Changes in the Mortality Rate During the Last Decade In the Fields of Oncology in Hungary

Tamás Balázs[1], Pál Rakonczai[1], Róbert Frigyesy[1], Miklós Bacskai[1]

[1]Healthware Consulting Ltd.

Background

- Besides chronic diseases, provision of malignant neoplasms are also one of the most significant issue of the healthcare systems worldwide. Aging of the world's population is a major factor contributing to the increase in cancer mortality because the incidence of most cancers increases with age. Global cancer mortality rose from 6 million in 1990 to 7 million in 2000.[1,2]
- According to the data of WHO, nowadays more patients die in cancer than in AIDS, TBC and malaria together. In Hungary the cause of death for patients with tumour have progressively risen in the last 60 years. The trend of mortality caused by malignancies has increased and Hungary has become the country with one of the highest cancer death rates among the member states of the European Union. [2]
- To reduce mortality and morbidity from cancer the importance of prevention, screening, early detection methods, improved and targeted therapies and palliative care have become more fundamental in the last decade. Despite these procedures, according to expert opinions, the incidence of some cancers (etc. kidney, pancreas) is increasing and decline in the cancer death rate has been slower. [3]
- Based on the data of the Hungarian Central Statistical Office prevalence of oncological patients in Hungary is growing due to the modern diagnostic devices, the effectiveness of diagnostic screening methods and also the increasing life expectancy. This study aims to assess information about the change in mortality rate in different cancer patient groups in Hungary during the last decades.

Methods

- **DATABASE:** The retrospective analysis used patients' attendance data from the National Insurance Fund Administration (NHIFA), which contains detailed provision data (no lab values) from the whole population of Hungary (about 10 million citizens). NHIFA disposed of payer databases which cover major segments of care, i.e.: hospital treatments, outpatient care, pharmaceuticals, medical aids and devices.
- **CANCER TYPES OF INTEREST:** (*Table 1*)

Table 1: Investigated fields of oncology

Cancer Type	ICD code	Cancer Type	ICD code	Cancer Type	ICD code
Colorectal cancer	C18-C20	Breast cancer	C50	Prostate cancer	C61
Lung cancer	C34	Malignaces of haematopoietic and lymphatic system (MHLS)	C81-85, C88, C90-96	Kidney cancer	C64-C65

- **INCLUSION CRITERIA:** Patients with 2 asymptomatic years were included into the study.
- **PATIENT GROUPS:** In the study 3 different patient groups were analyzed. Patients, who fulfilled the inclusion criteria, were included in patient group ①. Those patients in group ①, who had minimum 2 disease-related examinations (i.e. laboratory, imagining technics), or therapies by medicines within 1 year from the index-date too, were included in patient group ②. At last in patient group ③ minimum 2 services (therapy or DRG) within 1 year were required as well.
- **STUDY PERIOD:** The study period spanned 10 years, from 01.01.2005. to 12.31.2014, but the analysis started only 01.01.2007. because of the inclusion criteria.
- **STATISTICAL METHODS**: Descriptive statistics were used to describe the basic features of the patients, and the relationship between the covariates and the risk of the mortality was modelled by Cox proportional hazard models. [4]
- **COVARIATES:** The time of the relevant ICD code, which met the inclusion criteria first, was considered as index date. The age was calculated at the time of the index date. Those patients who had any other malignant neoplasm different from the diagnosed one within half year were identified as metastatic. Further, non-oncology comorbidities were aggregated into Charlson index with three categories: mild - medium - severe.
- **SOFTWARE**: Relative risk estimates of survival were available using the 'survival' package of the R statistical programming language.
- **LIMITATIONS:** Patient's pathways were all left truncated (no data was available before 2005) so the identification of the first diagnosis could be inaccurate. NHIFA contains data only about services which were provided in the public healthcare system, so services of the private sector remain unknown (low proportion).

Results

- The number of patients and the mortality rates can be found in *Table 2* below. The patient groups were embedded into each other that implied decreasing sample sizes. The stricter inclusion criteria were chosen, the higher mortality rate was found (except breast cancer) due to lower misclassification rate and more severe state within the patient groups. The mortality rates of lung cancer were found the highest [60.5% in ①, 70.6% in ②, 82.1% in ③].

Table 2: Number of patients and mortality rate in the different patient groups

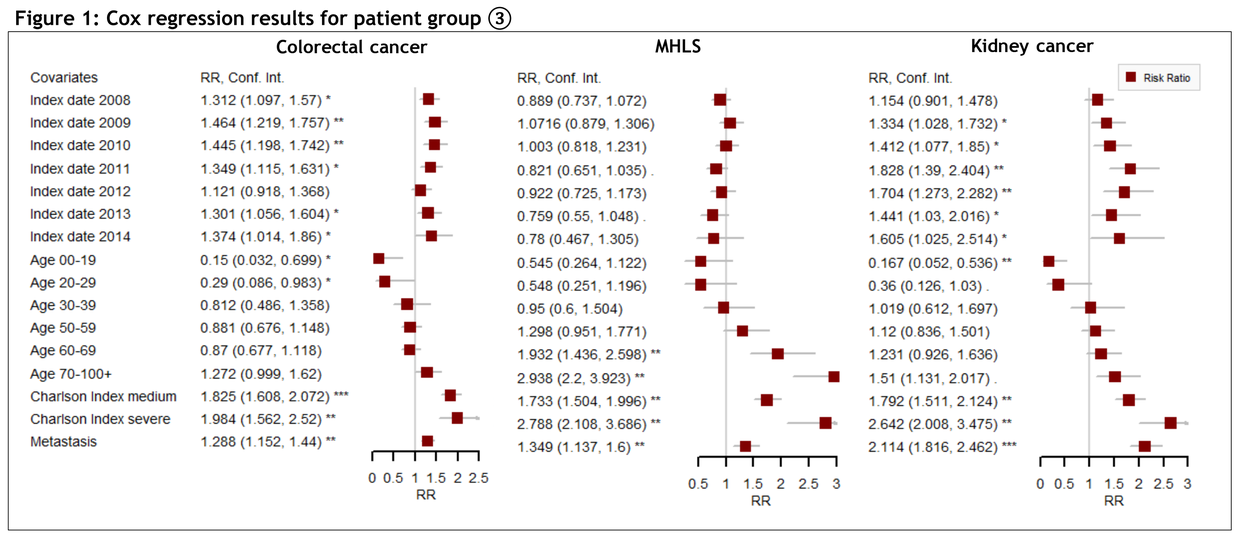
Cancer types	Patient group ①		Patient group ②		Patient group ③	
	Number of patients	Mortality rate	Number of patients	Mortality rate	Number of patients	Mortality rate
Colorectal cancer	83 761	39.9%	56 053	42.3%	3 192	72.2%
Breast cancer	85 079	17.4%	52 503	19.6%	31 764	16.0%
Prostate cancer	35 888	26.0%	25 447	27.6%	18 482	32.0%
Lung cancer	79 903	60.5%	49 237	70.6%	15 746	82.1%
MHLS	48 688	30.1%	25 698	34.1%	4 076	42.5%
Kidney cancer	18 096	26.7%	11 550	27.8%	2 608	47.8%

- In most cases the probability of one year survival for patients with index date 2007 and 2011 were rather similar (*Table 3*). Relevant differences could only be found in group ③: in colorectal and kidney cancer there was 8.5% and 4.6% drop, and in MHLS 3.3% rise.
- Neither censoring nor the effects of additional variables (as age, metastasis and comorbidities) were taking into account when calculating the above descriptive statistics.
- Both censoring and covariates can be handled by fitting Cox proportional hazard model, which estimates the relative risks of death in each specified cohorts.
- Index date 2007, age 40-49, mild Charlson index and no metastasis were chosen as reference category during the estimation.

Table 3: Difference in one year survival for 2007 and 2011 based on relative frequencies

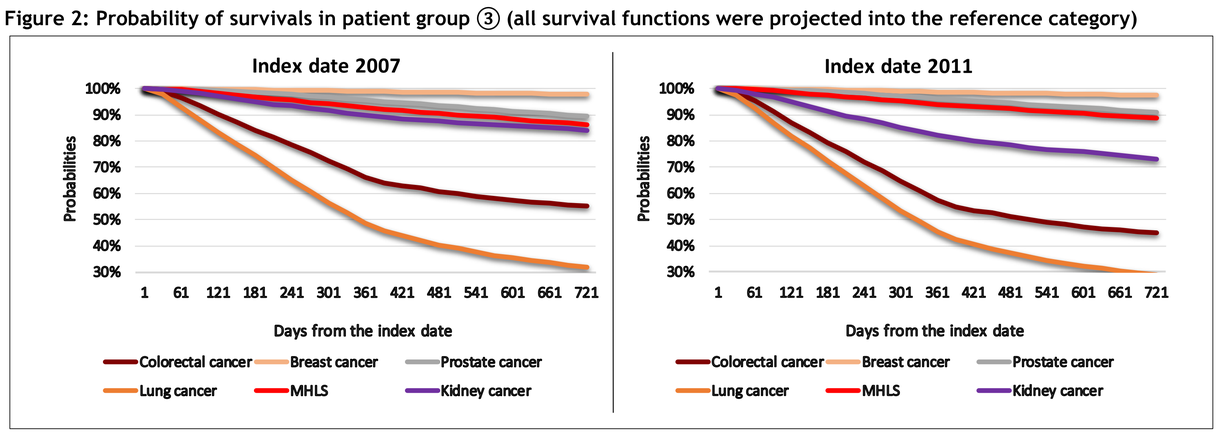
Cancer types	Patient group ①		Patient group ②		Patient group ③	
	Index date 2007	Index date 2011	Index date 2007	Index date 2011	Index date 2007	Index date 2011
Colorectal cancer	86.17%	84.84%	87.86%	87.63%	82.68%	74.20%
Breast cancer	97.09%	96.39%	96.99%	96.84%	99.13%	98.23%
Prostate cancer	94.92%	95.62%	95.29%	96.68%	96.85%	97.31%
Lung cancer	72.53%	70.30%	70.96%	71.57%	68.33%	68.66%
MHLS	91.06%	87.71%	92.15%	89.63%	91.70%	95.00%
Kidney cancer	91.81%	91.19%	92.31%	92.80%	91.39%	86.83%

Figure 1: Cox regression results for patient group ③



- The effect of the comorbidity and metastasis was always significant and remarkable in every patient group and oncology field. (*Figure 1*)
- Significant temporal trend in patient group ① and ② couldn't be determined. In patient group ③ difference was discoverable among the index dates even if it was not necessarily mending. (*Figure 1*, *Figure 2*).
- This result can probably be attributed to the different composition of cohorts, which didn't appear in the current covariates.

Figure 2: Probability of survivals in patient group ③ (all survival functions were projected into the reference category)



Conclusions

- Decision-makers need various indicators and analyses at Health System Performance Assessment.
- The changes in mortality rates can present great importance findings, especially in oncology.
- However, in the field of oncology the survival probability can be very different in the variant indication of malignant neoplasms. The selection and definition of compared populations are very crucial within an indication, because the medications and characters of patients can have a great effect on the investigated data.
- Therefore, to conclude from observational data is very hard, moreover the input cohorts in time can be very different due to data recording and care protocols. All findings must be handled with caution, because the confounding effects are accumulated in data.
- More local case-control studies are needed to clarify and assess the multiple exposures and risk factors belong to the mortality of patients with oncological disease. The consecutive results give useful information to plan the right interventions for the best outcomes in the healthcare systems.

References

[1] Ezzati, Majid – Henley, S.J. – Lopez, A.D. – Thun, M.J. [Role of smoking in Global and Regional Cancer Epidemiology: Current Patterns and Data Needs (2005)] International Journal of Cancer. 116,936-971.

[2] Tompa, A. [The Prevalence of Cancer: Domestic and Internation Situation (in Hungarian)]. Magyar Tudomány, 2011, 172(11).

[3] Suzanne H. Reuben - Erin L. Milliken - Lisa J. Paradis [The Future of Cancer Research: Accelerating Scientific Innovation; President's Cancer Panel Annual Report 2010-2011]]. 2012.

[4] Therneau, T. - Grambsch, P. [Modeling Survival Data: Extending the Cox Model]. Springer-Verlag, 2000.

This poster is compiled by Healthware Consulting Ltd. ISPOR 18th Annual European Congress, Milan, 7-17 November 2015.
Healthware Consulting Ltd. / H-1093 Budapest, Közraktár str. 30. River Park Offices, VI. floor
Phone.: +36 1 279 1083 / Fax: +36 1 279 1084 / www.healthware.hu

Download our ISPOR posters directly from our webpage:

Poster code: PCN9