by Vascular Disease

The total mortality showed a steady upward trend from 12.1/1,000 in 1990 to 14.3/1,000 population in 1998 (5). The increase in mortality was ob-



**Figure 1.** Trends in two traditional public health indicators, infant mortality (closed symbols, right axis) and notifications of new cases of active tuberculosis (open symbols, left axis), Bulgaria, 1970-1998 (1,2).

served for both sexes, although it was faster in men. Between the 1960s and mid 1990s, there has been a continuous rise in death rate attributed to non-communicable diseases in Bulgaria (6). In the 1970-1998 period, the proportion of deaths attributed to vascular causes increased from 28% to 44% in men aged 65 and younger, and from 33% to 41% in women of the same age. Trend for deaths certified to ischemic heart disease and stroke is shown in Figure 2. Whereas trend in ischemic heart disease have been broadly comparable to that in other Central and East European countries, the level of stroke mortality has been notably higher continually since 1970. In the European Union, the rate ratio of the two causes of death rose between 1970 and 1998 from 2.1 to 4.3 for men under 65 and from 1.7 to 5.3 for women in the same age group. The last figure shows that although excess vascular mortality (compared to the EU) was *absolutely* greater in men, the *proportional* excess was at least as great in women. The figures for women also showed that the East-West gap has mainly been created not by the increase in vascular mortality in the East but by the unmatched decrease in the West. Since smoking largely accounted for the rise in those death rates in men in the East (7, Powles JW, unpublished), the rate of “vascular mortality not attributable to smoking” in

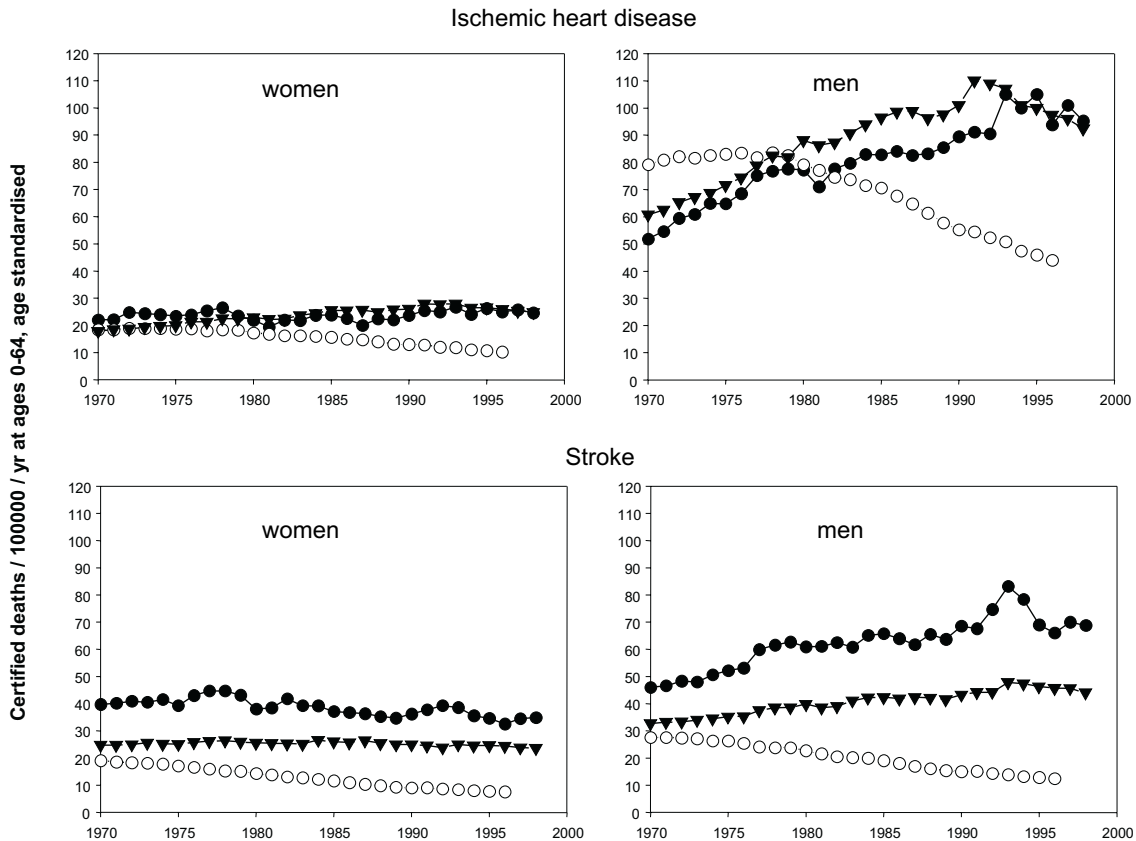


Figure 2. Age-standardized death certification rates for ischemic heart disease and stroke in Bulgarian women and men aged 0-64, 1970-1998 (2). Closed circles – Bulgaria, closed triangles – Central and East Europe average, open circles – EU average.

men showed a pattern more like that in women (although at higher absolute levels), which again emphasized the role of mortality declines in the West in the emergence of the East-West gap. Because the excess in the East is not *proportionally* greater in men, it is unlikely to be due to influences operating predominantly on men.

The only objective indicator available for psychosocial distress is the suicide rate, which showed an increase from 14.1 to 16.4 per 100,000 between 1990 and 1998. The rate was three times higher among men than among women in 1998 (25.3 vs 8.7 per 100,000 population).

**Chronic Disease Determinants**

Bulgaria seems to be one of the last European countries to pass through all phases of the cigarette smoking epidemic. Comparatively high smoking prevalence has been recorded only in the generations of men born during and after World War II – a lag of several decades behind the countries such as England, where cigarette smoking was adopted quite early (Fig. 3; refs. 8,9). The positive or absent association of smoking with socio-economic status is also indicative of the early phases of the cigarette epidemic in Bulgaria: for example, lifetime smoking prevalence is lower among older men with less education in rural areas (10). Smoking prevalence among women is of-

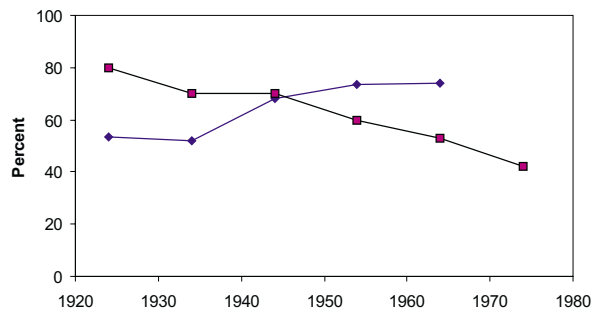


Figure 3. Evolution of cigarette smoking in men in Sofia, Bulgaria and in England: percentage of people reporting ever having smoked regularly by central birth year (8,9). Rhombs – Sofia, Bulgaria; squares – England.

ten higher in professional groups, even among those working in the medical sector. Smoking prevalence is now high among middle-aged and younger men and among women younger than 35. A national probability survey conducted in 1997 reported overall prevalence of smoking of 38.4% for men and 16.7% for women in the population aged 18 years and older (9).

That the onset of the smoking epidemic has been relatively late in Bulgaria is also revealed by trends in the death certification rates for lung cancer. Since 1970, lung cancer death rates have been increasing in men in

Bulgaria only about half as rapidly as in the Central Eastern Europe as a whole. By 1998, the age-standardized rates for Bulgarian men aged up to 64 had risen to a level of 40.5/100,000, which is below the Central and East European regional average of 51.1/100,000 but well above the (decreasing) level of 28.9 in the European Union. The rates in Bulgarian women (5.4/100,000) were substantially below those in the Central and Eastern Europe as a whole (8.6/100,000) and lower than those in the European Union (7.0/100,000) (2).

Data on alcohol consumption are available both from the national 24-hour dietary recalls (11,12) and from the Sofia Heart Study (10). Spirits (*rakia*) account for around 50% of alcohol consumed, beer for around 30%, and wine for around 20% (10). In Sofia Heart Study (10), men reported an average of less than 3 drinking days per week and an average consumption of 65 g alcohol on those days; 17% of men reported excess alcohol consumption of 40 g/day and 12% of 60 g/day. The percentages and thresholds for excess alcohol consumption in women were 5% (20 g/day) and 2% (40 g/day). In relation to the increased risk of ischemic heart disease from non-drinking causes, 30% of men and 67% of women aged over 45 reported themselves as non-drinkers (10).

There is no established national surveillance system for chronic disease risk factors and only a limited number of such studies have been conducted. Interpretation of findings from these studies is often hampered by the lack of published detail on sampling and recruitment procedures and on measurement methods and quality control. The data cited below draws on two main studies (10,13) (Table 2).

Neither blood pressure nor blood cholesterol concentrations showed any systematic pattern in relation to socio-economic status within the Sofia Heart Study (10). The results for body mass index showed that Bulgarians were generally well above optimum levels of adiposity (10)

The most representative and detailed information on diet was obtained by two nationwide 24-hour recall surveys conducted in May 1997 (11) and March 1998 (12). Cereal products provided around one third of dietary energy. Consumption of potatoes and pulses was also high. Pork and chicken were the most popular meat. Dairy products, especially yogurt, milk and, cheese were major sources of animal proteins. From the data obtained in the 1998 survey (12), it appeared that intakes of thiamin, riboflavin, and folate were likely to be below desirable levels in significant proportions of the population, but blood samples were not assayed. Intakes of vitamins A and C were assessed as adequate.

As elsewhere in the former socialist economies, the system of counter-seasonal supply of fresh fruits and vegetables in Bulgaria is poorly developed. In 1989, household acquisitions of fresh fruit and vegetables were over 10 times higher in summer (May-October) than in winter (November-April) (S. Petrova, personal communication). In Britain, the corresponding ratios were less than 1.7 times (14). For out-of-season supplies, reliance continues to be placed on

**Table 2.** Two studies of the blood pressure, total cholesterol concentration, and body mass index of adult Bulgarian population (8,13)

Source area	City of Sofia region <sup>a</sup>	Provincial city of Veliko Turnovo and surrounding area <sup>b</sup>
Area population (N)	1,116,454	90,597 (80% urban)
Study population (N)	1,996 (aged 25-74)	2,363 (aged 25-64)
Probability sampling	Yes	Yes
Participation rate (%)	64	67.7
Year of fieldwork	1994	1995-1996
Systolic blood pressure (mm Hg):		
men	132	134
women	129	129
Diastolic blood pressure (mm Hg):		
men	86	85
women	85	81
Total cholesterol (mmol/L):		
men	5.0	5.6
women	5.0	5.4
Body mass index (kg/m <sup>2</sup> ):		
men	26.2	27.0
women	25.8	26.8

<sup>a</sup>Sofia Heart Study. Medians for age group 35-64, standardized to the world standard population (10).

<sup>b</sup>Bulgarian CINDI. Reported as means for age group 25-64; age-specific rates unavailable for standardization (13).

canning and traditional methods of preservation. In the 24-hour recall survey conducted in March 1998 (12), canned and pickled vegetables accounted for one third of the vegetables consumed (by weight) and canned fruit comprised two thirds of the total fruit consumed. Citrus accounted for less than 10% of fruit consumption (by weight).

The massive seasonal swings in the intake of potentially protective constituents of fresh foods could be contributing to the high rates of vascular diseases, particularly stroke. Annualized estimates of fruit and vegetable consumption (as commonly used) appear relatively favorable because of high consumption during harvest seasons, while being consistent with very low intakes during the rest of the year. The picture revealed by data collected at one point in the year – whether by dietary survey or by blood and urine collections – is highly dependent on the season in which the data is collected, and can only be interpreted in that light. To form an overall picture, data from both winter and summer are needed at least. Traditionally preserved foods tend to be high in salt and there is evidence that high sodium consumption can increase stroke risk independent of its effects on blood pressure (15,16). Preliminary data from 24-hour urine collections in the Varna Diet and Stroke Study showed very high salt consumption during winter (J. Powles, unpublished).

### Issues and Prospects

To improve the health of the Bulgarian population, several measures will have to be considered. Traditional foci of public health concern, such as maternal and infant health and communicable disease control, demand renewed attention in the face of ad-

verse trends. Bulgaria has experienced neither the dramatic adverse trends in vascular mortality, as Russia has, nor the early declines as those seen in the Central European countries, but it has one of the highest death rate from stroke reported, which cannot be explained by existing evidence on blood pressure distributions. Furthermore, chronic disease surveillance should focus on potentially modifiable causes of major components of the disease burden, including stroke. Regular, systematic, and standardized measurement is required in representative population samples of a) conventional cardiovascular risk factors; and b) urinary sodium and potassium excretion and blood levels of antioxidant vitamins in both winter and summer; and c) the performance of the medical system in the detection and control of raised blood pressure. Likewise, the environmental causes of very high stroke rates should be a research priority. Stroke registries and analytic epidemiological studies are needed and should be supported, if need be, from international sources. Programs for chronic disease reduction should concentrate on tobacco control (including increased taxation, more effective restrictions on advertising, and assistance in smoking cessation) (17) and on improving the detection and control of high blood pressure (18). Programs to promote a reduction in salt consumption deserve serious consideration. Programs to promote increased fruit and vegetable consumption in winter are desirable in principle, but may not be realistic until restrictions on purchasing power are eased by improvements in the economic situation.

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