



Cancer surveillance using registry data: Results and recommendations for the Lithuanian national prostate cancer early detection programme

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Abstract *Introduction:* We describe long term trends in prostate cancer epidemiology in Lithuania, where a national prostate specific antigen (PSA) test based early detection programme has been running since 2006.

Methods: We used population-based cancer registry data, supplemented by information on PSA testing, life expectancy and mortality from Lithuania to examine age-specific prostate cancer incidence, mortality and survival trends among men aged 40+ between 1978 and 2009, as well as life expectancy of screening-eligible men, and the proportion of men with a first PSA test per year since the programme started.

Results: The number of prostate cancer patients rose from 2,237 in 1990–1994 to 15,294 in 2005–2009. By 2010, around 70% of the eligible population was tested, on average around two times. The early detection programme brought about the highest prostate cancer incidence peaks ever seen in a country to date. Recent incidence and survival rises in the age

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groups 75–84 suggest PSA testing in the elderly non-eligible population. Life expectancy of men aged 70–74 indicates that less than 30% of patients will live for 15 years and may have a chance to benefit from early detection.

Conclusions: Early detection among men aged 70–74, and particularly among the elderly (75+) may have to be reconsidered. Life expectancy assessment before testing, avoiding a second test among men with low PSA values and increasing the threshold for further evaluation and the screening interval may help reducing harm. Publishing information on treatment modalities, side-effects and patient reported quality of life is recommended.

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1. Introduction

To our knowledge, Lithuania is the only country in the world with a prostate specific antigen (PSA) test based official national prostate cancer early detection programme [1]. The programme was launched in 2006, when men aged 50–74, as well as men aged 45–49 with family history of prostate cancer became eligible to undergo PSA testing once a year, while since 2008, testing is offered every two years. The programme works on an invitation by opportunity basis currently, and tests are offered when men visit their general practitioner for some reason. Further urological evaluation is offered when PSA levels exceed 3 ng/ml. Although the European Randomized study of screening for prostate cancer (ERSPC) demonstrated a potential for mortality decline [2,3], the very long lead time of cancer detection [4], the potentially very serious side-effects of the treatment and large variation in the life expectancy of different populations [5], as well as concern about the overall validity of the ERSPC results [6] keep PSA-based early detection highly controversial [7–9].

In this paper, we provide a comprehensive analysis of population-based trends of prostate cancer incidence, survival and mortality using data from the Lithuanian Cancer Registry [10] and other relevant accompanying data sources, and compare recent trends in prostate cancer incidence and mortality in Lithuania to those seen in the United States (US), the country which probably experienced the highest intensity of PSA testing in the recent two decades. Additionally, we include an analysis of recent life expectancy in Lithuanian men to consider the age-specific variation in chances for a potential benefit from testing.

2. Materials and methods

2.1. Data sources and calculation of basic epidemiologic measures

Incidence data for this analysis came from the population-based Lithuanian Cancer Registry, which covers the entire population (3 million people in 2011) of the country, and has been in operation since 1984 (yet incidence data are available since 1978) [10]. The

registry's principal sources of information are from primary, secondary and tertiary health care centres and pathology laboratories, with additional notifications from all physicians, hospitals and other health institutions. These notifications are supplemented by death certificate information, and population registry information to verify vital status – these data were available since 1990. National mortality data were available from Statistics Lithuania [11] for the years 1978–2009.

Here, cancer information of patients aged 40 years and older and diagnosed with prostate cancer (ICD-10 C61) between 1978 and 2009 was considered. We calculated age-specific incidence and mortality trends in detail for 5-year age groups between 45–49 and 85+. Additional data on the number of first tested men in the eligible population in each year between 2006 and 2010, and the total number of tests administered in those years were obtained by request from the National Health Insurance Fund Database to assess testing coverage and intensity. Prostate cancer incidence and mortality data in the US among Caucasians for matched years and age groups were obtained from the SEER's online database [12].

2.2. Survival analysis

Only patients who were not registered by death certificates only (DCO) or autopsy were included in the survival analysis. Five-year relative survival estimates were calculated for the periods 1995–1999, 2000–2004 and 2005–2009. Relative survival estimates were derived as a ratio of the absolute survival of the cancer patients divided by the expected survival of the age-matched Lithuanian male population. Expected survival estimates were derived using the Ederer II method [13]. Life expectancy was calculated on the basis of national life tables for Lithuania [14]. Survival calculations were done with the STATA statistical package, using the freely available 'srtr' command [15], which was set up to allow for model based period analysis [16]. Age standardisation of the period estimates and standard errors was done using the age groups 40–49, 50–59, 60–69, 70–79 and 80+, using weights from International Cancer Survival Standards (ICSS) proposed by Corazziari et al. [17].

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