



# Outcomes of Health Systems : Towards the development of indicators of amenable mortality

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# Objectives of the project

- Explore the potential of “Amenable Mortality” to serve as an indicator of health care systems outcomes in cross-country comparisons.
- Assess the feasibility of inclusion of amenable mortality rates in OECD Health data

# Outcome indicators to measure health systems performance in OECD statistics

- Health status:
  - Mortality: Life expectancy; Mortality rates by cause; Potential years of life lost by cause; maternal and infant mortality
  - Morbidity: perceived health status, low-weight births, dental health, incidence of some communicable diseases, Incidence of some cancers, and absence from work
- Life styles and behaviours (that health systems may seek to influence): food consumption, alcohol and tobacco consumption, body weight.
- Quality of care (Health care quality indicator project):
  - Disease specific survival rates, Avoidable hospital admissions,
  - Patient safety, patient satisfaction and system's responsiveness (in development)
- Equity in access to health care or in health status (?)
  - see De Looper and Lafortune, OECD 2009

# Health status: what can be attributed to health systems?

- Current indicators:
  - Either lack of specificity (e.g. Life expectancy can be influenced by many other factors than health systems interventions)
  - Or are too narrow to get a “global picture” of health systems performance (e.g. mortality for a specific cause or HCQ Indicators)
- Mortality “amenable to health care” could serve as an indicator for global performance in improving health status

# The concept of “Mortality amenable to health care/systems”

- “Amenable deaths” = “deaths that should not occur in the presence of timely and effective health care”
- “Amenable mortality” is measured by:
  - Age-standardised mortality rates
  - For selected causes of death: *“Conditions for which effective clinical interventions exist [that should prevent premature deaths]” (Tobias and Yen 2009)*
  - In people under 75 years old (general age limit)
- With some adaptations for some diseases:
  - E.g. only half of deaths due to ischemic heart diseases are considered to be amenable to health care
  - Age limits vary for some causes to take into account the fact that health systems cannot be held responsible for deaths above or below a certain age in certain disease categories
- Criteria for inclusion are “evidence-based”

# Amenable / avoidable?

- Terms sometimes used as synonyms in the literature
- Eurostat – Atlas of mortality (2009)
  - “*Avoidable*’ is loosely defined as important causes of death which could be avoided by changing lifestyles or health policies”.
  - Includes for instance deaths from road accident, suicides
  - Age limit set at 65.
- The difference between the two concepts pertains to the “boundaries of health systems”
  - e.g. Prevent fatal home injuries or road accidents is not always in the scope of MoH activities
  - E.g. Suicides are not included in amenable mortality though prevention of suicide is generally included in formulated health policy objectives
- Usually, “avoidable mortality” includes more causes of death and a unique age limit.

# Methodology and data

## Data

- Mortality databases from the WHO Statistical Information System (WHOSIS).
- From 1996 to 2006 (or last available year 2004-2005)
- Population structure: OECD population structure 1980.
- Lists of causes published by Nolte & McKee (2008) and Tobias & Yeh (2009)
- Limitations:
  - Switzerland and Turkey excluded because of data limitations
  - Minor modifications to the original Tobias & Yeh list were done to fit the particular grouping of codes used in the WHO database (only in ICD9 codes):
    - Exclusion of deaths from Thyroid Cancer because they are integrated in a much larger category in the WHO database.
    - Asthma included in the Chronic Obstructive Pulmonary Diseases category (all ages <75 included).

## Method

- Standardize Mortality Rates (SMR) over 100,000 people for specific causes of death in specific age groups (<75 years).

# Analyse

## Analyse

- Level and trend in amenable mortality
- Analysis by gender
- Comparison of results obtained from the two lists of “amenable causes”
- Disaggregated analysis according to partition proposed by Murray & Lopez (1996):
  - Transmittable, maternal and perinatal causes of deaths.
  - Non transmittable diseases.



# Nolte & McKee (2008) and Tobias & Yeh (2009)

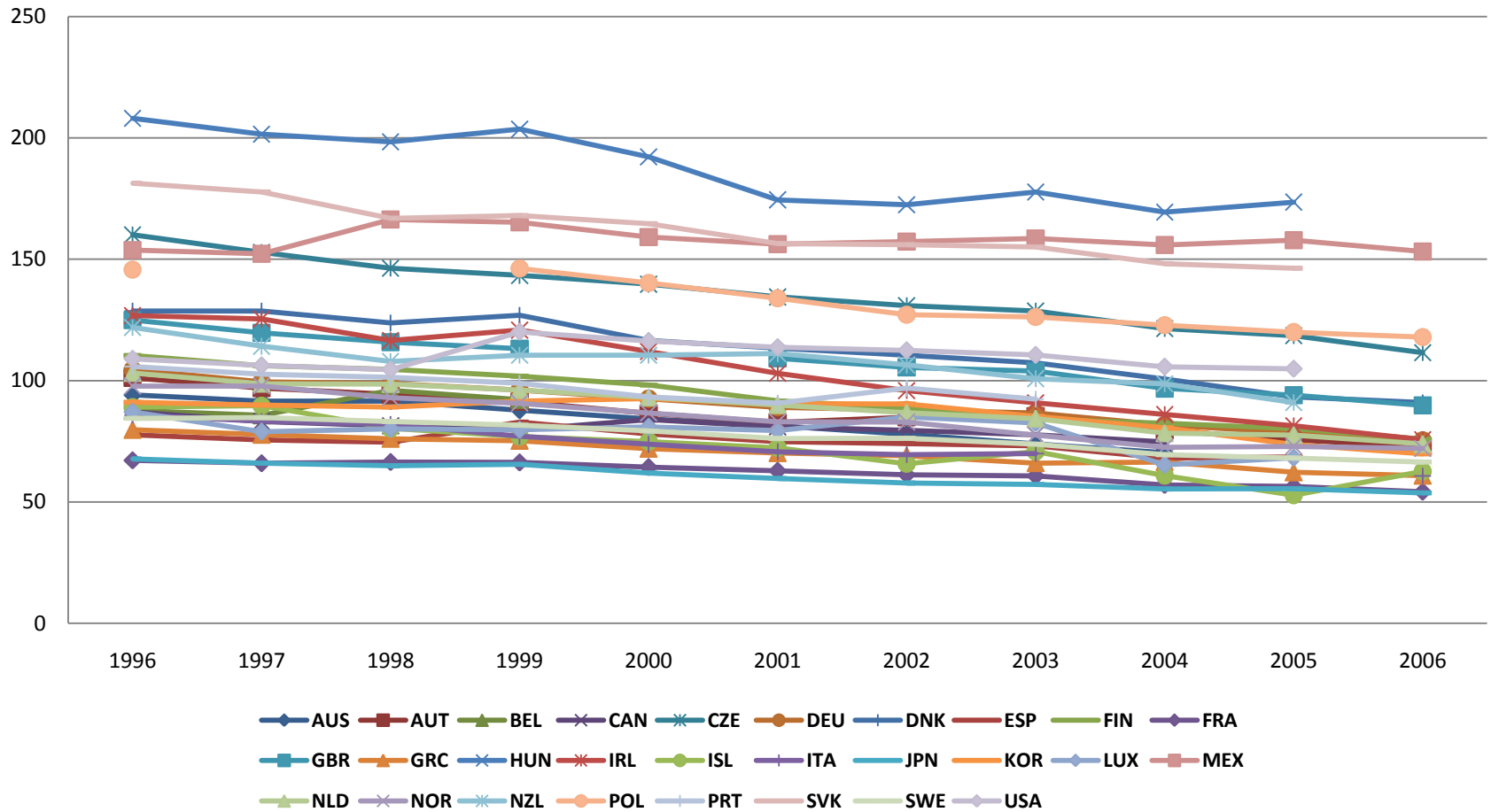
Causes of deaths	Nolte & McKee (2008)	Tobias & Yeh (2009)
Infectious diseases	Tuberculosis Intestinal Infections (other than typhoid, diphtheria) <14 Typhoid, diphtheria, tetanus, septicaemia, poliomyelitis, osteomyelitis Whooping cough & measles <14 Measles – 1-14	Tuberculosis, Selective invasive bacterial infections (incl. malaria, meningitis, infections of the skin)
Neoplasms	Colorectal cancer, Malignant neoplasm of skin Breast cancer Cervical cancer and uterine cancer (<45) Neoplasm of the testis Hodgkin's disease, Leukaemia < 45	Colorectal cancer, Melanoma of skin, nonmelanotic skin cancer, Breast cancer Cervical cancer and uterine cancer Bladder cancer Thyroid cancer Hodgkin's disease, Leukaemia < 45 Benign tumours
Endocrine, nutritional and metabolic diseases	Thyroid disorders Diabetes mellitus < 50	Thyroid disorders Diabetes (type 2) - 50% of deaths
Diseases of the nervous system	Epilepsy	Epilepsy

# Nolte & McKee (2008) and Tobias & Yeh (2009)

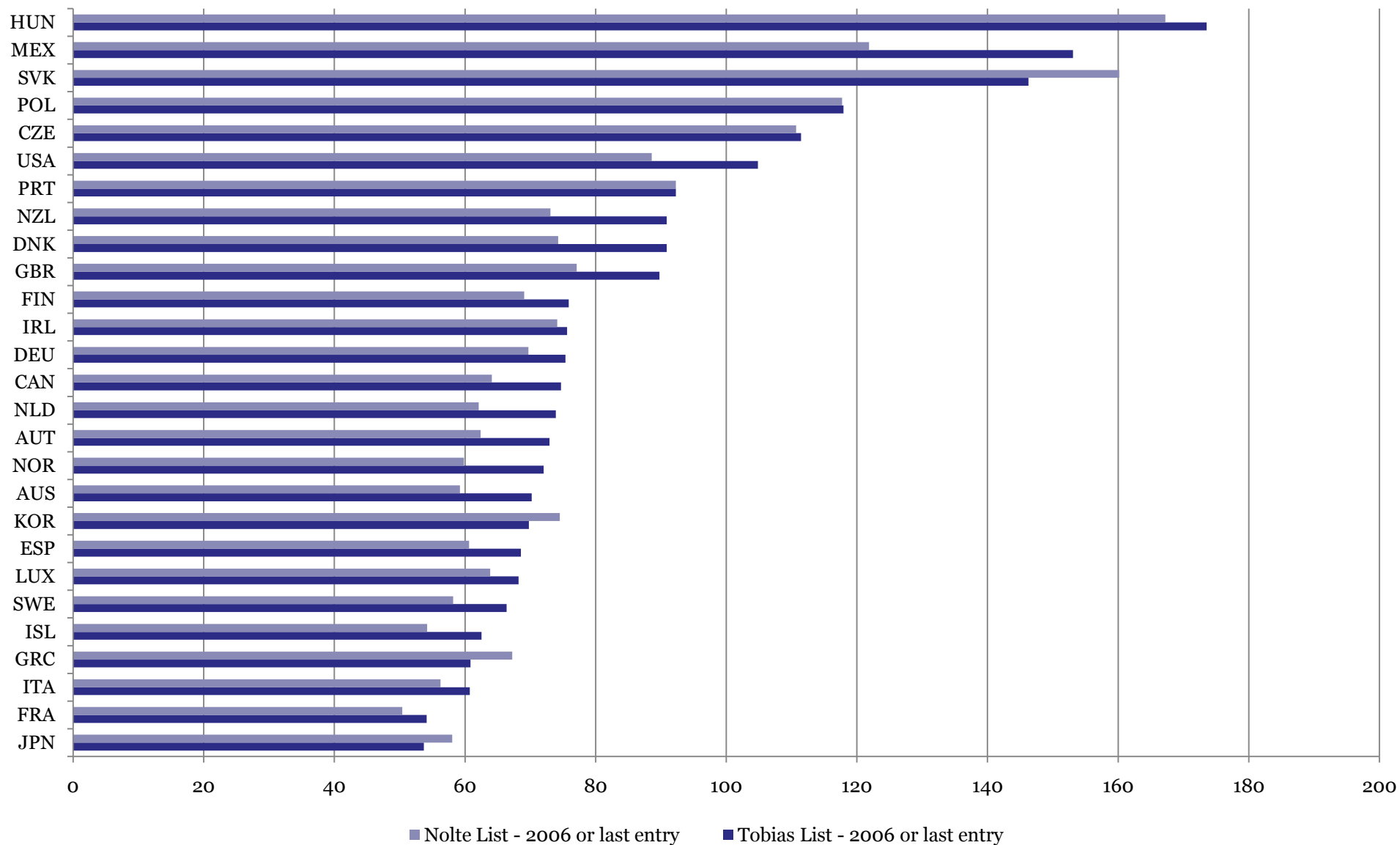
Causes of deaths	Nolte & McKee (2008)	Tobias & Yeh (2009)
Diseases of the circulatory system	Rheumatic heart diseases <45 Ischemic heart diseases – 50% of deaths Cerebrovascular diseases Hypertensive diseases	Rheumatic heart diseases Ischemic heart diseases - 50% of deaths Cerebrovascular diseases – 50% of deaths
Diseases of the genitor-urinary system	Nephritis and nephrosis Benign prostatic hyperplasia	Nephritis and nephrosis Obstructive uropathy and prostatic hyperplasia
Diseases of the respiratory system	All respiratory diseases (excl. pneumonia/influenza) . 1-14 Pneumonia/influenza	Chronic Obstructive Pulmonary disease >45 Asthma < 45
Diseases of the digestive system	Peptic ulcer Appendicitis Abdominal hernia Cholelithiasis and cholecystitis	Peptic ulcer disease Acute abdomen, appendicitis, intestinal obstruction, cholecystitis / lithiasis, pancreatitis, hernia
Perinatal mortality	Maternal deaths Perinatal deaths (excluding stillbirths) Congenital cardiovascular anomalies – 1-14	Birth defect Complications of the perinatal period
External causes	Misadventures to patients during surgical and medical care	

# Results (Tobias & Yeh)

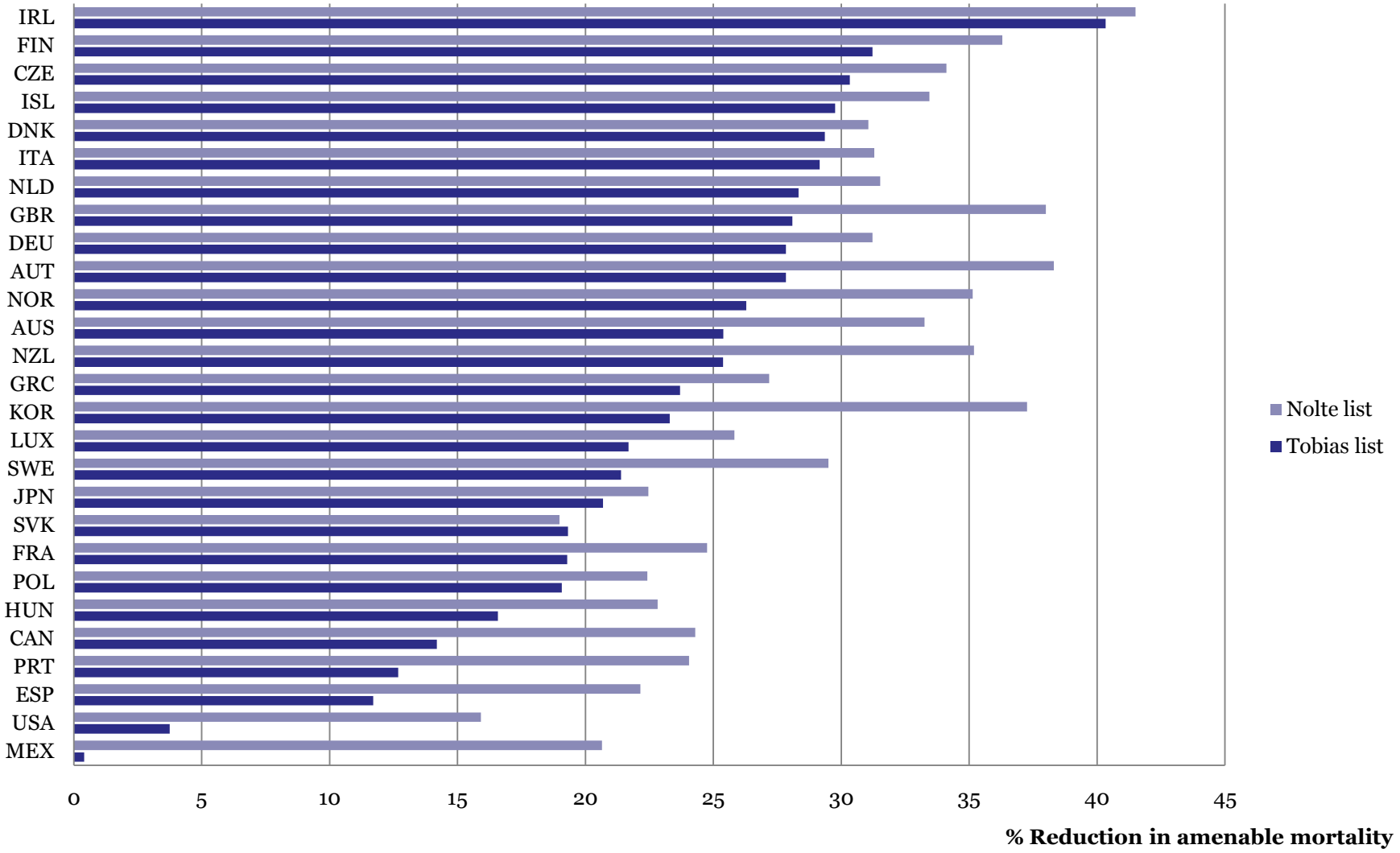
Amenable Mortality all causes, both males and females.  
SMR per 100,000 people, 1996 to 2006



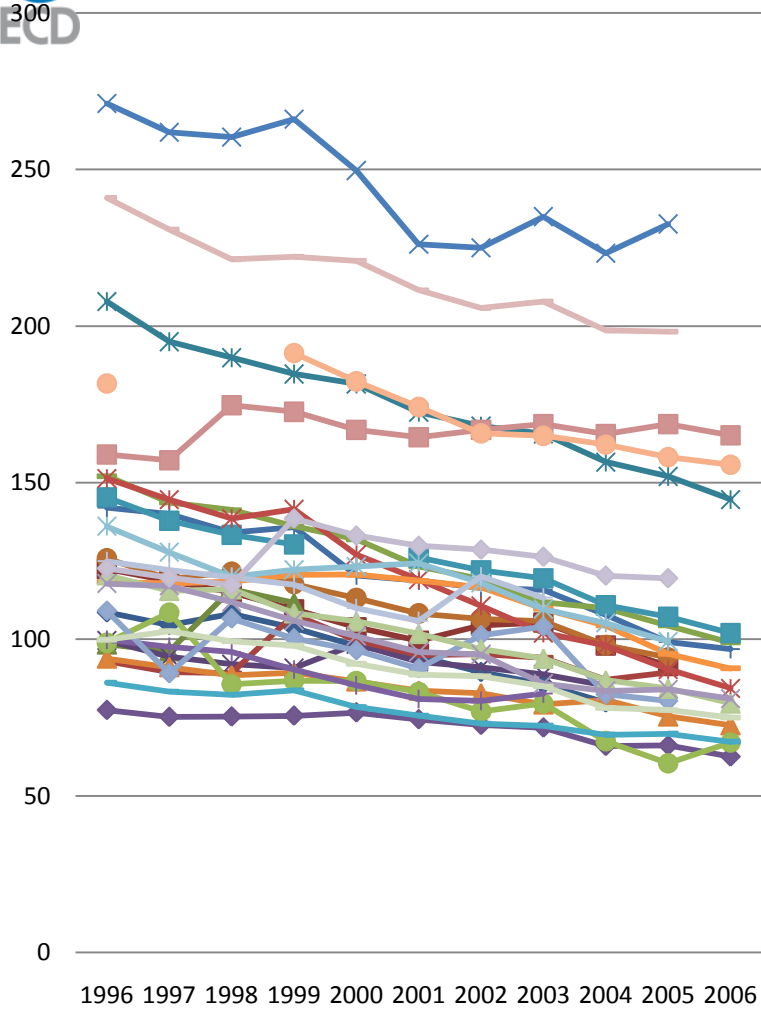
# Amenable mortality - 2006 or last entry



# Reduction in Amenable mortality between 1996 and 2006 (or last available year)

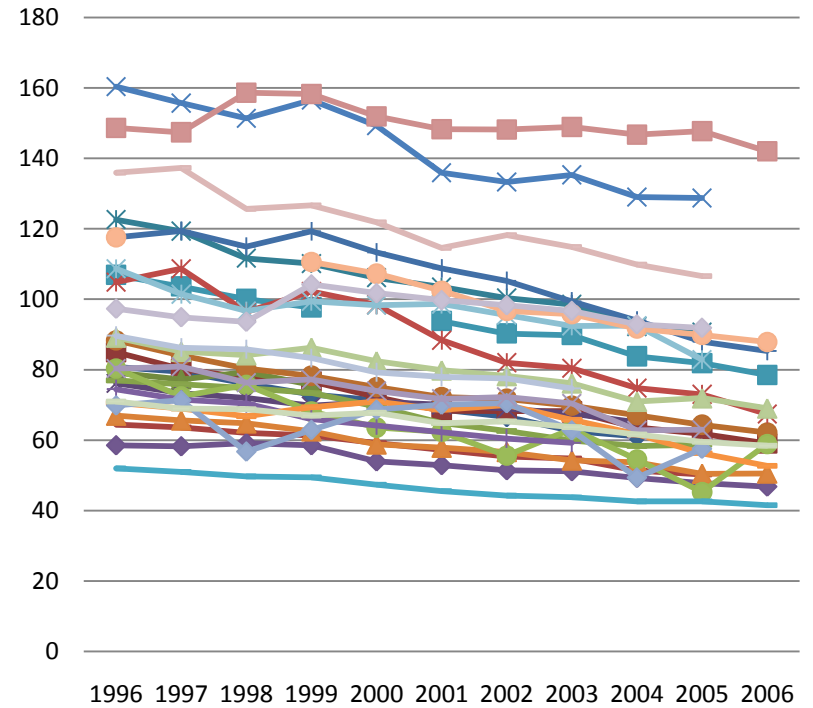


# Males



# Results by gender Amenable Mortality all causes (Tobias & Yen) SMR per 100,000 people, 1996 to 2006

## Females



- ◆ AUS
- AUT
- ▲ BEL
- ✖ CAN
- ✖ CZE
- DEU
- ◆ DNK
- ESP
- ▲ FIN
- ◆ FRA
- GBR
- ▲ GRC
- ✖ HUN
- ✖ IRL
- ISL
- ✖ ITA
- JPN
- ▲ KOR
- ◆ LUX
- MEX
- ▲ NLD
- ✖ NOR
- ✖ NZL
- POL
- ◆ PRT
- SVK
- ▲ SWE
- ◆ USA

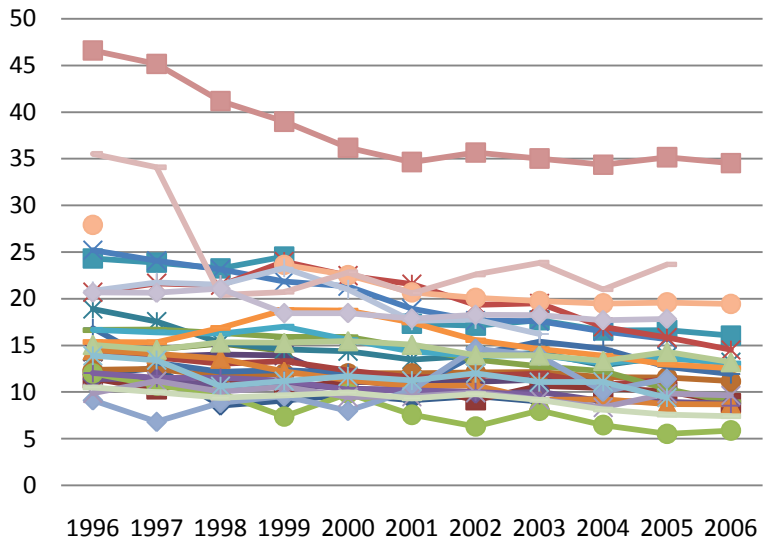


# Results, by disease category

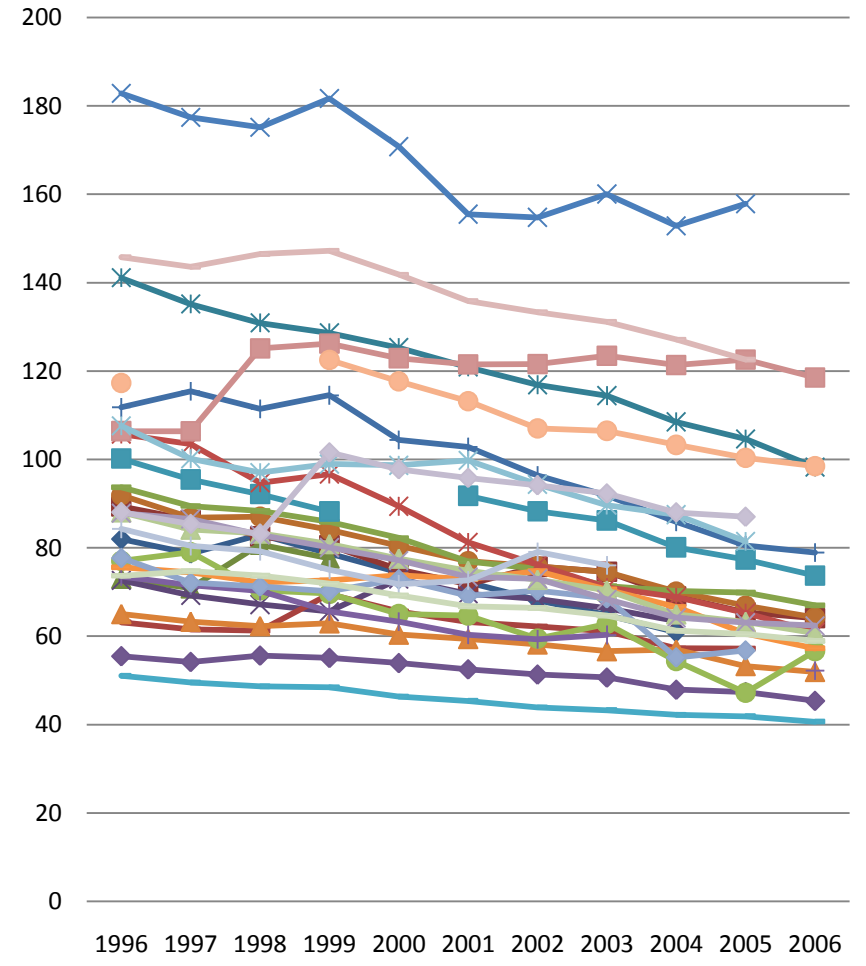
## Amenable Mortality all causes

### SMR per 100,000 people, 1996 to 2006

### Transmissible



### Non transmissible



- ◆ AUS
- AUT
- ▲ BEL
- ◆ CAN
- ✱ CZE
- DEU
- ◆ DNK
- ESP
- ▲ FIN
- ◆ FRA
- GBR
- ▲ GRC
- ✱ HUN
- ✱ IRL
- ISL
- ◆ ITA
- JPN
- ▲ KOR
- ◆ LUX
- MEX
- ▲ NLD
- ◆ NOR
- ✱ NZL
- POL
- ◆ PRT
- SVK
- ▲ SWE
- ◆ USA

# Main findings

- Clear declining tendency in amenable mortality.
- Differences among best performing countries have drastically decreased in the last ten year.
- France, Japan, Sweden and Island have constantly demonstrated better results throughout the last decade.
- Eastern European countries and Mexico have systematically performed less good than the rest of OECD counties.
- US is performing significantly below the rest of OECD countries excluding Mexico and Eastern Europe.
  - Surpassed by counties like Finland, New Zealand, Great Britain, Ireland and Denmark that were experiencing higher Amenable Mortality in 1996
  - No general trend of reduction on Amenable Mortality was identified in the US since 1999 (except for non-transmissible diseases).
- New Zealand, Denmark and Great Britain have also experienced a constant decrease in amenable mortality, yet a gap between them and the rest of best performing OECD countries persist.



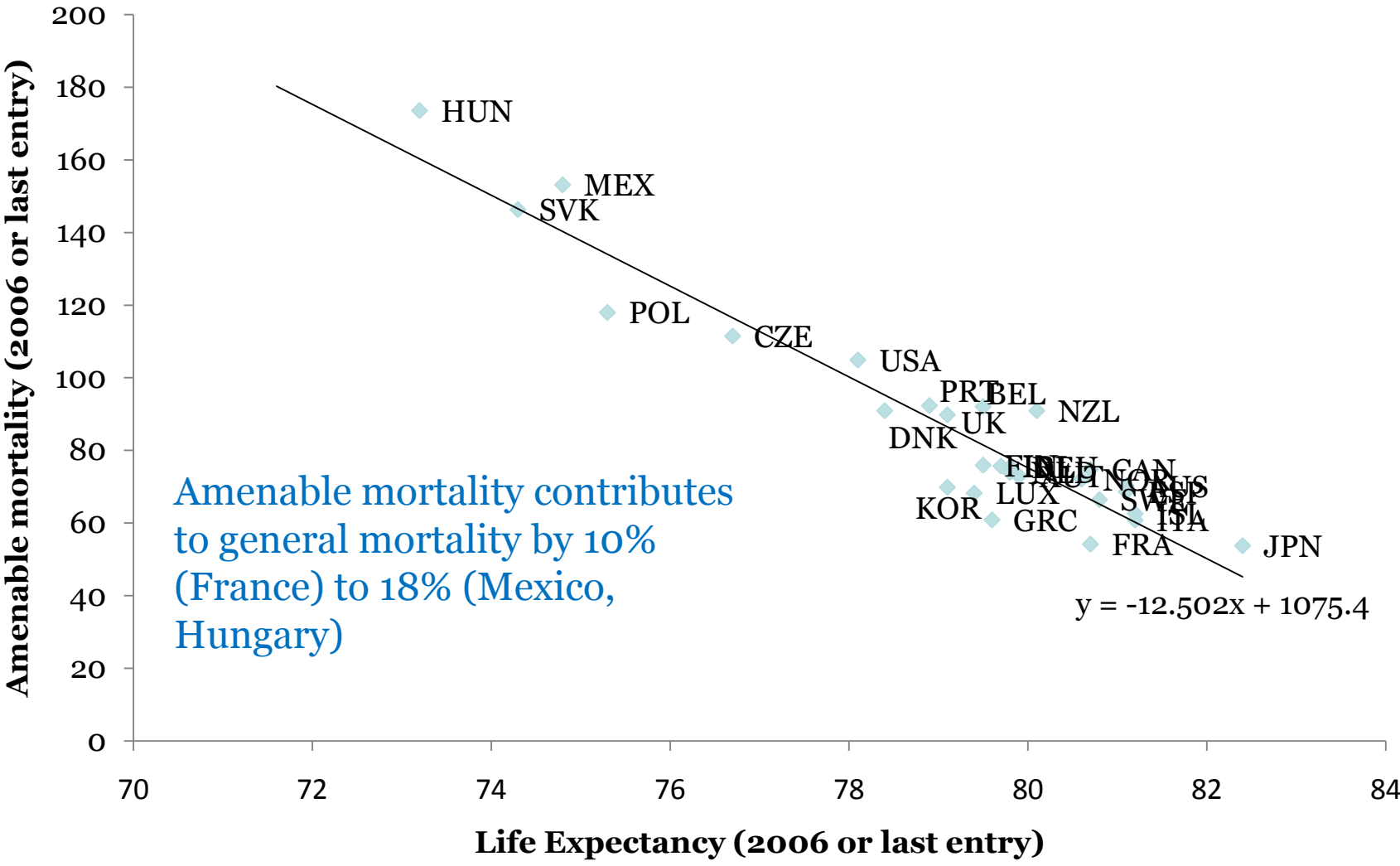
# Limitations

- Dissimilar diagnostic practices of death certification and use of ICD codes across countries.
- Definition of the causes of death that can be considered amenable to health care is expected to vary over time
- Definition of age limits is expected to vary over time
- By definition, AM does not take into account:
  - Improvements in survival that do not allow people to go beyond 75 years (AIDS/VIH?)
  - Improvements in the quality of life: Is not an appropriate indicator to assess the performances of health care services, whose primary intend is to improve the quality of life, with low impact on mortality. E.g.: Mental care is virtually not taken into account
- Lists of causes of deaths amenable to health care have been modest in taking into account deaths that could be avoided from changes in life-styles (abusive consumption of tobacco or alcohol)

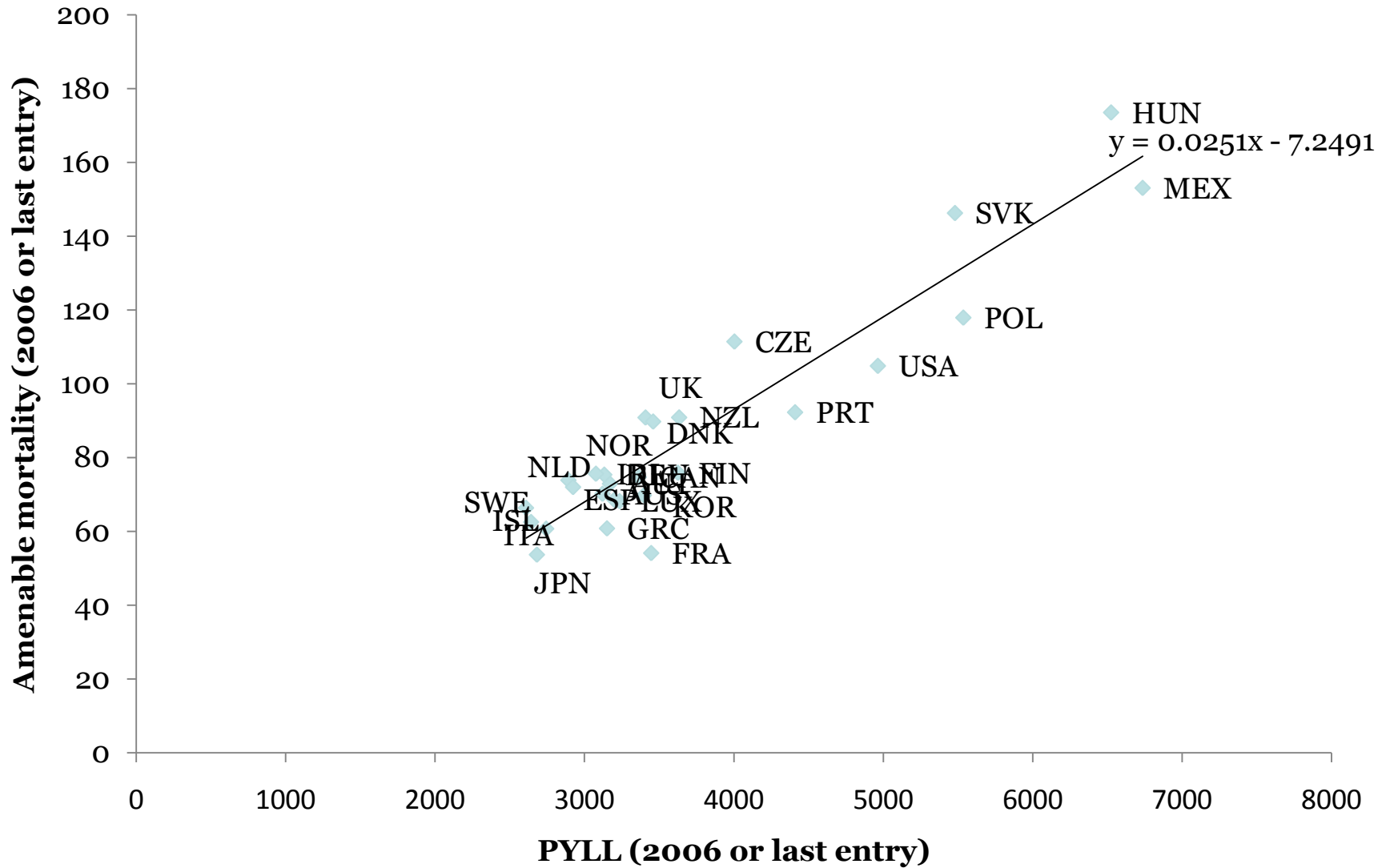
# Comparisons with other outcome indicators

- Life-expectancy
  - Takes into account all causes of death
- Potential years of life lost
  - Include all causes of mortality, including external causes (road accidents, suicide, falls, etc...)
  - Age limit: 70 years (for all causes)
  - Is the some of all years lost between age of death and 70 years (death at 50 « weights » half less than death at 30, which is not the case in amenable mortality).

# Life expectancy and amenable mortality



# PYLL and amenable mortality



# Conclusions

- Amenable Mortality is a practical and effective indicator that could be useful in the comparison of the performance of health care systems across OECD countries.
- AM offers the potential to go further in the identification potential weaknesses of health systems (by categories of diseases)
- Inclusion in OECD health data requires the choice of a list
- AM is only an indicator of outcome. It should be related to resources invested in health care to really assess health systems performance (efficiency)