Chapter 1

Cancer care systems: Increasing burdens and existing performance gaps

Chapter 1 sets out why it is important to study cancer care. It shows that cancer remains a major challenge in all OECD countries, not only in terms of the immense human costs, but also with respect to the financial costs to the health sector, to patients and their families and to the wider economy. It also demonstrates marked differences in survival. This suggests an urgent need to understand whether particular policy approaches are associated with better outcomes.The chapter also explains the conceptual framework used to explore this policy question. Country-level information on cancer care systems and relevant policy approaches are gathered from standardised questionnaires based on this framework and interviews with cancer experts.

Introduction

With several million new cases a year, cancer presents a major health care challenge in all OECD countries. As the cause of more than a quarter of all deaths, cancer has a tremendous human cost in every country, and despite continuing improvements in care, mortality and survival, it is likely to place an increasing burden on countries in the future, including financially.

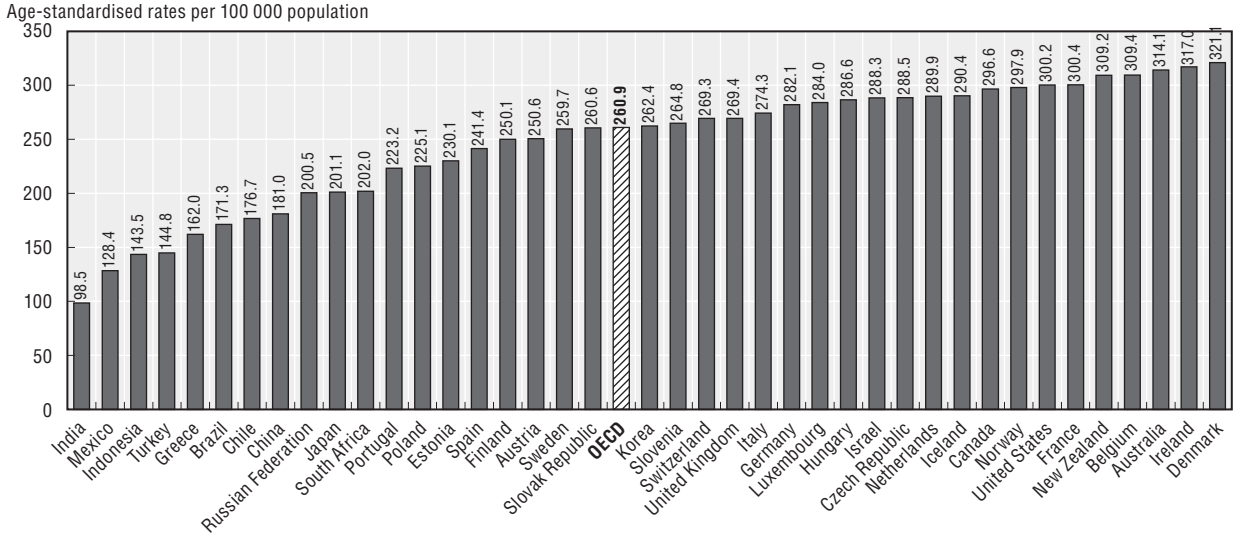
This chapter defines cancer and examines some recent trends in cancer incidence and survival, including some marked differences in survival between countries. This suggests an urgent need to understand whether particular policy approaches are associated with better outcomes.

Chapter 1 also explains the conceptual framework we have used to explore this policy question and describes the epidemiology of the four main types of cancer used by this report for the purpose of international comparison: breast cancer, cervical cancer, colorectal cancer and lung cancer. Country-level information on cancer care systems and relevant policy approaches are gathered from standardised questionnaires developed based on the conceptual framework and interviews with cancer experts. The chapter concludes with an explanation of how this report is structured.

Cancer: What it is and recent trends in rates of incidence

In 2008, an estimated 5.2 million new cases of cancer were diagnosed in OECD countries, i.e. an average of 261 cases per 100 000 population. As shown in Figure 1.1,

Figure 1.1. **All cancers incidence rates, total population, 2008**



Note: Mortality rates are standardised based on 1980 OECD population.
Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: *10.1787/health_glance-2011-en*.

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globally, high-income countries tend to have higher cancer incidence rates than middle- or lower-income ones, because people in high-income countries are more likely to be overweight, consume more alcohol and be inactive, each of which is a risk factor for several common cancers (smoking rates show a mixed picture and typically are falling in OECD countries whilst increasingly rapidly in some low- and middle-income countries). Furthermore, high-income countries have good records in diagnosing cancers, which contributes to higher reported incidence rates than countries where incidence may appear low due to lower detection rates (OECD, 2011).

Cancer incidence is higher among men than women across countries. Incidence is more than 50% higher for men in Spain, Turkey, Poland and Japan while the gender gap is small, within 10%, in Mexico, Israel and Denmark.

The most commonly diagnosed cancers in OECD countries in 2008 were colorectal (665 000 cases) and lung cancer (663 000 cases), each making up 13% of all new cases. Incidence of these cancers was higher among men across OECD countries; on average, new cases of colorectal cancer were 53% higher and those of lung cancer were as much as three-times higher. Among men, prostate cancer was the most common cancer (632 000 cases, or 23% of all new male cancers), followed by lung and colorectal. Among women, breast cancer was most common (639 000 cases, or 27% of all new female cancers), and then colorectal and lung cancer (OECD, 2011).

Cancer incidence rates increased up until around the year 2000, but since then have shown different trajectories. The rates decreased in recent years for cervical, colorectal and lung cancers. The decline in lung cancer incidence has followed the reduction in smoking over recent decades. But breast cancer incidence rates have increased in almost all OECD countries. These increases are largely due to improvements in diagnosis and the growing number of women who receive mammography screening, leading to a subsequent rise in the detection of new cases. Likewise, the rise in the reported incidence of prostate cancer in many countries since the 1990s is due largely to the greater use of prostate specific antigen (PSA) diagnostic tests (OECD, 2011), although the use of these tests has also fluctuated because of their cost and uncertainty about the long-term benefit to patients.

Box 1.1. **What is cancer?**

Cancer is a generic term for a large group of diseases that can affect any part of the body. Other terms used are malignant tumours and neoplasms.

Cancer arises from a single cell, which transforms into a malignant, rapidly reproducing colony of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs. This process is referred to as metastasis, and metastases are the major cause of death from cancer. The transformation from a normal cell into a tumour cell is a multistage process, resulting from the interaction between a person's genetic factors and three categories of external agents, including:

- physical carcinogens, such as ultraviolet and ionising radiation;
- chemical carcinogens, such as asbestos, components of tobacco smoke, aflatoxins (a food contaminant) and arsenic (a drinking water contaminant); and
- biological carcinogens, such as infections from certain viruses, bacteria or parasites.

Box 1.1. **What is cancer?** *(cont.)*

Ageing is another fundamental factor for the development of cancer. The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age. The overall risk accumulation is combined with the tendency for cellular repair mechanisms to be less effective as a person grows older.

More than 30% of cancer deaths could be prevented by modifying or avoiding key risk factors, including:

- tobacco use;
- being overweight or obese;
- unhealthy diet with low fruit and vegetable intake;
- lack of physical activity;
- alcohol use;
- sexually transmitted HPV infection;
- urban air pollution;
- indoor smoke from household use of solid fuels.

Tobacco use is the single most important risk factor for cancer, causing 22% of global cancer deaths and 71% of global lung cancer deaths.

Source: WHO (2012), *www.who.int/cancer*.

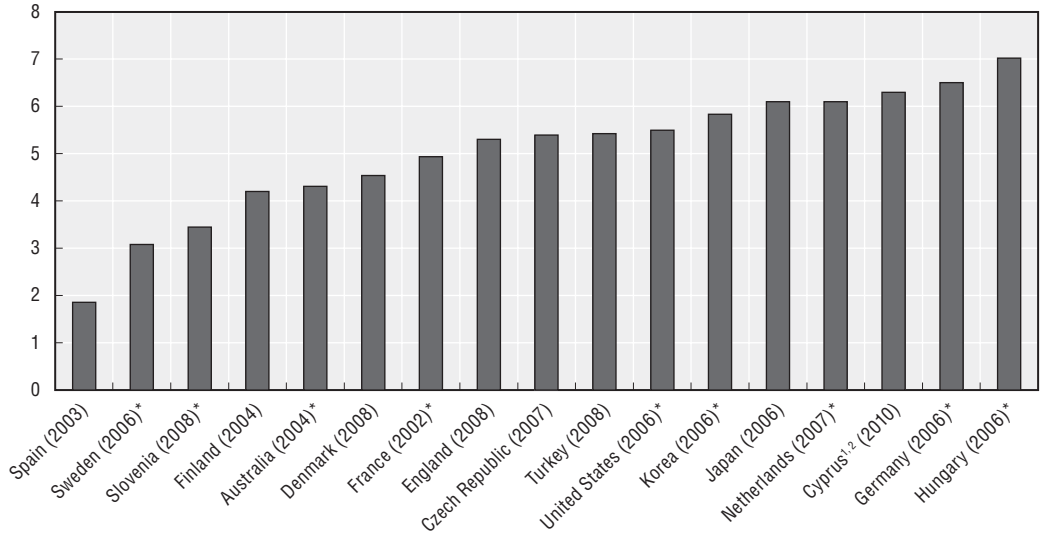
Cancer is associated with great financial cost, within the health care sector and beyond

Cross-national comparison of expenditure on cancer care is challenging as a uniform approach has not been applied across countries, but based on the OECD data, per capita spending on cancer care varied between USD PPP 32 per person per year in Turkey to over USD PPP 400 per person per year in the United States. As a proportion of total health expenditure, spending on cancer care ranged between 3% and 7% (Figure 1.2). It should be noted that the data are available for different years across countries, so the ranking of the countries needs to be interpreted with care.

The Lancet Oncology Commission (*The Lancet Oncology*, 2011) reported that the total costs of cancer care in the United States were estimated to be more than USD 124 billion for 2010, representing roughly 5% of total health care spending. Responding to the OECD Health Care Quality Indicators (HCQI) Questionnaire on Systems of Cancer Care, the English National Health System (NHS) reports that total cancer spending was GBP 5.13 billion in 2008, representing 5.3% of total health spending for the year, and Japan reports that cancer costs accounted for 6.1% of total health care spending in 2006.

The level of health care spending for a particular cancer generally reflects its prevalence and survival compared to other cancers. For example, spending is usually higher for breast cancer, reflecting its high incidence (71.6 cases per 100 000 women on average in the OECD) and survival (on average, 83.5% at five years), and ranges between 8.3% of total cancer costs in Australia to up to 19.0% in Denmark (compared to 8.1% and 13.6% respectively on colorectal cancer). For lung cancer, spending varies between 4.7% and 11.2% of total cancer costs and, for cervical cancer, between 0.4% and 3.7%.

Figure 1.2. **Percentage of total health expenditure spent on cancer care**



Note: Data from countries with an asterisk come from OECD Disease Expenditure Studies and data include expenditure for benign neoplasms. Data from other countries were collected through the OECD Questionnaire on Systems of Cancer Care 2010. Data for Sweden and Denmark refer to costs in hospitals only. Data for Finland do not include all costs related to medications. Further systematic efforts are needed to improve cross-national comparability of these data.

1. Footnote by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
2. Footnote by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Source: OECD Disease Expenditure Studies and OECD Questionnaire on Systems of Cancer Care 2010.

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Besides medical care costs, cancer patients also incur expenses on non-medical care, placing an additional burden on them and their caregivers. For example, in Korea, non-medical care costs are estimated to be at least 25% of the cost of medical care, and for breast cancer patients in Sweden the annual cost of the informal care provided by family and friends in the first year was estimated to be 21% of the medical costs (Lidgren et al., 2007).

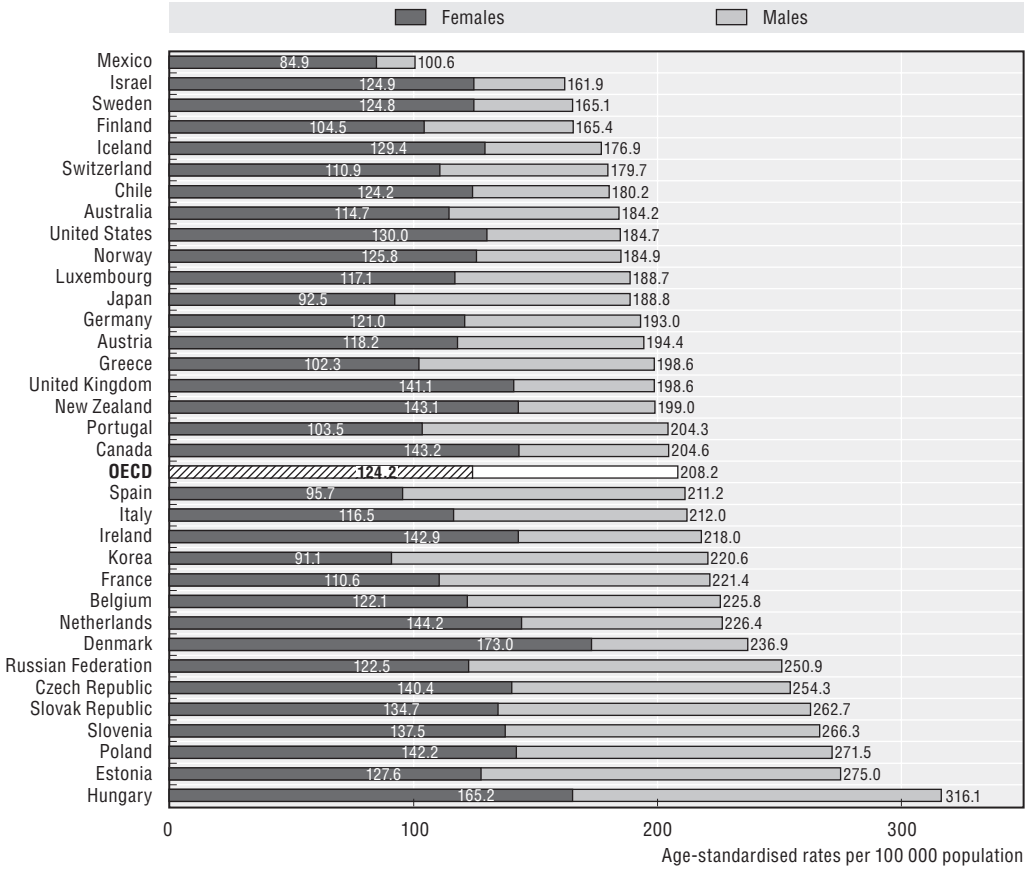
In addition to the significant costs of medical and social care related to cancer (Meropol and Schulman, 2007; Mariotto et al., 2011; National Cancer Institute, 2011), the economic cost is also substantial across countries as a result of premature deaths and lost earnings (Featherstone and Whitham, 2010). Cancer causes the highest economic loss of the leading causes of death worldwide. The economic toll from cancer is nearly 20% higher than for heart disease, the second-leading cause of economic loss (American Cancer Society, 2010). The American Cancer Society estimates the total economic impact of premature death and disability from cancer worldwide to have been USD 895 billion in 2008. This figure based on disability adjusted life year (DALY) and GDP per capita across countries does not include the direct costs of treating cancer but represents 1.5% of the world's GDP. The top three cancers that caused the most economic impact globally were lung cancer (USD 188 billion), colorectal cancer (USD 99 billion) and breast cancer (USD 88 billion).

Since cancer incidence is increasing, medical as well as non-medical costs are expected to grow in the future. For example, in Japan, total spending on cancer is estimated to have grown from USD 27 billion in 1990 to USD 90 billion in 2008 and is projected to reach USD 157 billion (in today's dollars) by 2020; this roughly amounts to a 600% increase in 30 years (*The Lancet Oncology*, 2011).

Cancer is causing an increasing numbers of deaths

Cancer is the second-leading cause of mortality in the OECD countries after diseases of the circulatory system. Worldwide, cancer accounted for 7.6 million deaths (around 13% of all deaths) in 2008, a figure that is projected to rise to over 13.1 million in 2030. Within the OECD countries, cancer accounted for 28% of all deaths in 2009. Cancer mortality rates were lowest in Mexico, Israel, Sweden and Finland and highest in the central and eastern European countries (Hungary, Poland, Slovenia, the Czech and Slovak Republics) and Denmark (Figure 1.3; OECD, 2011).

Figure 1.3. **All cancers mortality rates, males and females, 2009 (or nearest year)**



Note: Data refer to 2008 for France, Israel, Luxembourg, Poland Spain and Sweden, 2007 for Chile, Italy, Mexico, New Zealand, Switzerland and the United States, 2006 for Australia, Denmark and Russian Federation, and 2004 for Canada.

Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: 10.1787/health_glance-2011-en.

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Death rates from all types of cancer for males and females have declined at least slightly in most OECD countries since 1995, although the decline has been more modest than for cardiovascular diseases. The exceptions to this declining pattern are Greece, Portugal and Estonia, where cancer mortality has remained static. Cancer mortality rates are higher for men than for women in all countries, which is explained partly by the greater prevalence of risk factors among men, as well as the lesser availability or use of screening programmes for cancers affecting men, leading to lower survival after diagnosis.

This report focuses on four cancers, chosen for their public health burden and the availability of robust comparable data across OECD countries: breast, cervical, colorectal and lung. Furthermore, breast and cervical and colorectal cancers are considered curable if detected early enough. Information on the risks and disease burden associated with each is given below.

Breast cancer

Breast cancer is the most prevalent form of cancer in women, accounting for almost 460 000 deaths worldwide in 2008 (WHO, 2011). In the western industrialised countries, one in nine women will acquire breast cancer at some point in her life and one in thirty will die from the disease. There are a number of risk factors that increase a person's chance of getting this disease, such as age, family history of breast cancer, estrogen replacement therapy, alcohol use and others.

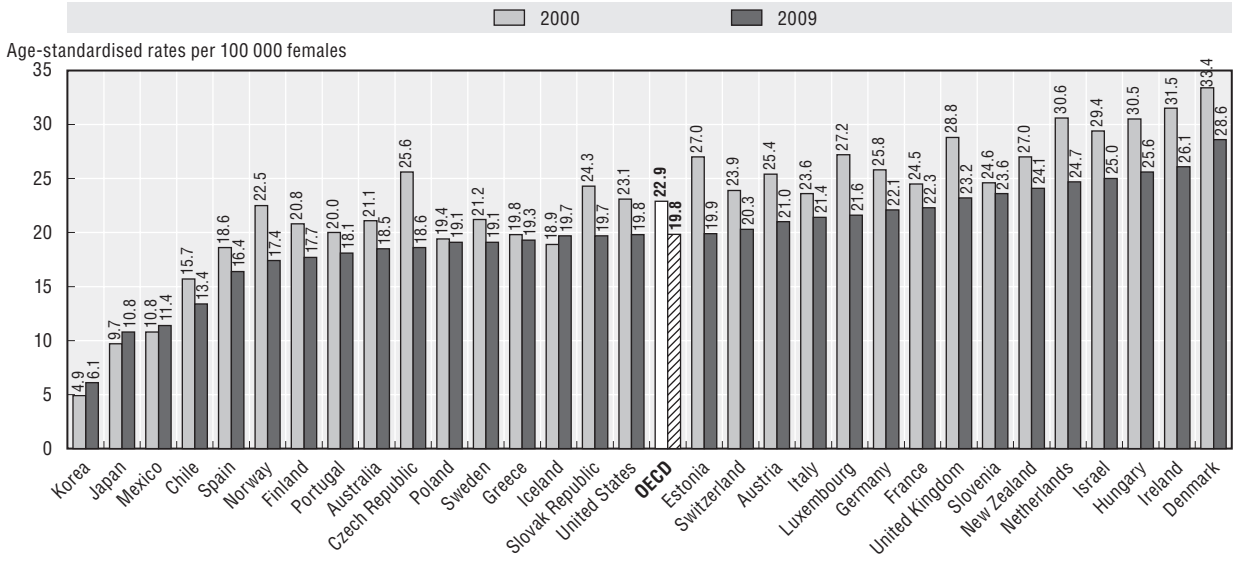
The promotion of screening mammography (European Union, 2003) has led to the detection of the disease at earlier stages. Most OECD countries have adopted breast cancer screening programmes as the most effective way for detecting the disease. The periodicity and population target groups vary across member states and are still the subject of debate. EU guidelines (European Commission, 2006), for example, promote a desirable target screening rate of at least 75% of eligible women in European countries. Further discussion on screening programmes is available in Chapter 3.

These improvements in the early detection and treatment of breast cancer have been reflected in mortality rates. Overall, breast cancer mortality rates have declined in most OECD countries over the past decade (Figure 1.4). The improvements were substantial in Estonia, the Czech Republic, the Netherlands, the United Kingdom,[1] Luxembourg and Norway. The exceptions are Korea, Japan, Iceland and Mexico, where the increases were modest and mortality rates continue to be among the lowest in the OECD countries.

Cervical cancer

Cervical cancer is preventable, and curable if detected early. The main cause of cervical cancer, accounting for approximately 95% of all cases, is sexual exposure to the human papillomavirus, HPV (IARC, 1995; Franco et al., 1999). The primary prevention of cervical cancer attributable to human papillomavirus types 16 and 18 by prophylactic vaccines has been shown to be highly effective and is now recommended in many countries worldwide (Shefer et al., 2008; Koulova et al., 2008). Two important methods for secondary prevention are Pap smears and HPV DNA testing. These facilitate the early detection of premalignant lesions that can then be treated more effectively than more advanced tumours. Population-based cancer screening programmes have been promoted by the Council of the European Union and the European Commission (European Union, 2003; European Commission, 2008), but since the introduction of HPV vaccination programmes there has been much discussion about whether cervical cancer screening needs to be re-evaluated. It

Figure 1.4. **Breast cancer mortality, females, 2000 and 2009 (or nearest year)**



Note: Data refer to 2008 for France, Israel, Luxembourg, Mexico, Poland, Spain and Sweden, 2007 for Chile, Italy, New Zealand, Switzerland and the United States, 2006 for Australia, Denmark and Russian Federation, 2005 for Belgium, and 2004 for Canada.
Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: *10.1787/health_glance-2011-en*.

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may, for example, be appropriate in the case of HPV-vaccinated populations to initiate screening at older ages than is currently recommended (Goldhaber-Fiebert et al., 2008; Wheeler et al., 2009).

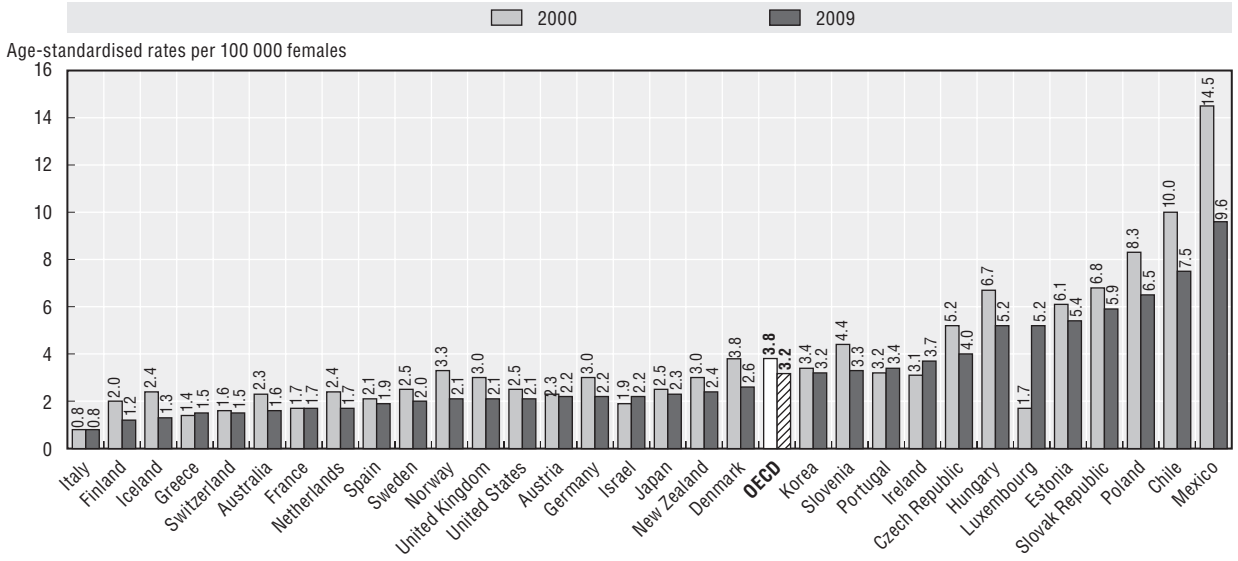
Mortality rates reflect the effect of cancer care in past years, particularly of improved diagnosis of early stage cancers with a better prognosis, as typically happens when screening is widespread. The mortality rates for cervical cancer declined for most OECD countries between 2000 and 2009, apart from Luxembourg, Ireland, Israel, Portugal and Greece (Figure 1.5). Mexico experienced a sharp decrease in cervical cancer mortality, from 14.5 per 100 000 females to 9.6, although it still has the highest rate among OECD countries.

Colorectal cancer

Colorectal cancer is the most common cancer diagnosed in the OECD countries; worldwide, approximately one million new cases are diagnosed per year (Parkin et al., 2005). There are several factors that place certain individuals at increased risk for the disease, including age, the presence of polyps, ulcerative colitis, a diet high in fat, and genetic background. The disease is more common in the United States and Europe, and is rare in Asia. However, in Asian countries where people are gradually adopting western diets, such as Japan, the incidence of colorectal cancer is increasing (IARC, 2011). It is estimated that approximately 610 000 people worldwide died due to colorectal cancer in 2008 (WHO, 2011).

Colorectal cancer screening is recommended in adults, using faecal occult blood testing, sigmoidoscopy or colonoscopy, beginning at around age 50 or later. Issues such as the precise age group targeted and the screening interval are determined by local cost-benefit analyses and the screening method used (USPSTF, 2008; NHSBCSP, 2008).

Figure 1.5. **Cervical cancer mortality, females, 2000 and 2009 (or nearest year)**



Note: 2000 data for the United Kingdom refers to 1999, and 2009 data refer to 2008 for France, Israel, Luxembourg, Mexico, Poland, Spain and Sweden, 2007 for Chile, Italy, New Zealand, Switzerland and the United States, and 2006 for Australia, Denmark and Germany.
Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: *10.1787/health_glance-2011-en*.

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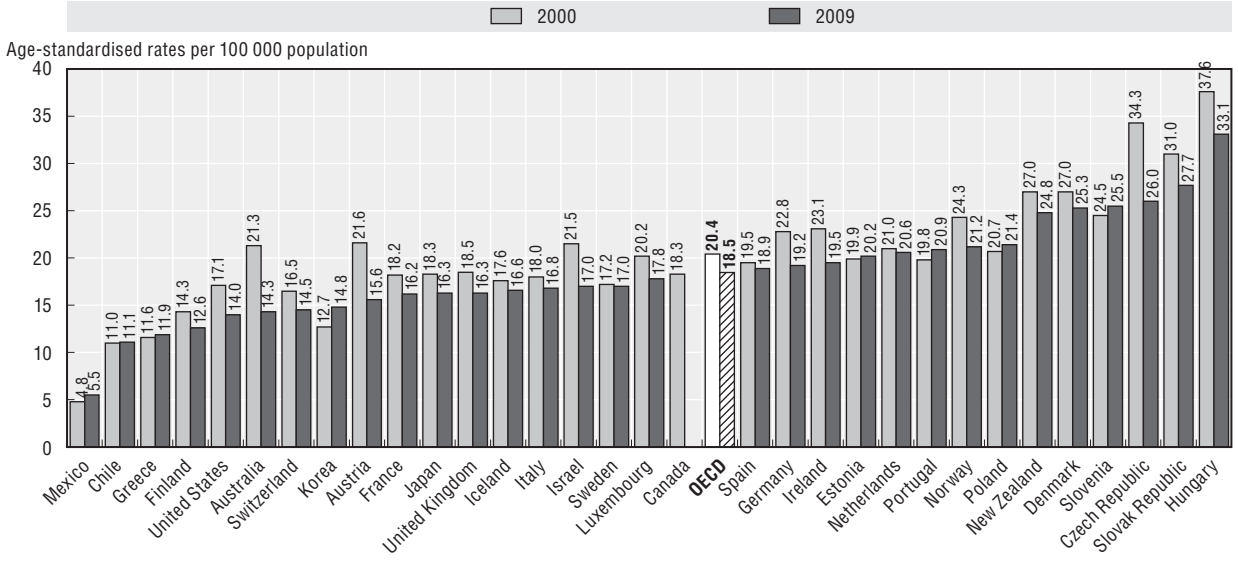
Most countries experienced a decrease in mortality for colorectal cancer between 2000 and 2009 (Figure 1.6), with the exceptions of Korea, Portugal, Slovenia, Poland, Mexico, Greece, Estonia and Chile. The central and eastern European countries tend to have higher mortality rates than other OECD countries. Despite a decrease in mortality for colorectal cancer over the past decade, Hungary continues to have the highest mortality rate for colorectal cancer, followed by the Slovak Republic and the Czech Republic.

Figure 1.6. **Colorectal cancer mortality 2000 and 2009 (or nearest year)**



Note: 2009 data refer to 2008 for France, Israel, Luxembourg, Mexico, Poland, Spain and Sweden, 2007 for Chile, Italy, New Zealand, Switzerland and the United States, and 2006 for Australia, Denmark and Germany.
Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: *10.1787/health_glance-2011-en*.

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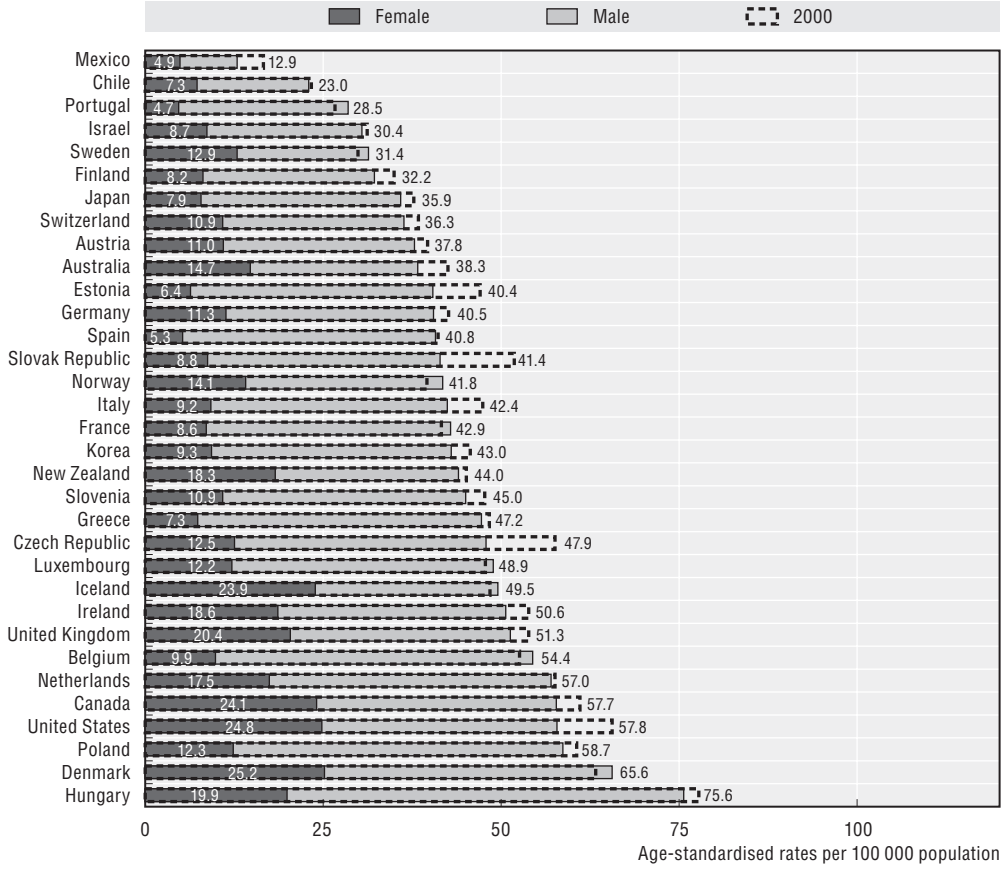
Lung cancer

Lung cancer is responsible for the largest number of cancer deaths among men in OECD countries, except in Sweden, Mexico and Chile, and is one of the main causes of cancer mortality among women. Tobacco smoking is the most important risk factor for lung cancer: smokers are 10-15 times more likely than non-smokers to develop lung cancer, and smoking accounts for 85% of all cases of lung cancer. In 2009, death rates from lung cancer among men were highest in Hungary, Poland, Belgium, Denmark, Greece and the Netherlands (Figure 1.7). These are all countries where smoking rates among men are relatively high. Death rates from lung cancer among men were low in Chile, Mexico and Sweden, which, in the latter two countries, reflects smoking rates.

Figure 1.7. **Lung cancer mortality rates, males and females, 2009 (or nearest year)**



Note: 2009 data refer to 2006 for Belgium and Denmark, 2007 for Switzerland, and 2008 for New Zealand and the United States.

Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: *10.1787/health_glance-2011-en*.

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Following the declining trend of smoking in recent decades, the mortality rates of lung cancer have declined across countries. Between 2000 and 2009, the mortality rates fell in most countries except for Belgium, Denmark, France, Iceland, Luxembourg, Norway, Portugal, and Sweden (Figure 1.7). Cross-country variations and downward trend of smoking rates and anti-smoking policies are discussed in Chapter 3.

Performance of cancer care is uneven across countries

Together with cancer incidence and mortality, survival estimates are key measures of assessing quality of cancer care systems and they are commonly used as outcome measure to track progress in treating a disease over time. They reflect both how early the cancer was detected and the effectiveness of the treatment (Box 1.2).

Box 1.2. **Relative survival and mortality**

Relative cancer survival reflects the proportion of patients with a certain type of cancer who are still alive after a specified time period (commonly five years) compared to those still alive in the absence of the disease. Relative survival estimates capture the excess mortality that can be attributed to the diagnosis. For example, a five-year relative survival estimate of 80% does not mean that 80% of the cancer patients are still alive after five years, but that 80% of the patients that were expected to be alive after five years, given their age and sex at diagnosis, are in fact still alive. All the survival estimates presented in the report have been age-standardised using the International Cancer Survival Standard (ICSS) population.

The comparison of survival estimates is, however, challenging. First, cancer screening programmes and activities often contribute to improved survival statistics through lead time bias and overdiagnosis. Earlier diagnosis through screening may appear to prolong survival even without any change in the course of disease progression (lead time bias), and through screening, people may be diagnosed and treated even if they did not need treatment (overdiagnosis), adding surviving patients and inflating survival estimates. Screening methods and practices are different across countries and they lead to a varied extent of lead time bias and overdiagnosis, a different impact on survival estimates and consequently a complexity in cross-national comparisons of survival. Second, survival estimates are not adjusted for the tumour stage at diagnosis, which complicates assessment of the impacts of early detection initiatives and better treatment. Third, the OECD has been making efforts to collect cancer survival in a standardised manner but given the differences in the data availability across countries, calculation methods have not been completely harmonised yet.

Cancer mortality rates are based on the number of deaths with cancer as the underlying cause of death occurred in a country in a year divided by the size of the corresponding population and refer to all age groups. For international comparison, the rates have been age-standardised using the OECD standard population to remove variations arising from differences in age structure across countries and over time. The rates are per 100 000 population.

The EUROCARE and CONCORD studies have shown wide international differences in population-based cancer survival (Berino, 2007; Verdecchia, 2007; De Angelis, 2009; Coleman, 2008, 2011), suggesting wide variations in the performance of cancer care systems. Cancer survival trends reveal continuous increases in general, but also persistent differences between countries (Coleman, 2008). Survival for all major cancers is usually higher in the United States than in Europe. Despite the considerable increase in survival in eastern European countries due to improvements in cancer care and screening programmes (Verdecchia, 2007), the east-west gap in Europe, though narrower, still exists. There are also marked differences among western European countries (see Figures 1.8 to 1.11 for breast, cervical, colorectal and lung cancer survival).

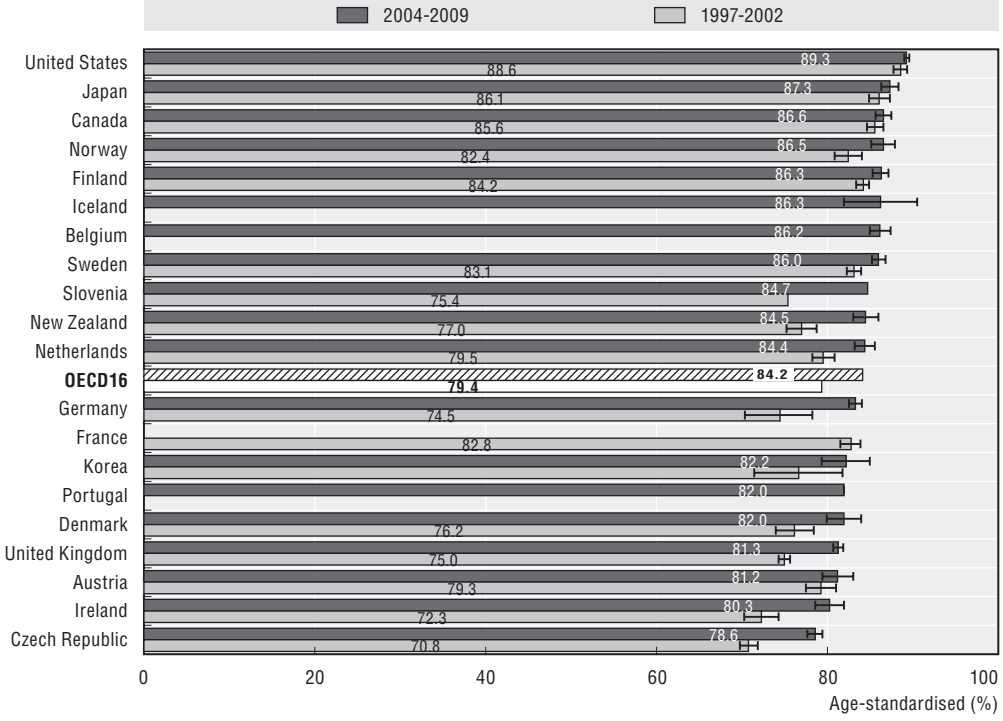
Further discussion of survival estimates of the four cancers considered in this report follows below.[2] When interpreting the data, caveats mentioned in Box 1.2 should be taken into account.

Variation in breast cancer survival

Breast cancer survival reflects advances in public health interventions, such as greater awareness of the disease, screening programmes and improved treatment. In particular, the introduction of combined breast conserving surgery with local radiation and neoadjuvant therapy have increased survival as well as the quality of life of survivors (Mauri et al., 2008).

The relative five-year breast cancer survival has improved in all countries between 1997-2002 and 2004-09, but variations exist across countries (Figure 1.8). Most OECD countries have survival estimates of over 80% at five years, with notable increases in Ireland, the Czech Republic and Slovenia. Nevertheless, the difference in survival estimates is up to 11 percentage points between the highest and the lowest countries.

Figure 1.8. **Breast cancer five-year relative survival, 1997-2002 and 2004-09[1] (or nearest period)**



Note: 95% confidence intervals are represented by H. 1997-2002 data for Japan refer to 1999-2004, and 2004-09 data refer to 2000-05 for Japan, 2002-07 for Canada, 2003-08 for the Czech Republic, Finland, Germany, Ireland and the United States, and 2005-10 for Iceland. Data for Slovenia is updated using period analysis.

1. These figures show the relative proportions of people diagnosed with breast cancer in 1997 and 2004 who are still alive five years later, compared to healthy cohorts from the same years of a similar age and sex. See Box 1.2.

Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: *10.1787/health_glance-2011-en* and cancer registry of the Republic of Slovenia.

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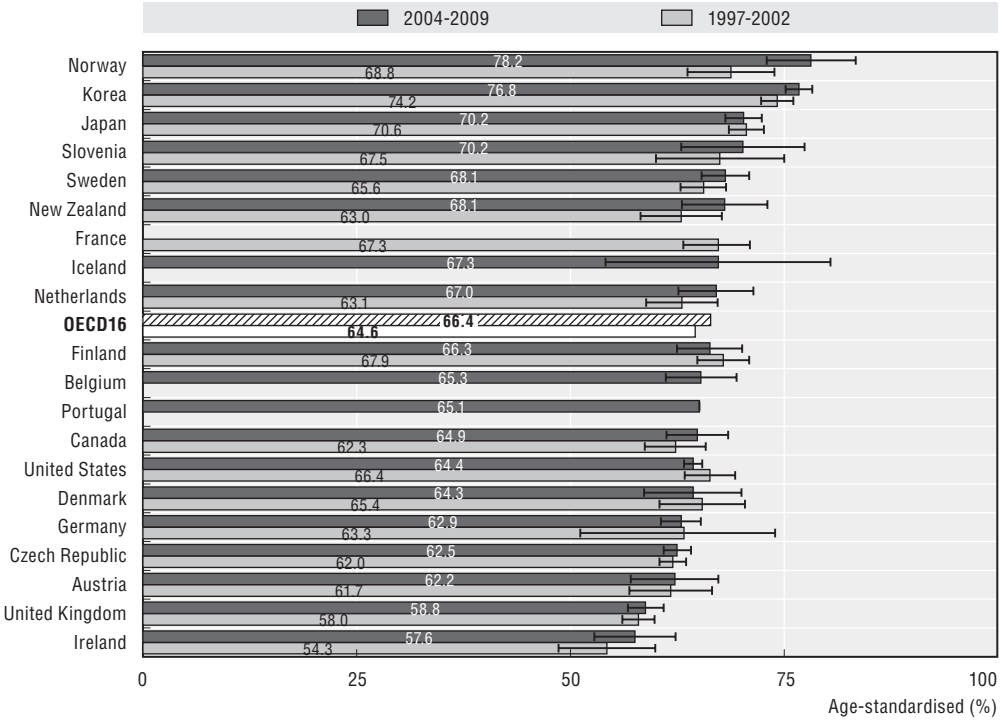
Variation in cervical cancer survival

Over the periods 1997-2002 and 2004-09, the five-year relative survival from cervical cancer improved in most countries due to the improved effectiveness of screening and treatment (Figure 1.9). Survival estimates were below 60% in Ireland and the United Kingdom and above 75% in Norway and Korea. Age, co-morbidities such as smoking, and the tumour stage at diagnosis are all important determinants of cervical cancer survival, underlining the role of screening and other public health programmes. But a significant difference still exists between countries, with a cross-country gap of up to 21 percentage points, larger than that for breast cancer.

Figure 1.9. **Cervical cancer five-year relative survival, 1997-2002 and 2004-09 (or nearest period)**



Note: 95% confidence intervals are represented by H. 1997-2002 data for Japan refer to 1999-2004, and 2004-09 data refer to 2000-05 for Japan, 2002-07 for Canada, 2003-08 for the Czech Republic, Finland, Germany, Ireland and the United States, and 2005-10 for Iceland.

Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: *10.1787/health_glance-2011-en*.

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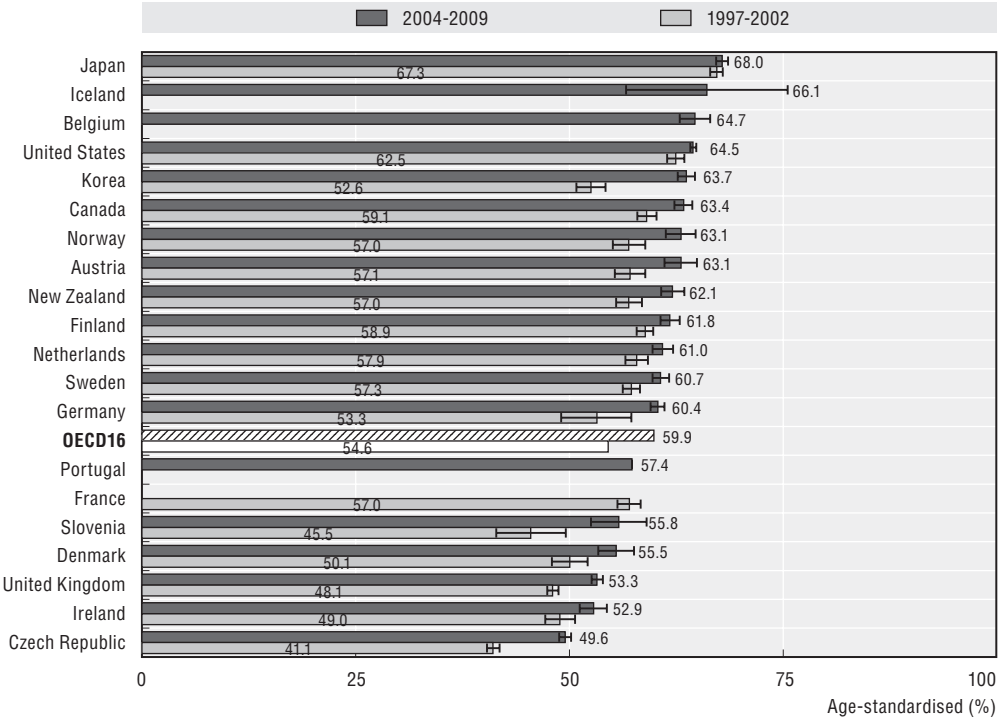
Variation in colorectal cancer survival

Advances in diagnosis and treatment have increased survival over the last decade in colorectal cancer too, but the speed of progress differs across countries. There is compelling evidence in support of the clinical benefit of improved surgical techniques, radiation therapy and combined chemotherapy, but cancer care systems have not always applied these advances. All countries show improvements in survival between 1997-2002 and 2004-09 (Figure 1.10), but a significant difference still exists. Japan and Iceland had the highest relative survival estimates, at over 66%, while the Czech Republic has the lowest

Figure 1.10. **Colorectal cancer, five-year relative survival, 1997-2002 and 2004-09 (or nearest period)**



Note: 95% confidence intervals are represented by H. 1997-2002 data for Japan refer to 1999-2004, and 2004-09 data refer to 2000-05 for Japan, 2002-07 for Canada, 2003-08 for the Czech Republic, Finland, Germany, Ireland and the United States, and 2005-10 for Iceland.

Source: OECD (2011), *Health at a Glance 2011: OECD Indicators*, doi: *10.1787/health_glance-2011-en*.

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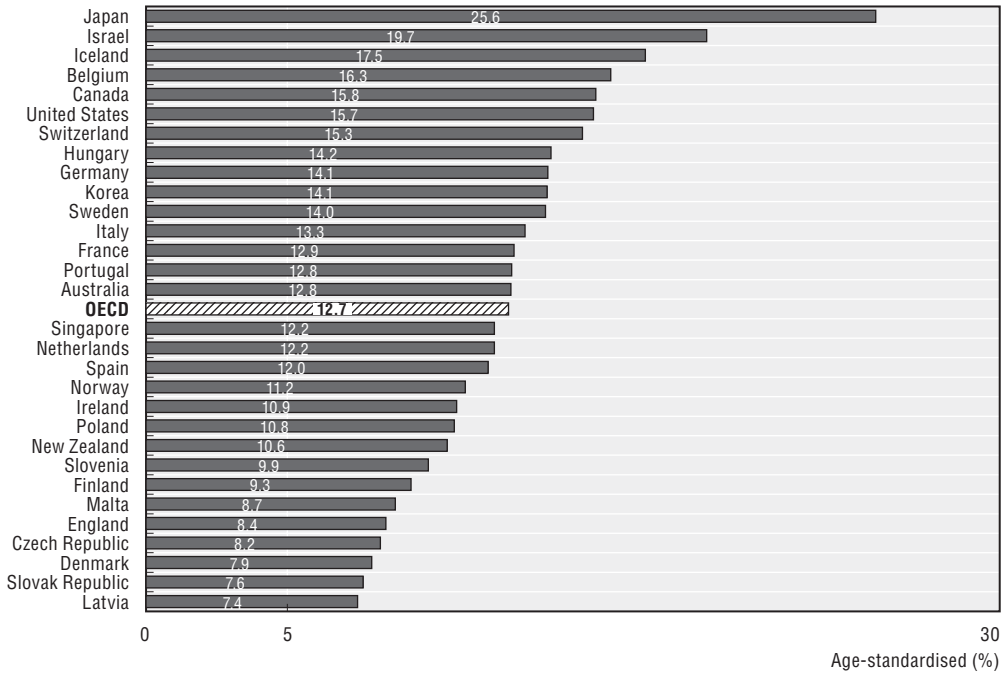
estimate, more than 18 percentage points lower than the highest countries, although recent data show that survival for colorectal cancer is continuing to increase, particularly in central and eastern Europe (Verdecchia et al., 2007).

Variation in lung cancer survival

Lung cancer continues to be associated with very poor survival and with large cross-country variations (Figure 1.11). Patients often present late in the course of their disease (no safe or cost-effective population screening options are currently available), and lung cancer is often rapidly progressive. Within the time period studied here, Japan reported the best five-year survival, at just over 25%. On the other hand, the five-year survival was less than 10% in Slovenia, Finland, Malta, England, the Czech and Slovak Republics, Denmark and Latvia, suggesting that there is substantial room for improving the cancer care systems for detecting and treating lung cancer patients in these countries.

Figure 1.11. **Lung cancer relative five-year survival, up to 2003**



Note: Countries not participated in the EUROCARE-4 study provided data based on the calculation methods proposed in the study (period analysis).
Source: De Angelis, R. et al. (2009), "The EUROCARE-4 Database on Cancer Survival in Europe: Data Standardisation, Quality Control and Methods of Statistical Analysis", *European Journal of Cancer*, Vol. 45, pp. 909-930; US SEER and OECD.

StatLink http://dx.doi.org/10.1787/888932866507

A fundamental question: Do certain cancer care policies lead to fewer deaths?

Given the high burden of cancer and persistent cross-country variations in cancer mortality and survival, countries need to know which policies perform better in the fight against cancer. *Cancer Care: Assuring Quality to Improve Survival* tries to respond to this need.

The Institute of Medicine's widely recognised work on improving health care quality (IOM, 2001) tackles the complex task of defining "quality" by considering the various points at which health care systems come into contact with people: when *staying healthy* (managing risk factors), when *getting well* (detection, diagnosis and treatment), when *living with illness* (on-going monitoring and treatment) and at *end of life* (palliative care). High-quality health care needs certain activities and policies to be in place at each point; in the case of cancer care, these include effective screening and early diagnosis programmes, having sufficient cancer care beds and specialist staff, rapid access to diagnostic and treatment facilities and adequate provision of care for terminally ill patients and their families (see Box 1.3).

Beyond these necessary and fundamental clinical activities, policy makers are increasingly focusing attention on variations in the *organisation and governance* of cancer care. Governance refers to how a system of care is steered and managed, particularly with respect to outcomes and to quality improvement, at a macro-level as well as an institutional level. Hence policy makers are asking how health systems ensure that they have the right organisational structures and governance in place to ensure effective and equitable delivery of these clinical activities, as well as whether inter-country differences

Box 1.3. **What constitutes good quality clinical care for cancer?**

Although the details of clinical management will vary from cancer to cancer, certain elements characterise high-quality clinical management irrespective of cancer type. These are:

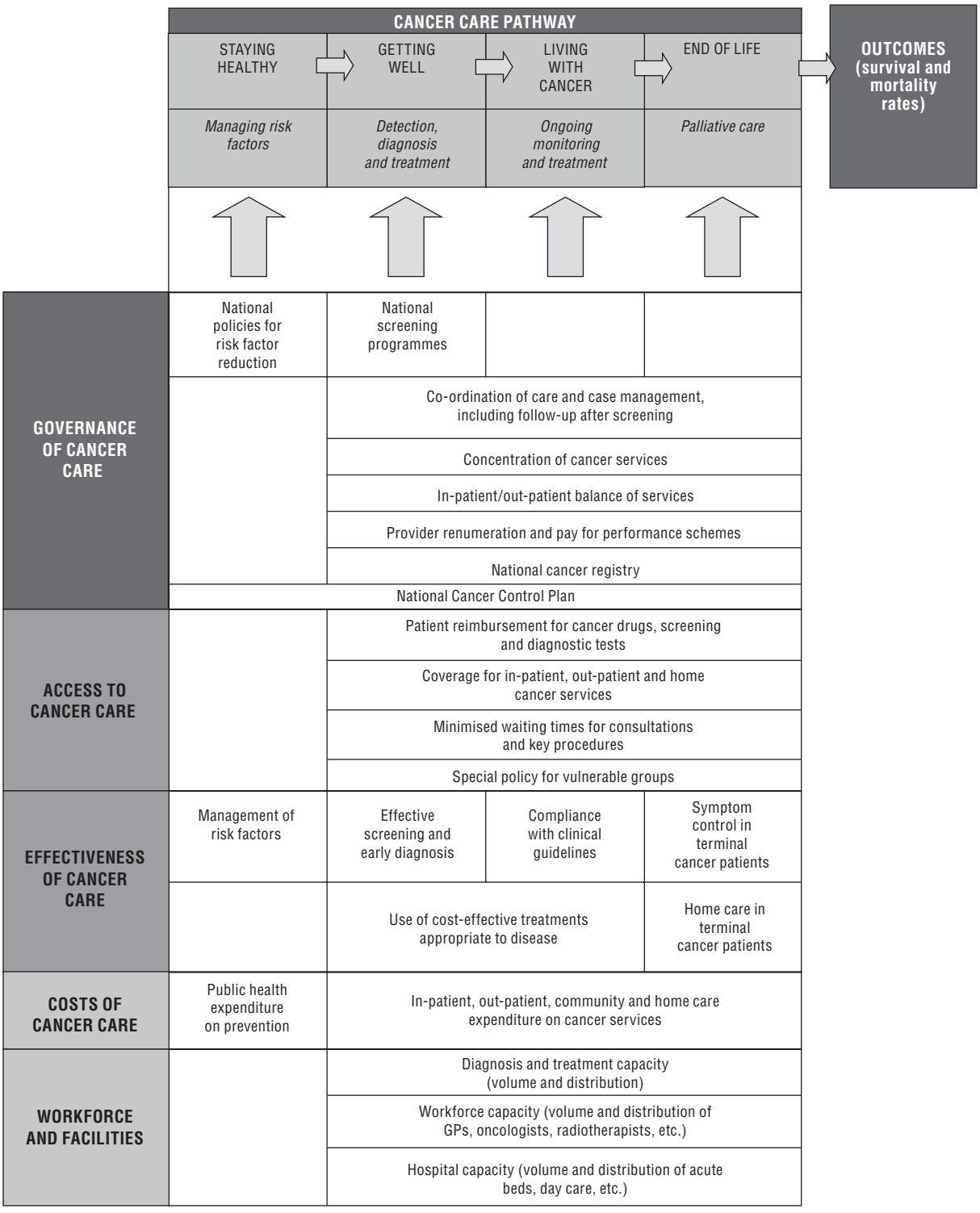
- *Prevention strategies*, including increased avoidance of the risk factors listed earlier (especially smoking and excess body weight and alcohol consumption), vaccination against human papillomavirus (HPV) and hepatitis B virus (HBV), controlling occupational hazards, reduced exposure to sunlight.
- *Early detection*, including clinician awareness or incentive programmes and intiatives so that the public are better informed of the symptoms and signs characteristic of cancer. Screening programmes may be appropriate if there is a valid screening test and the implementation of such a screening programme has been proven to be associated with more benefit than harm.
- *Clear information and effective communications*, including clinical nurse specialists available at all stages of care to support patients and carers, with particular thought for speakers of other languages and those with specific communications difficulties.
- *Accurate diagnosis and staging* using investigations that give the most information about diagnosis and staging with the least risk to the patient.
- *Prompt access to appropriate treatment* with surgery, radiotherapy, chemotherapy alone or in combination.
- *Managing complications* via rapid access to a team capable of providing support for complications of cancer and/or its treatment, including psychosocial support.
- *Regular specialist follow-up*, particularly in the first months or years after treatment is completed.
- *Palliative care* or treatment to relieve, rather than cure, symptoms caused by cancer where there is little chance of cure. Most palliative care should take place at home, or in community settings.

in the organisation and governance of cancer care explain the marked differences observed across countries in cancer mortality and survival.

There are indeed significant inter-country differences in organisation and governance. A recent review of national cancer control plans across Europe in 2009, for example, found that only 16 out of the 31 European countries studied had launched a national control plan, and of those that did, five did not specify responsible organisations for governance and delivery, and four did not contain measurable targets to monitor success (Atun et al., 2009). A recent study showed 24 out of 29 European countries had some kind of national cancer control plan but its content varied across countries (Gorgojo et al., 2012).

Given the importance of organisation and governance, we have built upon the IOM's stages of care to develop the conceptual framework shown in Figure 1.12. For each stage of care, the critical activities and policies that should be in place are set out and gathered into three cross-cutting themes: resources, cancer care practice, and governance of cancer care.

Figure 1.12. **Conceptual framework**



Source: Authors for the OECD.

How this report is structured

The same conceptual framework also provides the structure used for the report. Health systems are organised differently across countries (Paris et al., 2010) and these differences may have some impact on cancer care performance through patient pathway, but this report focuses on a resource, practice and governance of a subsystem, the cancer care system.

The report uses 2010 information collected through surveys and structured telephone interviews with national experts on cancer care systems in 35 countries.[3] To complement this information, the report also uses the data collected through the OECD's Health Data, the System of Health Accounts and OECD Disease Expenditure Studies. The list of experts who contributed to the study is available in Annex A.

Efforts were made to ensure international comparability of the information presented in this report through several rounds of validation with experts. But as only a few experts were designated by country, information compiled may not reflect the views of other experts within the country.

Chapter 2 reports the findings from an international survey of experts regarding the *resources* put into cancer care in each country. As well as access to cancer drugs and devices such as MRI scanners and radiotherapy equipment (paying particular attention to the issue of high-cost novel therapeutics) and the distribution of specialist cancer care clinicians, the chapter illustrates cross-national variations in the availability of resources and policy trends related to this. The issue of pursuing increasingly specialised cancer care by concentrating resources and expertise into fewer, high-volume institutions is given particular attention.

Chapter 3 uses findings from the same survey to consider *public policy and clinical practice*, focussing on the extent to which policy and practice facilitate patients' access to effective cancer care. Public health measures to reduce cancer incidence (such as tobacco control and screening programmes) are discussed, as well as initiatives to facilitate early diagnosis and rapid access to appropriate treatment, such as clinical guidelines and fast-track pathways.

Chapter 4 considers *governance*. Survey responses are used to describe the extent to which countries use comprehensive and coherent frameworks to manage the provision of high-quality cancer care (whether at national or regional level) by setting targets, clarifying tasks and responsibilities and implementing quality assurance tools. Such tools include the accreditation of hospitals and the licensing of the professionals who deliver cancer care. Policy trends are discussed, such as increasing interest in the patient experience as an important dimension of health care quality.

Chapter 5 uses *quantitative techniques* to explore whether the five-year survival from breast, cervical, colorectal and lung cancer are associated with differences in some of the system characteristics discussed above. This quantitative work was undertaken using data from 31 countries.[4]

Finally, Chapter 6 provides *recommendations* for organising and governing cancer care systems based on findings from the previous chapters.

Notes

1. The United Kingdom provided some information specific to England, Northern Ireland, Scotland and Wales, and where possible, the country-specific data and information are included in this publication but otherwise data and information refer to the United Kingdom as a whole are used.
2. Figures 1.8-1.10 show five-year cancer survival for breast, cervical and colon cancer from *OECD Health Data 2011*. The estimates analysed in Chapter 5 come from the EUROCARE-4 project (De Angelis et al., 2009). While country coverage is slightly different, and years and underlying sources also differ slightly, correlations between these two data sources are high, generally above 0.8. *OECD Health Data* does not include relative survival for lung cancer. Hence, Figure 1.11 shows five-year lung cancer survival using data from the EUROCARE-4 and US SEER projects.
3. Australia, Belgium, Canada, Chile, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States. The United Kingdom provided some information specific to England, Northern Ireland, Scotland and Wales and where possible, the country-specific data and information are included in this publication but otherwise data and information for the United Kingdom as a whole are used. The publication uses three-letter country codes defined by the International Organization for Standardization (ISO). GBR refers to the United Kingdom and CHE refers to Switzerland; for England, ENG is used.
4. Australia, Belgium, Canada, the Czech Republic, Denmark, England, Finland, France, Germany, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United States.

References

American Cancer Society (2010), "The Global Economic Cost of Cancer", *www.cancer.org/acs/groups/content/@internationalaffairs/documents/document/acspc-026203.pdf*.

Atun, R., T. Ogawa and J.M. Martin-Moreno (2009), *Analysis of National Cancer Control Programmes in Europe Study*, Imperial College,London.

Berino F. et al. (2007), "Survival for Eight Major Cancers and All Cancers Combined for European Adults Diagnosed in 1995-99: Results of the EUROCARE-4 Study", *The Lancet Oncology*, Vol. 8, pp. 773-783.

Coleman, M. et al. (2008), "Cancer Survival in Five Continents: AWorldwide Population-based Study (CONCORD)", *The Lancet Oncology*, Vol. 9, pp. 730-756.

Coleman, M.P. et al. (2011), "Cancer Survival in Australia, Canada, Denmark, Norway, Sweden and the UK, 1995-2007 (International Cancer Benchmarking Partnership): An Analysis of Population-based Cancer Registry Data", *The Lancet*, Vol. 377, No. 9760, pp. 127-138.

De Angelis, R. et al. (2009), "The EUROCARE-4 Database on Cancer Survival in Europe: Data Standardisation, Quality Control and Methods of Statistical Analysis", *European Journal of Cancer*, Vol. 45, pp. 909-930.

Dickman, P.W. and H.O. Adami (2006), "Interpreting Trends in Cancer Patient Survival", *Journal of Internal Medicine*, No. 260, pp. 103-117.

European Commission (2006), *European Guidelines for Quality Assurance in Breast Cancer Screening and Diagnosis*, 4th edition, Luxembourg.

European Commission (2008), *European Guidelines for Quality Assurance in Cervical Cancer Screening*, 2nd edition, Luxembourg.

European Union (2003), "Council Recommendation of 2 December 2003 on Cancer Screening (2003/879/EC)", *Official Journal of the European Union*, L327, Vol. 46, pp. 34-38, 16 December.

Featherstone, H. and L. Whitham (2010), "The Cost of Cancer", *Research Note February 2010*, Policy Exchange.

Franco, E.L., T.E. Rohan and L.L. Villa (1999), "Epidemiologic Evidence and Human Papillomavirus Infection as a Necessary Cause of Cervical Cancer", *Journal of the National Cancer Institute*, Vol. 91, No. 6, pp. 506-511.

Goldhaber-Fiebert, J.D. et al. (2008), "Cost-effectiveness of Cervical Cancer Screening with Human Papillomavirus DNA Testingand HPV-16, 18 Vaccination", *Journal of the National Cancer Institute*, Vol. 100, No. 5, pp. 308-320.

Gorgojo, L., M. Harris and E. Garcia-Lopez (2012), "National Cancer Control Programmes: Analysis of Primary Data from Questionnaires", *Final Preliminary Report*, European Partnership for Action against Cancer, Brussels.

IARC – International Agency for Research on Cancer (1995), "Human Papillomaviruses", *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 64, IARC, Lyon.

IARC (2011), "GLOBOCAN 2008: Cancer Fact Sheet", *http://globocan.iarc.fr/factsheets/cancers/colorectal.asp*.

IOM – Institute of Medicine (2001), *Envisioning the National Health Care Quality Report*, National Academies Press, Washington, DC.

Koulova, A. et al. (2008), "Country Recommendations on the Inclusion of HPV Vaccines in National Immunization Programs Among High Income Countries", *Vaccine*, Vol. 26, No. 19, pp. 6529-6541.

Lancet Oncology (2011), "Delivering Affordable Cancer Care in High-Income Countries", *The Lancet Oncology*, Vol. 12, pp. 933-980.

Lidgren, M. et al. (2007), "Resource Use and Costs Associated with Different States of Breast Cancer", *International Journal of Technology Assessment in Health Care*, Vol. 23, No. 2, pp. 223-231.

Mariotto, A.B. et al. (2011), "Projections of the Cost of Cancer Care in the United States: 2010-2020", *Journal of National Cancer Institute*, Vol. 103, No. 2, pp. 117-128.

Mauri, D. et al. (2008), "Multiple-Treatments Meta-analysis of Chemotherapy and Targeted Therapies in Advanced Breast Cancer", *Journal of the National Cancer Institute*, Vol. 100, No. 24, pp. 1780-1791.

Meropol, N.J. and K.A. Schulman (2007), "The Cost of Cancer Care: Issues and Implications", *Journal of Clinical Oncology*, Vol. 25, pp. 180-186.

National Cancer Institute (2011), *Cancer Prevalence and Cost of Care Projections*, *http://costprojections.cancer.gov/*.

NHSBCSP – National Health Service Bowel Cancer Screening Programme (2008), "Guidance for Public Health and commissioners", *www.cancerscreening.nhs.uk/bowel/publications/index.html*.

OECD (2011), *Health at a Glance 2011 – OECD Indicators*, OECD Publishing, doi: *10.1787/health_glance-2011-en*.

Paris, V., M. Devaux and L. Wei (2010), "Health Systems Institutional Characteristics: A Survey of 29 OECD Countries", *OECD Health Working Paper*, No. 50, OECD Publishing, doi: *10.1787/5kmfxfq9qbnr-en*.

Parkin, D.M. et al. (2005), "Global Cancer Statistics, 2002", *A Cancer Journal for Clinicians*, No. 55, pp. 74-108.

Shefer, A. et al. (2008), "Early Experience with Human Papillomavirus Vaccine Introduction in the United States, Canada, and Australia", *Vaccine*, Vol. 26, No. S10, pp. K68-K75.

USPSTF – US Preventive Services Task Force (2008), "Screening for Colorectal Cancer: US Preventive Services Task Force Recommendation Statement", *Annals of Internal Medicine*, Vol. 149, pp. 627-637.

Verdecchia, A. et al. (2007), "Recent Cancer Survival in Europe: A 2000-02 Period Analysis of EUROCARE-4 Data", *The Lancet Oncology*, Vol. 8, No. 9, pp. 784-796.

Wheeler, C.M. et al. (2009), "Human Papillomavirus Genotype Distributions: Implications for Vaccination and Cervical Cancer Screening in the United States", *Journal of the National Cancer Institute*, Vol. 101, No. 7, pp. 1-13.

WHO – World Health Organization (2011), "Cancer", Fact Sheet, No. 297, Geneva, *www.who.int/mediacentre/factsheets/fs297/en/*.

WHO (2012), Geneva, *www.who.int/cancer*.