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

Work: Juan G. Gay
Presentation: Valérie Paris
OECD
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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 heard 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
  – “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)

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

- 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.
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<tbody>
<tr>
<td><strong>Infectious diseases</strong></td>
<td><strong>Tuberculosis</strong>&lt;br&gt;<strong>Intestinal Infections (other than typhoid, diphtheria) &lt;14</strong>&lt;br&gt;<strong>Typhoid, diphtheria, tetanus, septicaemia, poliomyelitis, osteomyelitis</strong>&lt;br&gt;<strong>Whooping cough &amp; measles &lt;14</strong>&lt;br&gt;<strong>Measles – 1-14</strong></td>
<td><strong>Tuberculosis,</strong>&lt;br&gt;<strong>Selective invasive bacterial infections</strong>&lt;br&gt;(incl. malaria, meningitis, infections of the skin)</td>
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<td><strong>Neoplasms</strong></td>
<td><strong>Colorectal cancer,</strong>&lt;br&gt;<strong>Malignant neoplasm of skin</strong>&lt;br&gt;<strong>Breast cancer</strong>&lt;br&gt;<strong>Cervical cancer and uterine cancer (&lt;45)</strong>&lt;br&gt;<strong>Neoplasm of the testis</strong>&lt;br&gt;<strong>Hodgkin’s disease,</strong>&lt;br&gt;<strong>Leukaemia &lt; 45</strong></td>
<td><strong>Colorectal cancer,</strong>&lt;br&gt;<strong>Melanoma of skin, nonmelanotic skin cancer, Breast cancer</strong>&lt;br&gt;<strong>Cervical cancer and uterine cancer</strong>&lt;br&gt;<strong>Bladder cancer</strong>&lt;br&gt;<strong>Thyroid cancer</strong>&lt;br&gt;<strong>Hodgkin’s disease,</strong>&lt;br&gt;<strong>Leukaemia &lt; 45</strong>&lt;br&gt;<strong>Benign tumours</strong></td>
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<td><strong>Endocrine, nutritional and metabolic diseases</strong></td>
<td><strong>Thyroid disorders</strong>&lt;br&gt;<strong>Diabetes mellitus &lt; 50</strong></td>
<td><strong>Thyroid disorders</strong>&lt;br&gt;<strong>Diabetes (type 2) - 50% of deaths</strong></td>
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<td><strong>Diseases of the nervous system</strong></td>
<td><strong>Epilepsy</strong></td>
<td><strong>Epilepsy</strong></td>
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<td>Diseases of the circulatory system</td>
<td>Rheumatic heart diseases &lt;45 Ischemic heart diseases – 50% of deaths Cerebrovascular diseases Hypertensive diseases</td>
<td>Rheumatic heart diseases Ischemic heart diseases - 50% of deaths Cerebrovascular diseases – 50% of deaths</td>
</tr>
<tr>
<td>Diseases of the genitor-urinary system</td>
<td>Nephritis and nephrosis Benign prostatic hyperplasia</td>
<td>Nephritis and nephrosis Obstructive uropathy and prostatic hyperplasia</td>
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<tr>
<td>Diseases of the respiratory system</td>
<td>All respiratory diseases (excl. pneumonia/influenza) . 1-14 Pneumonia/influenza</td>
<td>Chronic Obstructive Pulmonary disease &gt;45 Asthma &lt; 45</td>
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<td>Diseases of the digestive system</td>
<td>Peptic ulcer Appendicitis Abdominal hernia Cholelithiasis and cholecystitis</td>
<td>Peptic ulcer disease Acute abdomen, appendicitis, intestinal obstruction, cholecystitis / lithiasis, pancreatitis, hernia</td>
</tr>
<tr>
<td>Perinatal mortality</td>
<td>Maternal deaths Perinatal deaths (excluding stillbirths) Congenital cardiovascular anomalies – 1-14</td>
<td>Birth defect Complications of the perinatal period</td>
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<tr>
<td>External causes</td>
<td>Misadventures to patients during surgical and medical care</td>
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Results (Tobias & Yeh)
Amenable Mortality all causes, both males and females.
SMR per 100,000 people, 1996 to 2006

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
Reduction in Amenable mortality between 1996 and 2006 (or last available year)
Results by gender
Amenable Mortality all causes
(Tobias & Yen)
SMR per 100,000 people, 1996 to 2006

Males

Females

Legend:
- 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
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 sum 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).
Amenable mortality contributes to general mortality by 10% (France) to 18% (Mexico, Hungary)

$$y = -12.502x + 1075.4$$
PYLL and amenable mortality

Amenable mortality (2006 or last entry)

PYLL (2006 or last entry)

y = 0.0251x - 7.2491

HUN
SVK
POL
USA
MEX
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)