

Topic

*Health, morbidity and mortality*

**MORTALITY AND LIFE EXPECTANCY AT OLDER AGES IN RUSSIAN  
MEGAPOLIS (THE CASE OF SAINT-PETERSBURG)**

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## Introduction

In Russia big cities have been main engines of demographic development. Saint-Petersburg (SPb) is the second largest city and in several aspects plays the leading role in the country. The city is important not only because of its large size (and therefore its potential to affect the areas immediately surrounding it as well as those further away) but also because it has been at the forefront of many of the demographic changes that have taken place in Russia during the transition period. For example, while the total population decline in Russia has been around 3 percent during the period 1990-2005, it has fallen by over 8 per cent in Saint-Petersburg [13, 14]. Further, the city currently has one of the lowest fertility rates in the Russian Federation and will be significantly affected by the aging of its population in the immediate future. Though mortality and life expectancy analysis is one of the major topics of demographic research in Russia (see for example [1, 5 - 11]), papers on mortality in SPb (especially at older ages) are very few. Nevertheless such studies seem to be important taking into account that one the driving forces of population ageing is life expectancy increase.

An important characteristic of ageing process is **life expectancy (LE) at older ages (60+)**, it is computed based on **age specific mortality rates (ASMR)**. Paper aims at analyzing dynamics of LE at older ages in Saint-Petersburg in 1990 – 2009 in comparison with Russia. Mortality by causes of death in SPb and gender differences in ASMR and LE will be considered.

First of all the contribution of old age mortality to the city's mortality is considered. It is shown that the percentage of deaths at 60+ in all deaths varies from 63.2% (1994) to 74.0% (1998), being 72.8% in 2009. Then dynamics of ASMR (*number of deaths per 1000 persons of the corresponding sex and age*) for older age groups (60-64, 65-69, ..., 80-84) in Saint-Petersburg in 1990 – 2009 is examined followed by analysis of mortality by causes of death. The following main causes of death are considered:

- diseases of the circulatory system ( in 2009 deaths from this cause amounted to 60.6% of all deaths and to 68.7% of deaths at 60+)
- neoplasms (in 2009 deaths from this cause amounted to 19.6 % of all deaths and to 20.5% of deaths at 60+),
- external causes of death, i.e.occasional alcohol poisoning, transport accidents, suicides, homicides (in 2009 deaths from this cause amounted to 7.3% of all deaths; and to 2.8% of deaths at 60+, 2009 ),
  - diseases of the respiratory system,
  - diseases of the digestive system,
  - certain infectious and parasitic diseases,
  - diseases of the urogenital system,
  - diseases of the nervous system,
  - mental disorders,
  - diseases of the endocrine system,
  - congenital anomalies,
  - other causes.

Dynamics of LE at older ages in Saint-Petersburg in 1990 – 2009 is compared with that in Russia as a whole. Special attention is given to gender differences in ASMR and LE at older ages.

The paper is based on data [2 – 4, 12]. Computations of considered indicators are made in Excel.

### **Preliminary results**

It is found that for all considered age groups in the whole period 1990 -2009 ASMRs have decreased (see Fig. 1a, b). For the male population the mentioned decrease in ASMRs changed monotonously from 2.3 % (relative to the value in 1990) for the age group 60 – 64 to 36.8% for the oldest old (85+). For the female population the change was not so regular as for the male population, and it varied from 6.7% for the age group 60 – 64 to 29.9% for the age group 65 – 69. Both for male and for female population for each of considered age groups of the elderly the decrease was not monotonous.

Three major causes of death are - diseases of the circulatory system, neoplasms and external causes. In 2009 deaths from these causes amounted to 87.5% of all death and to 92% of deaths at older age groups (60+). As an example, here ASMRs for diseases of the circulatory system for older age groups are presented in Fig. 2. For almost all considered age groups in the whole period 1990 -2009 ASMRs for diseases of the circulatory system have decreased (with the only exception being age group 60 – 64 in the male population). Other causes of death are also considered.

Dynamics of ASMRs by causes of death, and thus dynamics of ASMRs determined life expectancy increase. Since the beginning of this century LE at birth and at older ages in SPb (as well as in Russia as a whole) has increased (see Fig. 3). Nevertheless it is still much lower than LE in developed countries [2, 13], thus, in 2008 LE<sub>0</sub> for males in Russia was 64.8 years, for females – 76.1 years, while for EU-27 it was correspondingly 74.2 for males and 82.8 for females; LE<sub>65</sub> for males in Russia was 14.0 years, for females – 17.2 years, while for EU-27 it was much higher – 17.0 for males and 20.5 years for females [2].

It has been shown that old age mortality in Saint-Petersburg is lower than that in Russia as a whole, i.e. life expectancies are higher, as can be seen from Fig. 3.

Mortality indicators in Saint-Petersburg /Russia as a whole are characterised by significant gender imbalance. Thus, ASMRs for males are higher (LEs lower) than those for females (see Fig. 4, 5). It should be pointed out that gender imbalance is decreasing with age (see Fig. 4, 5). Thus, gender differences in LE measured as  $(LE_{fem} - LE_{mal}) / LE_{mal} * 100$ , in 2009 decreased from 28% for the age 65 to 9% for 75, and at the age of 80 LE for males was even greater than that of females. Male/female differences in LE in Saint-Petersburg /Russia have been more marked than in developed European countries. Thus, for example, male/female difference in LE<sub>0</sub> in Russia in 2008 was 20.1% (17.2 for SPb), while for EU-27 – 11.6%;

male/female differences in LE65 was correspondingly 38% for Russia (25% for SPb) and 20.5% for EU-27.

Changes in life expectancy at older ages have their effects on the LE of the whole population. Table 1 demonstrates that in the periods when life expectancy increase in Saint-Petersburg was observed, contributions of older age groups to these positive changes in LE were greater than those of children.

**Table 1. Contribution of major age groups into differences in LE at birth (LE0), Saint-Petersburg, years**

period	increase/ decrease	increase/decrease due to mortality changes in age groups		
		0 - 14	15 - 59	60+
1990-1993	-5.70	-0.11	-4.25	-1.34
1993-1998	5.56	0.64	3.60	1.32
1998-2000	-2.89	0.11	-2.46	-0.54
2000-2005	1.06	0.34	0.18	0.54
2005-2009	3.43	0.15	2.52	0.76
1990-2009	1.46	1.15	-0.86	1.17

## Conclusions

Deaths at older ages are the significant part of all deaths, thus, mortality decrease at older age groups may contribute to overcoming mortality crisis in Russia. Results of the study may promote better understanding of regularities of ageing development not only in Saint-Petersburg but in Russia as a whole. They would enable enhancing management and planning of social and health services. Life expectancy in Russia is growing, nevertheless it is much lower than in developed countries. Thus Western socio-economic policies which are connected with high and increasing life expectancy cannot be applied to the Russia situation without serious adaptation to the country's situation.

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Fig. 1a. Dynamics of ASMR for older age groups, Saint-Petersburg, (male population), 1990 – 2009

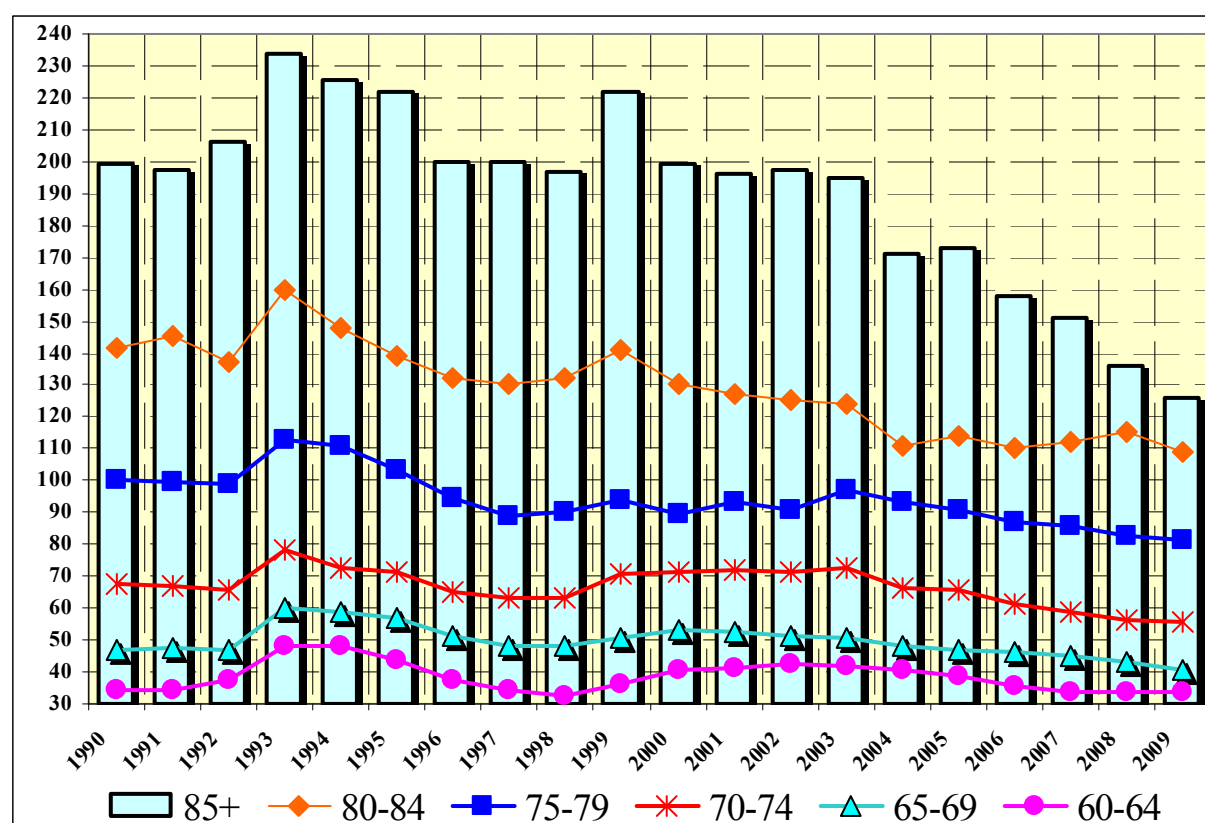


Fig. 1b. Dynamics of ASMR for older age groups, Saint-Petersburg, (female population), 1990 – 2009

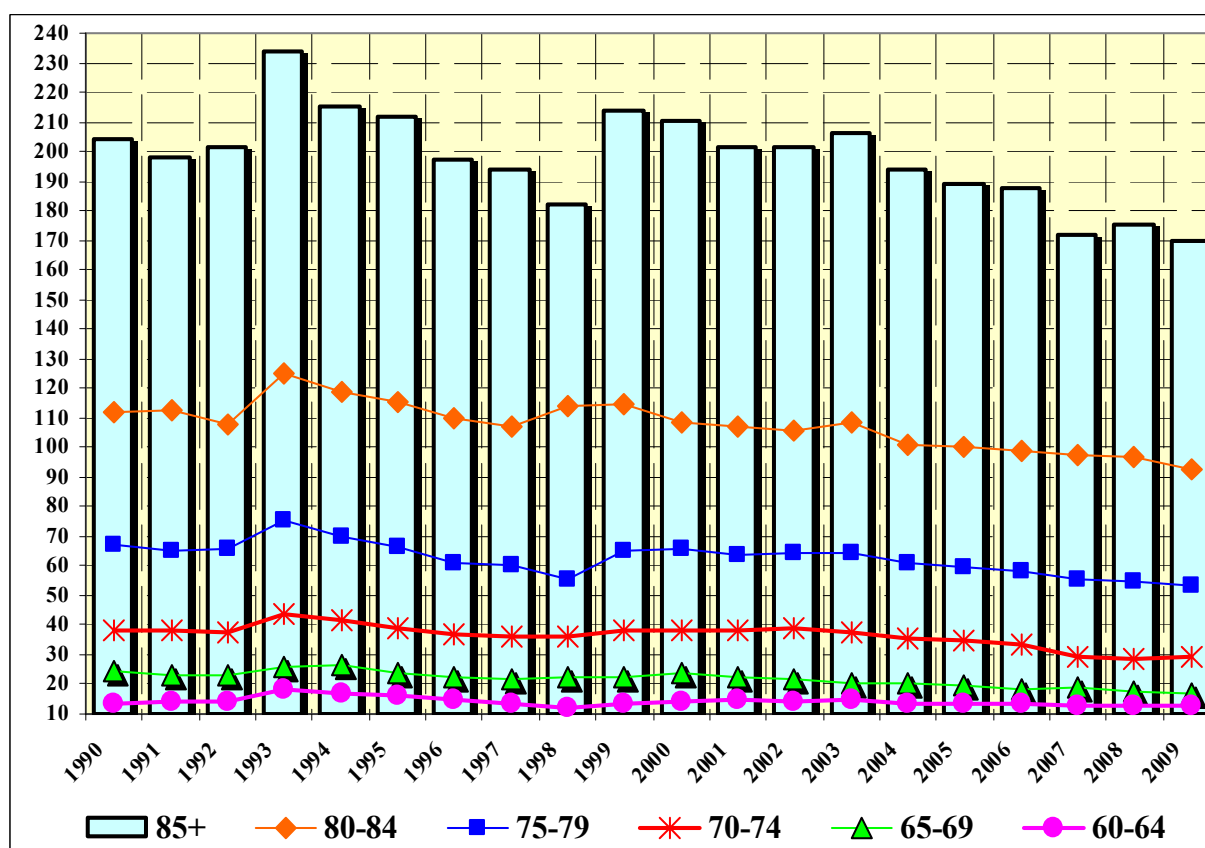


Fig. 2. ASMR for diseases of the circulatory system, Saint-Petersburg, 1990 – 2009 (per 100000 of population of corresponding age group)

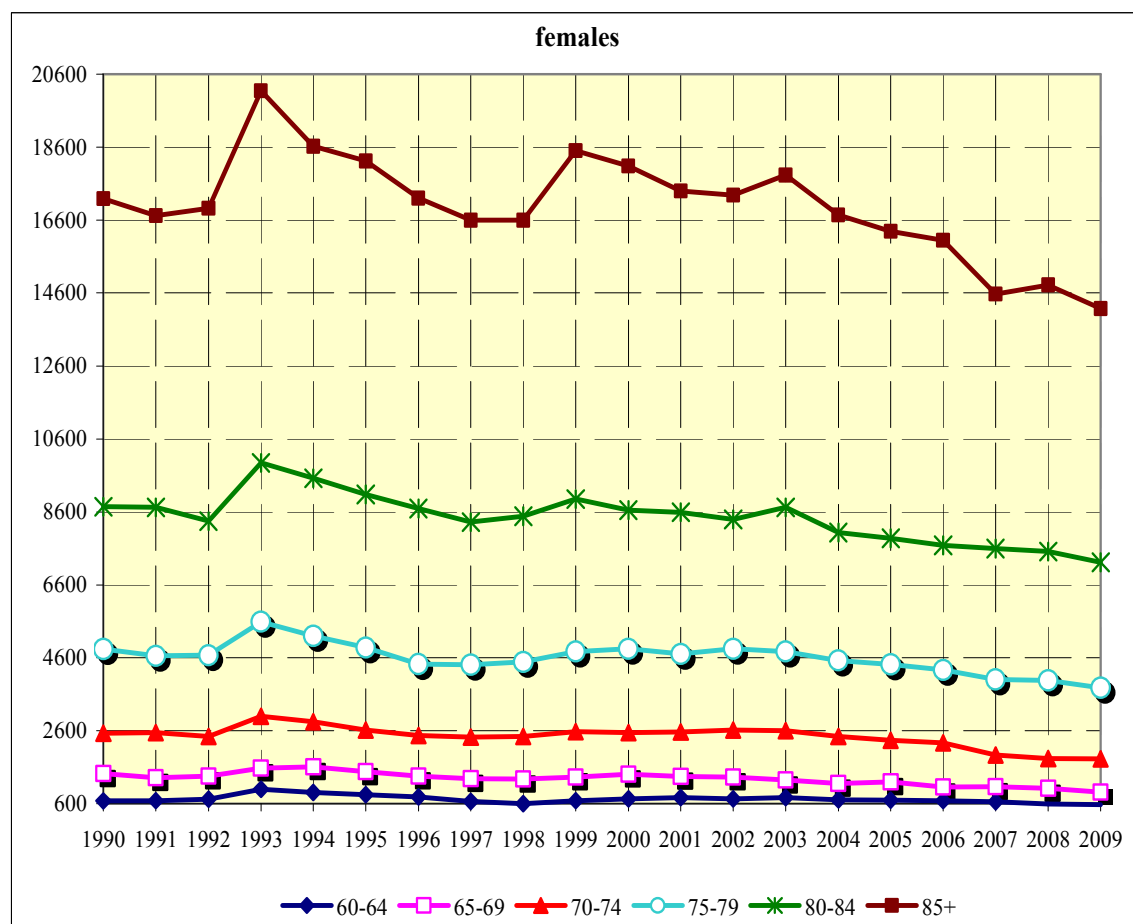
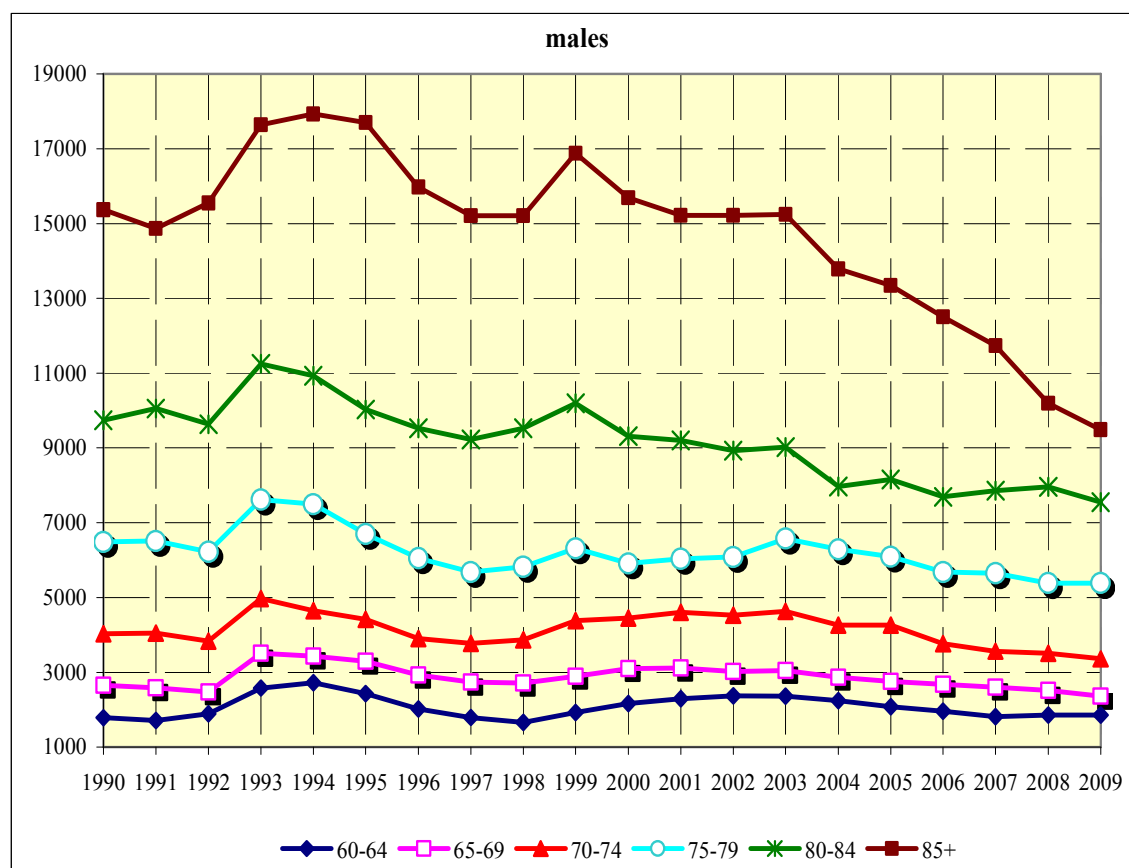


Fig.3a. Dynamics of LE at birth (left scale) and at older ages (right scale), Saint-Petersburg and Russia (male population), 1990 – 2009

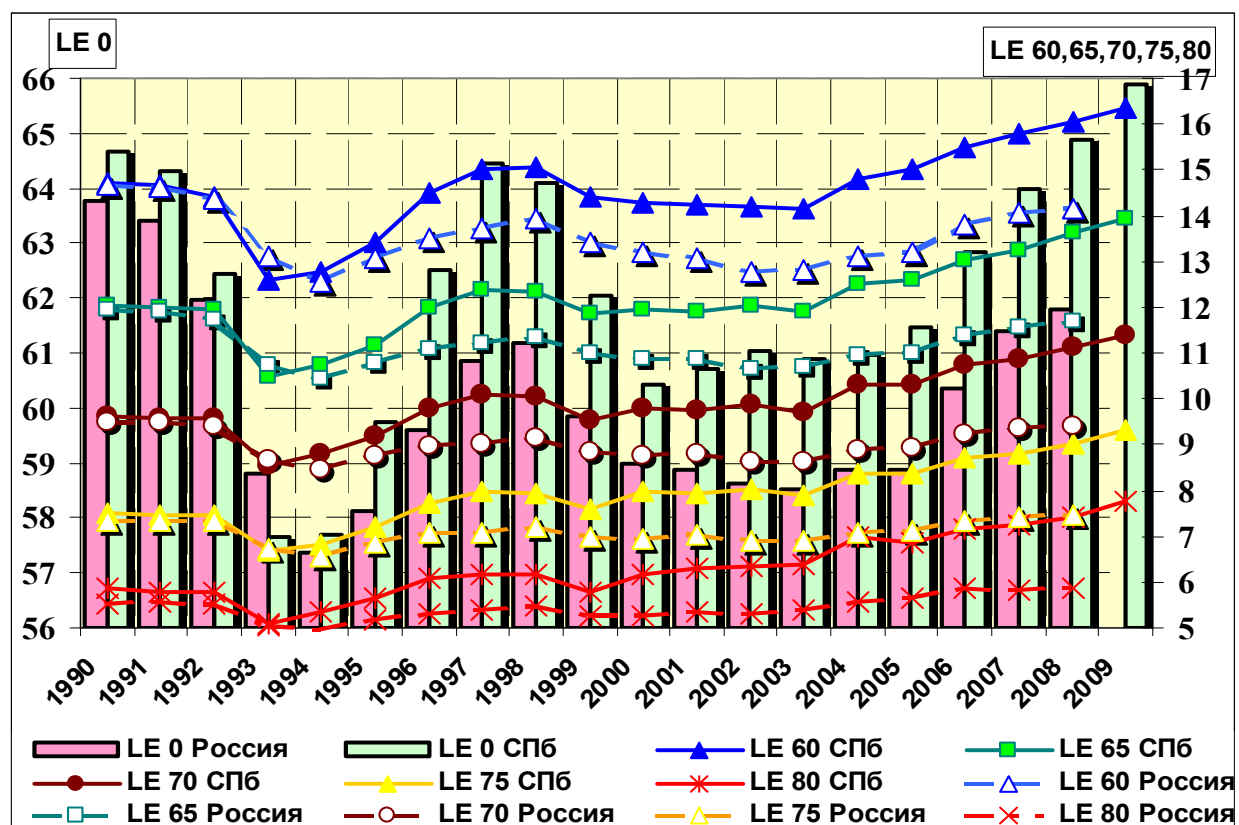


Fig. 3.b. Dynamics of LE at birth (left scale) and at older ages (right scale), Saint-Petersburg and Russia (male population), 1990 – 2009

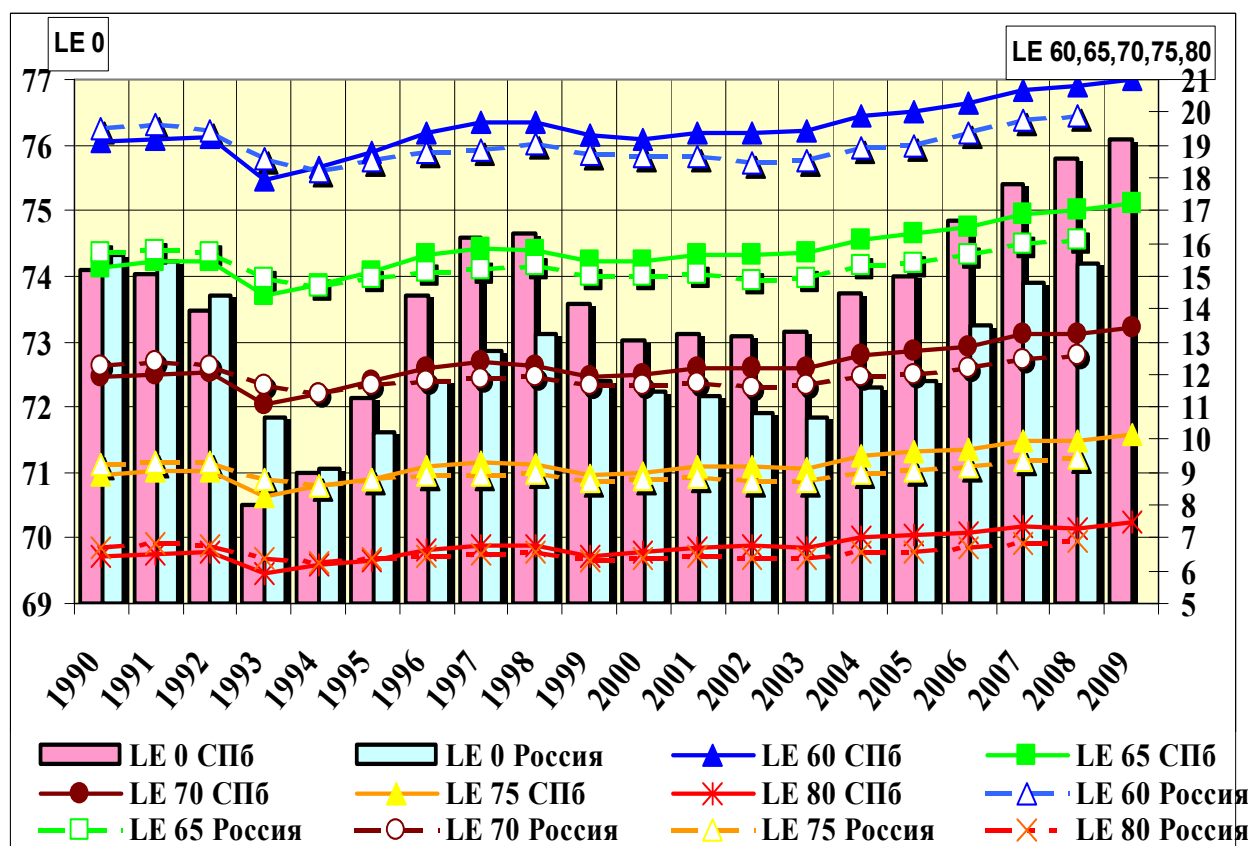




Fig 4. Gender differences in ASMR, Saint-Petersburg, 1990 – 2009  
(ASMR males/ASMR females)

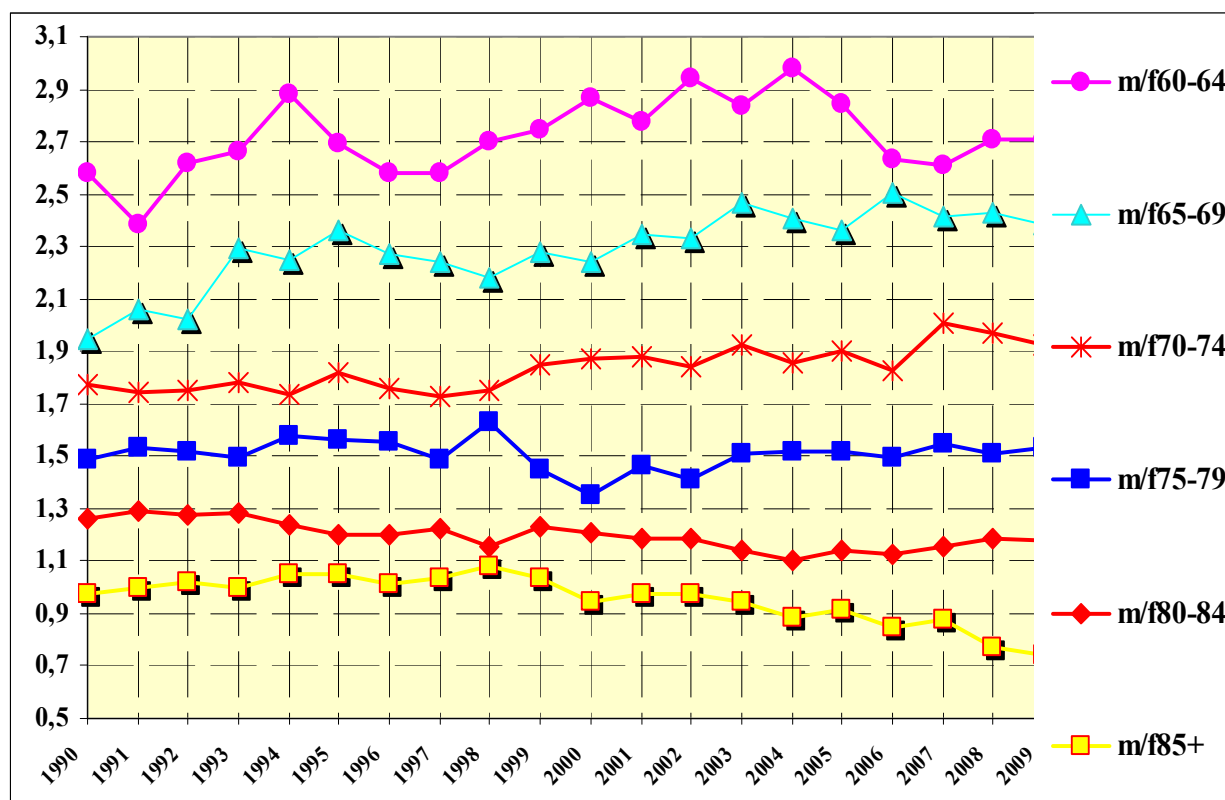


Fig. 5. Gender differences in LE, Saint-Petersburg and Russia, 1990 – 2009, %, ((LE fem-LE mal)/LE mal\*100)

