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European Association of Urology

Platinum Priority – Bladder Cancer

Editorial by Matthew J. Resnick on pp. 448–449 of this issue

Economic Burden of Bladder Cancer Across the European Union

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Article info

Article history:
Accepted October 8, 2015

Associate Editor:
James Catto

Keywords:
Bladder cancer
Cost of illness
Cancer
European Union

Abstract

Background: More than 120 000 people are diagnosed annually with bladder cancer in the 28 countries of the European Union (EU). With >40 000 people dying of it each year, it is the sixth leading cause of cancer. However, to date, no systematic cost-of-illness study has assessed the economic impact of bladder cancer in the EU.
Objective: To estimate the annual economic costs of bladder cancer in the EU for 2012.
Design, setting, and participants: Country-specific cancer cost data were estimated using aggregate data on morbidity, mortality, and health care resource use, obtained from numerous international and national sources.
Outcome measurements and statistical analysis: Health care costs were estimated from expenditures on primary, outpatient, emergency, and inpatient care, as well as medications. Costs of unpaid care and lost earnings due to morbidity and early death were estimated.
Results and limitations: Bladder cancer cost the EU €4.9 billion in 2012, with health care accounting for €2.9 billion (59%) and representing 5% of total health care cancer costs. Bladder cancer accounted for 3% of all cancer costs in the EU (€143 billion) in 2012 and represented an annual health care cost of €57 per 10 EU citizens, with costs varying >10 times between the country with the lowest cost, Bulgaria (€8 for every 10 citizens), and highest cost, Luxembourg (€93). Productivity losses and informal care represented 23% and 18% of bladder cancer costs, respectively. The quality and availability of comparable cancer-related data across the EU need further improvement.
Conclusions: Our results add to essential public health and policy intelligence for delivering affordable bladder cancer care systems and prioritising the allocation of public research funds.
Patient summary: We looked at the economic costs of bladder cancer across the European Union (EU). We found bladder cancer to cost €4.9 billion in 2012, with health care accounting for €2.9 billion. Our study provides data that can be used to inform affordable cancer care in the EU.

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1. Introduction

Cancer is a major health problem in the European Union (EU). In 2009 it cost the health care systems of the 27 countries in the EU €51 billion, representing 4% of total health care expenditures [1]. Including the burden associated with lost earnings, both from early mortality and absence from work, and the costs of informal care, whereby relatives and/or friends provided unpaid care for people with cancer, the costs increased to €126 billion.

http://dx.doi.org/10.1016/j.eururo.2015.10.024

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Although the study by Luengo-Fernandez et al (2013) [1] quantified the costs for breast, colorectal, lung, and prostate cancer, it did not evaluate how much of total cancer costs could be attributed to bladder cancer. Bladder cancer is the sixth leading cause of cancer in the EU [2], with 124 000 people diagnosed and >40 000 people dying from the disease each year. By 2030 the annual incidence is projected to increase to 219 000, two-fifths of this due to the ageing of the European population [2]. Planning urologic care systems across Europe requires not only good epidemiology but also investment and cost-effective treatments and pathways. Critical to these calculations is the macroeconomic impact of bladder cancer.

The aim of this study is to evaluate the economic burden of bladder cancer across the 28 countries that made up the EU in 2012. We included health care and non–health care costs and also updated the economic burden of all cancers for 2012.

2. Methods

Cancer was defined by the World Health Organisation International Classification of Diseases, 10th revision, as codes C00–C97, and bladder cancer was defined as C67. For all countries we used the same methodological framework to obtain data and value cancer-related resource use [1,3,4]. An annual time frame was adopted, whereby resource use attributable to cancer and bladder cancer within the most recent year for which data were available were measured, regardless of disease onset. Resource use was valued by applying country-specific unit costs. Costs were converted to 2012 prices [5], and national currencies were converted to euros (€) using 2012 exchange rates. To allow comparisons between countries, we also adjusted for cost of living using the purchasing power parity (PPP) method [6]. This method measures the price of the same bundle of goods in different countries and allows comparisons of costs adjusted for differences in the cost of living between countries.

International and national sources were consulted for country-specific aggregate data (see Supplement 1 for more detail). We also consulted peer-reviewed published studies or national reports from governmental or professional bodies. If no data were found, extrapolations were performed from similar countries (eg, similar health care expenditure per person, life expectancy, and geographic location).

2.1. Health care expenditure

Cancer health care service included primary care, accident and emergency (A&E) care, hospital inpatient care, outpatient care, and medications (see Supplement 1 for methodology, data sources, and the quality of each data estimate). Other types of activities relating to the prevention of cancer such as health education in community-based settings were not included because of the difficulties in identifying activity levels.

Country-specific pharmaceutical expenditures on cancer for 2009 were obtained. This consisted of sales of antineoplastic agents and endocrine treatment (Anatomical Therapeutic Chemical codes L1 and L2) [1]. Expenditures for 2009 were updated to 2012 by assuming a 4.6% annual growth in cancer-related pharmaceutical expenditures [7]. Due to the absence of EU-level data on cancer-related pharmaceutical expenditures due to bladder cancer, this proportion (4%) was obtained from reports from Germany (2%) and the Netherlands (6%) and applied to the remaining countries [8,9].

2.2. Informal care costs

Informal care costs were equivalent to the opportunity cost of unpaid care, that is, the time (work and/or leisure) that caregivers forgo, valued in monetary terms, to provide unpaid care for relatives with cancer. We used country-specific data from the International Agency for Research on Cancer (IARC) [2] to estimate the number of people with cancer and bladder cancer and data from the Survey of Health, Ageing and Retirement in Europe [10] to assess the hours of informal care needed by cancer and bladder cancer patients (see Supplement 1).

2.3. Productivity losses

Productivity costs included the foregone earnings related to cancer-attributable mortality and morbidity. For all countries we assumed an initial working age of 15 yr. Age- and gender-specific deaths due to cancer and bladder cancer were obtained for all countries from Eurostat [11]. The potential working-years lost was estimated as the difference between the age at death and maximum age of retirement (which we set at 79 yr). However, this would overestimate the total working-years lost because not everyone will be economically active (ie, either working or actively searching for work) or employed. Therefore, age- and gender-specific unemployment and activity rates for each of the 28 countries were applied to the potential foregone earnings due to premature mortality [12]. The total number of working-years lost was then multiplied by gender-specific average annual earnings [13]. Future earnings lost due to mortality were discounted to present values using a 3.5% annual rate (ie, the value society attaches to present as opposed to future costs).

Costs due to cancer-related morbidity comprised both the costs associated with individuals declared incapacitated or disabled because of cancer (permanent absence) and the costs due to individuals taking sickness leave for a defined time period (temporary absence) (see Supplement 1). Costs were estimated by multiplying the total working time lost due to cancer by mean earnings [12]. We used the friction period approach because absent workers are likely to be replaced, whereby costs for temporary and permanent absences were counted only during the time taken to replace a worker (first 90 d of work absence).

2.4. Noneconomic burden

We obtained noneconomic measures of burden of cancer and bladder cancer including number of deaths [11], incident disease cases [2], prevalent disease cases (5 yr) [2], and disability-adjusted life years (DALYs) lost. The rate, per 100 000 in the population, of DALYs lost for cancer and bladder cancer was obtained for 2010 [14] and applied to 2012 population estimates [15].

2.5. Statistical analysis

We explored variations between countries in cancer-related health care costs per capita using ordinary least squares (OLS) univariate regression analyses conditional on national income (per capita), health care expenditure (per capita), cancer incidence (crude rate), cancer mortality (crude rate), mortality-to-incidence ratio (MIR), proportion of the population who smoke, and cancer-specific DALYs (rate per 100 000). An explanatory variable was significant if its p value was <0.05. All regression analyses were performed using Stata software v.12.1 (StataCorp, College Station, TX, USA).

2.6. Sensitivity analysis

We estimated the effects on the total costs of bladder cancer of changes in (1) health care resource use (all categories) and earnings (male and female) across all countries, (2) proportion of cancer-related pharmaceutical expenditure due to bladder cancer (2% and 6%), (3) discounting rate for productivity losses due to early mortality, and (4) no friction period for costs due to cancer-related morbidity.