AVOIDABLE DEATHS TENDENCY IN ROMANIA

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Abstract: *To evaluate the performance of health care systems and their impact on the health of the population, several types of measurements were used, of which we quote: assessing the economic efficiency, medical efficiency, social acceptability or organizational structure assessment. Regular assessments are focused mainly on measuring the results of the hospital activities, of the various categories of physicians, especially family physicians, of the health system as a whole, in terms of numbers and types of services provided, and less on health impact assessment. Within this context, the concept of „avoidable deaths" has been introduced. This paper aims at highlighting the avoidable deaths tendency in Romania, based on their assessment for two years, 2002 and 2007, and based on the list of diseases used by Leveque, A, Humblet, PC Lagasse, R. in the atlas made for Belgium.(1)*

Cuvinte cheie: *decese evitabile, România, evaluarea îngrijirilor de sănătate*

Rezumat: *Pentru evaluarea performanţelor sistemelor de îngrijiri şi a impactului acestora asupra stării de sănătate a populaţiei sunt utilizate mai multe tipuri de măsurători dintre care citǎm: evaluarea eficienţei economice, a celei medicale, acceptabilitatea socială sau evaluarea structurii organizaţionale. Evaluările obişnuite sunt axate în special pe măsurarea rezultatelor activităţii spitalului, a diverselor categorii de medici, în special de familie, a sistemului de sănătate luat ca întreg, sub raportul numărului şi tipurilor de servicii furnizate, şi mai puţin pe evaluarea impactului asupra sănătăţii populaţiei. În acest context este introdus conceptul de "decese evitabile". Lucrarea îşi propune să evidenţieze tendinţa deceselor evitabile în România, pornind de la calculul acestora pentru doi ani, 2002 şi 2007, şi de la lista afecţiunilor utilizată de către Levêque, A, Humblet, P.C. Lagasse, R. în atlasul realizat pentru Belgia.(1)*

INTRODUCTION

To evaluate the performance of health care systems and their impact on the health of the population, several types of measurements are used, of which we quote: assessing the economic, medical efficiency, social acceptability or the assessment of the organizational structure.

In the absence of some relevant data, the results of medical care are rarely assessed. Moreover the relation between health care and its outcomes is often disguised, hidden by a number of determinants of health status, such as genetic, social, living, working, environmental and behavioural factors. Regular assessments are focused mainly on measuring the results of the hospital activity, of various categories of physicians, especially family physicians, the health system as a whole, in terms of numbers and types of services provided, and less on health impact assessment. Within this context, the concept of "avoidable deaths" has been introduced.

It was mainly used to make comparisons between different areas, territories, in order to detect the areas with high levels of mortality and to signal upon health inequalities. There were published several atlases based on avoidable deaths for Europe (as a whole or some parts, for example Central and South-East Europe) or some countries (Canada, USA, Belgium).(2) The most interesting results were obtained by the studies that have examined the evolution trend of the phenomenon (e.g. the calculations for Belgium have been made for the years 1974-78, 1980-84 and 1985-89).

Definition – as mentioned in the literature, "avoidable deaths" are defined as premature deaths (deaths before the age of 65 years) that can be influenced by health care or health promotion activities.(1)

Brief history of "avoidable deaths" concepts:

- 1976 Rutstein, DD. (together with a working group) proposes the concept of "sentinel health events" - a list of diseases, disabilities and premature deaths that could be considered "avoidable through preventive and curative measures";(3)
- 1980, the same workgroup reviewed the list of events:
- RJ Charlton (1983) and Mackenbach J. P. (1984) - have made the assumption that if the events are limited to deaths, "avoidable deaths" could easily be used to assess the impact of health resources on the health status of population;(4)
- 1997 - Holland, W.W. together with the European Community's Working Group on "Health services and avoidable deaths" published a list and an atlas of avoidable deaths. Compared to the previous lists, they introduced a series of sensitive causes to primary prevention (lung cancer, liver cirrhosis, road accidents).(4)

There were two reasons that led to changing the lists of disorders: introduction of diseases that can be influenced by

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primary prevention measures and improving the techniques of diagnosis and treatment for some diseases. The authors admit that diagnoses lists are not exhaustive; they do not cover all diseases that could have been included in the category of those generating avoidable deaths because:

- there is insufficient health information at local level;
- there are problems / difficulties with the declaration and coding the causes of death;
- there are differences of opinion among experts on the character of "avoidable death";
- the use of some lists with different structures makes it impossible to compare diverse data (over time and across countries). For example - a study conducted in the province of Valencia in Spain showed that for the period 1975 – 1990, avoidable deaths calculated based on "Holland" list accounted for 30% of all deaths and those calculated based on "Charlton" list only 3%.

These works made "avoidable deaths" to become a technique commonly used in assessing the impact of health services on the health of the population.

Application of the concept of "avoidable deaths"

- assessing the health status of the population;
- identifying health problems;
- establishing priorities and prioritizing health problems;
- comparing the health status of the population in different areas, territories, population subgroups;
- identifying health inequalities (especially at territorial level);
- establishing quantitative objectives of health programmes;
- assessing and monitoring the programmes / projects / interventions;
- measuring quality of care;
- assessing the health system's performance.

Examples of lists of diseases which are included in "avoidable diseases" category

List of diseases - used in the atlas published by the Hungarian Central Statistical Office, atlas supported by WHO-EURO:(5)

Deaths from external causes of injury and poisoning (all age groups);

- deaths from external causes of injury and poisoning (0-64 years old);
- deaths by lung, trachea, bronchi neoplasia (5-64 years old);
- deaths by chronic liver cirrhosis (15-64 years old);
- deaths by road accidents (5-64 years old);
- deaths from TB (5-64 years old);
- cervical cancer deaths (15-64 years old);
- deaths by cervical cancer and body of the uterus (15-54 years);
- Hodgkin disease deaths (5-64 years old);
- deaths by heart disease caused by rheumatic fever (5-44 years old);
- deaths from hypertension and cerebrovascular disease (35-64 years old);
- deaths from respiratory disease (1-14 years old);
- deaths due to asthma (5-44 years old);
- deaths due to appendicitis (5-64 years old);
- abdominal hernia deaths (5-64 years old);
- cholecystitis and cholelithiasis deaths (5-64 years old);
- maternal deaths (all age groups);
- perinatal deaths.

The list used in Belgium, in the study done by Leveque, Humblet and Lagasse – the authors subdivided the list of diseases into 2 subgroups: diseases that can be influenced by health care and conditions that may be influenced by primary prevention measures:(6)

Conditions amenable to medical care

- tuberculosis (5 – 64 years old);
- breast cancer (15 – 64 years old);
- cervical cancer (15 – 64 years old);
- hypertension and cardiovascular diseases (35 – 64 years old);
- asthma (5 – 49 years old);
- infant mortality;
- gastrointestinal disorders (1-14 years old);
- testicular cancer (15-64 years old);
- Hodgkin 's disease (5-64 years old);
- leukaemia (0-14 years old);
- chronic rheumatic heart disease (5-44 years old);
- respiratory diseases (1-14 years old);
- peptic ulcer (15-64 years old);
- appendicitis (5-64 years old);
- abdominal Hernia (5-64 years old);
- cholecystitis and cholelithiasis (5-64 years old);
- congenital anomalies of the heart and vessels (1-74 years old);
- maternal mortality (all ages).

Conditions amenable to health promotion activities

- cancer of the trachea, bronchus and lung (5-64 years old);
- ischemic heart disease (5-64 years old);
- cirrhosis (15-64 years old);
- road accidents due to motor vehicles (all ages);
- skin cancer (non-melanoma) (5 – 64 years old).

WHO experts included among avoidable deaths some deaths that could have not occurred:

- through primary prevention measures - deaths due to road accidents involving motor vehicles, cerebrovascular pathology, chronic liver disease and cirrhosis and some cancers (liver cancer, cancer of the upper respiratory and digestive tract, lung cancer);
- through measures for secondary prevention (early diagnosis and initiation of therapy) - deaths due to skin melanoma, breast cancer, cervical cancer and some cancers of the endometrium that may benefit from early diagnosis. In these conditions, it is possible to cure the patient or the long-term survival.

The rationale for choosing deaths produced only in specific age groups is the following:

- increase the avoidable part within the indicator structure (along with aging);
- the fact that any cause of death could not be completely eliminated; opportunity to enter into the category of avoidable causes is higher in a particular age group;
- in certain age groups, early diagnosis and treatment of some diseases can lead either to postpone death and consequently, to the survival expectancy increase.

METHODS

Source of data - for the identification and quantification of deaths that fall into the category of avoidable deaths, we used the mortality database of the World Health Organization.(7) It includes deaths by cause, age and gender and a time series.

Period of time - to highlight the trend of the phenomenon, two times have been used (for 2 years), at an interval of five-year period (2002 and 2007). The time and its

limits were chosen according to the existing data in the WHO database.

List of diseases – As a model, there has been chosen the list used by Leveque, A, Humblet, PC Lagasse, R. in the atlas made for Belgium for the years 1985-1989. It was completed based on existing data and taking into account changes in the coding of diseases, occurred in the study period. The criterion was to ensure the perfect comparability of data (diagnoses) studied in the two years. The list of diseases is presented in table no. 1. Data were taken separately for males and females.

Table no. 1. Avoidable deaths list of diagnosis used by Leveque, Humblet and Lagasse

Diagnosis	**Code (ICD – 9)**	**Code (ICD – 10)**	**Age groups**
Deaths amenable to medical care			
Gastro-intestinal infections	001 - 009	A00-A09	0 –14
Tuberculosis	010 – 018; 137	A15-A19; B90	5 – 64
Breast cancer	174	C50	15 – 64
Cancer of cervix uteri and body of the uterus	179-180;182	C53-C55	15 – 64
Leukaemia	204 - 208	C91-C95	0 – 14
Chronic RHD	393 - 398	I05-I09	5 – 44
Hypertension and cerebrovascular diseases	401 – 405;430 - 438	I10-I15; I60-I69	5 – 64
Respiratory diseases	460 - 519	J00-J99	1 – 14
Gastric and duodenal ulcer	531 - 534	K25-K28	15 – 64
Appendicitis	540 - 543	K35-K38	5 – 64
Abdominal hernia	550 - 553	K40-K46; K56	5 – 64
Cholecystitis and cholelithiasis	574 – 575.1; 576.1	K80-K83	5 – 64
Maternal mortality	630 – 678	O00-O97	
Congenital anomalies of the heart and vessels	745-747	Q20-Q28	1+
Infant mortality			0 – 1
Diseases amenable to health promotion			
Trachea, bronchus and lung cancer	162	C33-C34	5 – 64
Ischemic heart disease	410 – 414;429.2	I20-I25	5 – 64
Liver cirrhosis	571	K70;K73-K74; K76	15 – 64
Accidents involving motor vehicles	E810 - 825	V02-V04;V09; V12-V14; V19-V79; V86-V89	All ages
All causes			**0 – 64 years old**
All causes			**All ages**

Some of the diagnoses belonging to the avoidable deaths group and the identification of the possible factors are shown in table no. 2.

Table no. 2. Level of intervention in the case of some avoidable deaths

Diagnosis	Level of health system responsibility	Other potential influencing factors
Diseases amenable to medical care		
Maternal mortality	Primary care Hospital care	Socio-economic and living conditions level
Cancer of cervix uteri and body of the uterus	Public health Screening programmes	Risk factors: personal history, family history and sexual behaviour
Breast cancer	Public health Screening programmes	Risk factors: family history, obesity
Tuberculosis	Public health Tuberculosis control and surveillance network	Socio-economic and living conditions level
Appendicitis, cholecystitis, cholelithiasis	Primary care Hospital care	Educational level Lifestyle, nutrition
Chronic RHD	Primary care	Poor living conditions
Hypertension; cerebrovascular disease	Primary care Hospital care	Lifestyle: smoking, overweight, stress, unbalanced diet, treatment compliance
Gastric and duodenal ulcer	Primary care Hospital care	Lifestyle: smoking, alcohol, drugs, stress, poor diet
Diseases amenable to health promotion		
Ischemic heart disease	Primary care Hospital care	Lifestyle: smoking, overweight, stress, unbalanced diet
Trachea, bronchus and lung cancer		Lifestyle: smoking
Liver cirrhosis		Lifestyle: alcohol consumption
Accidents involving motor vehicles		Lifestyle, quality of roads and cars

RESULTS

Table no. 3 presents the absolute figures that quantify the avoidable deaths in Romania, in the years 2007 and 2012. The total number of avoidable deaths in 2007 was 38 683 (distributed among the diseases amenable to medical care - 16 695 and 21 988 in category of diseases amenable to health promotion). In 2012, the total of 34 526 decreases by about 4000 deaths as compared to 2007 (see table no. 3)

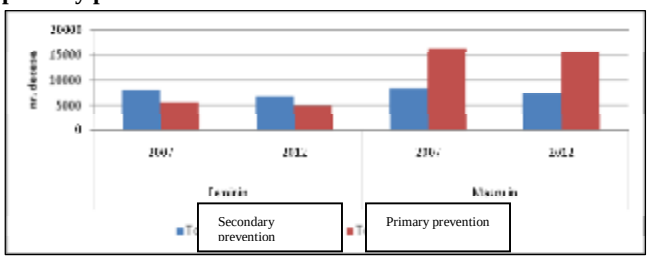
Table no. 3. Avoidable deaths in Romania, per causes and gender, in 1992, 2002 and 2007

Diagnosis	**2007**			**2012**		
	M	**F**	**T**	**M**	**F**	**T**
Diseases amenable to medical care						
Gastro-intestinal infections	15	14	29	8	8	16
Tuberculosis	1068	174	1242	704	139	843
Breast cancer		1414	1414	27	1362	1389
Cancer of cervix uteri and body of the uterus		1445	1445		1237	1237
Leukaemia	24	21	45	20	14	34

Chronic RHD	23	5	28	13	7	20
Hypertension and cerebrovascular diseases	5750	3262	9012	5214	2827	8041
Respiratory diseases	106	83	189	95	70	165
Peptic ulcer	173	40	213	111	34	145
Appendicitis	8	6	14	6	2	8
Abdominal hernia + intestinal obstruction	85	66	151	64	63	127
Maternal mortality		33	33		23	23
Congenital anomalies of the heart and vessels	51	36	87	30	34	64
Infant mortality	1176	1565	2793	1032	869	1901
Total secondary prevention	**8479**	**8164**	**16695**	**7324**	**6689**	**14013**
Diseases amenable to health promotion						
Trachea, bronchus and lung cancer	3642	706	4348	3880	850	4730
Ischemic heart diseases	7322	2473	9795	6431	2030	8461
Liver cirrhosis	3706	1826	5532	3704	1606	5310
Accidents involving motor vehicles	1703	610	2313	1527	485	2012
Total primary prevention	**16373**	**5615**	**21988**	**15542**	**4971**	**20513**
Total	**24852**	**13779**	**38683**	**22866**	**11660**	**34526**

Constantly, avoidable deaths are higher among men compared to women. The difference is obvious for the group of diseases that can be prevented by measures which promote a healthy lifestyle.

Figure no. 1. Gender distribution of avoidable deaths by primary prevention in 2007 and 2012



Gender variable also intervenes in the distribution of avoidable deaths according to the two possible categories of interventions, both in 2007 and in 2012. In men, the number of avoidable deaths by primary prevention measures is higher and in women, those by secondary prevention measures (so, early diagnosis and treatment).

Evaluation of reserves in decreasing the crude mortality rate can be done by calculating the share (%) of avoidable deaths in relation to the deaths produced in population (see table no. 4).

In 2007, the total number of deaths was 251 965 (figure existing in WHO database) and in 2012, 255 539 (figure existing in the database of Computing Centre), so the crude mortality rate was higher in 2012 than in 2007. The share of avoidable deaths in 2012 is 1% lower than in 2007. The decrease has the same amplitude as in males and females.

Table no. 4. Share of avoidable deaths in relation to total deaths

% of total deaths

	2007	2012
Total	15	14
Masculine	19	17
Feminine	12	10

If we refer only to the age group of 0-64 years old, the situation changes and is presented in table no. 5:

Table no. 5. Share of avoidable deaths in relation to total deaths in the age group of 0 – 64 years old

% of all deaths

	2007	2012
Total	56	53
Masculine	52	51
Feminine	64	58

- Over half of the deaths in the age group of 0-64 years old, produced both in 2007 and 2012, falls into the category of avoidable deaths;
- The share of avoidable deaths in the three times has very small oscillations;
- This applies to both women and men;
- Constantly, the share of the avoidable deaths is higher in women than men, the difference being statistically significant.

In 2012, we are witnessing a 100% increase in the number of avoidable deaths from breast cancer in men and cancer of the trachea, bronchus and lung (6.53% increase in men and 20.40 in women) (see table no. 6 and figures no. 2, 3 and 4).

Table no. 6. Avoidable deaths in Romania, by causes and gender, in 2007 compared to 2002

% in 2007 (year 2002 is the baseline)

Diagnosis	Masculine	Dif. +/-	Feminine	Dif. +/-	Total	Dif. +/-
Diseases amenable to medical care						
Gastro-intestinal infections	53.33	-46.67	57.14	-42.86	55.17	-44.83
Tuberculosis	65.92	-34.08	79.89	-20.11	67.87	-32.13
Breast cancer	0.00	100.00	96.32	-3.68	98.23	-1.77
Cancer of cervix uteri and body of the uterus			85.61	-14.39	85.61	-14.39
Leukaemia	83.33	-16.67	66.67	-33.33	75.56	-24.44
Chronic RHD	56.52	-43.48	140.00	40.00	71.43	-28.57
Hypertension and cerebrovascular diseases	90.68	-9.32	86.66	-13.34	89.23	-10.77
Respiratory diseases	89.62	-10.38	84.34	-15.66	87.30	-12.70
Peptic ulcer	64.16	-35.84	85.00	-15.00	68.08	-31.92
Appendicitis	75.00	-25.00	33.33	-66.67	57.14	-42.86
Abdominal Hernia + intestinal obstruction	75.29	-24.71	95.45	-4.55	84.11	-15.89
Maternal			69.70	-30.30	69.70	-30.30

mortality						
Accidents involving motor vehicles	58.82	-41.18	94.44	-5.56	73.56	-26.44
Infant mortality	87.76	-12.24	55.53	-44.47	68.06	-31.94
Diseases amenable to health promotion						
Trachea, bronchus and lung cancer	106.53	6.53	120.40	20.40	108.79	8.79
Ischemic heart diseases	87.83	-12.17	82.09	-17.91	86.38	-13.62
Liver cirrhosis	99.95	-0.05	87.95	-12.05	95.99	-4.01
Accidents involving motor vehicles	89.67	-10.33	79.51	-20.49	86.99	-13.01

In conclusions, in 2012, in males, we are witnessing a growing number of avoidable deaths by two cases (+ breast cancer + trachea, bronchus and lung cancer - see figure no. 2) and in women for two causes (RHD + trachea, bronchus and lung cancer - see figure no. 4).

Figure no. 2. Distribution by causes of avoidable deaths in 1012 in men

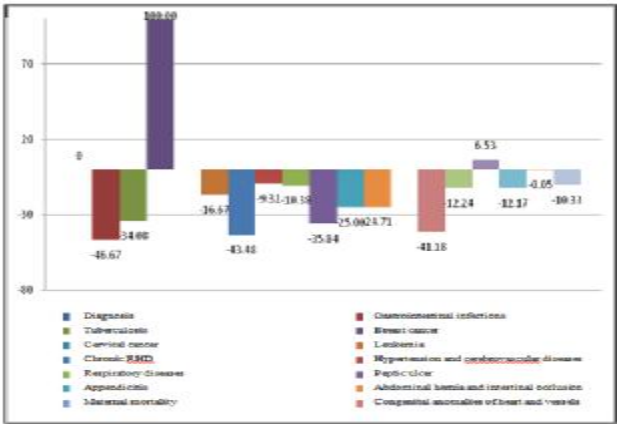


Figure no. 3. Distribution by causes of avoidable deaths in 2012

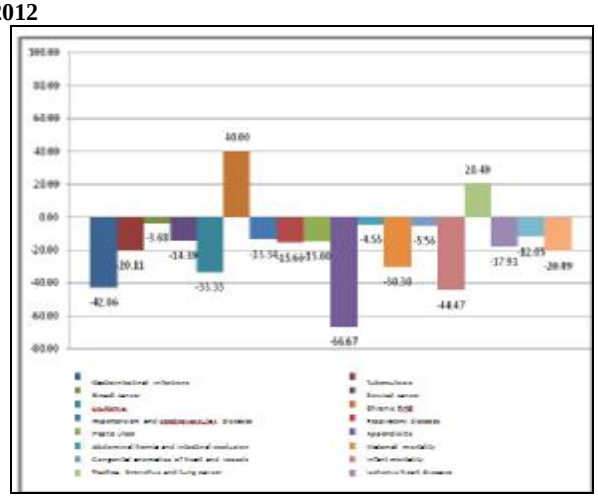
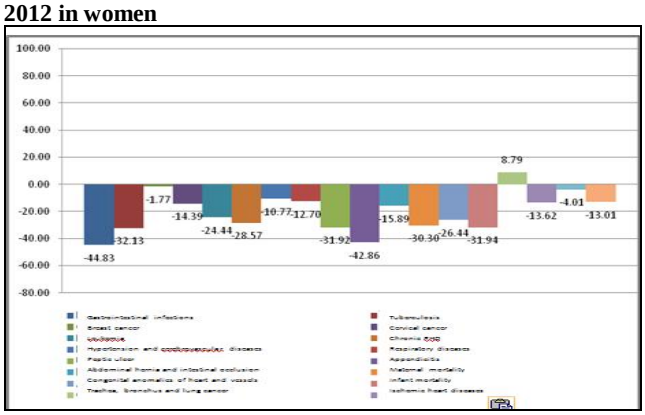


Figure no. 4. Distribution by causes of avoidable deaths in 2012 in women



CONCLUSIONS

1. The assessment of avoidable deaths is a useful method for measuring the health of the population and the impact of health system on it (through primary and secondary prevention measures);
2. The list of diseases and of age groups that may fall into the category of those generating avoidable deaths in Romania was established based on the list recommended by WHO, these ones being subdivided into deaths can be prevented by influencing lifestyles and deaths that can be prevented through secondary prevention measures. The period was determined according to the available data;
3. Constantly, avoidable deaths are higher among men compared with women. The difference is obvious in the group of diseases that can be prevented by measures which promote a healthy lifestyle;
4. For almost all groups of diseases, we are witnessing a reduction in avoidable deaths;
5. Avoidable deaths represent the reserve of the decrease of the mortality rate in Romania.

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