

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

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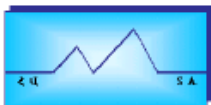
**with the collaboration of Mariana Mourgova<sup>4</sup> and Gwendoline Taché<sup>1</sup>**

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NSS - RA



**GCPR**

# 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

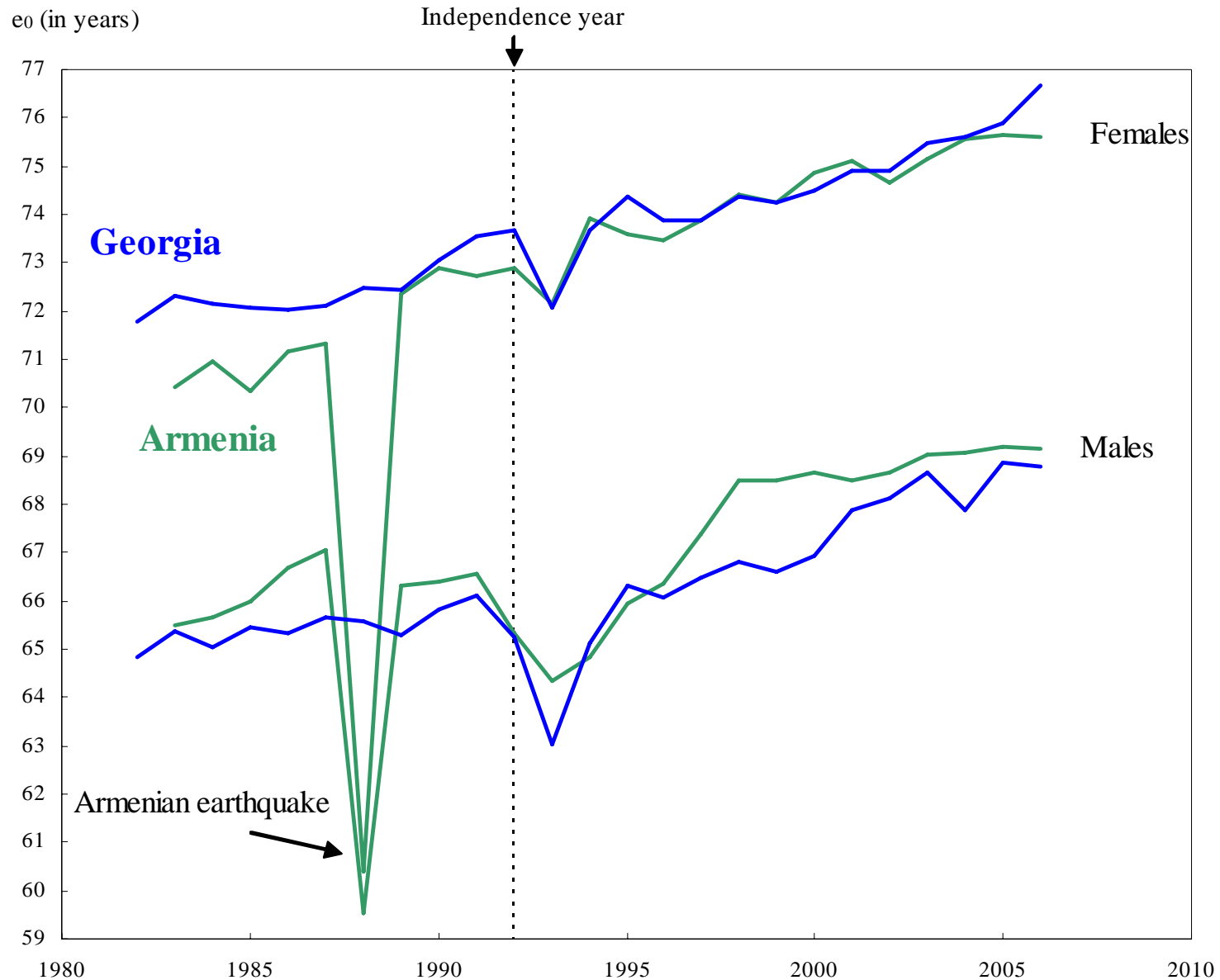
## ➤ New reliable population estimates

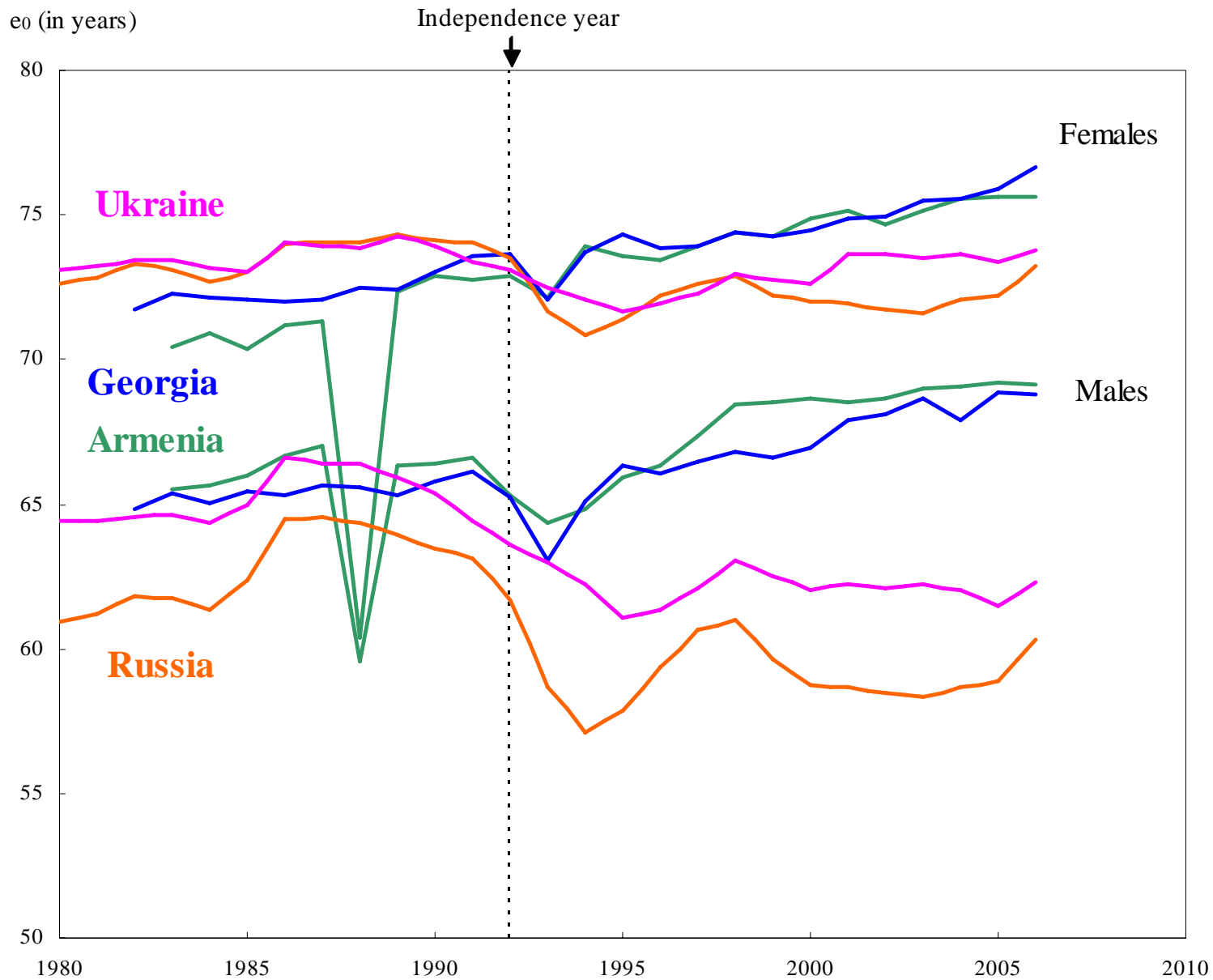
- Censuses in early 2000s in both countries

## ➤ 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

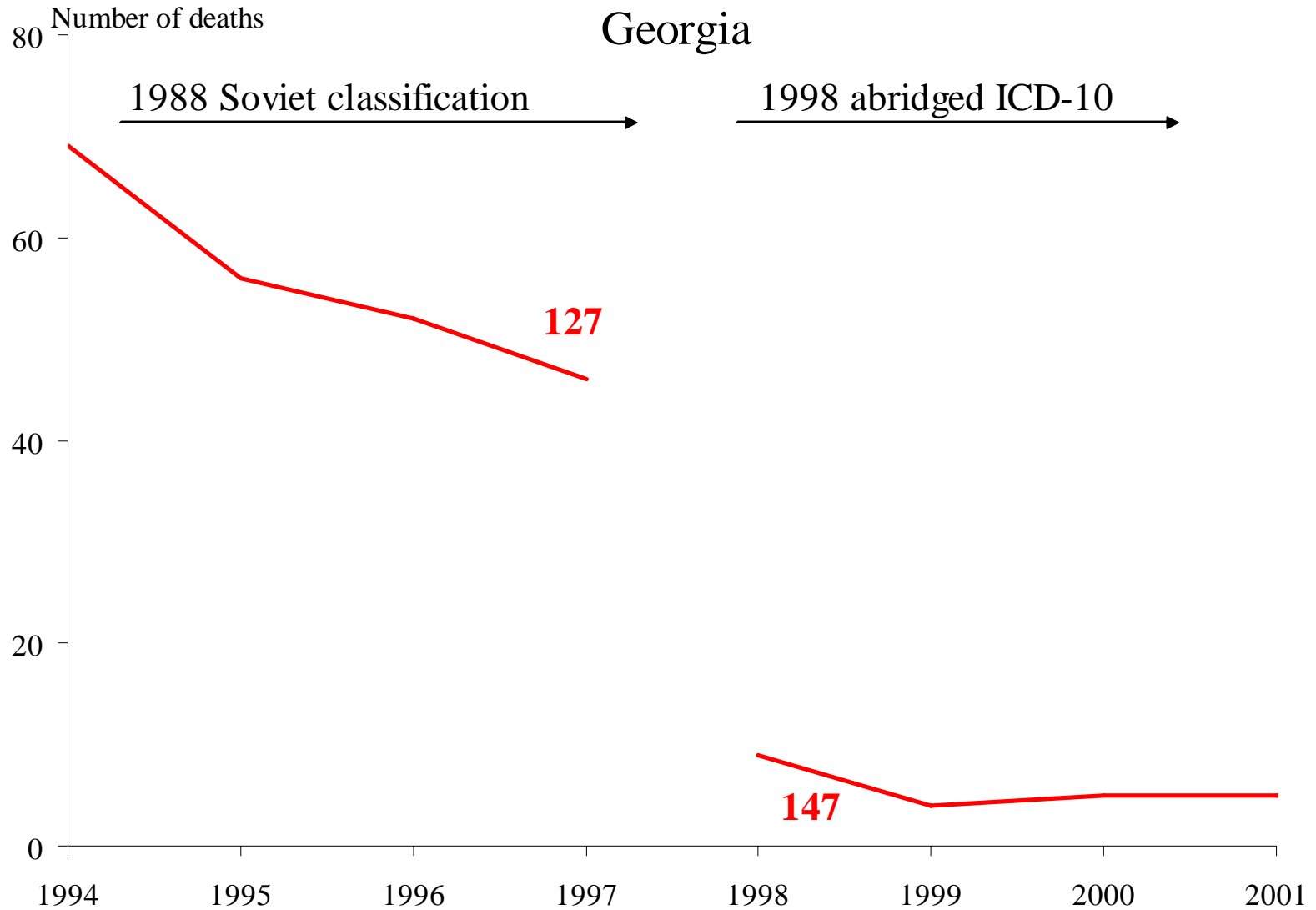
- Association between old/new items
- Coefficients of transition between old/new items
- Some corrections if necessary

## ➤ Already used for many countries:

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

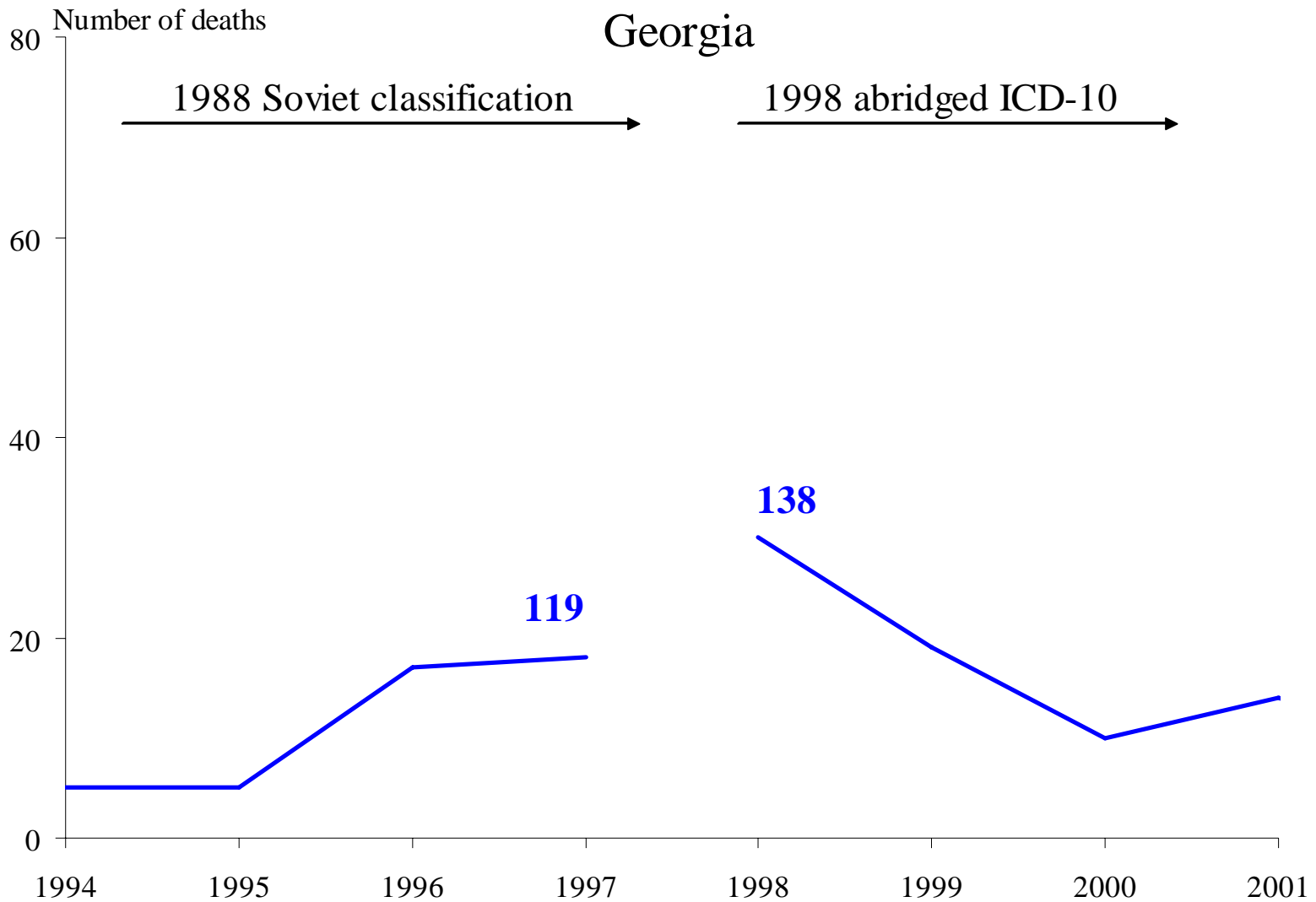
# Associations

## Item “Other diseases of the digestive system” Crude data



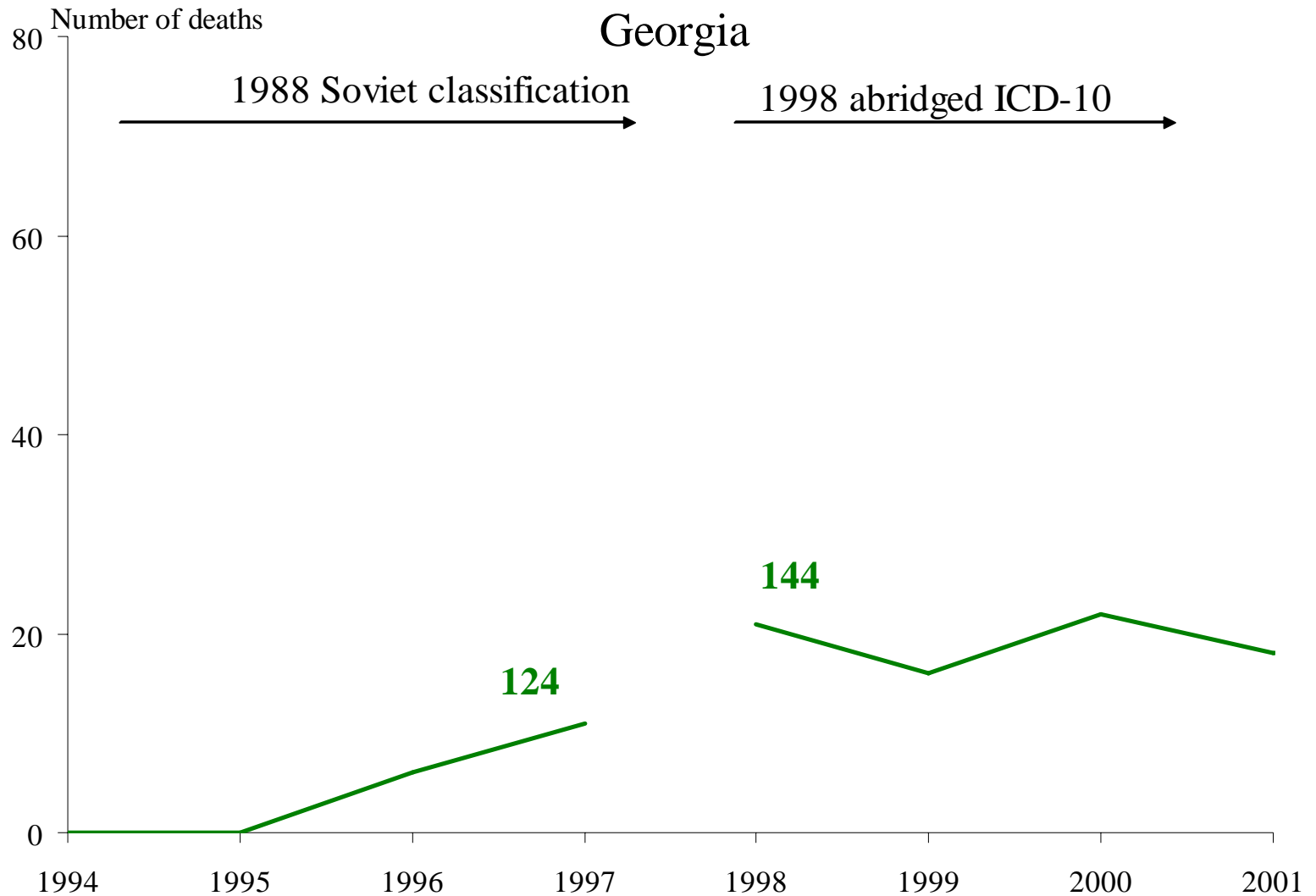
# Associations

## Item Hernia of the abdominal cavity – crude data



# Associations

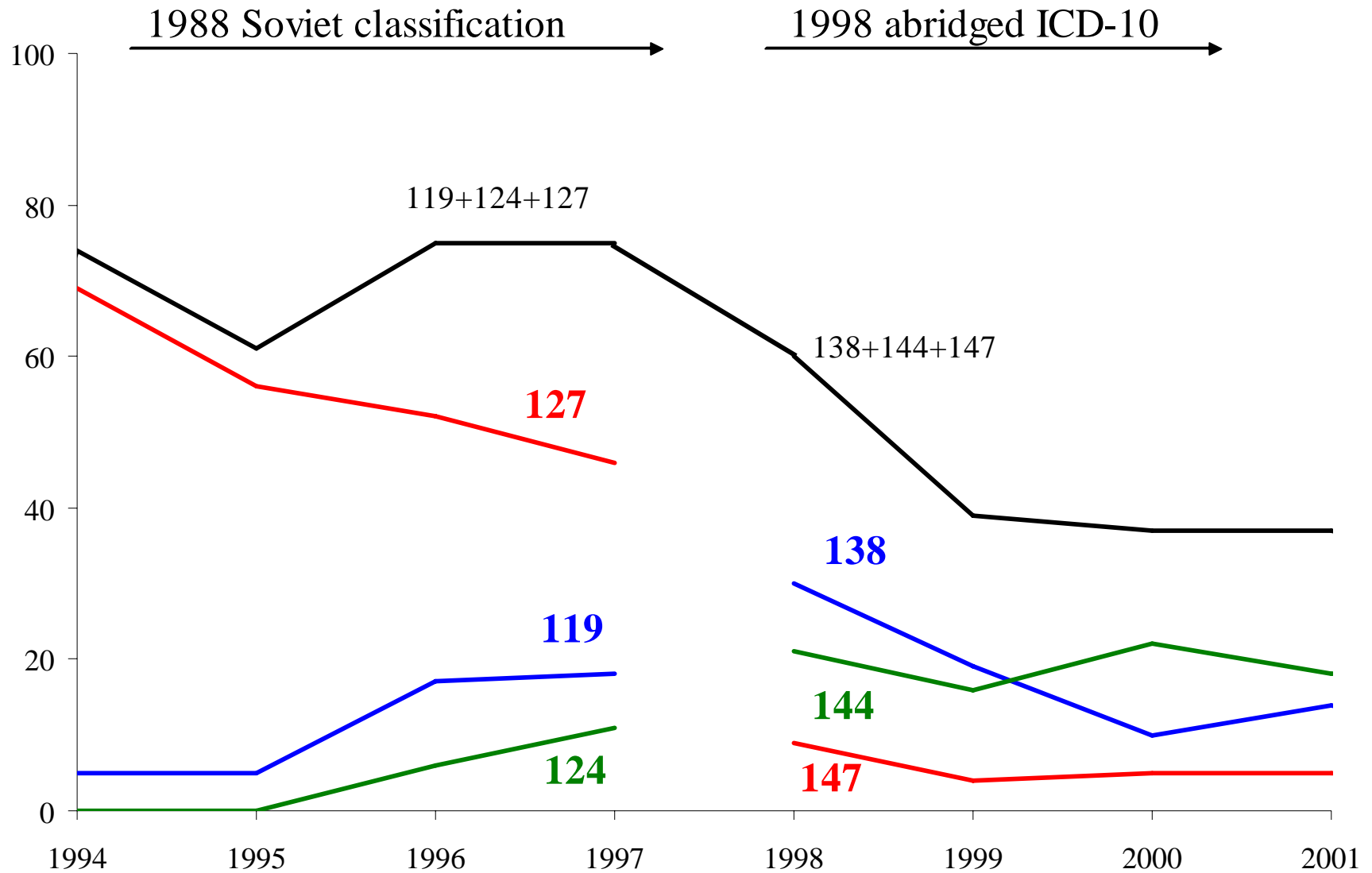
## Item **Calculus of gallbladder with cholecystitis** – Crude data



# 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	Hernia of the abdominal cavity	30	18	119	Total	Hernia of the abdominal cavity
			46	127	Partial	Other diseases of the digestive system
144	Calculus of gallbladder with cholecystitis	21	11	124	Total	Calculus of gallbladder with cholecystitis
			“	127	Partial	Other diseases of the digestive system
147	Other diseases of the digestive system	9	“	127	Partial	Other diseases of the digestive system
Total number of deaths		60	75	Total number of deaths		



# Coefficients of transition

Number of deaths		OLD classification			Deaths in 1998
NEW classification		119	124	127	
138					30
144					21
147					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					30
144					21
147					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	127	
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**

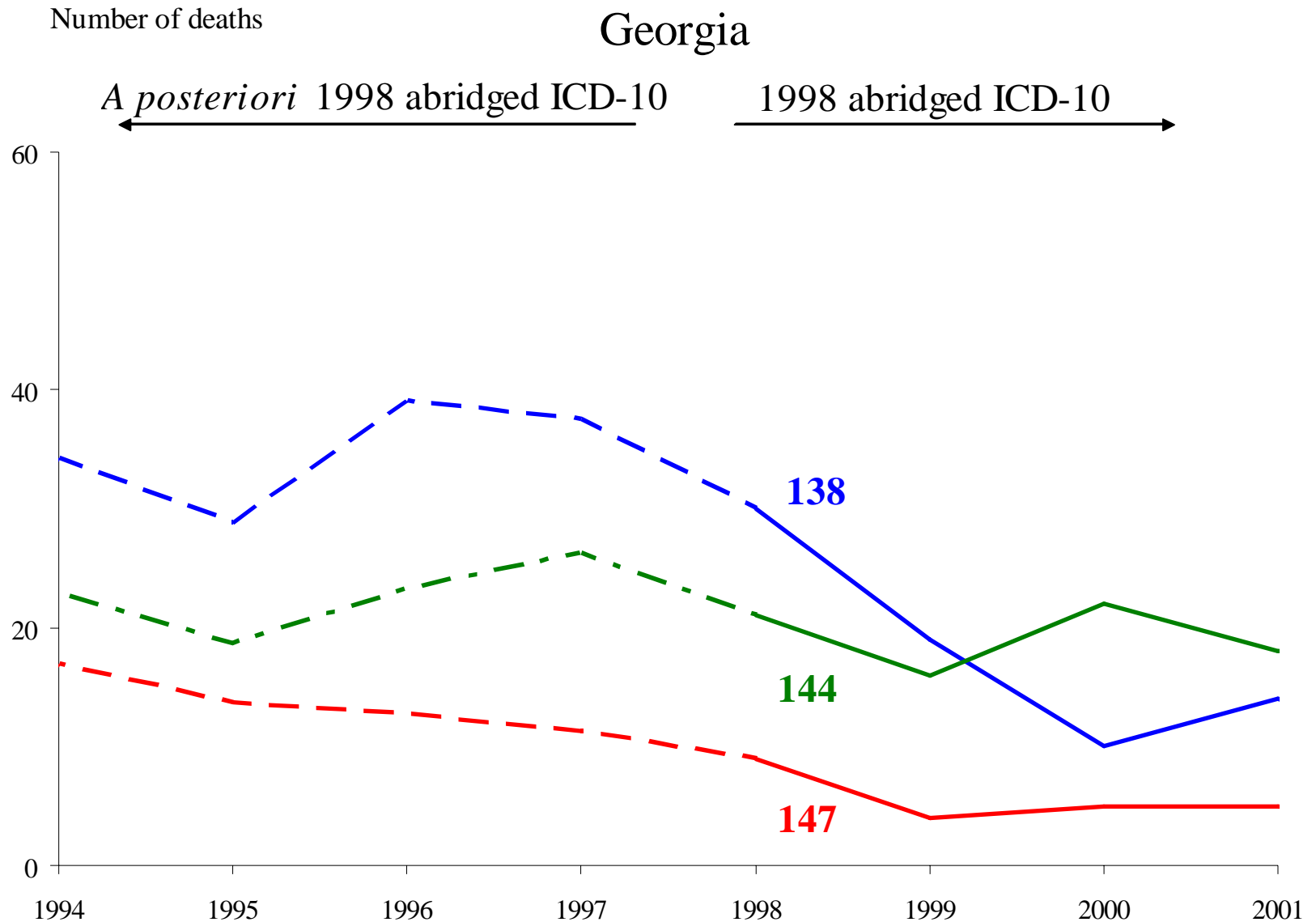
NEW classification	OLD classification		
	119	124	127
138	100.0		42.4
144		100.0	33.2
147			24.5
Total	100.0	100.0	100.0

# 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

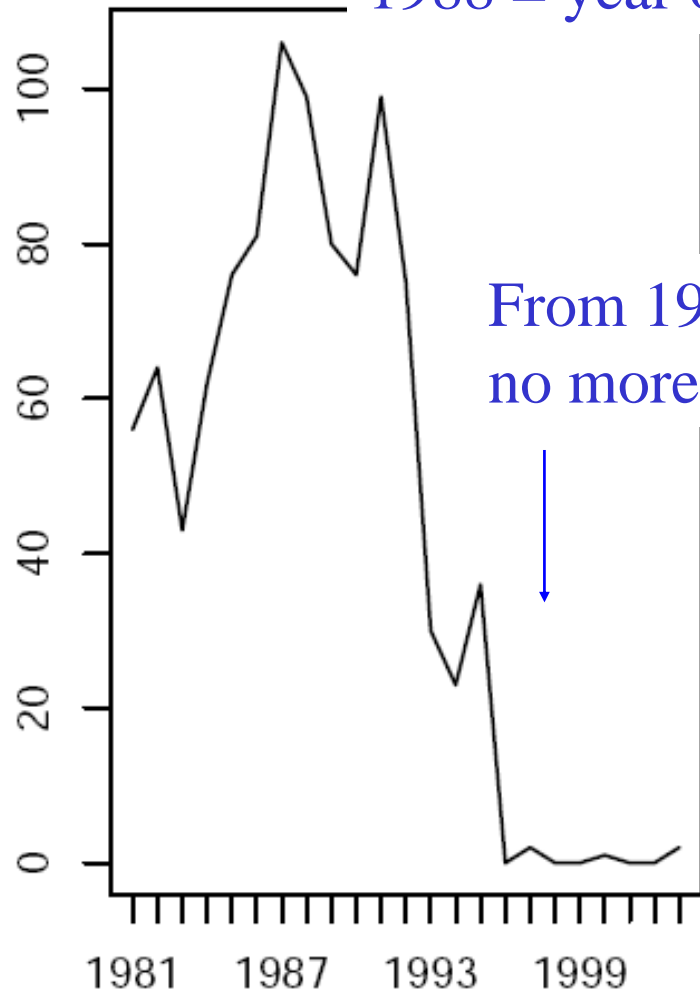
- Checking all the series
  - Total number of deaths, deaths by age group
  - Both sexes, males and females
- Doing corrections if necessary

# corrections

## ➤ Example: Armenia – 1988 soviet classification

- item 84: acute rheumatic fever

↓ 1988 = year of classification change



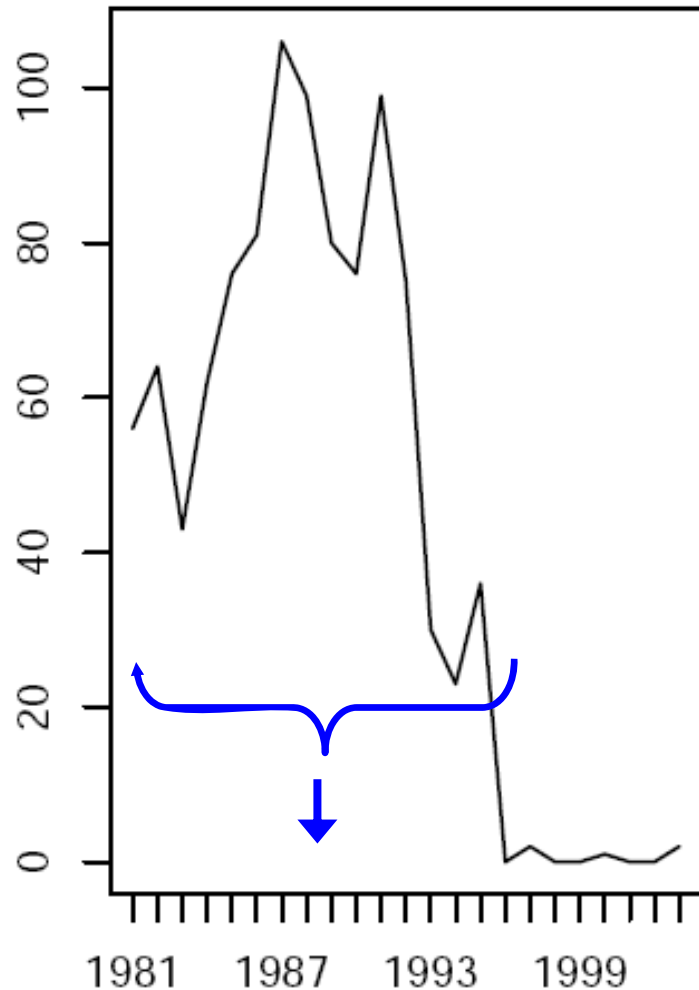
From 1996,  
no more use of this item



# corrections

## ➤ Example: Armenia – 1988 soviet classification

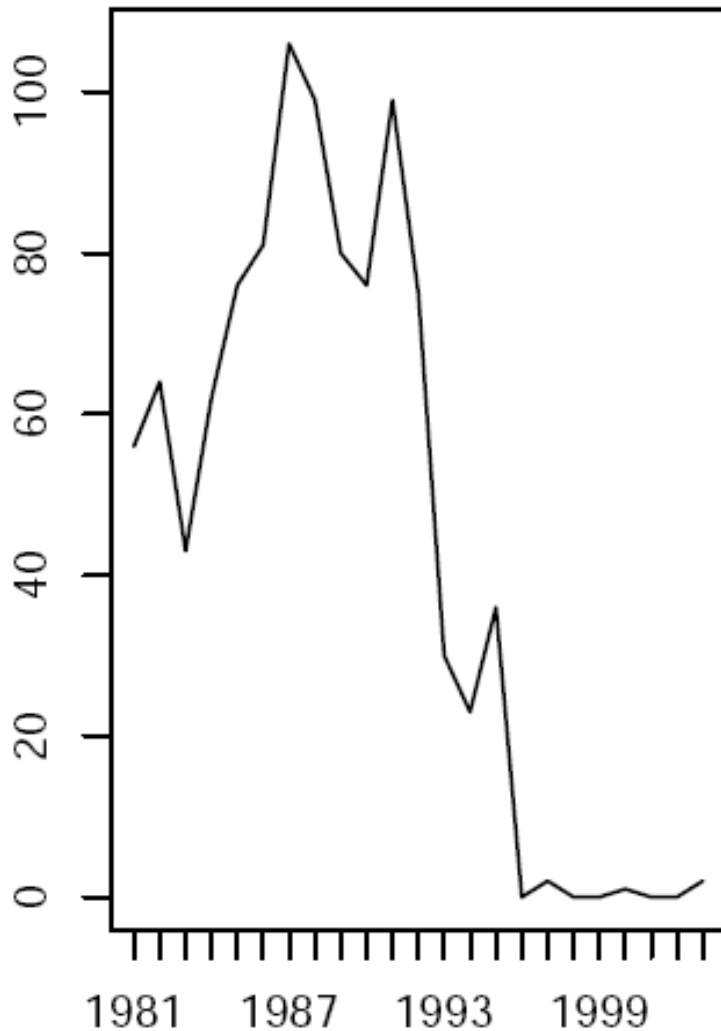
- item 84: acute rheumatic fever



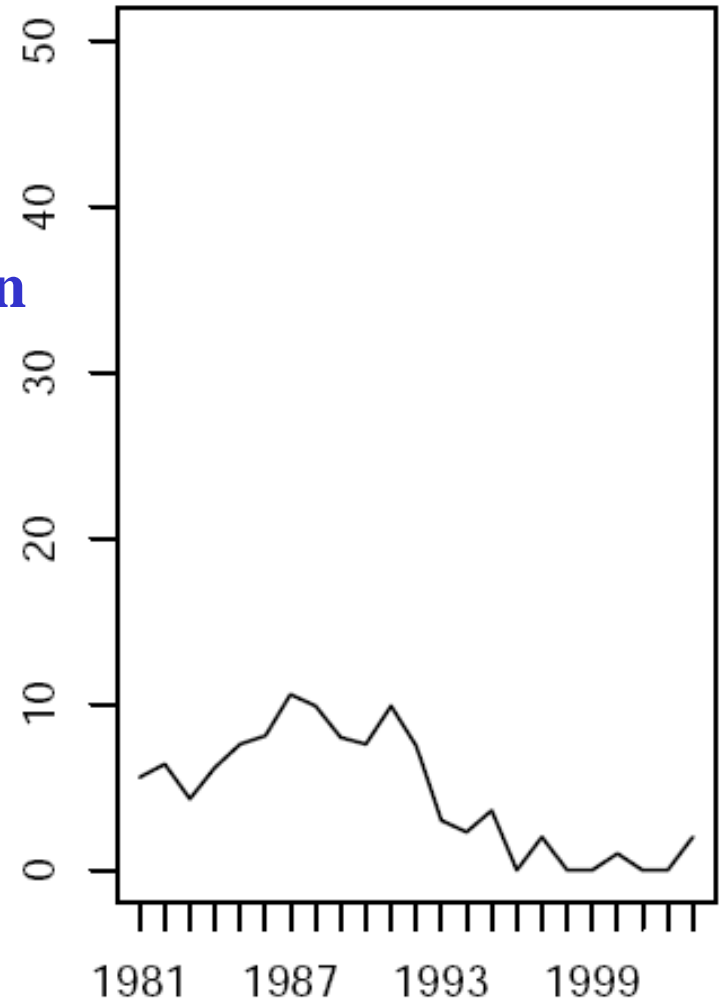
- 1) Principle : improvement over the time of classification
- 2) To reduce number of deaths in this item from 1981-1995
- 3) To find another item to put this deaths
  - A similar and symmetric phenomenon
  - A close item (medical content)
    - Item 91:  
Acute myocardial infarction
  - A less detailed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

# corrections

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

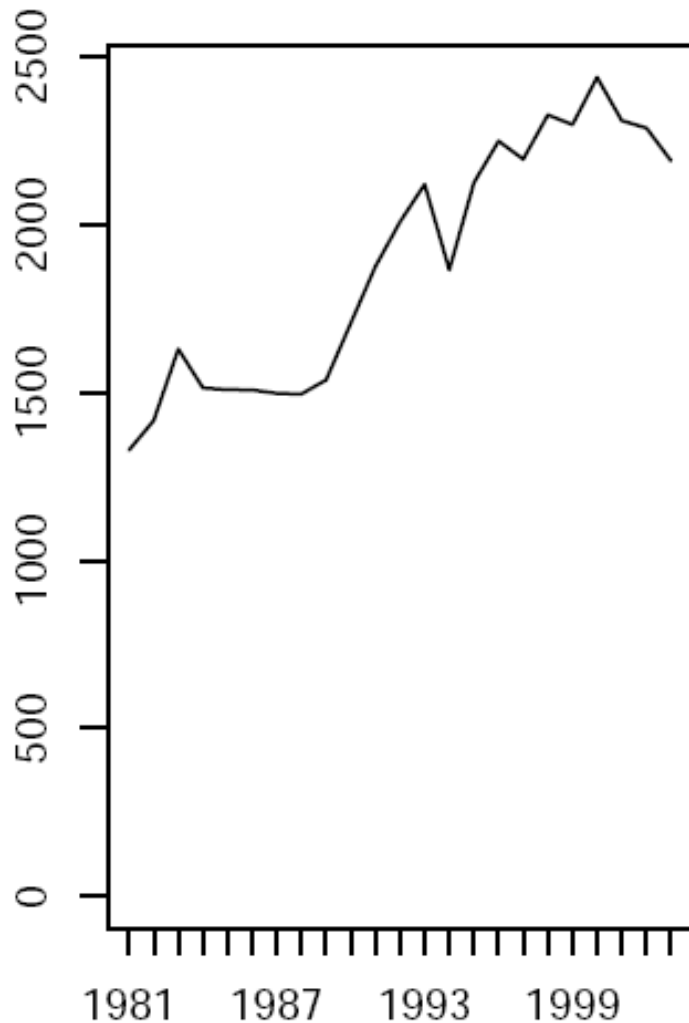


correction

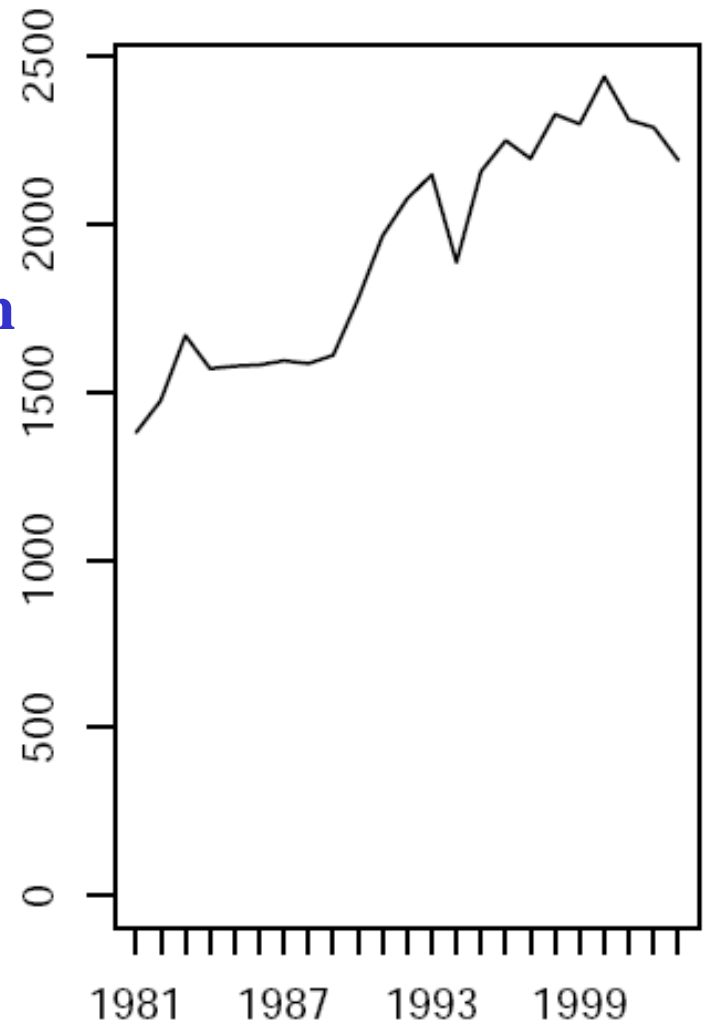


# corrections

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

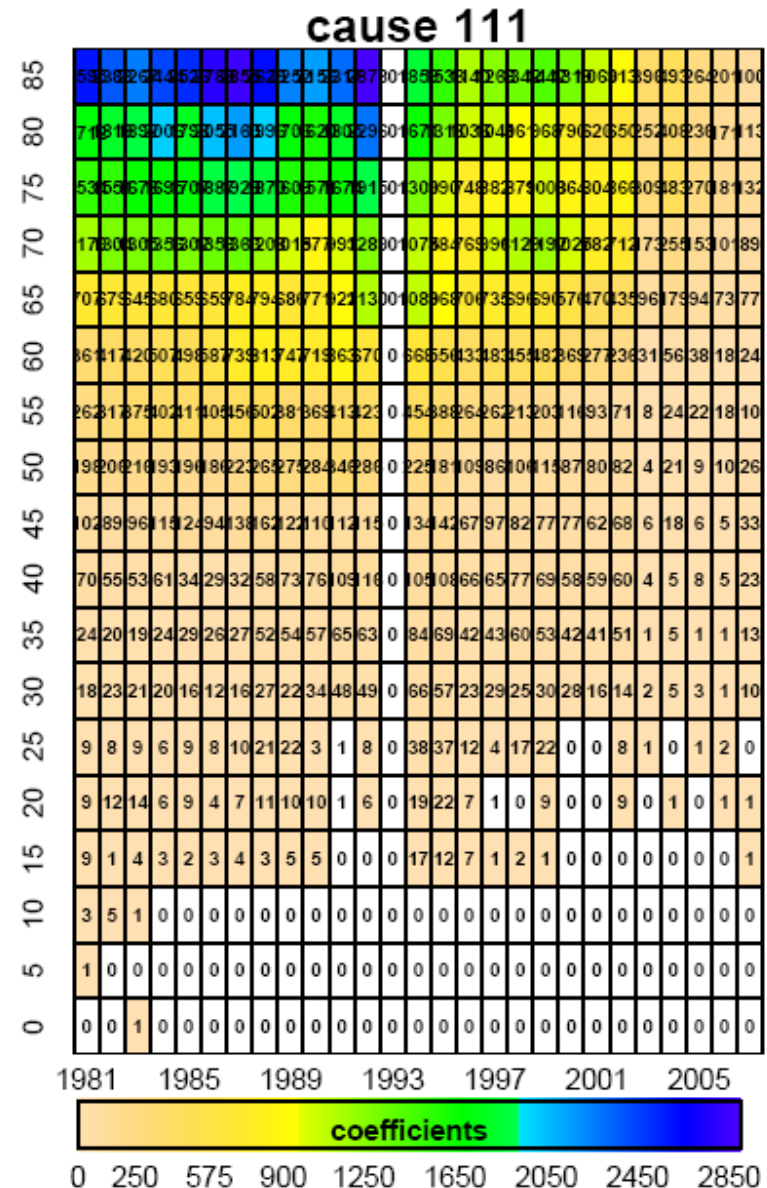


correction



# Reconstructed and checked series

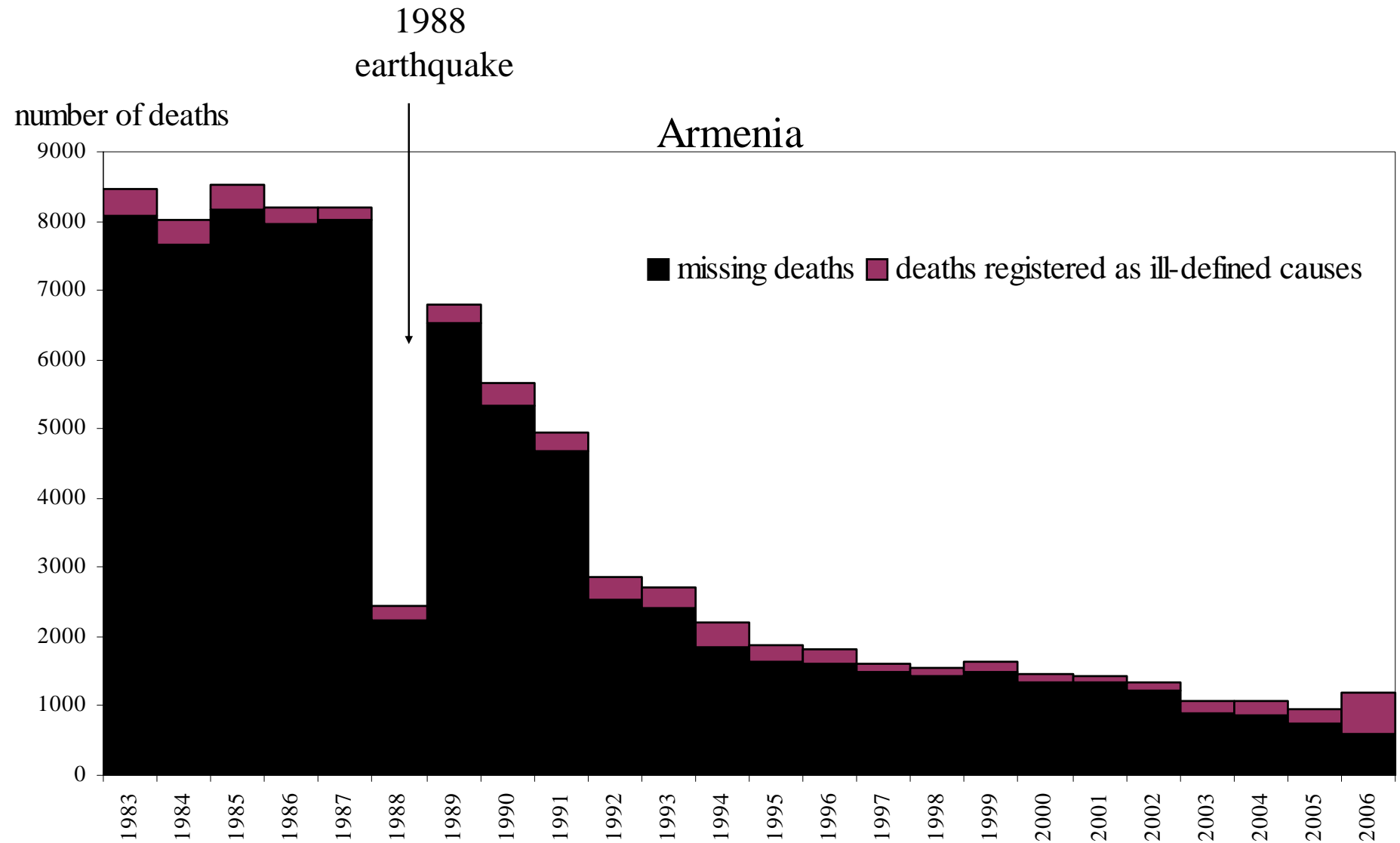
- e.g.  
Georgia  
Item 111  
coronarian atherosclerosis  
from 1981 to 2007



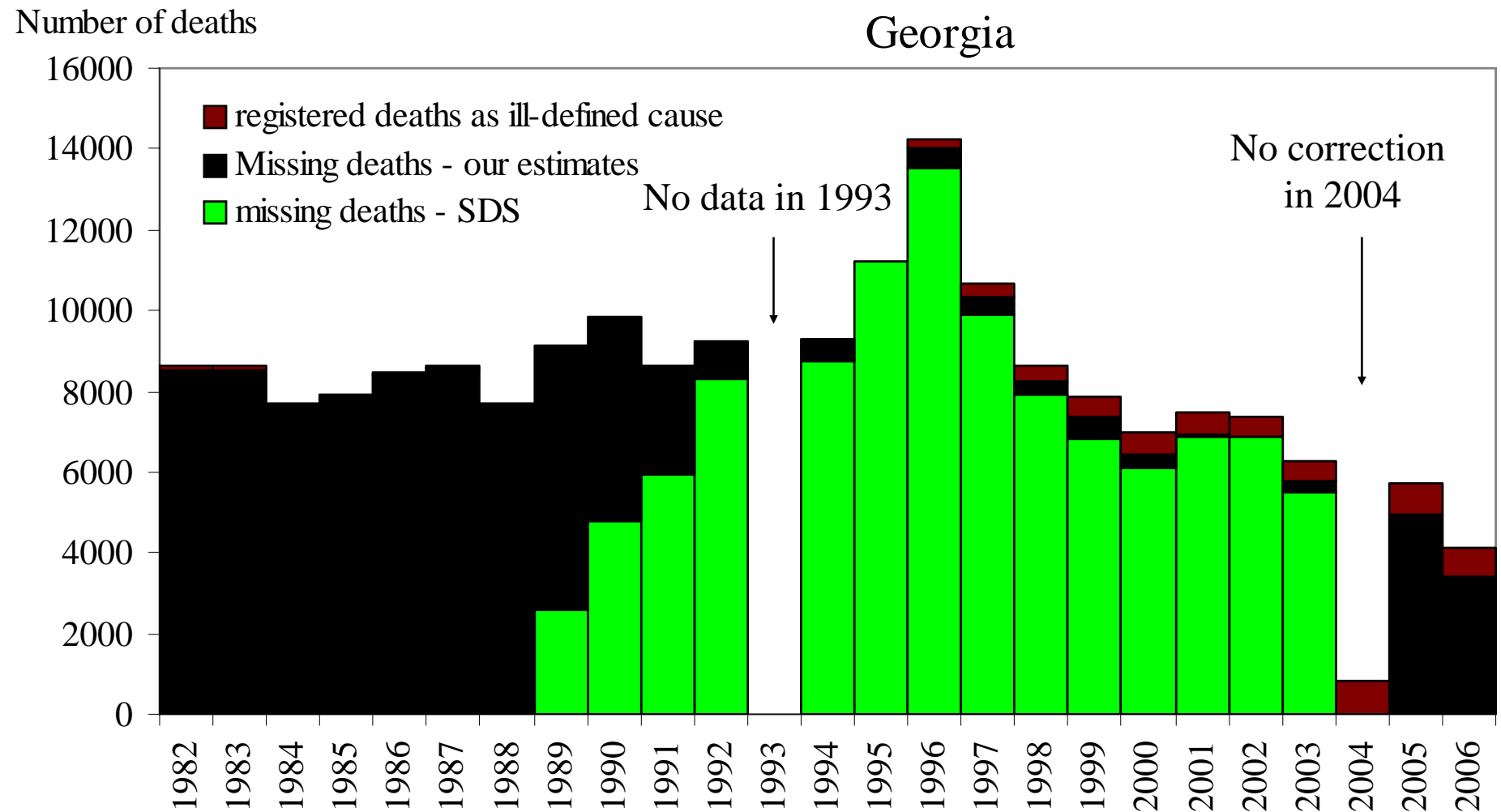
# Cause specific mortality rates

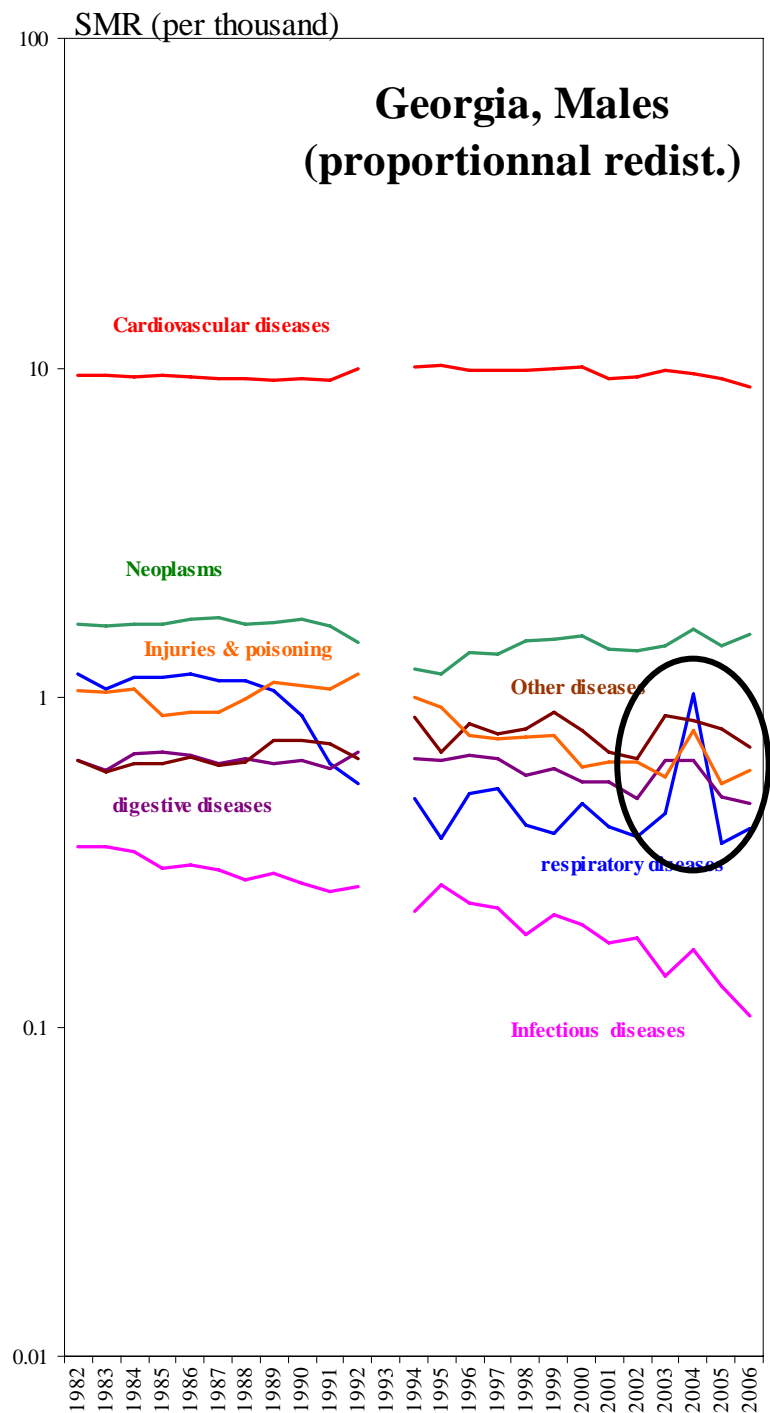
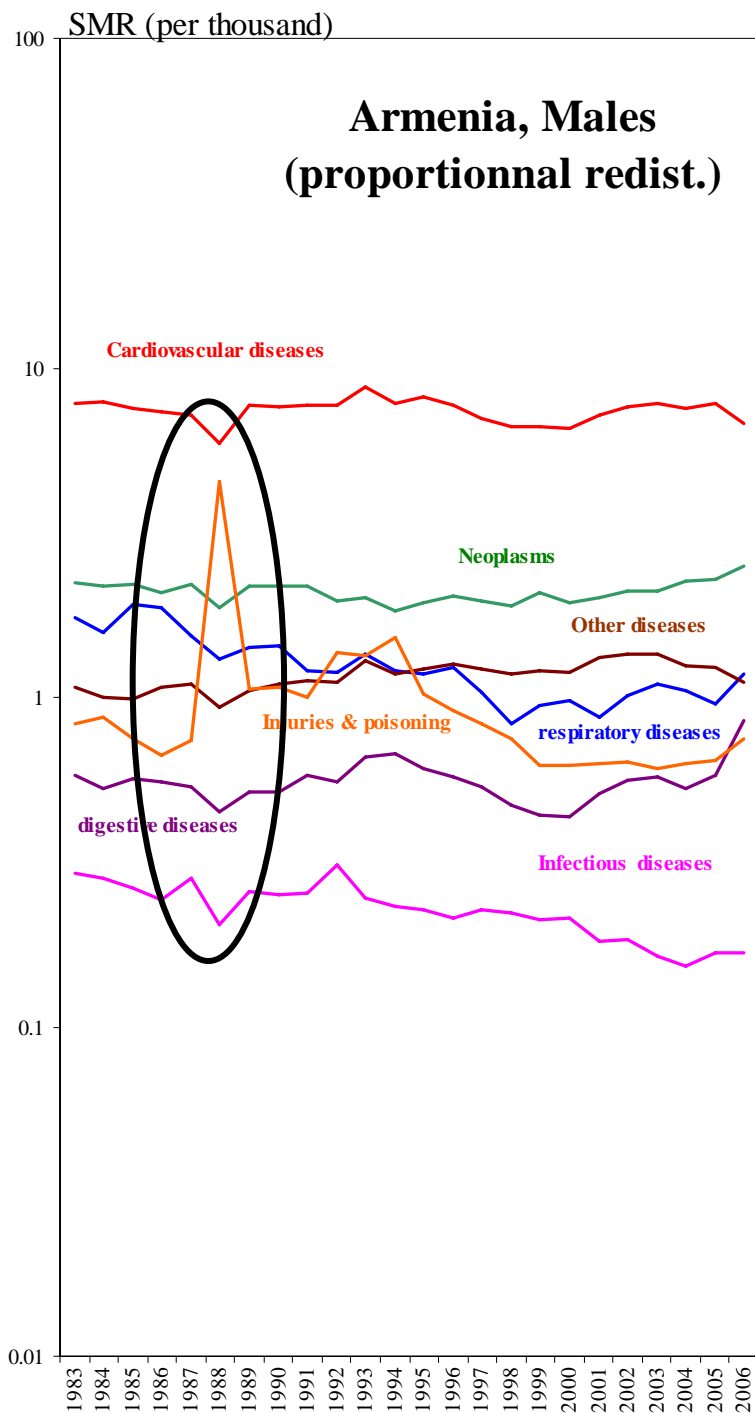
- Estimation of cause-specific mortality rates by age group
  - Adding missing deaths in deaths counts by age group
    - Infant deaths
    - Deaths after age 60:
      - until 1991 in both countries, in 2005 and 2006 in Georgia
    - For Georgia :from 1989 to 2003 there is a difference between estimated 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

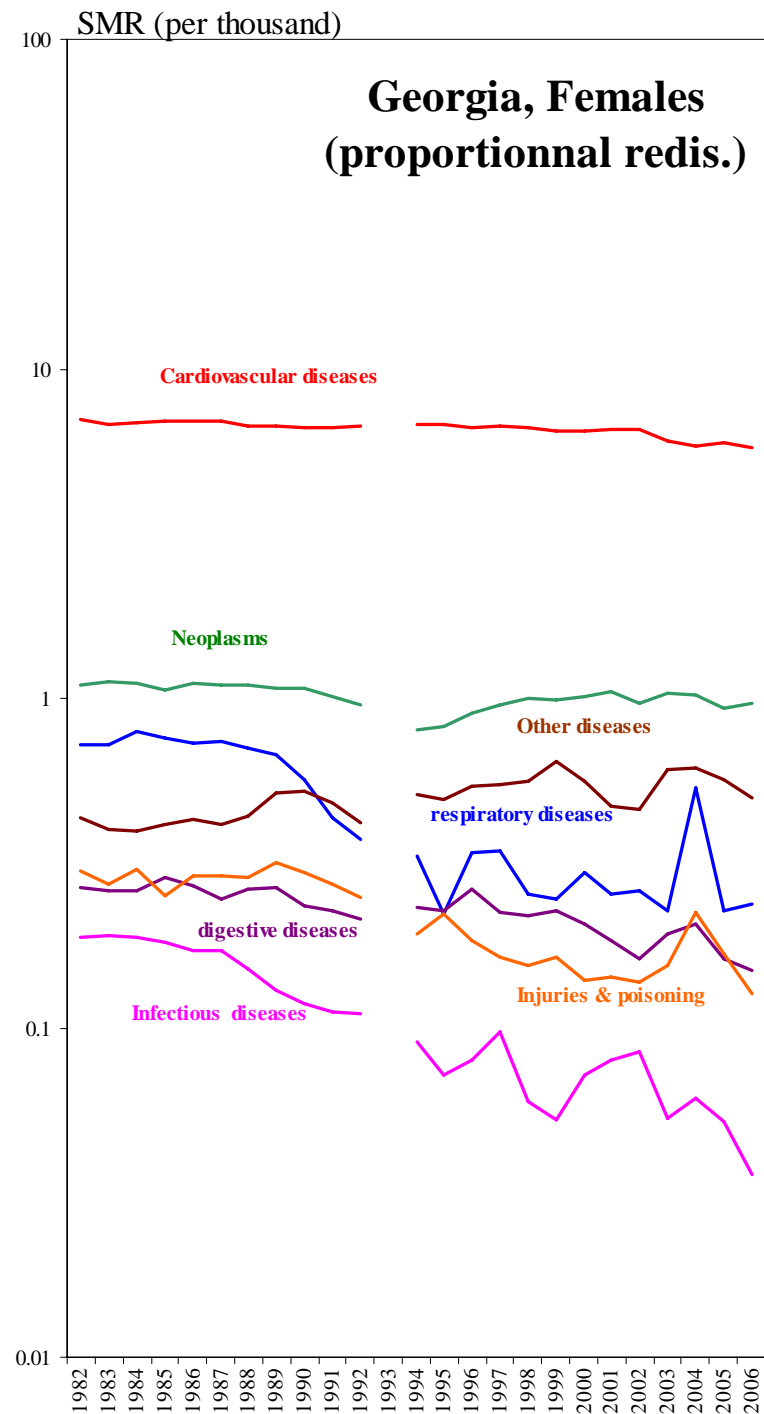
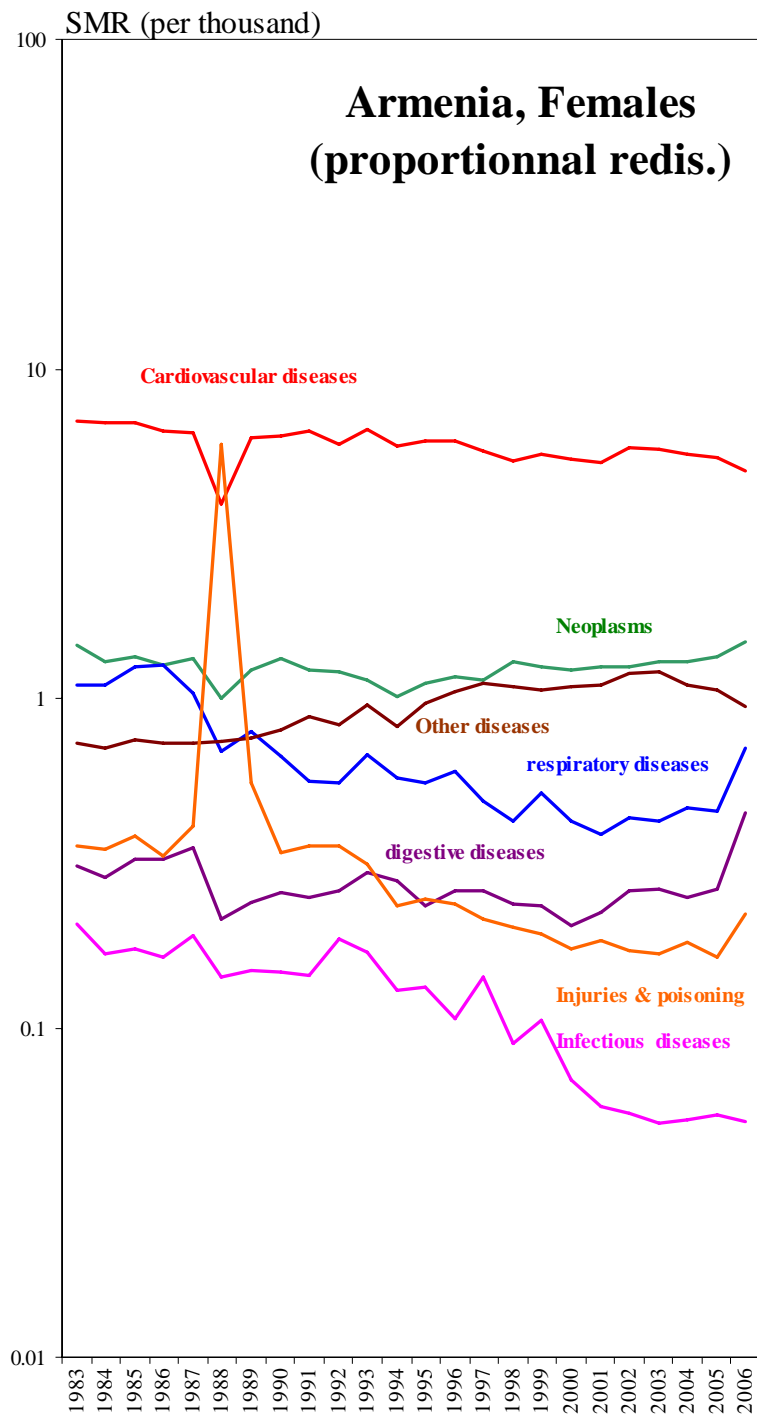


# From missing deaths to ill defined cause

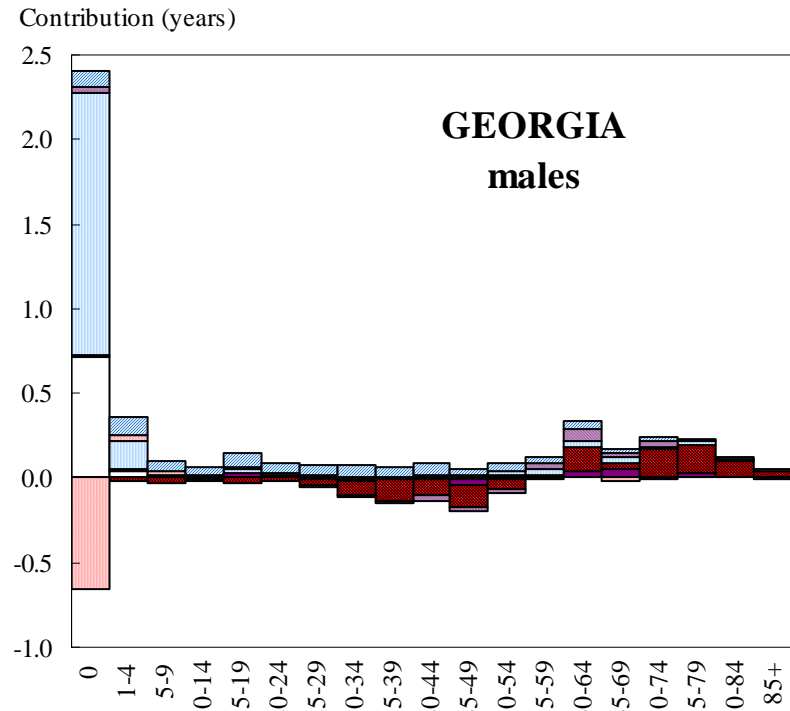
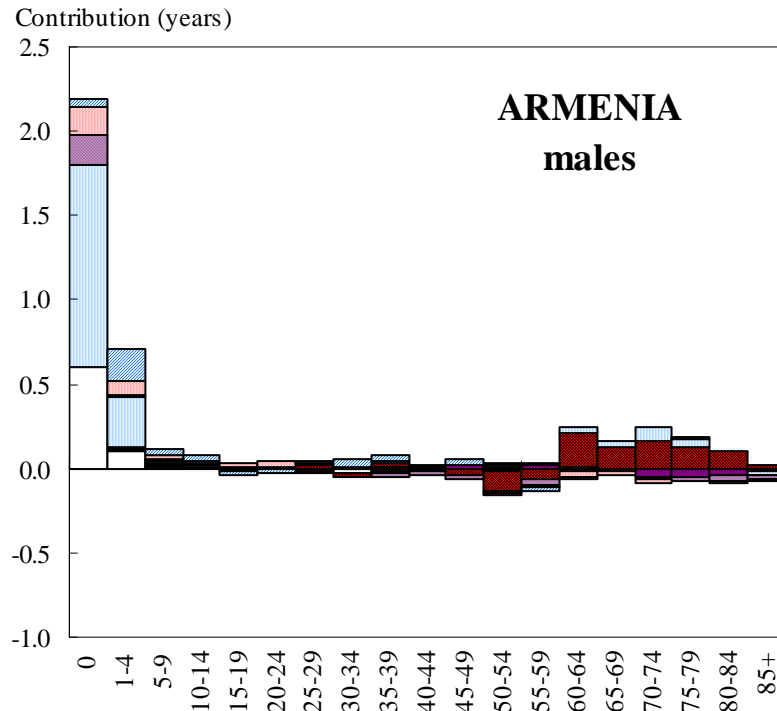








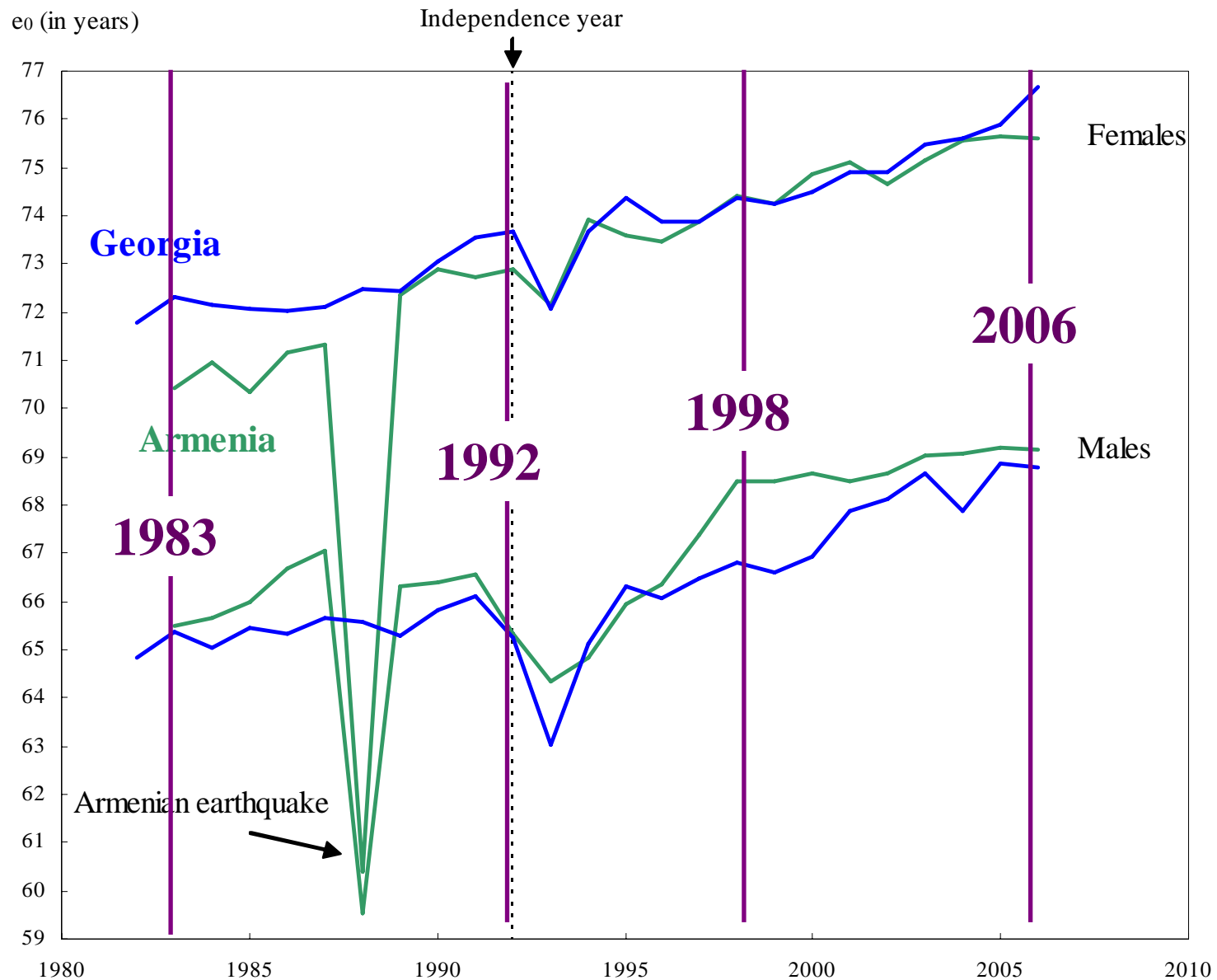
# Contribution of causes of death in the difference of life expectancy between 1983 and 2006, by age group and sex



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

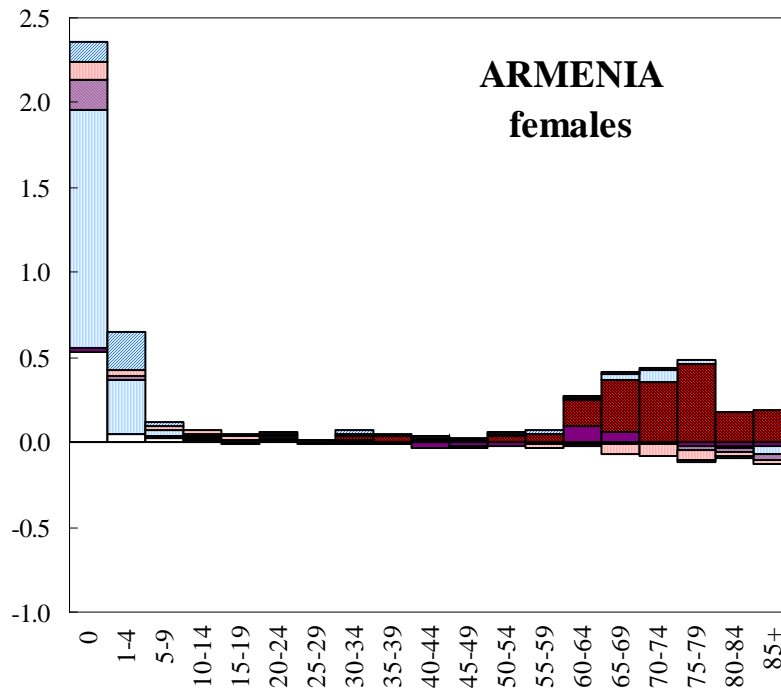
- Neoplasms
- Diseases of the respiratory system
- Other diseases

# Life expectancy trends

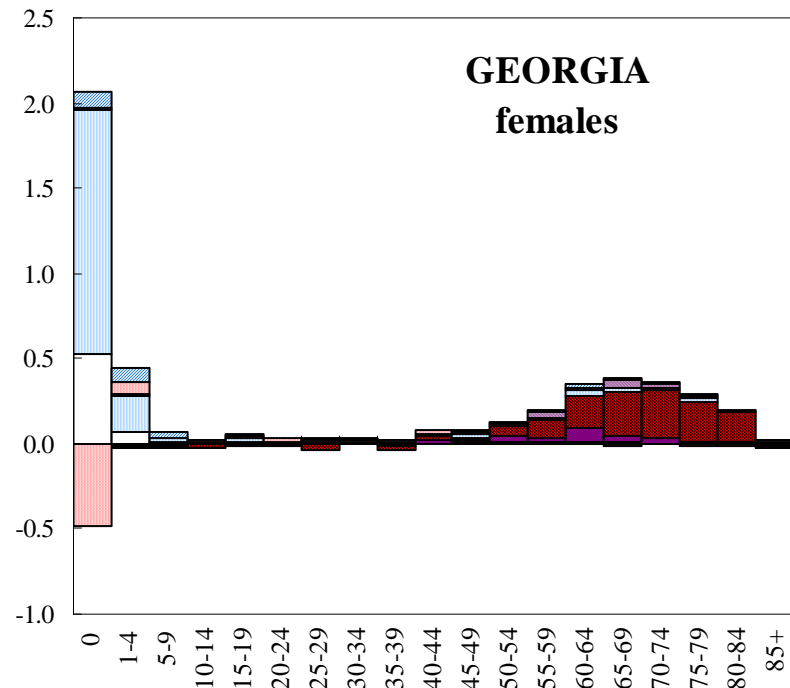


# Contribution of causes of death in the life expectancy difference between 1983 and 2006, by age group and sex

Contribution (years)



Contribution (years)



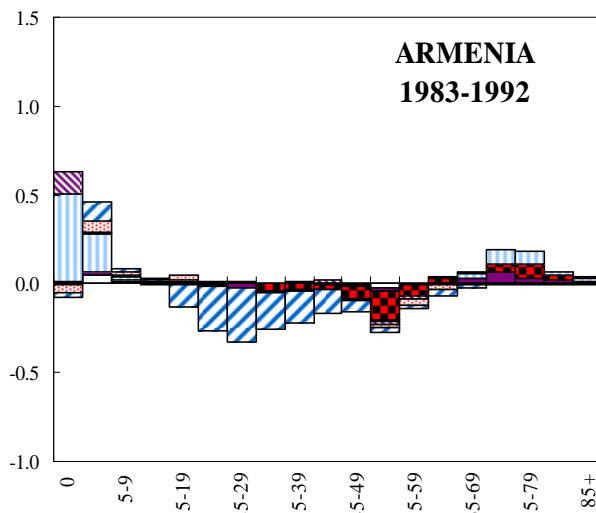
- Infectious diseases
- Cardio-vascular diseases
- Diseases of the digestive system
- Injury and poisoning

- Neoplasms
- Diseases of the respiratory system
- Other diseases

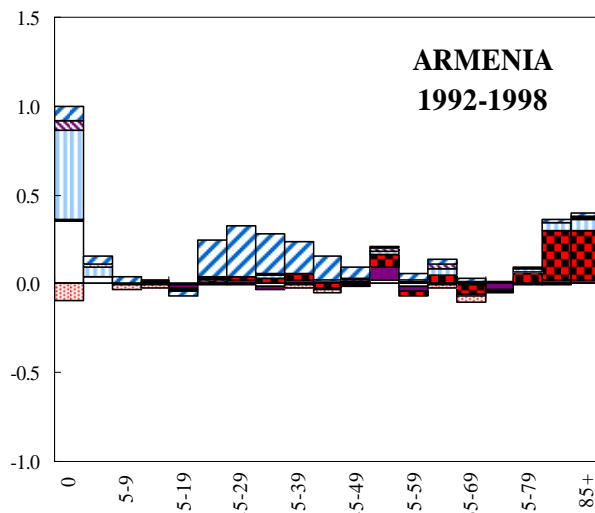
# Males, by period

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

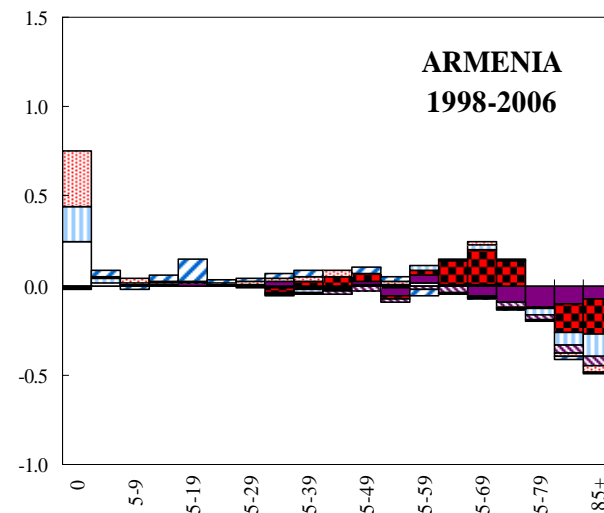
Contribution (years)



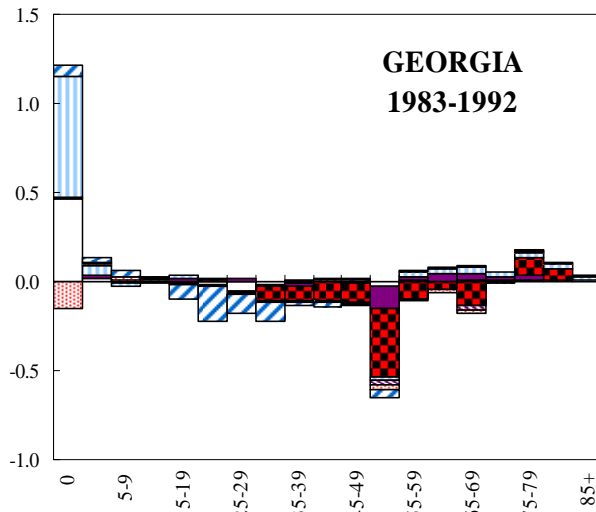
Contribution (years)



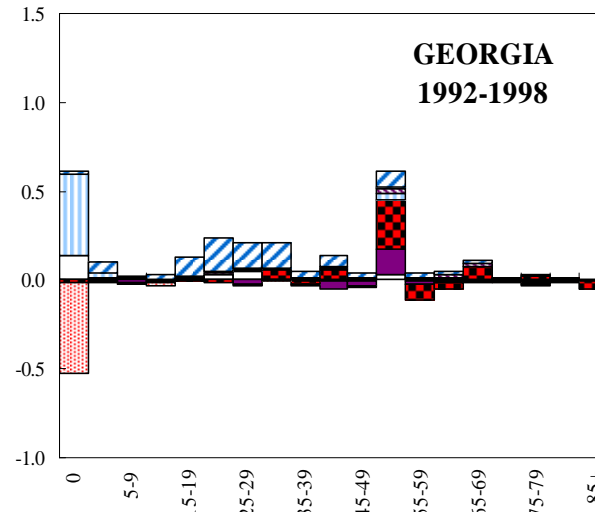
Contribution (years)



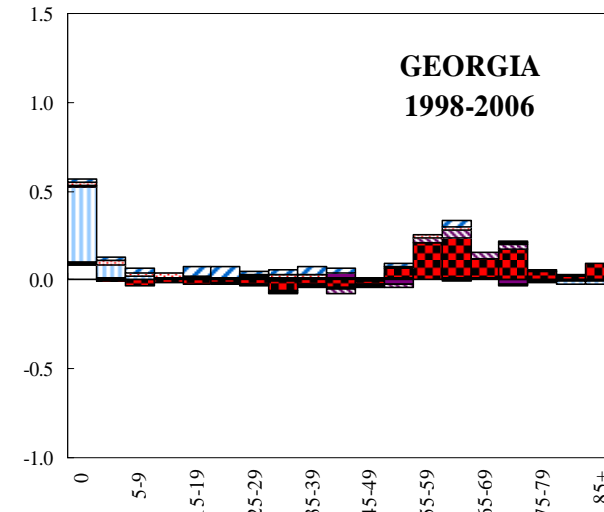
Contribution (years)



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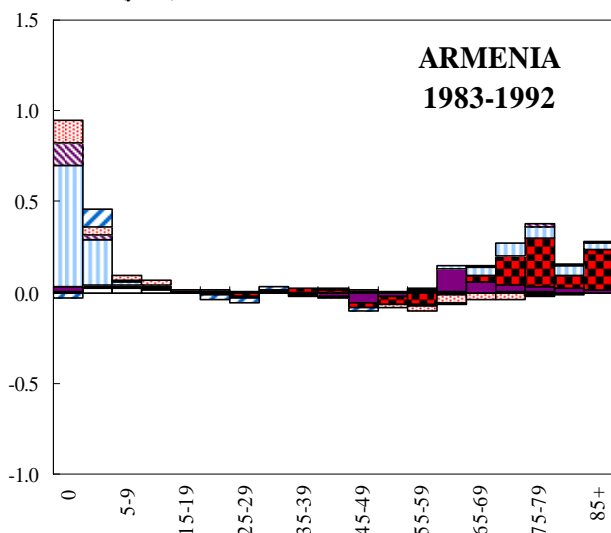


# Females, by period

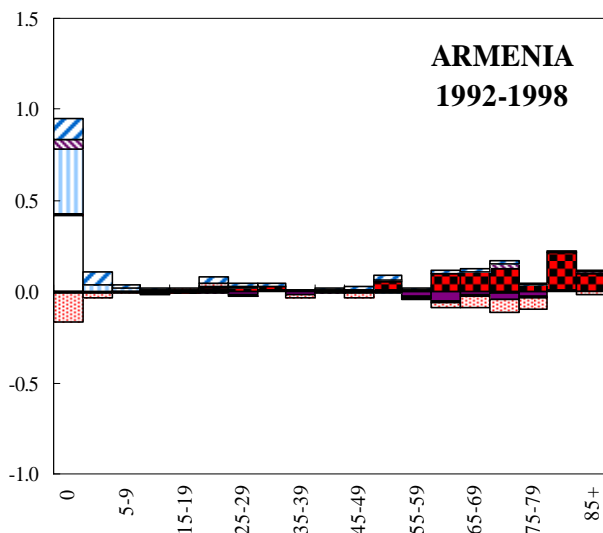
- Infectious diseases
- Cardio-vascular diseases
- Diseases of the digestive system
- Injury and poisoning

- Neoplasms
- Diseases of the respiratory system
- Other diseases

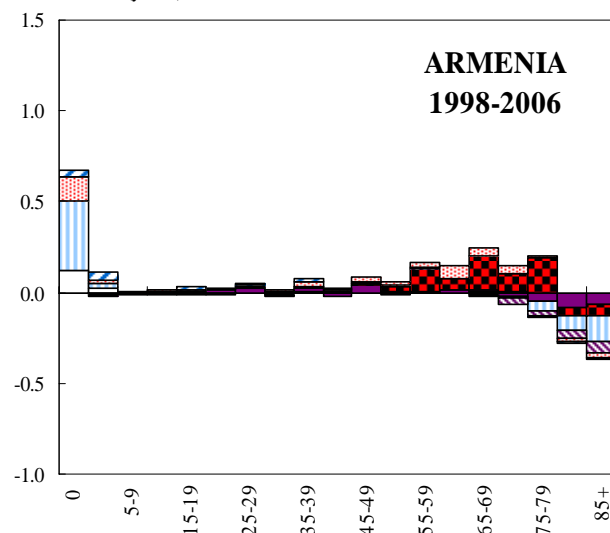
Contribution (years)



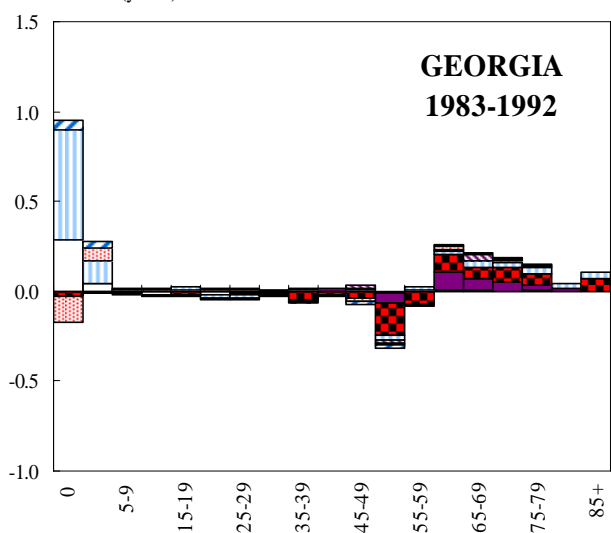
Contribution (years)



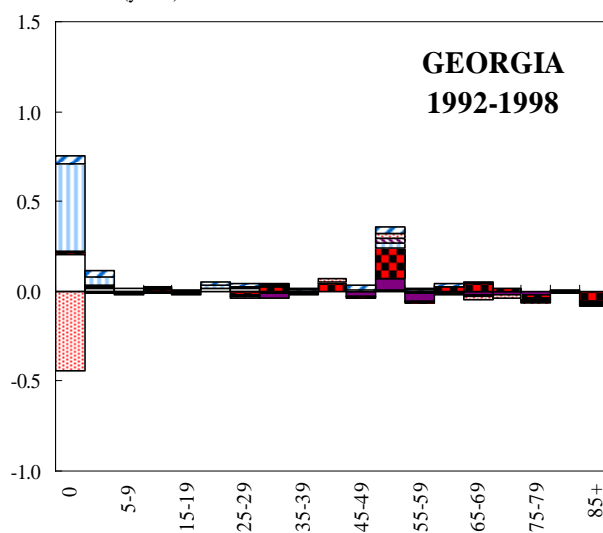
Contribution (years)



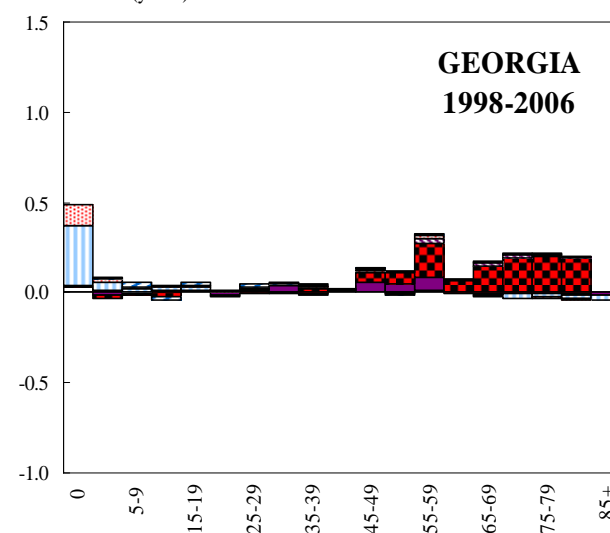
Contribution (years)



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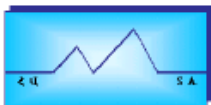
## **Thank you for your attention**

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