

# Cause-specific mortality trends in two Caucasian countries since the early 1980s

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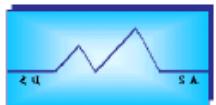
**with the collaboration of Mariana Mourgova<sup>4</sup> and Gwendoline Taché<sup>1</sup>**

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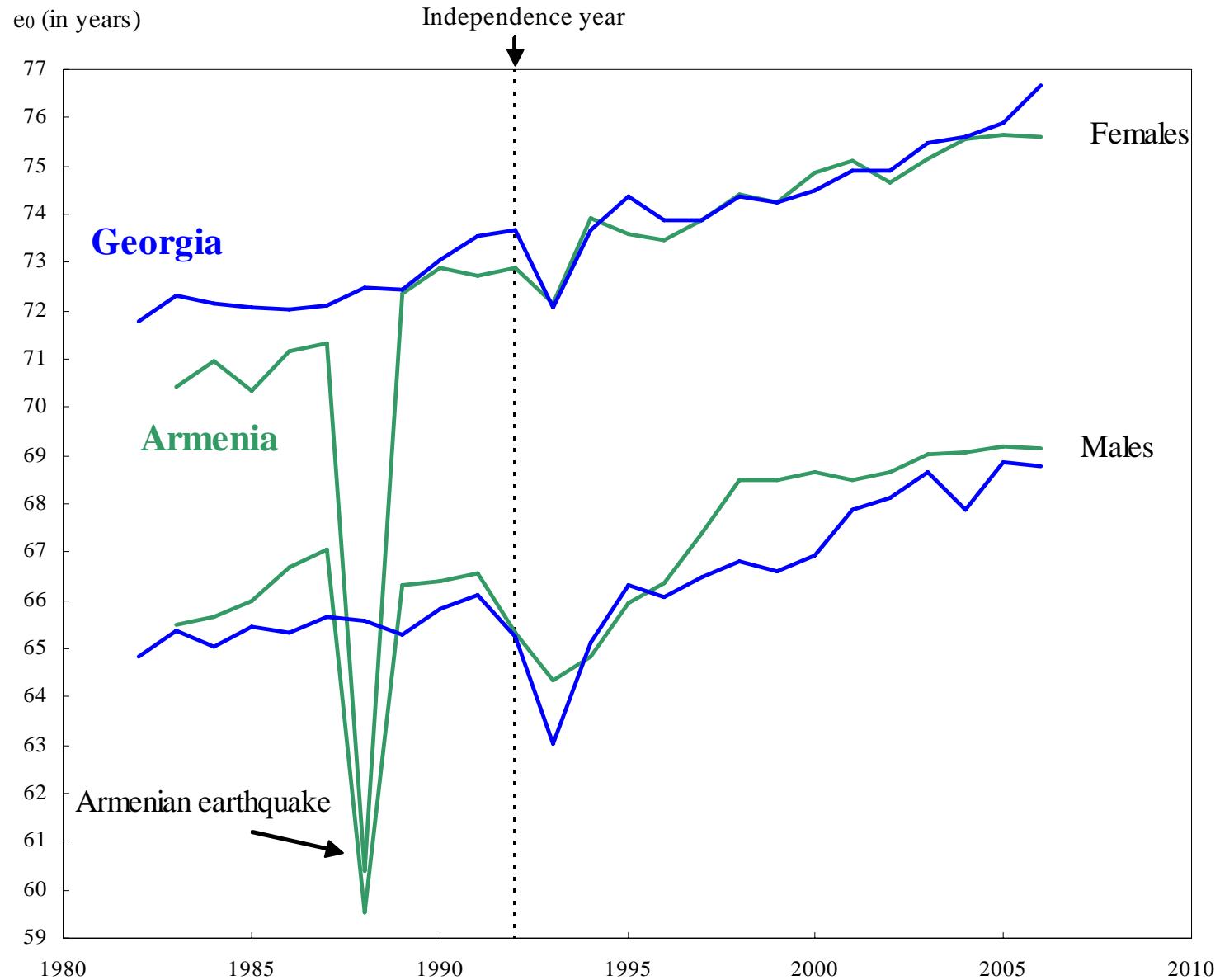
# Cause-specific mortality trends in two Caucasian countries since the early 1980s

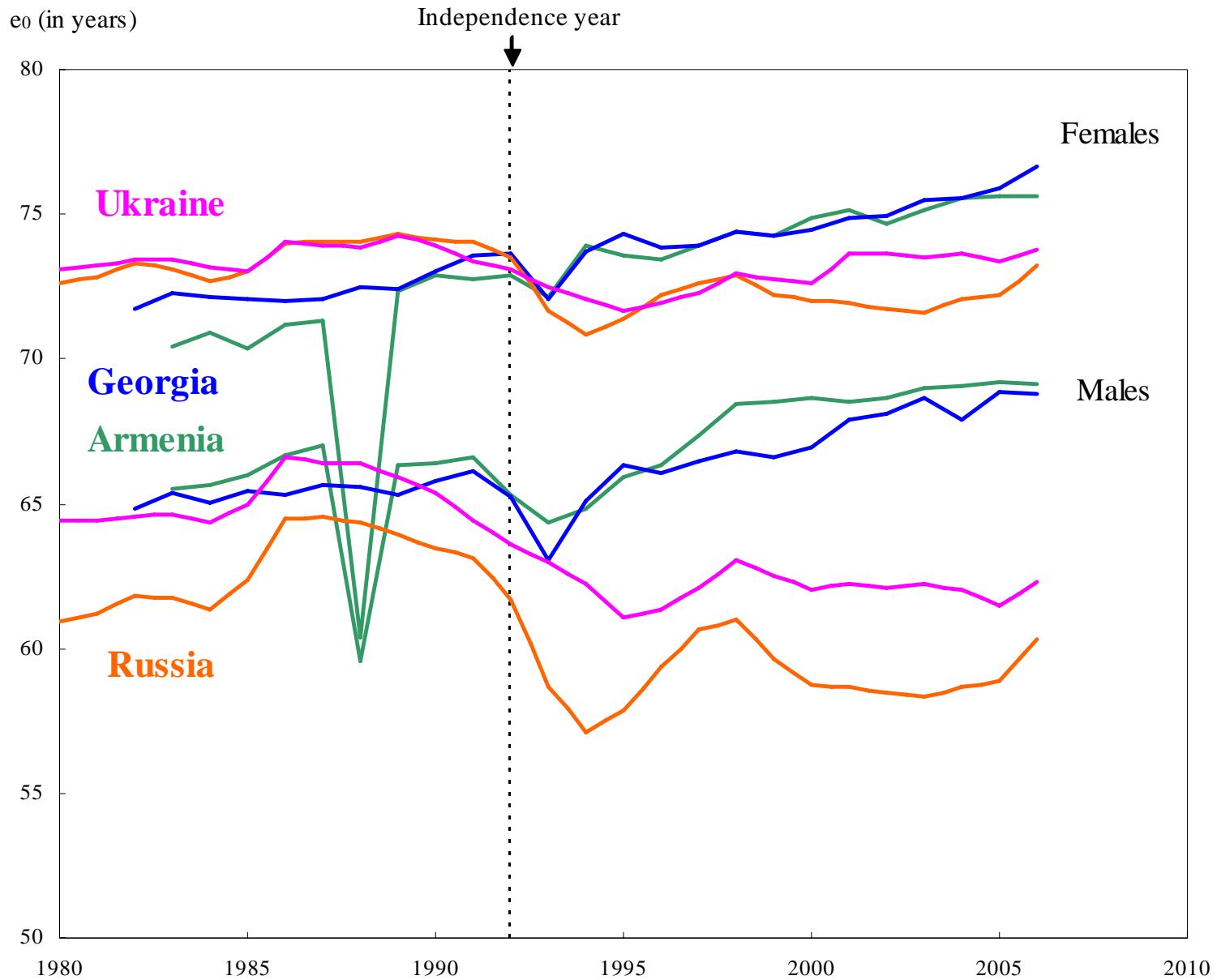
- Unfavourable mortality trends observed in the ex-Soviet Union area since the 1960s
- Caucasian countries (Armenia, Georgia)
- Problem of data
  - 1) Re-estimating mortality levels and trends
    - Duthé *et al.*, 2008 (EPC)
  - 2) Providing continuous series of deaths by cause
    - Different classifications of causes over the period

# 1) Re-estimating mortality levels and trends

- New reliable population estimates
  - Censuses in early 2000s in both countries
- Correction of mortality levels
  - Vital events
    - Official statistics :
      - Armenia : civil registration
      - Georgia :
        - > 1988: civil registration
        - 1989-2003: estimates
        - <- 2004 : crossing data civil regist. + health counts
    - Infant mortality rates
      - Arm-DHS / Georg-RHS -> correction of annual coverage rates
    - Life expectancy at age 60 for specific years
      - Coale and Demeny model life table and relationship between IMR and  $e_{60}$

# 1) Re-estimating mortality levels and trends





## 2) Providing continuous series of deaths by cause

- Computing “hidden causes”
- Changes in the classification of causes of death
- Use of the *a posteriori* method

# “Hidden causes” in the 1981 classification

## ➤ Computing “hidden causes”

- Cholera, plague, injuries at work, other external deaths
- Added in other items in statistics
  - “ill-defined causes” until 1985
  - “other accidents” in 1986-1987
- Detailed data kept in specific tables
  - Except few corrections, coherence between tables is good
  - Not available for Georgia for the period 1981-87 :
    - Treatment of an additional item “total of hidden causes” in the classification

# Changes in the classification of causes of death

- Soviet period : similar in both countries
  - 0) 1981 Soviet classification (185 items)
  - 1) 1988 Soviet classification (175 items)
- Since independence :
  - 2) Georgia : ICD-10 in 1998
    - constitution of an abridged ICD-10 (197 items)
  - 2) Armenia : ICD-10 in 2004
    - for publication, use of an abridged ICD-10 (229 items)
- Two transitions to manage in each country
  - 1) 1988 vs 1981
  - 2) abridged ICD-10 vs 1988

# Change 1: 1988 vs 1981 Soviet classification

## ➤ Small changes :

- Items 1 to 159, devoted to diseases and ill-defined causes, remain unchanged
- Injuries : drop the distinction between accidents at work and other accidents
  - 1981 classification:
    - 169 = Falls, except injury at work
    - 170 = Falls, injury at work
  - 1988 classification:
    - 166 = Falls
- Simple correspondences for other external deaths
  - Suicide, homicide and undetermined intent

# Change 2: Abridged ICD-10 vs 1988 soviet classification

## ➤ More complex:

- Creation of new items:  
e.g. yellow fever, HIV/AIDS, malignant neoplasms of pancreas, malnutrition...
- Drop of old items:  
e.g. the distinction of cerebrovascular diseases with or without an hypertensive disease

# The *a posteriori* method

## ➤ Two principles

- Correspondence of the medical contents of old/new items
- Statistical continuity over the period of change
  - By age group and sex

## ➤ Steps

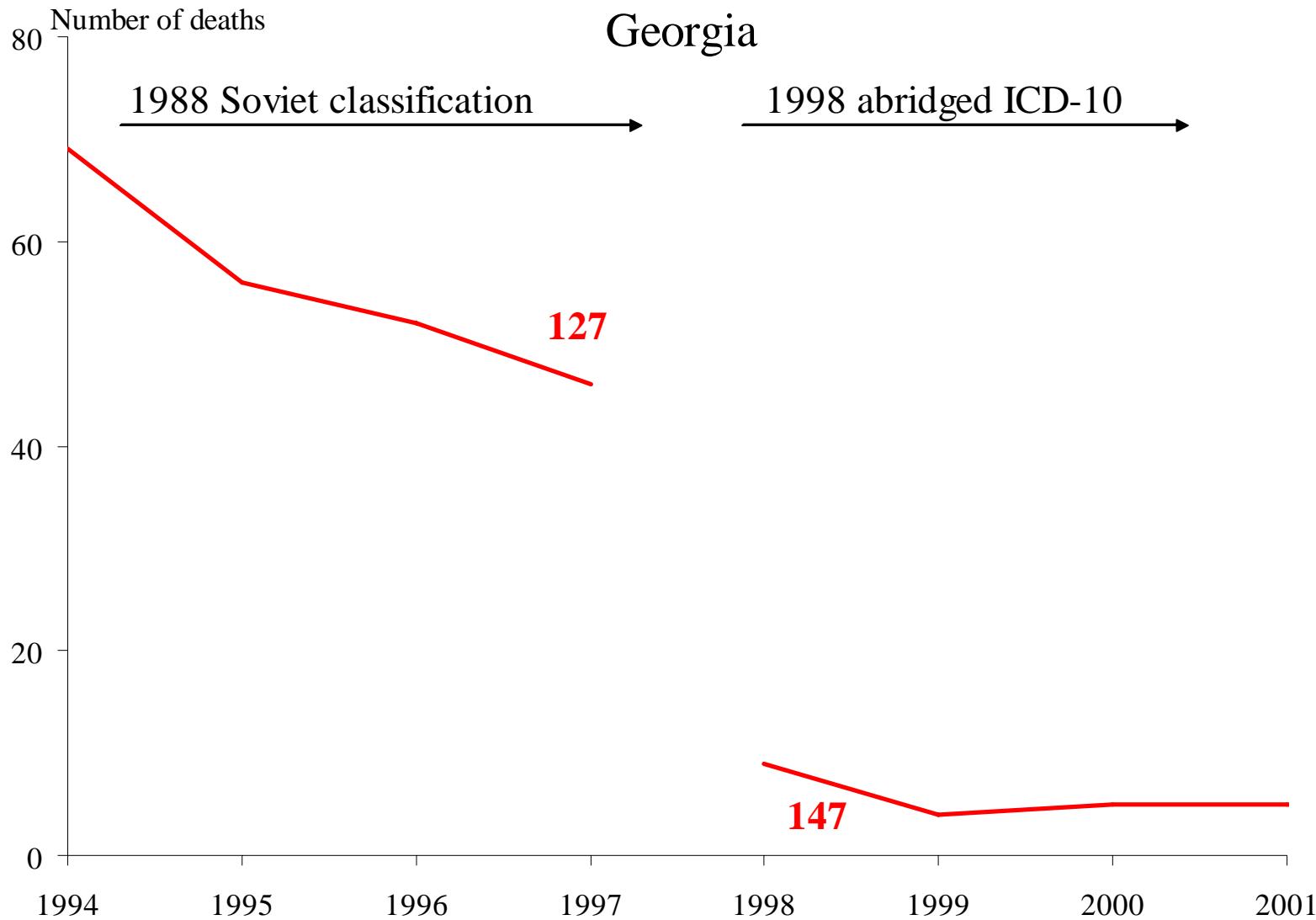
- Association between old/new items
- Coefficients of transition between old/new items
- Some corrections if necessary

## ➤ Already used for many countries:

- France (Vallin and Meslé, 1988)
- Russia, Ukraine, Baltic countries...

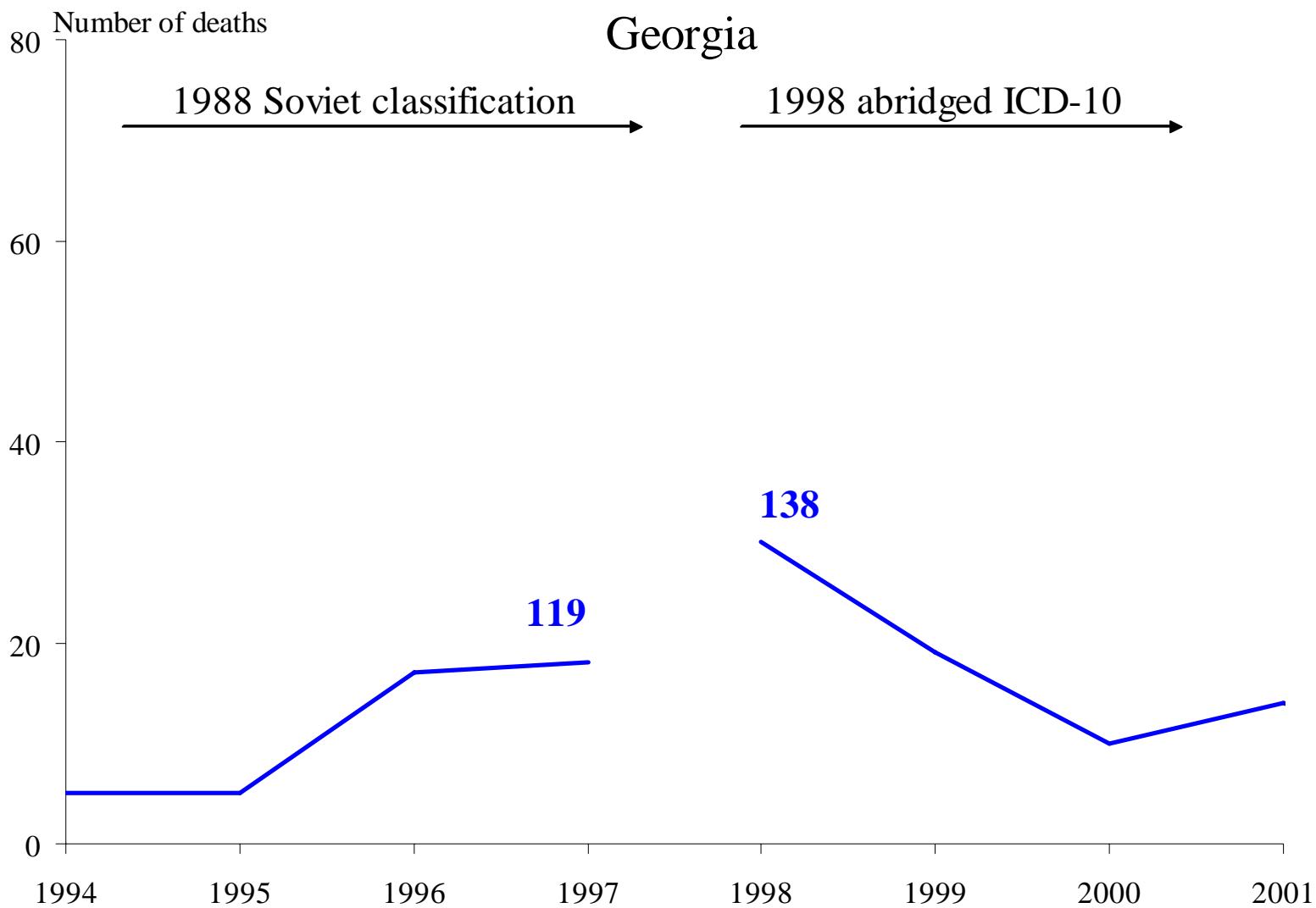
# Associations

Item “Other diseases of the digestive system” Crude data



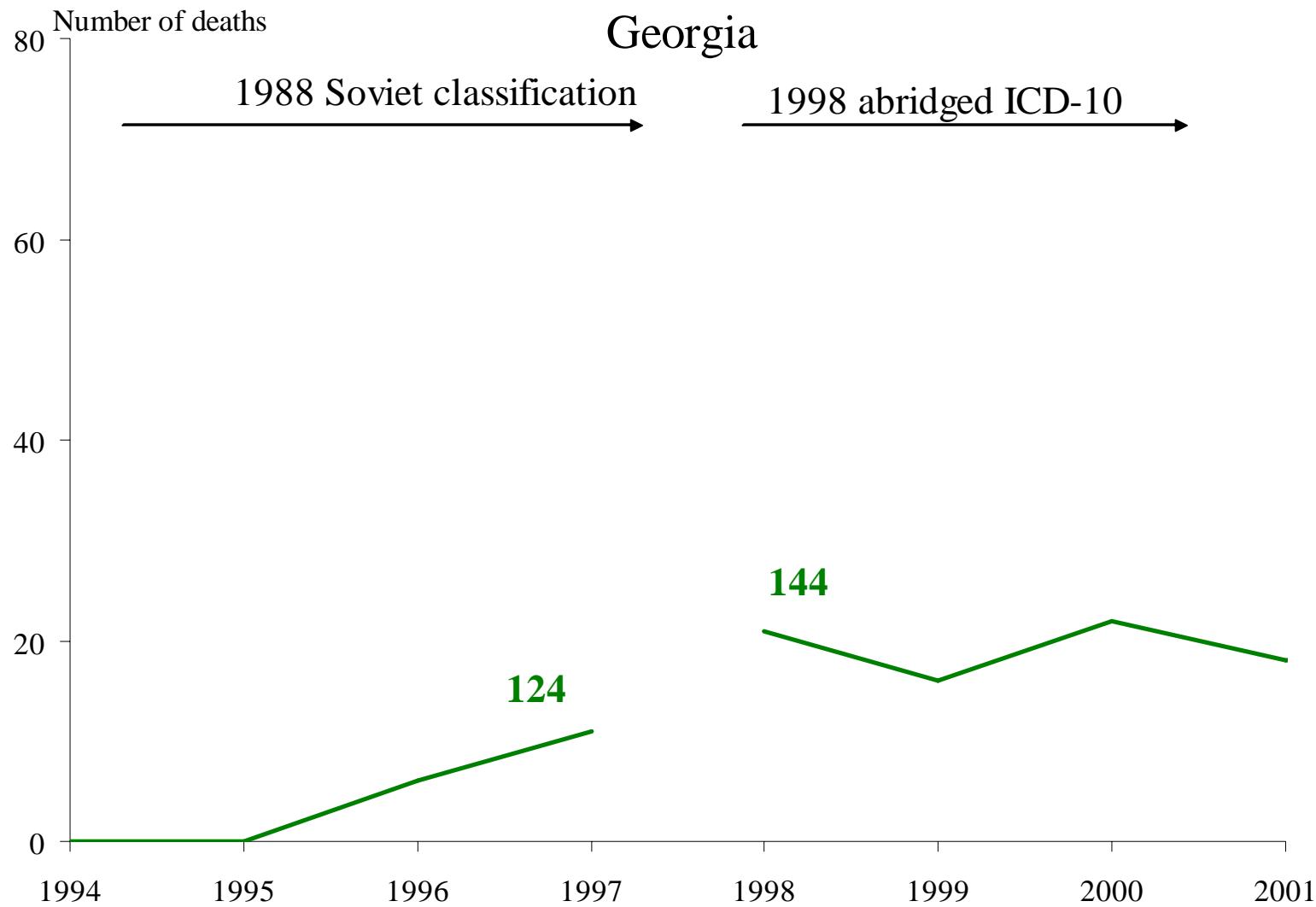
# Associations

## Item **Hernia of the abdominal cavity – crude data**



# Associations

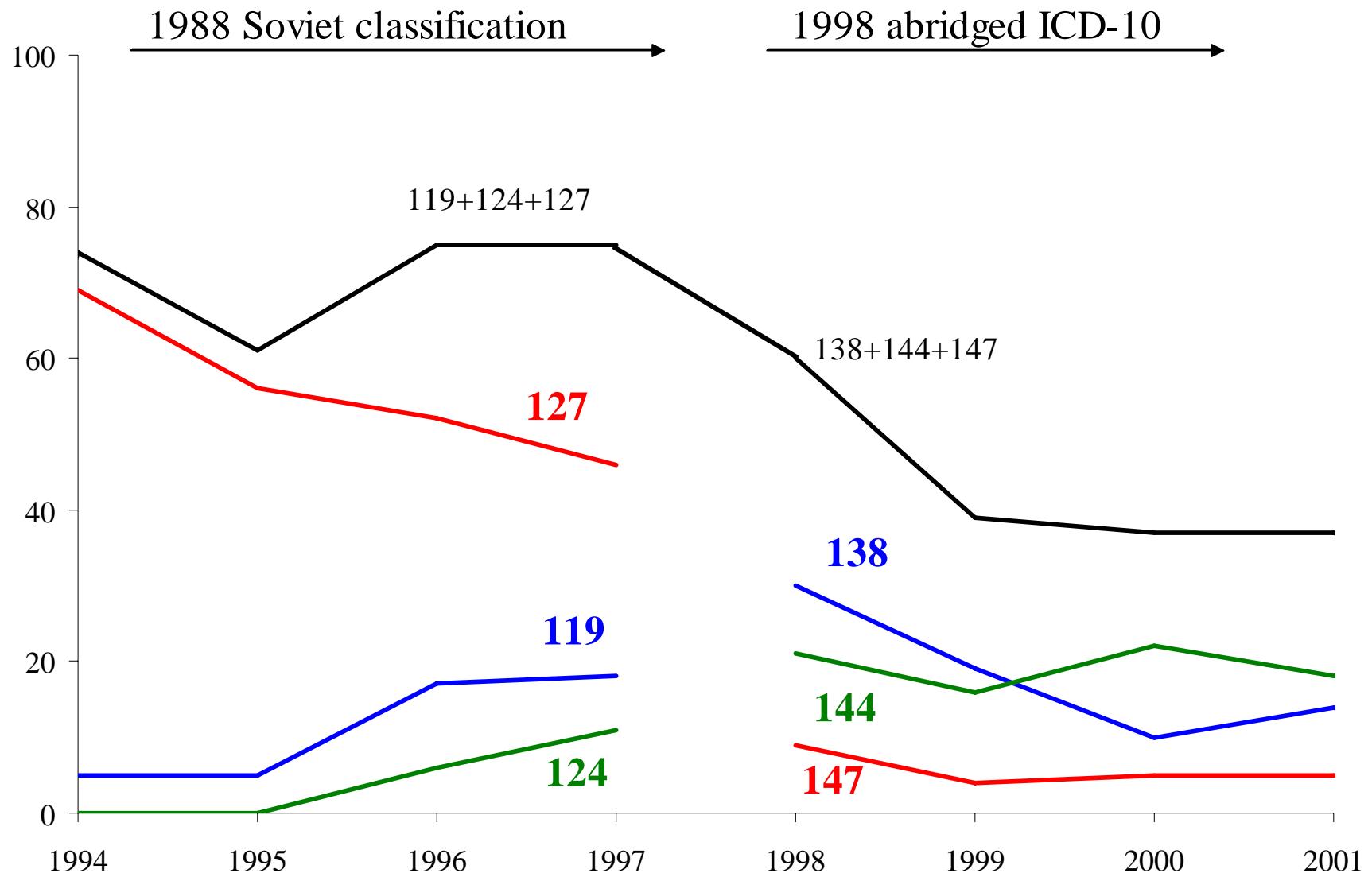
## Item **Calculus of gallbladder with cholecystitis** – Crude data



# Associations

Number of deaths

Georgia



# Associations

ex. Georgian association old 119-124-127 / new 138-144-147

1998 classification “NEW”			1988 classification “OLD”			
N°	Item	1998	1997	N°	T/P	Item
138	<b>Hernia of the abdominal cavity</b>	30	18	119	Total	<b>Hernia of the abdominal cavity</b>
			46	127	Partial	<b>Other diseases of the digestive system</b>
144	<b>Calculus of gallbladder with cholecystitis</b>	21	11	124	Total	<b>Calculus of gallbladder with cholecystitis</b>
			“	127	Partial	<b>Other diseases of the digestive system</b>
147	<b>Other diseases of the digestive system</b>	9	“	127	Partial	<b>Other diseases of the digestive system</b>
<b>Total number of deaths</b>		<b>60</b>	<b>75</b>	<b>Total number of deaths</b>		

# Coefficients of transition

Number of deaths	OLD classification			Deaths in 1998
NEW classification	119	124	127	
138	138	124	127	30
144	144	124	127	21
147	147	124	127	9
Actual deaths in 1998				60
Actual deaths in 1997	18	11	46	75

# Coefficients of transition

Number of deaths	OLD classification			Deaths in 1998
NEW classification	119	124	127	
138	138	124	127	30
144	144	124	127	21
147	147	124	127	9
Estimated deaths in 1998	14.4	8.8	36.8	60
Actual deaths in 1997	18	11	46	75

# Coefficients of transition

Number of deaths	OLD classification			Deaths in 1998
	NEW classification	119	124	
138	14.4		15.6	30
144		8.8	12.2	21
147			9	9
Estimated deaths in 1997	14.4	8.8	36.8	60
Actual deaths in 1997	18	11	46	75

# Coefficients of transition

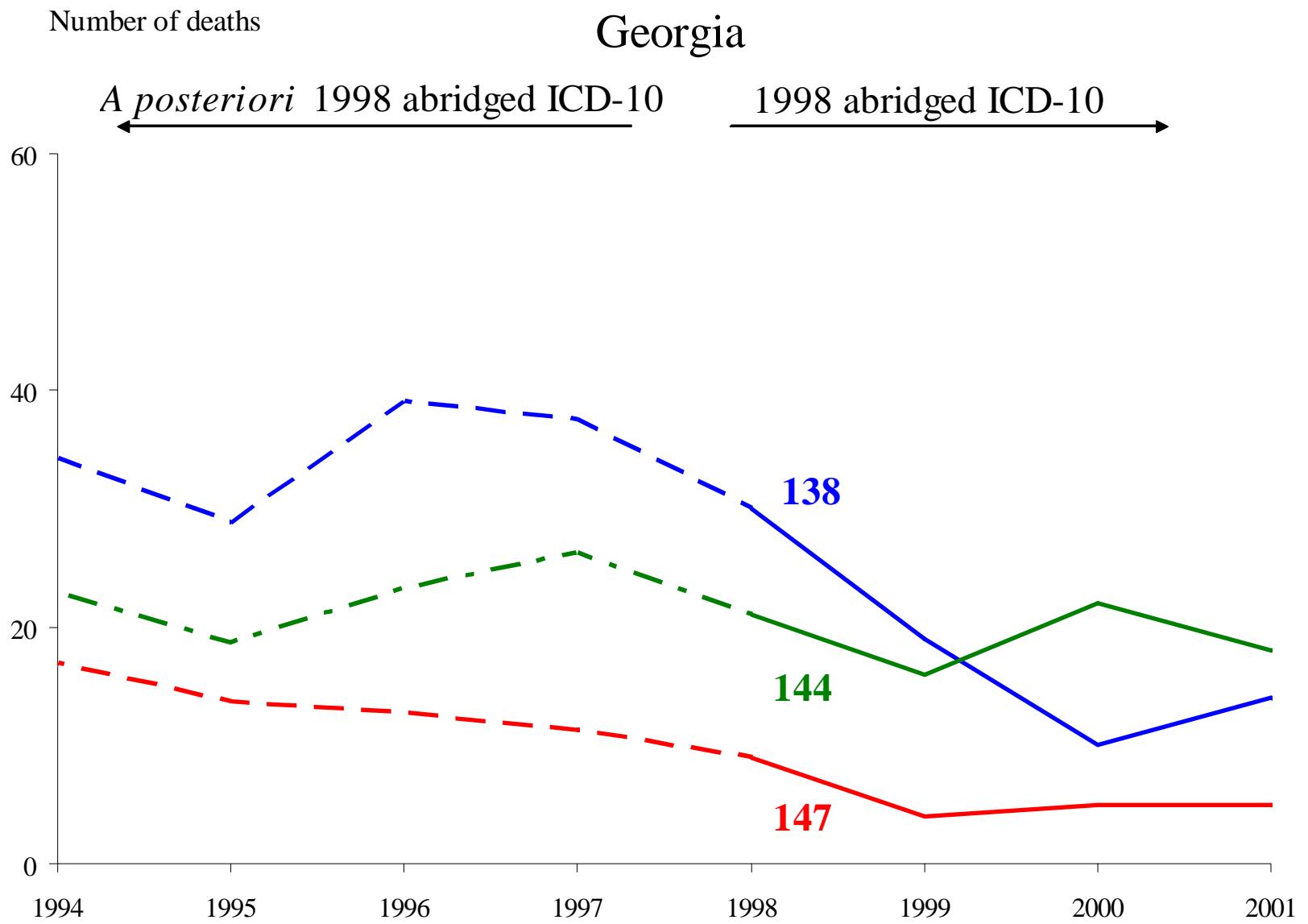
Number of deaths	OLD classification		
NEW classification	119	124	127
138	100.0		42.4
144		100.0	33.2
147			24.5
Total	100.0	100.0	100.0

# Coefficients of transition

- Table of coefficients of transition

<u>OLD</u>	<u>COEF</u>	<u>NEW</u>
119	100 %	138
124	100 %	144
127	42.4 %	138
127	33.2 %	144
127	24.5 %	147

# Reconstructed series



# Corrections

- Checking all the series
  - Total number of deaths, deaths by age group
  - Both sexes, males and females
- Doing corrections if necessary

# corrections

- Example: Armenia – 1988 soviet classification

- item 84: acute rheumatic fever



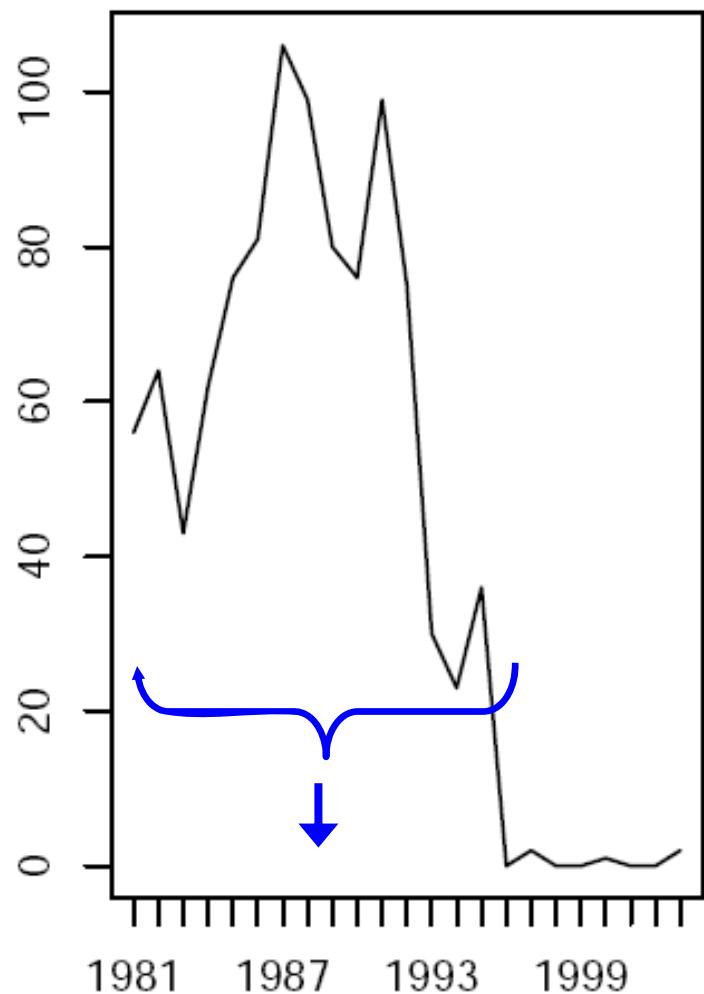
1988 = year of classification change

From 1996,  
no more use of this item



# corrections

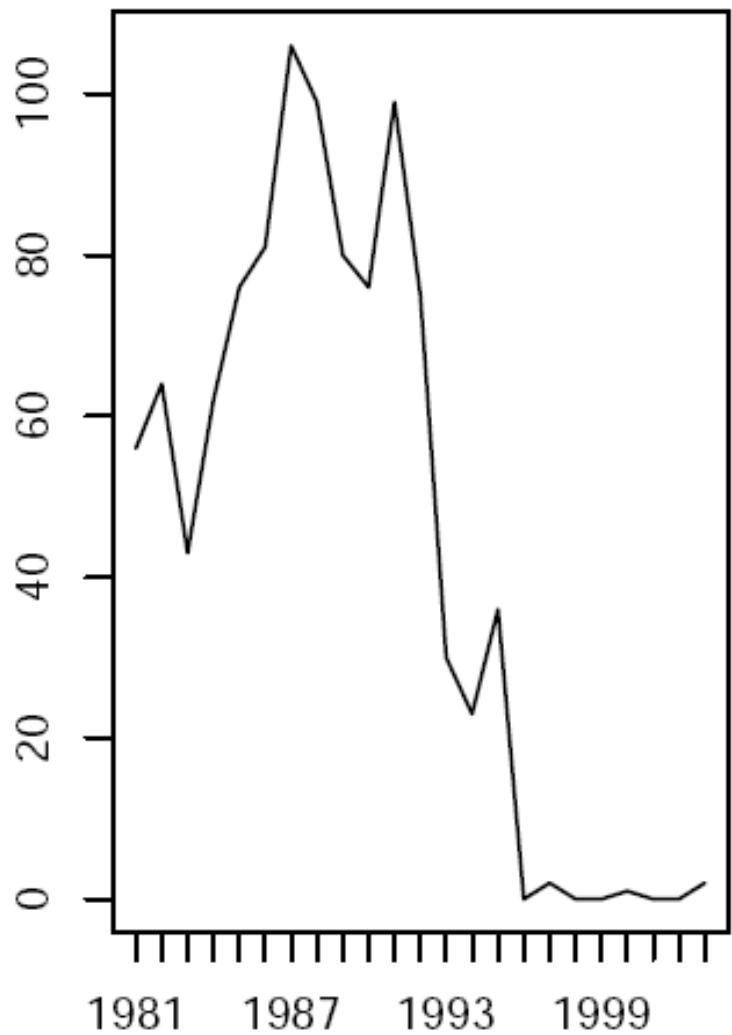
- Example: Armenia – 1988 soviet classification
  - item 84: acute rheumatic fever



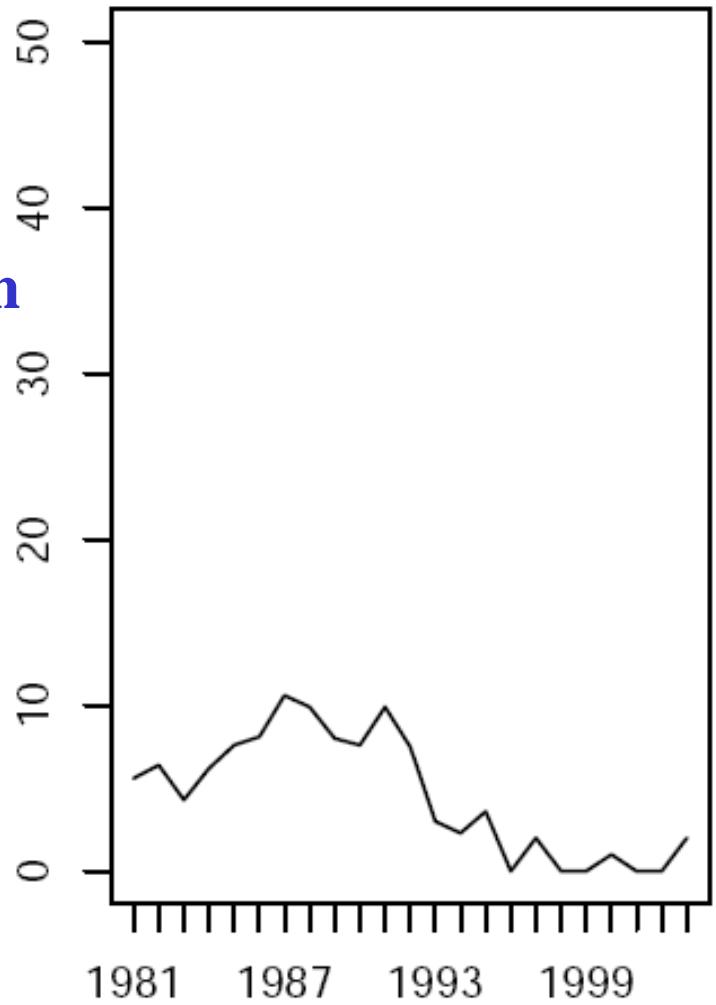
- 1) Principle : improvement over the time of classification
- 2) To reduce number of deaths in this item from 1981-1995
- 3) To find another item to put this deaths
  - A similar and symmetric phenomenon
  - A close item (medical content)
    - Item 91:  
**Acute myocardial infarction**
    - A less detailed item (others...)

# corrections

- Correction: 90% of **item 84** from 1981 to 1995 go to item 91

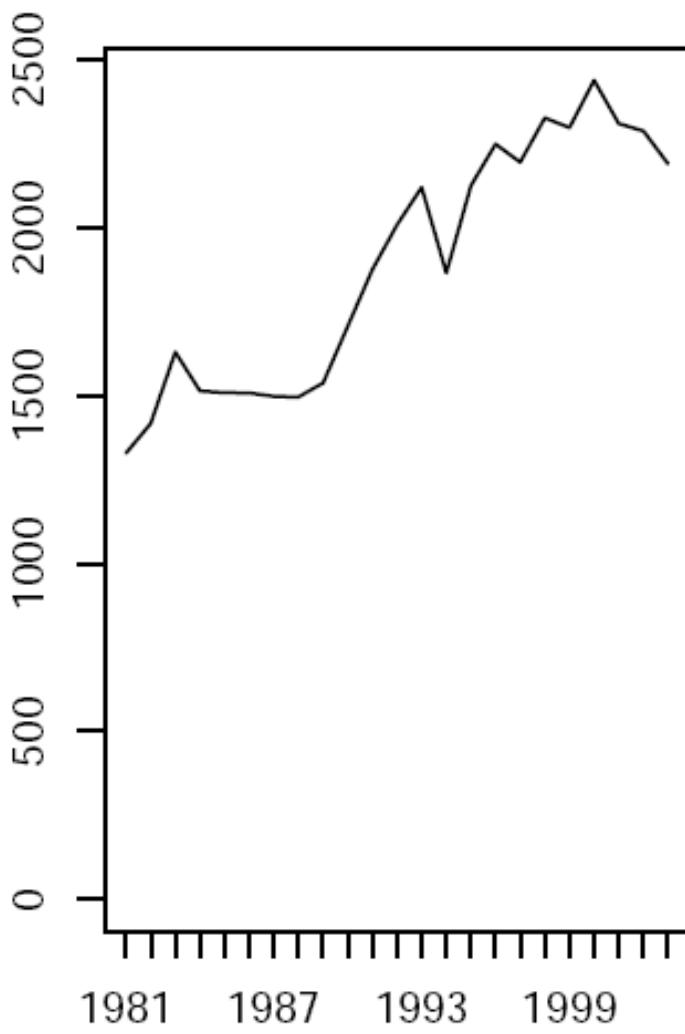


correction

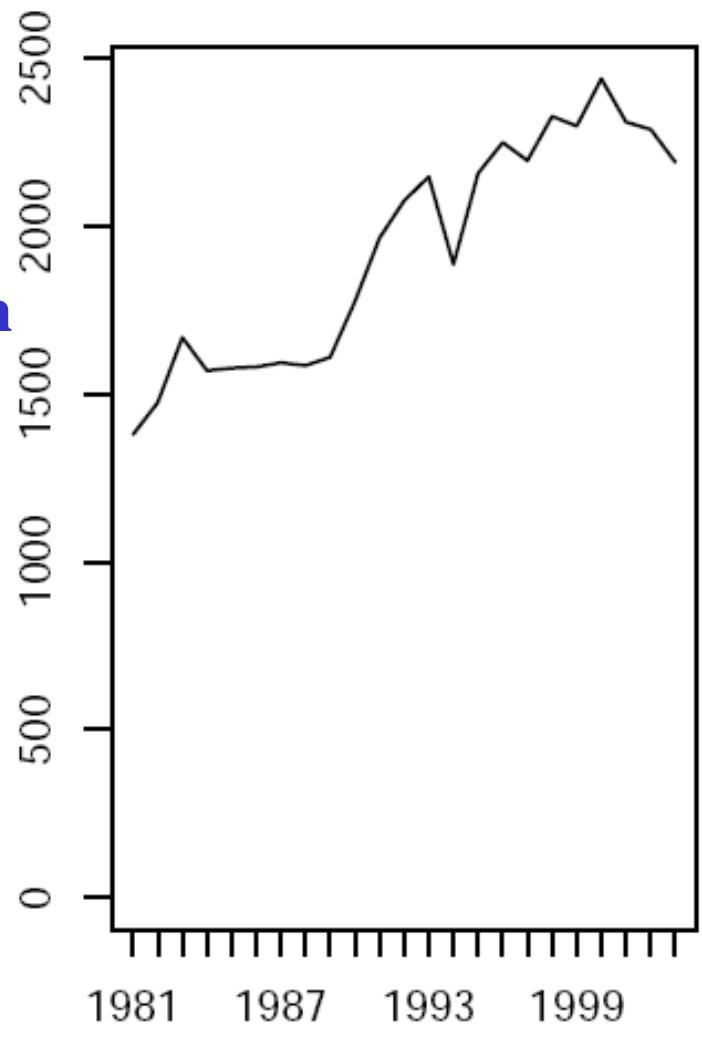


# corrections

- Correction: 90% of item 84 from 1981 to 1995 go to item 91

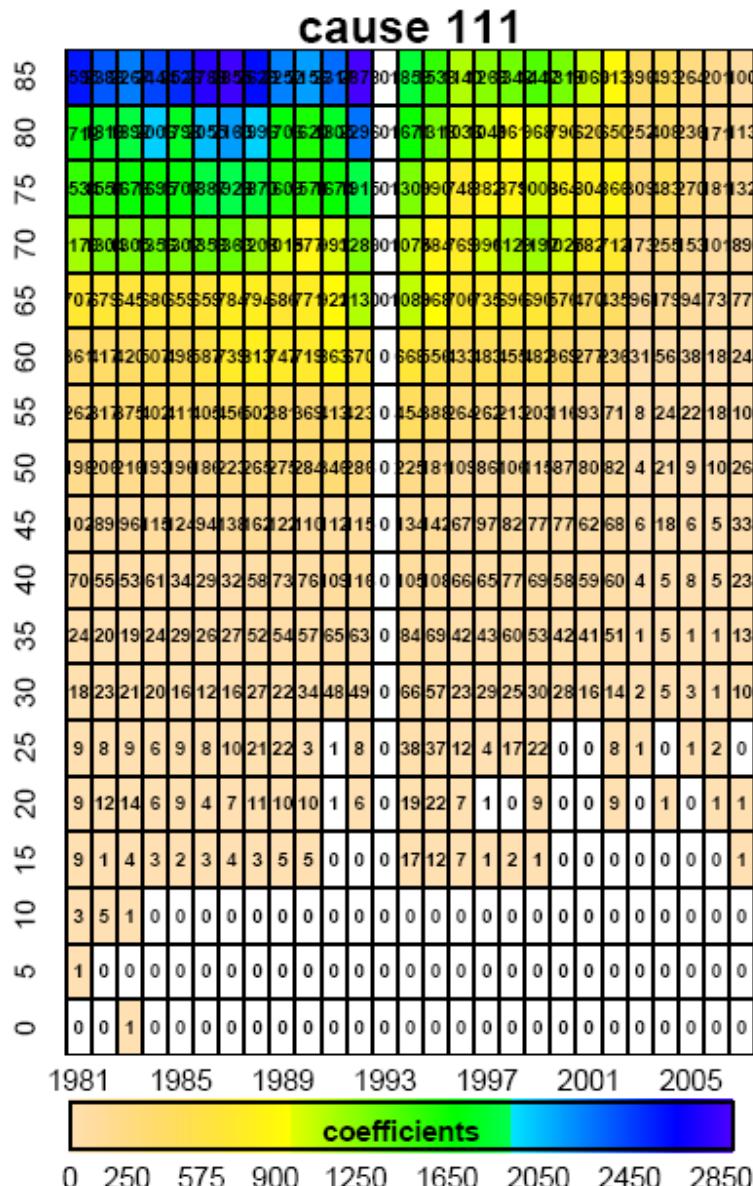


correction



# Reconstructed and checked series

- e.g.
  - Georgia
  - Item 111
  - coronarian atherosclerosis
  - from 1981 to 2007

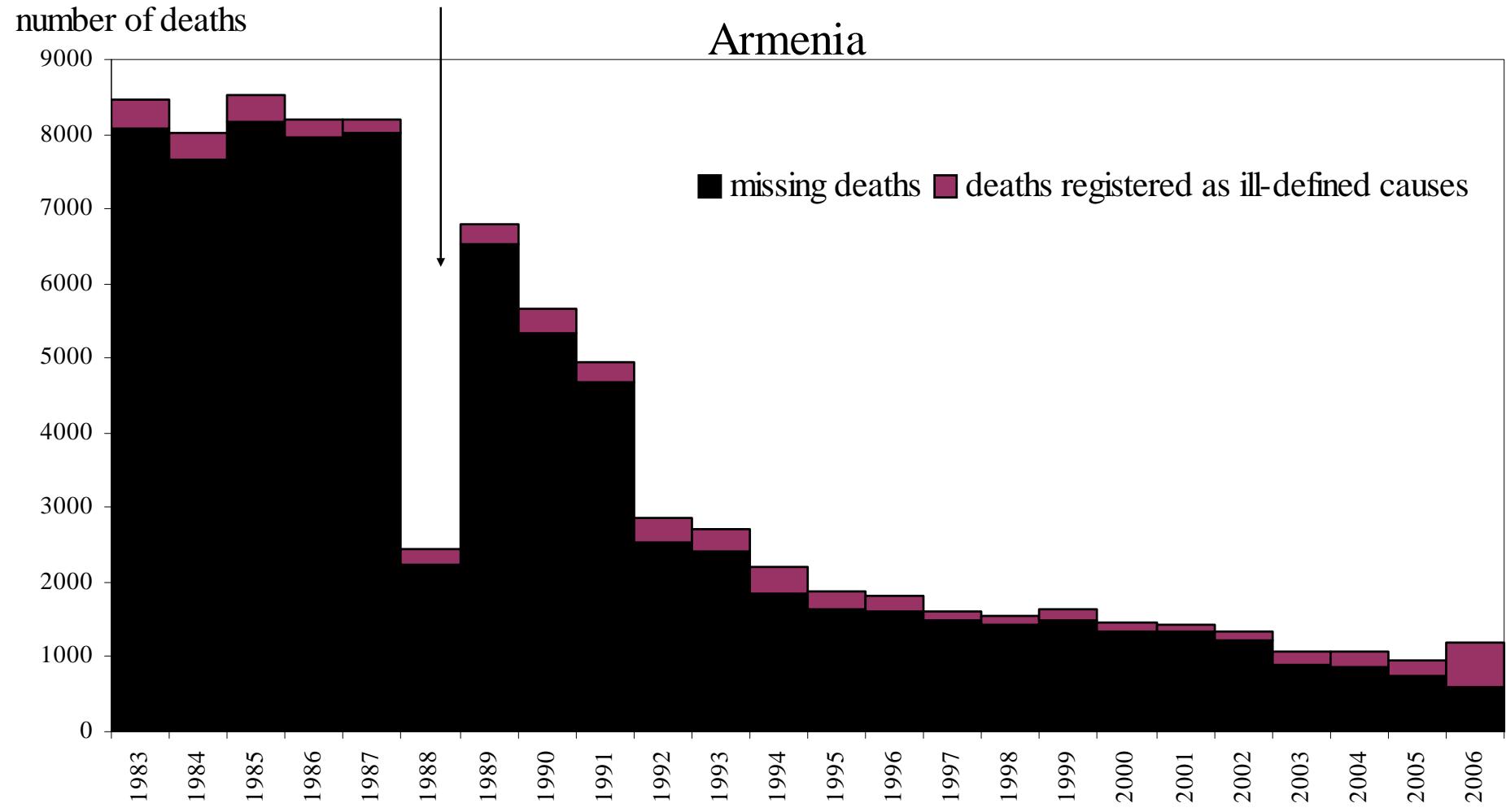


# Cause specific mortality rates

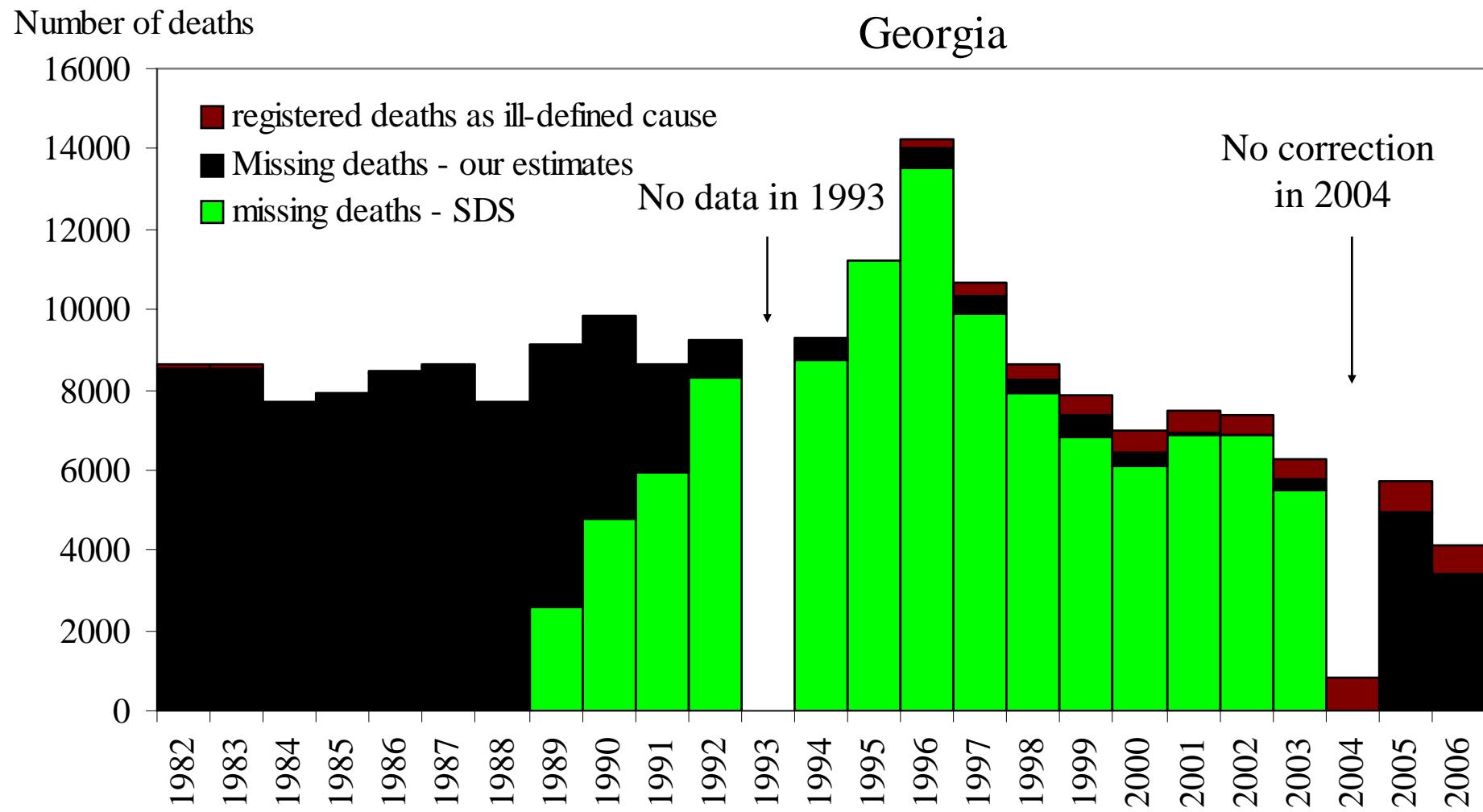
- Estimation of cause-specific mortality rates by age group
  - Adding missing deaths in deaths counts by age group
    - Infant deaths
    - Deaths after age 60:
      - until 1991 in both countries, in 2005 and 2006 in Georgia
      - For Georgia :from 1989 to 2003 there is a difference between estimated deaths by Statistical service and deaths with a medical certificate.
  - Considering these missing deaths as ill-defined cause (unknown)
    - Added to registered ill-defined cause
  - Redistributing deaths from ill-defined cause
    - Proportional redistribution among all other groups

# From missing deaths to ill defined cause

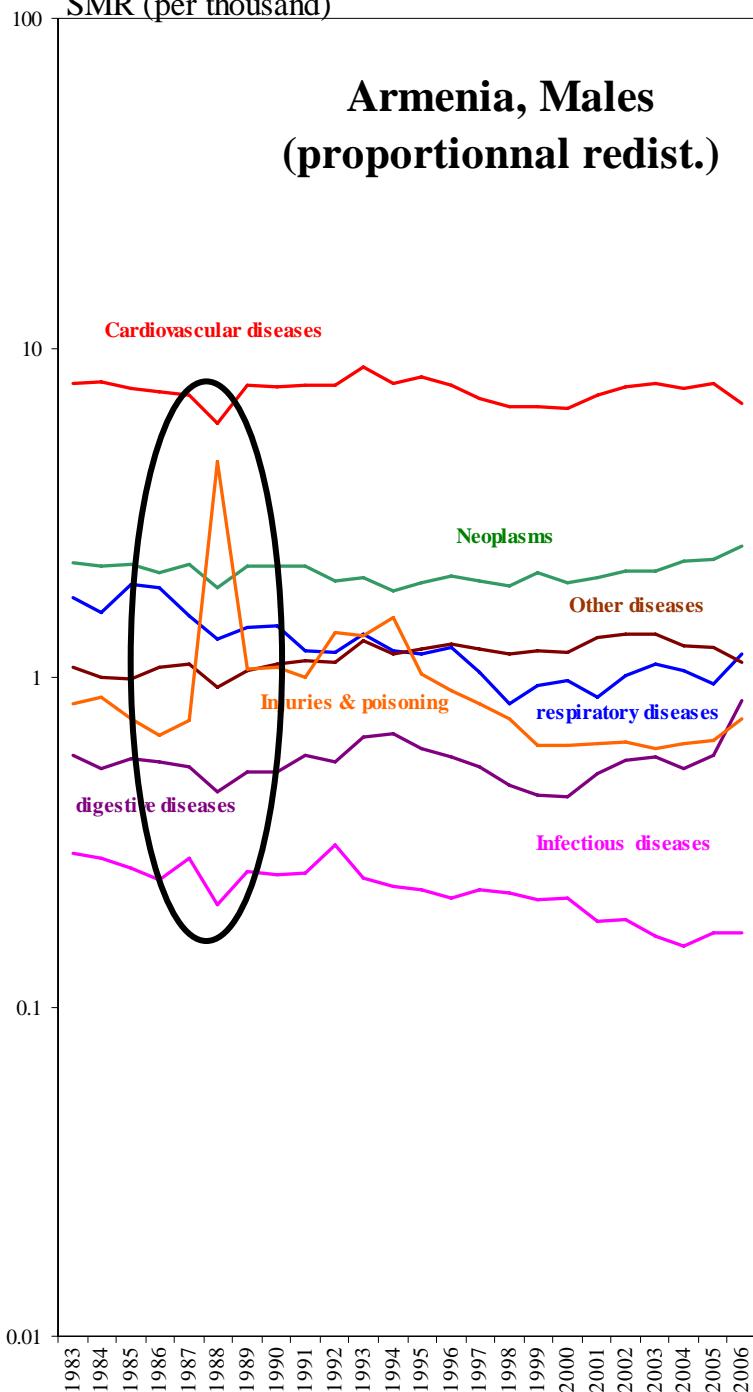
1988  
earthquake



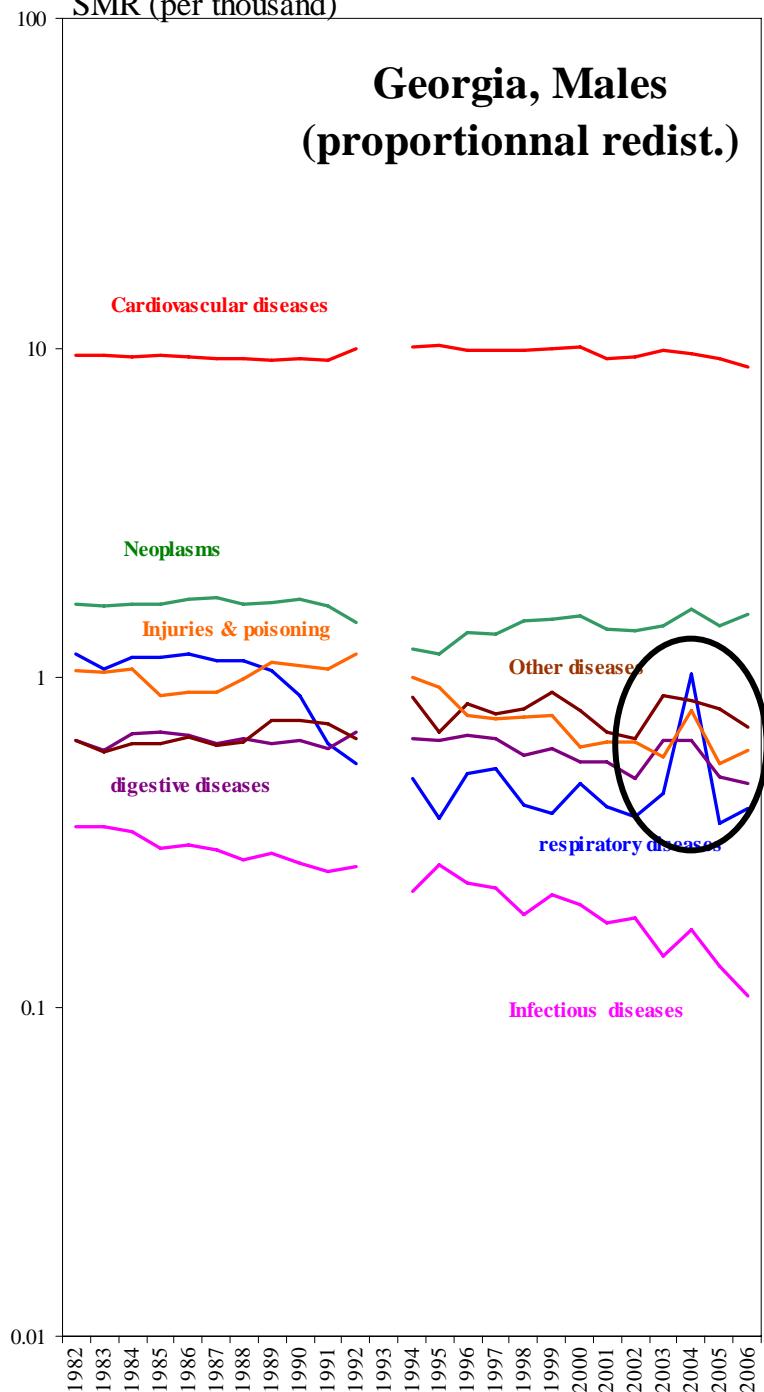
# From missing deaths to ill defined cause



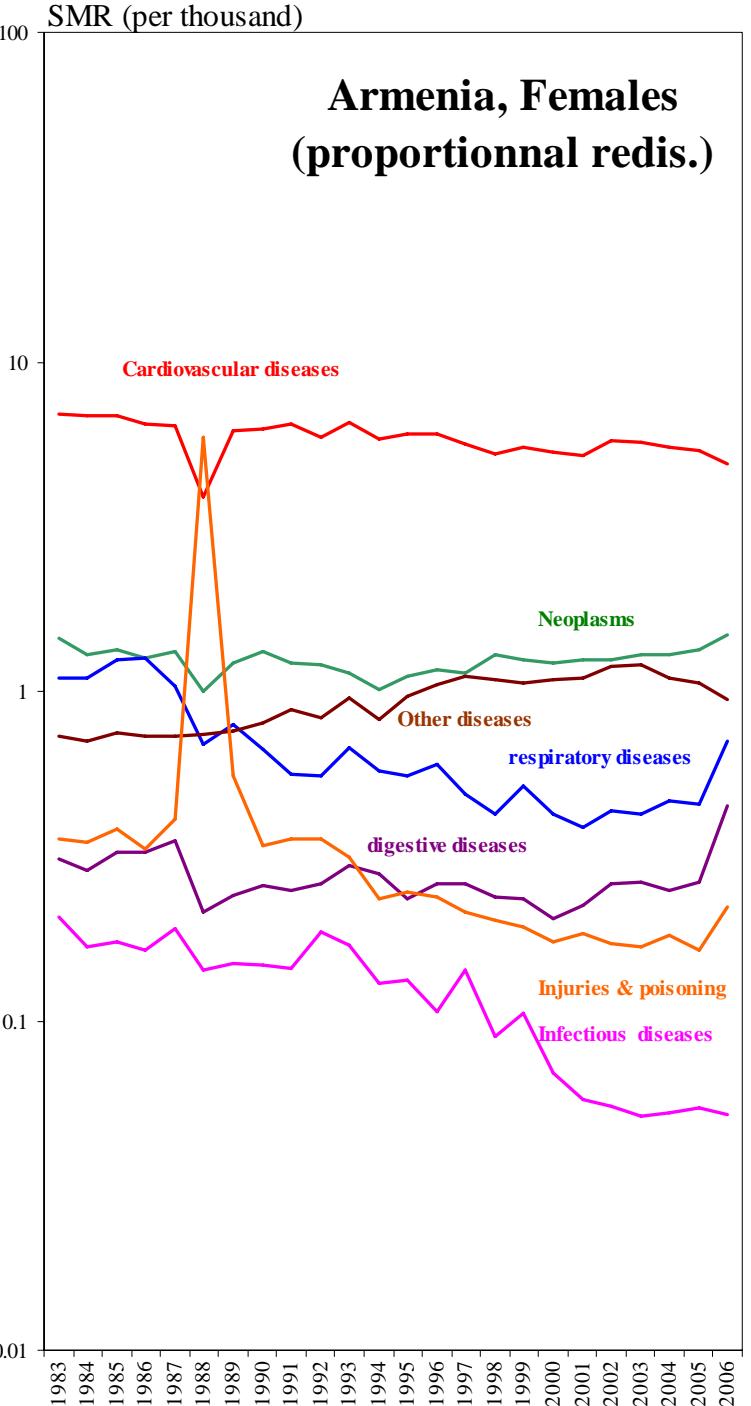
SMR (per thousand)



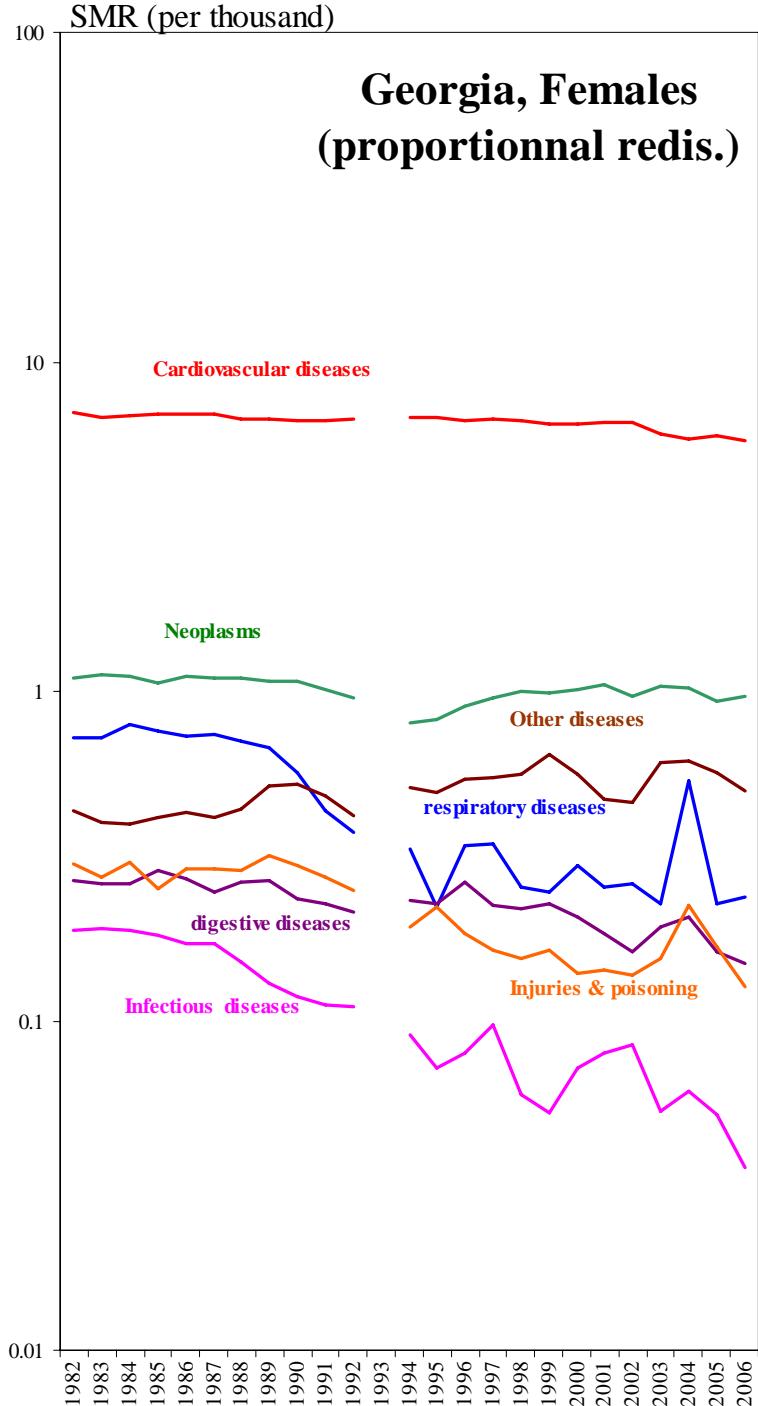
SMR (per thousand)



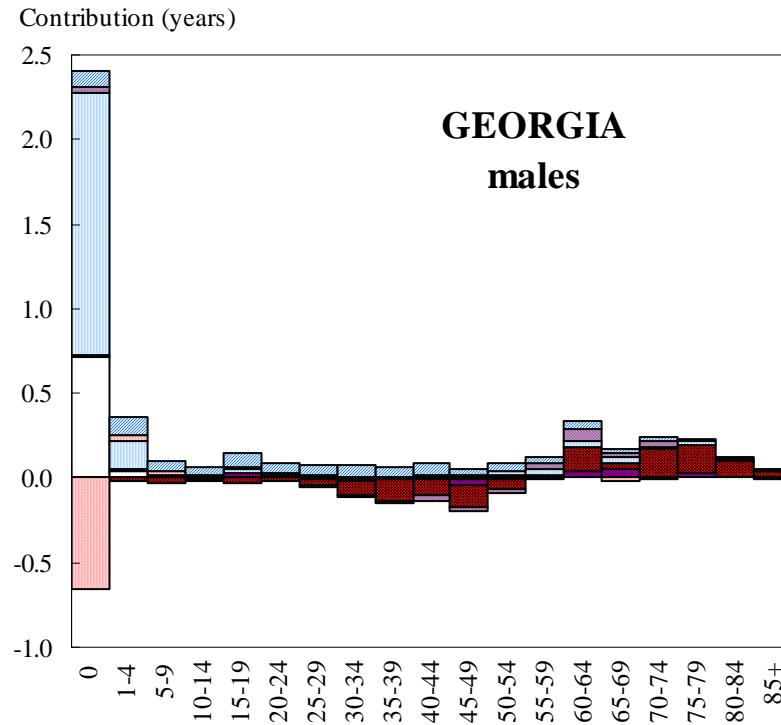
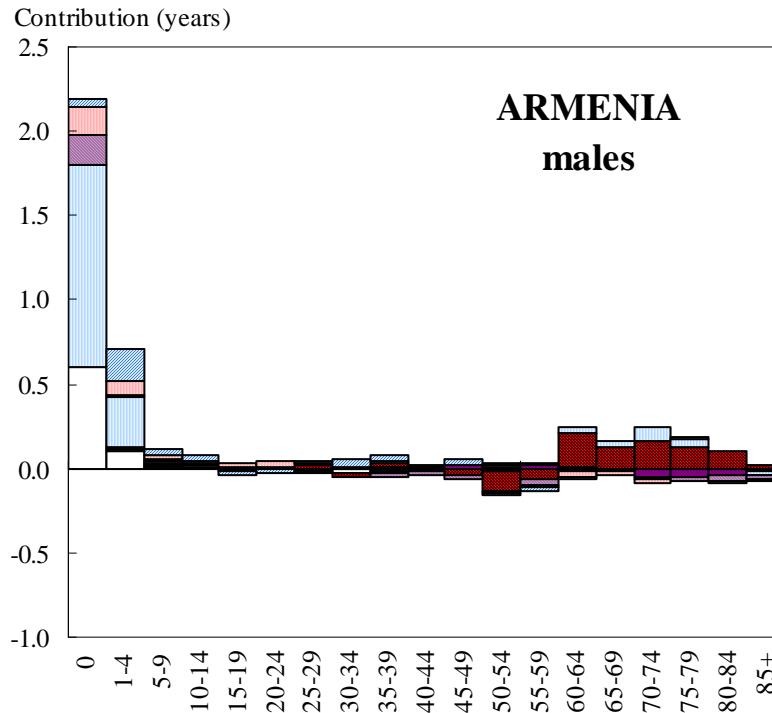
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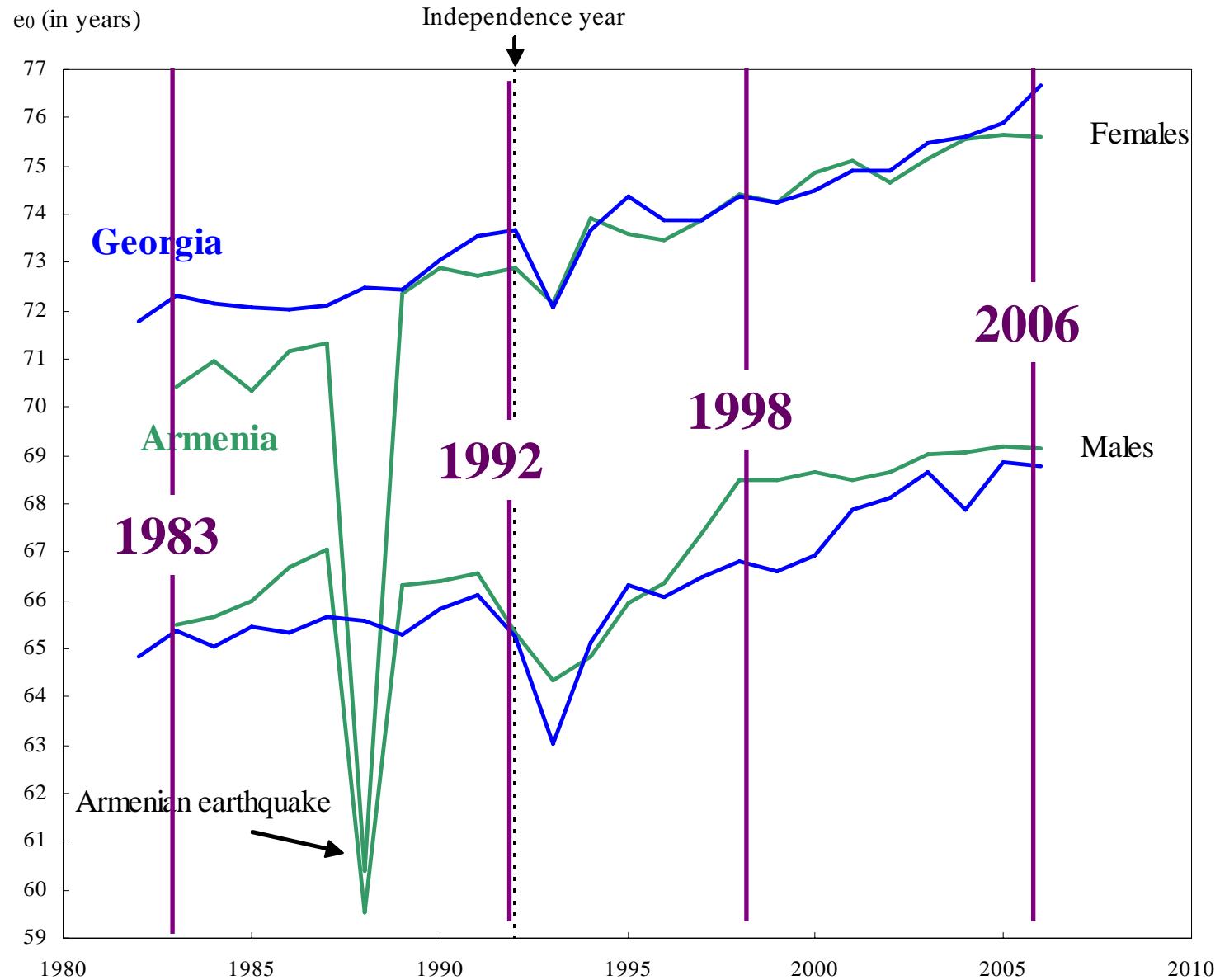


# Contribution of causes of death in the difference of life expectancy between 1983 and 2006, by age group and sex



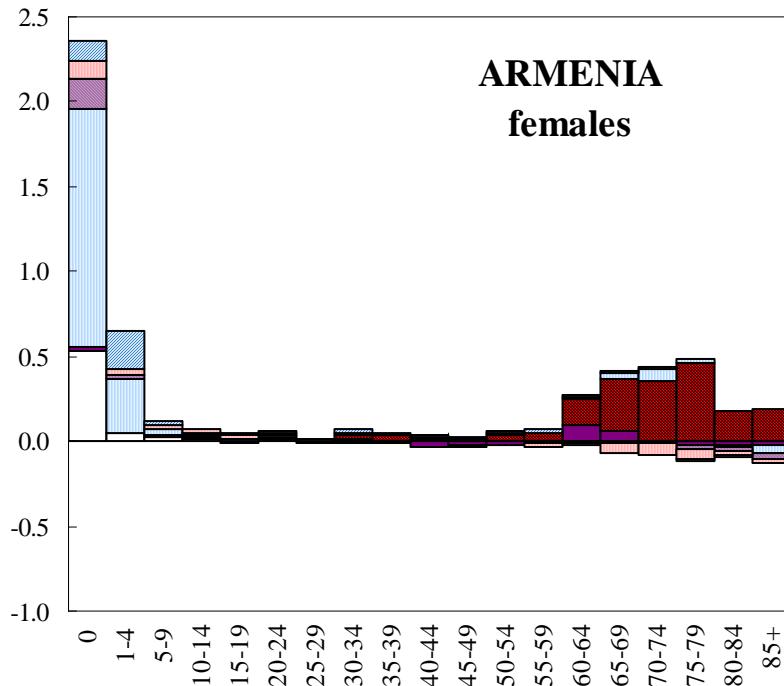
- Infectious diseases
- Cardio-vascular diseases
- Diseases of the digestive system
- Injury and poisoning
- Neoplasms
- Diseases of the respiratory system
- Other diseases

# Life expectancy trends

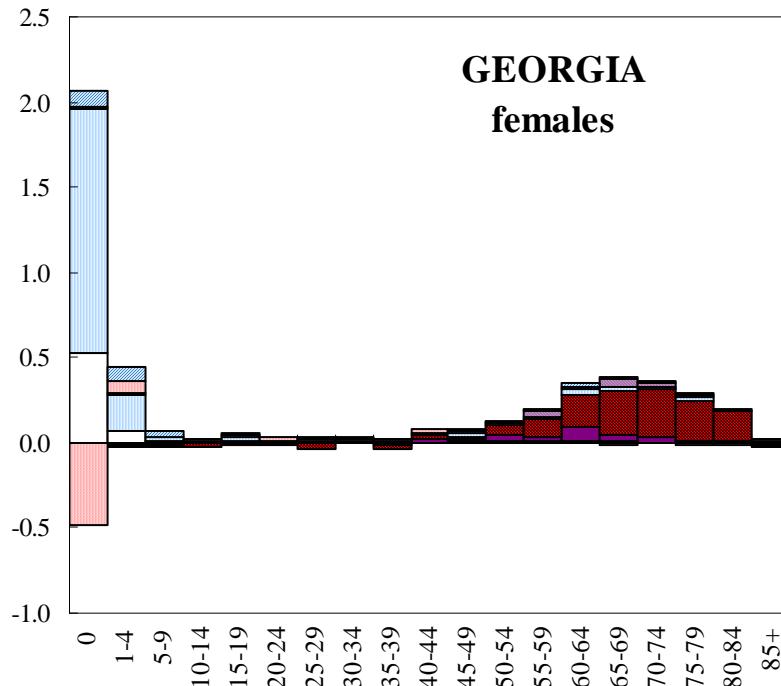


# Contribution of causes of death in the life expectancy difference between 1983 and 2006, by age group and sex

Contribution (years)



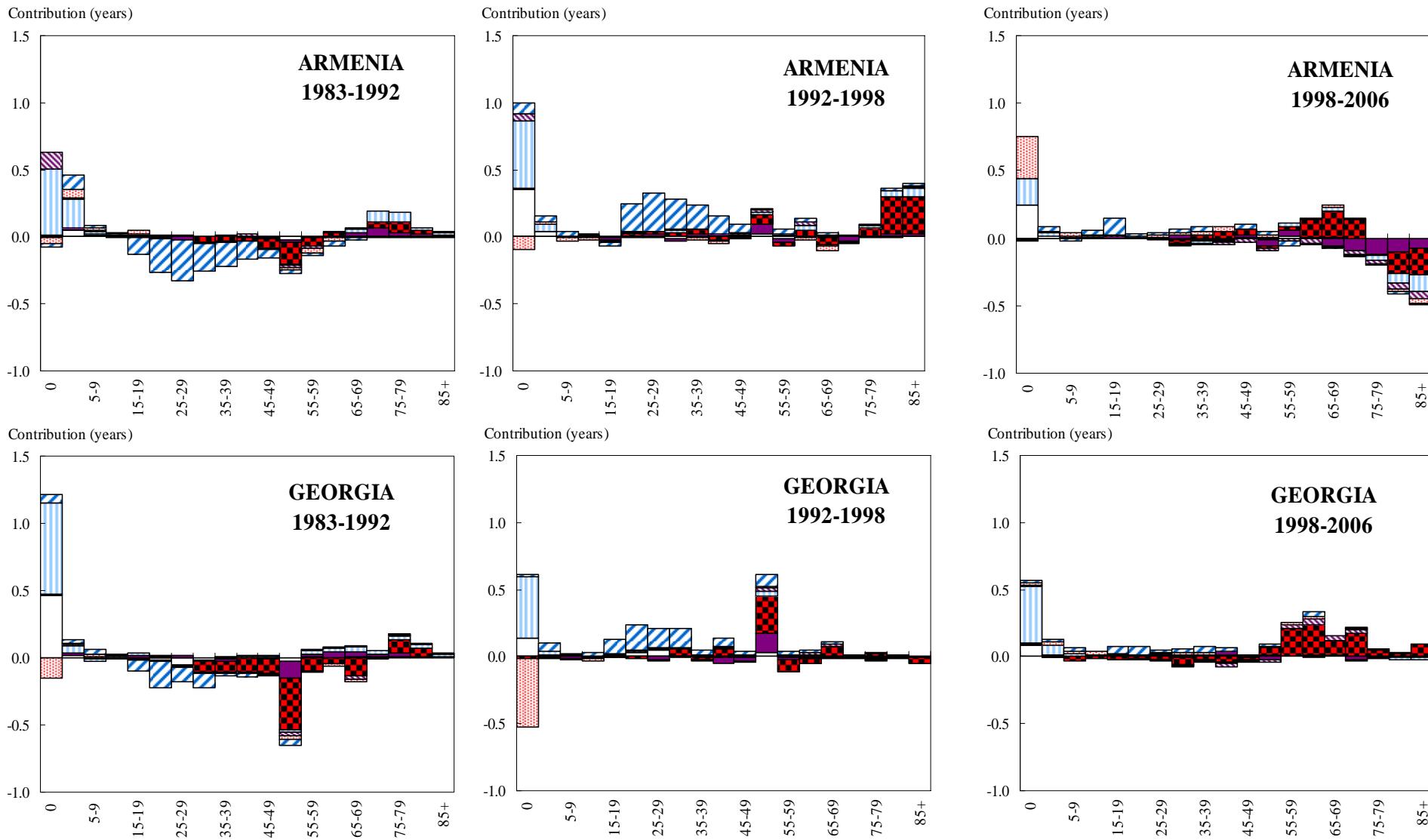
Contribution (years)



- Infectious diseases
- Cardio-vascular diseases
- Diseases of the digestive system
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- Diseases of the respiratory system
- Other diseases

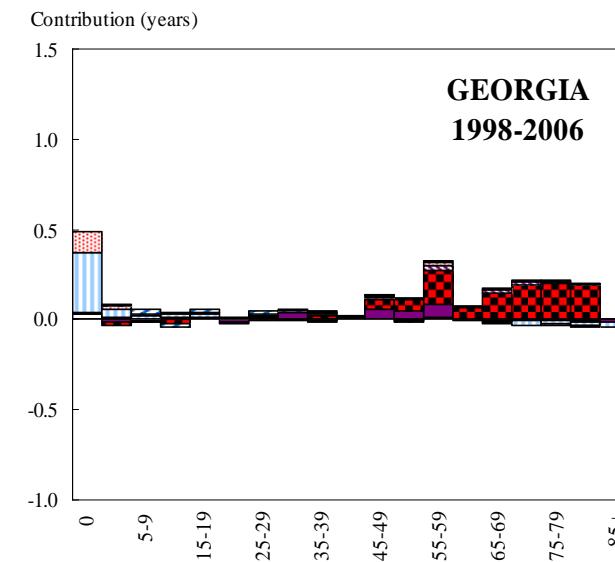
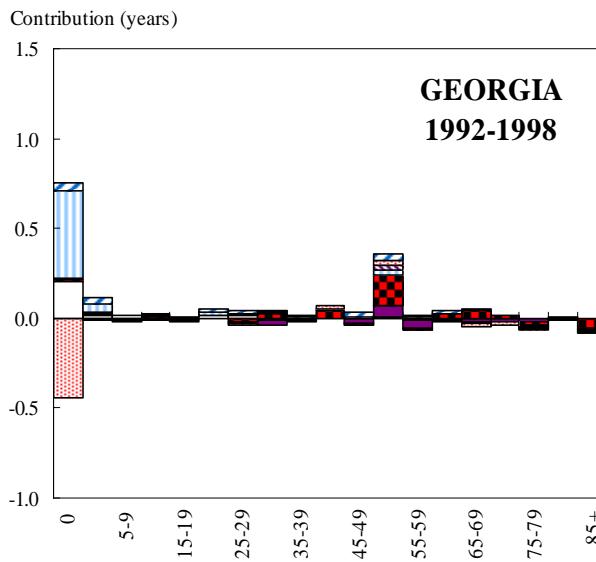
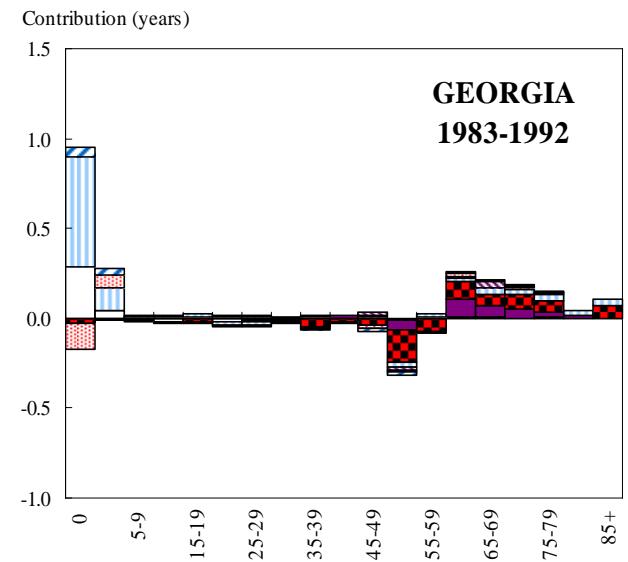
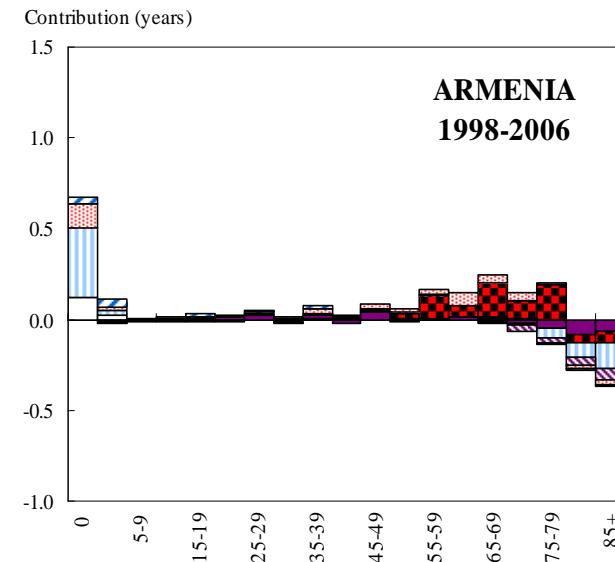
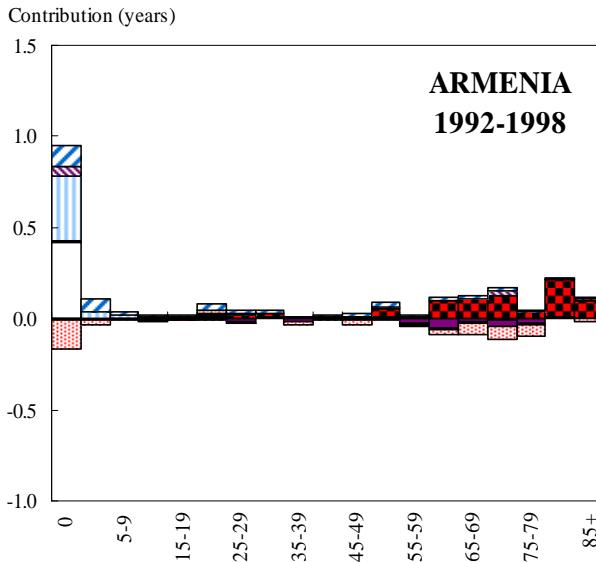
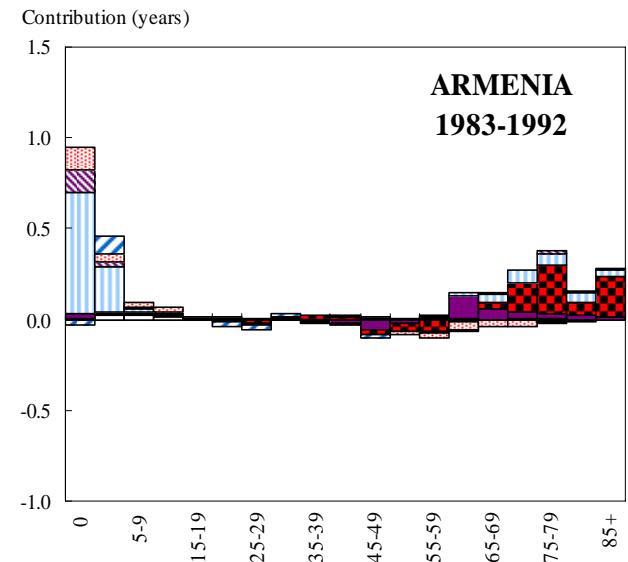
# Males, by period

- Infectious diseases
- Cardio-vascular diseases
- Diseases of the digestive system
- Injury and poisoning
- Neoplasms
- Diseases of the respiratory system
- Other diseases



## Females, by period

- Infectious diseases
- Cardio-vascular diseases
- Diseases of the digestive system
- Injury and poisoning
- Neoplasms
- Diseases of the respiratory system
- Other diseases



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**Thank you for your attention**

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