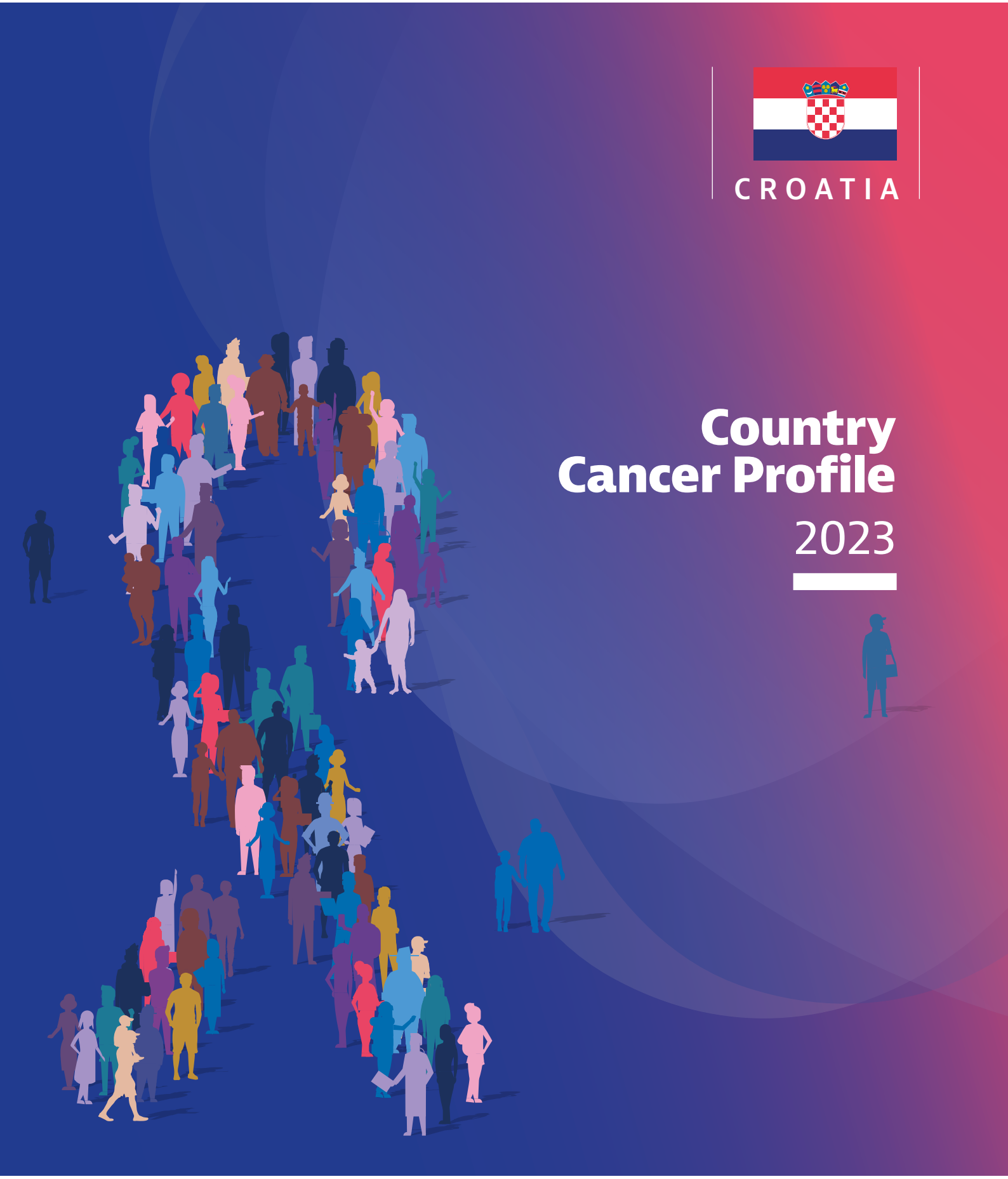
European Cancer Inequalities Registry



CROATIA

# Country Cancer Profile

2023

European Commission

OECD

BETTER POLICIES FOR BETTER LIVES

### The Country Cancer Profile Series

The European Cancer Inequalities Registry is a flagship initiative of the Europe's Beating Cancer Plan. It provides sound and reliable data on cancer prevention and care to identify trends, disparities and inequalities between Member States and regions. The Country Cancer Profiles identify strengths, challenges and specific areas of action for each of the 27 EU Member States, Iceland and Norway, to guide investment and interventions at the EU, national and regional levels under the Europe's Beating Cancer Plan. The European Cancer Inequalities Registry also supports Flagship 1 of the Zero Pollution Action Plan.

The Profiles are the work of the OECD in co-operation with the European Commission. The team is grateful for the valuable inputs received from national experts and comments provided by the OECD Health Committee and the EU Expert Thematic Group on Cancer Inequality Registry.

### Data and information sources

The data and information in the Country Cancer Profiles are based mainly on national official statistics provided to Eurostat and the OECD, which were validated to ensure the highest standards of data comparability. The sources and methods underlying these data are available in the Eurostat Database and the OECD Health Database.

Additional data also come from the World Health Organization (WHO), the International Agency for Research on Cancer (IARC), the International Atomic Energy Agency (IAEA), the Institute for Health Metrics and Evaluation (IHME) and other national sources (independent of private or commercial interests). The calculated EU averages are weighted averages of the 27 Member States unless otherwise noted. These EU averages do not include Iceland and Norway.
Purchasing Power Parity (PPP) is defined as the rate of currency conversion that equalises the purchasing power of different currencies by eliminating the differences in price levels between countries.



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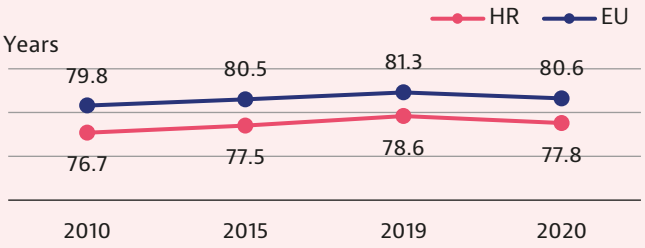
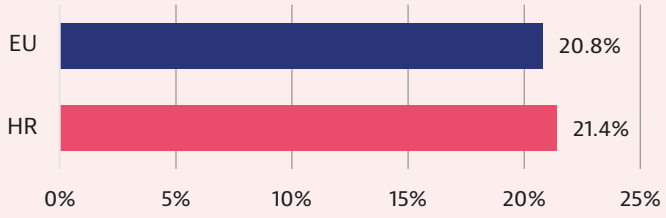
## Summary of the main characteristics of the health system

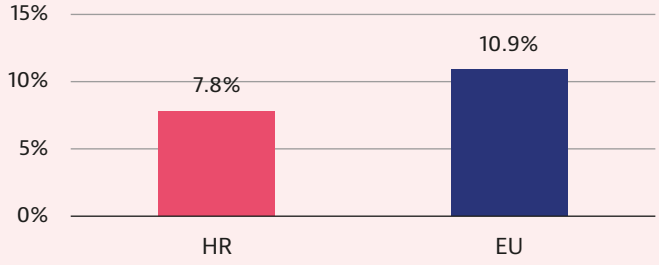
### LIFE EXPECTANCY AT BIRTH (YEARS)




### SHARE OF POPULATION AGED 65 AND OVER (2021)

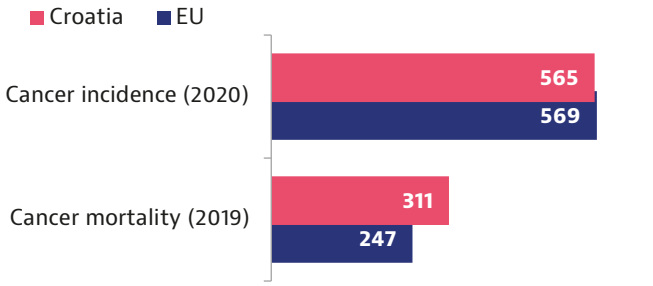



### HEALTH EXPENDITURE AS A % OF GDP (2020)




*Source: Eurostat Database.*

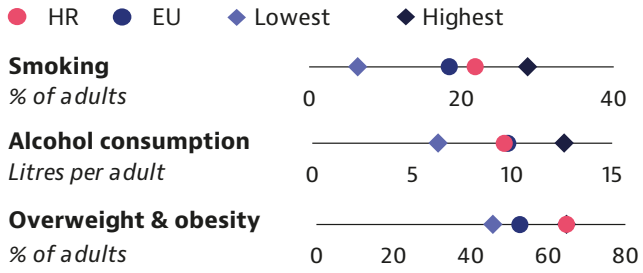
# 1. Highlights




*Age-standardised rate per 100 000 population*

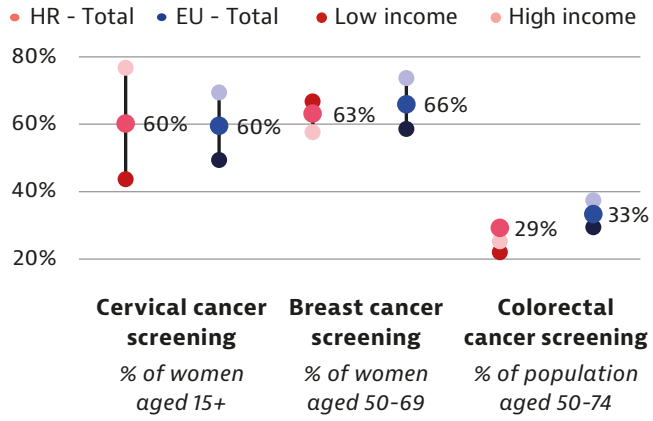
## Cancer in Croatia

Estimated cancer incidence in Croatia is close to the EU average, but the country has the second highest mortality from cancer across EU countries. Lung and colorectal cancer are the two main causes of death by cancer. The National Strategic Framework for Cancer 2020-2030 focuses on prevention, coordination and treatment quality.



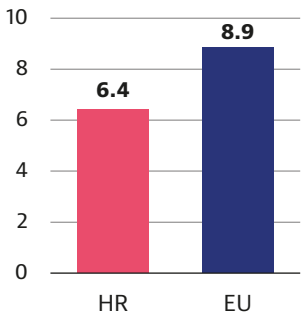

## Risk factors and prevention policies

More people in Croatia are obese or overweight than in any other country in the EU; Croatia also has among the highest prevalence of smokers. Better evidence-based policies are needed to complement current efforts to control risk factors for cancer.

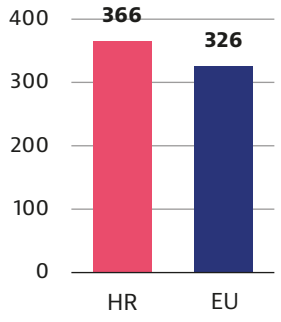



## Early detection

Population-based screening programmes for breast, cervical and colorectal cancer have slightly lower participation rates than the EU average. Population groups in rural areas, and those with low education and income are at risk of low participation. In 2020, Croatia introduced lung cancer early detection programme.




*Number of radiation therapy centres per 100 000 population, 2007-22*




*Total cost of cancer (EUR per capita PPP), 2018*

## Cancer care performance

Prompt access to cancer treatment is undermined by lower than average health workforce numbers, radiotherapy centres and treatment capacities. Challenges are enhanced by a lack of effective coordination along the care pathway, resulting in poor performance in cancer five-year survival. A reform to improve the cancer care pathway coordination is under way, including a strong component of data intelligence. Cancer care costs are marked by low direct costs but high costs of cancer morbidity, resulting in a total cost 11 % higher than the EU average.

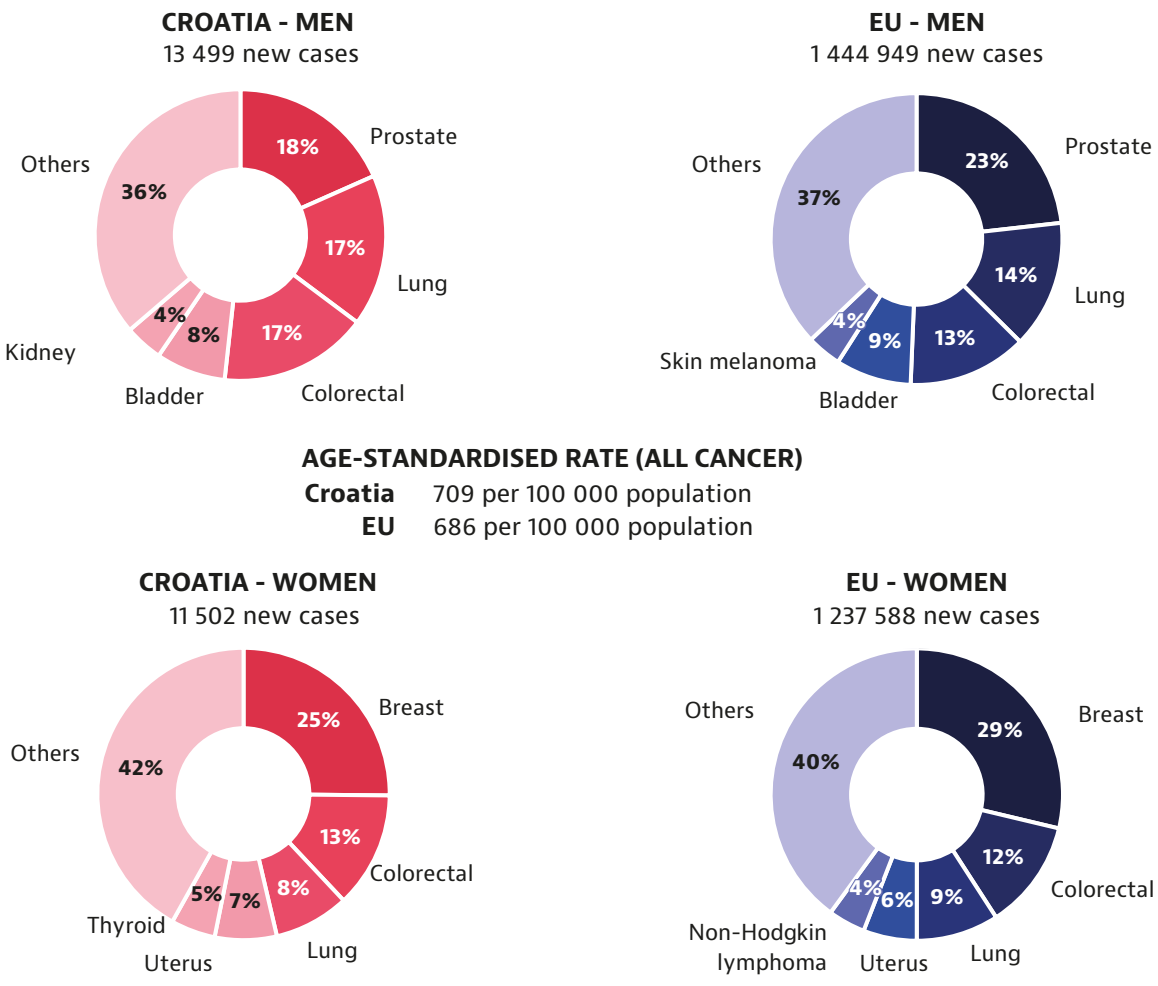
# 2. Cancer in Croatia

### Cancer incidence in Croatia has increased over the past two decades

According to European Cancer Information System (ECIS) of the Joint Research Centre based on incidence trends from pre-pandemic years, 25 001 new cases of cancer were expected in Croatia in 2020. Croatia's population is 3.9 million, meaning that around 0.6 % of the population was expected to have a first diagnosis of cancer that year. The age-standardised rate in 2020 was 709 new cancer cases per 100 000 population among men (slightly higher than the EU average of 686) and 467 among women (close to the EU average of 484)(Figure 1). From 2004 to 2020, the rate increased by 6 % (from 511 new cases per 100 000 population to 565). The steady increase shows that cancer incidence in the country is growing independently of population ageing. The negative influence of risk factors and the limited effectiveness of the health system to control them is acknowledged in the National Strategic Framework for Cancer 2020-2030 (NSFC). The framework aims to strengthen primary prevention and cancer care system coordination (Parliament of Croatia, 2020).

**Figure 1. Cancer incidence is close to the EU average for both sexes in 2020**

**Distribution of cancer incidence by sex in Croatia and the EU**




*Note: Corpus uteri does not include cancer of the cervix. These estimates were created before the COVID-19 pandemic, based on incidence trends from previous years, and may differ from observed rates in more recent years.*
*Source: European Cancer Information System (ECIS). From https://ecis.jrc.ec.europa.eu, accessed on 09/05/2022. © European Union, 2022.*

### More than 45 % of new cancer cases are concentrated in three cancer types

In 2020, prostate, colorectal and lung cancer were estimated to be responsible for half of new cancer cases among men (52 %). For women, breast, colorectal and uterus cancer represented 46 % of new cases (Figure 1). Breast cancer is the most common cancer among new cases in females, and has been for at least two decades (Parliament of Croatia, 2020). Both sexes combined, colorectal cancer is the most common newly diagnosed cancer in Croatia.

### Several cancer types have considerably higher incidence than the EU averages

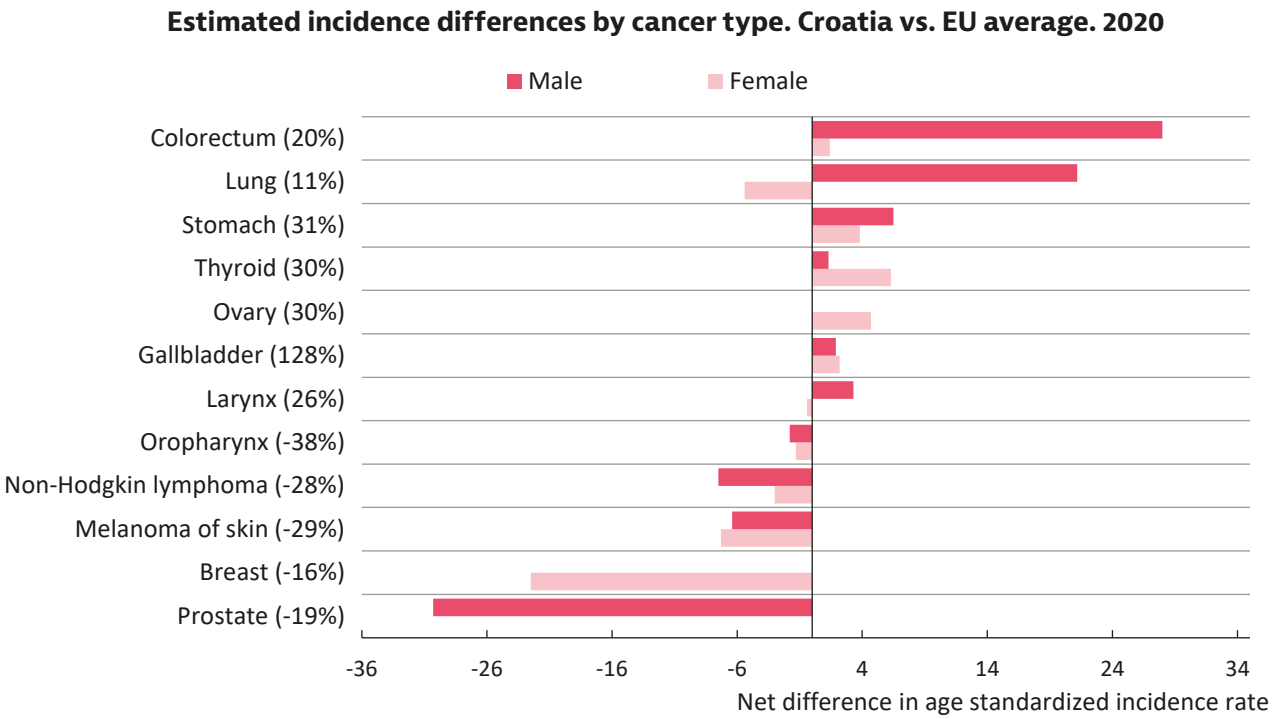
In 2020, lung and colorectal cancers are estimated to have 5 and 12 more new cases (age-standardised rate) per 100 000 inhabitants than the EU average. For men, new lung cancer rates were significantly higher per 100 000 inhabitants (118 vs. 97) than the EU average, as were colorectal cancer rates (120 vs. 92) (Figure 2). For women, the largest difference was for breast cancer, at 120 new cases per 100 000 population, compared to the EU average of 143.

Moreover, other cancer sites have important proportional differences in incidence from the EU averages. For example, gastric (stomach) cancer has a 31 % higher incidence in Croatia than the EU average (21 vs. 16 per 100 000 population). The difference is more pronounced in men (6.5 difference per 100 000 population) than women (3.8 difference per 100 000 population).

Paediatric cancer (among children aged 0-14 years) in Croatia has an estimated age-standardised rate of 17.5 new cases per 100 000 population[1]. This is the fourth highest rate in the EU, and is 13 % higher than the EU average.

Gallbladder, thyroid and ovarian cancers have more than 30 % greater incidence in Croatia than the EU average (128 % more for gallbladder). As with many cancers, incidence of these types is associated with lifestyle factors (see Section 3). On the other hand, skin cancer (melanoma) has a 29 % lower incidence rate than the EU average, with similar differences between men and women. In 2013, the estimated number of new rare cancer cases in Croatia was 5 394.

**Figure 2. Important differences are seen in several estimated incidences**



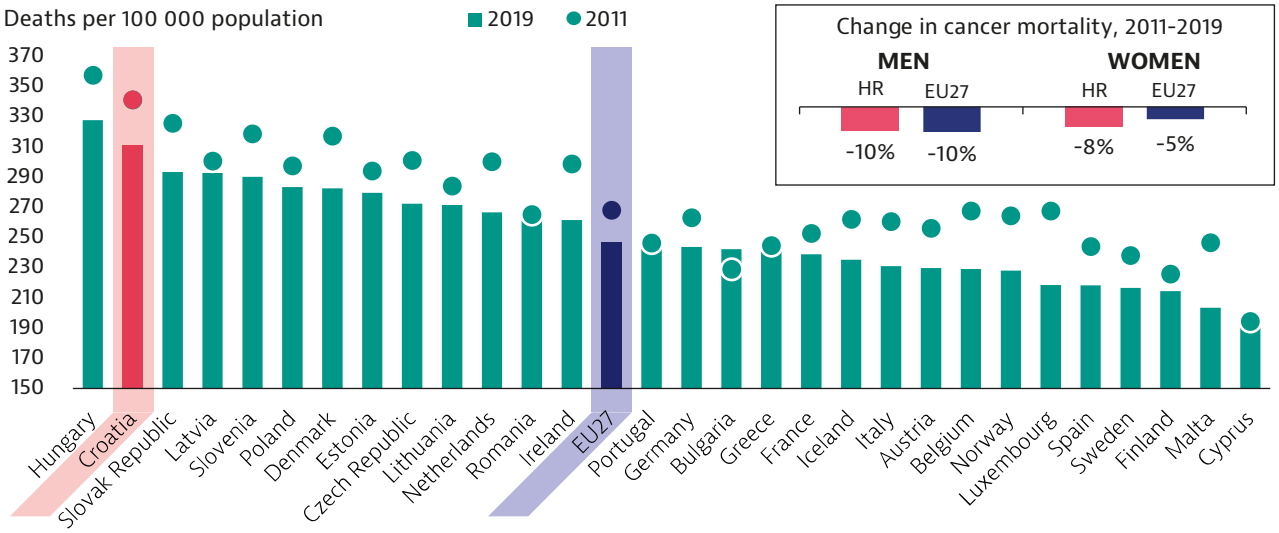

*Note: The EU average is weighted (calculated by Eurostat). In parenthesis, the proportional differences in age-standardised incidence rates between Croatia and EU average calculated for the total population.*
*Source: ECIS. From https://ecis.jrc.ec.europa.eu, accessed on 09/05/2022. © European Union, 2022.*

1 *The rate may be overestimated given that a number of children residing in neighbouring countries are treated in Croatian hospitals.*

## Croatia has the second highest cancer mortality in the EU

In 2019, Croatia had 311 cancer deaths per 100 000 population – the second highest rate after Hungary, and 25 % higher than the EU average of 247 (Figure 3). However, moderate improvement has been seen since 2011. For women, the reduction in mortality by cancer between 2011 and 2019 was larger in Croatia than across the EU (8 % vs. 5 %); in men, the reduction was close to the EU average (9.8 % vs. 10.4 %).

### Figure 3. Cancer mortality in Croatia is among the highest in the EU

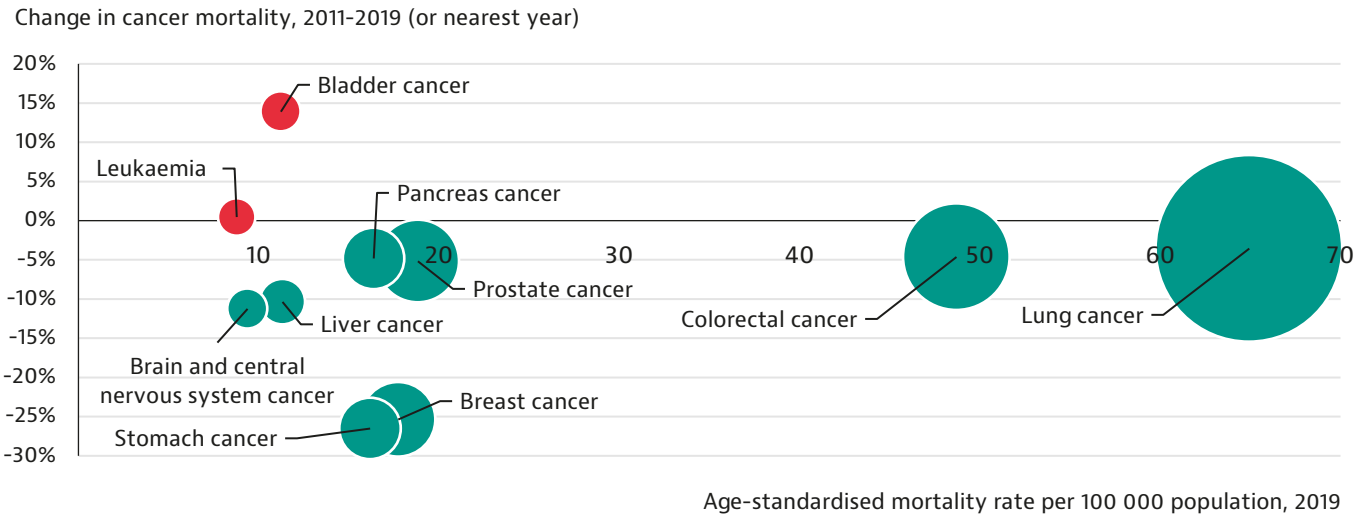



*Note: The EU average is weighted (calculated by Eurostat for 2011-2017 and by the OECD for 2018-2019).*
*Source: Eurostat Database.*

In 2019, the leading causes of cancer mortality for men were lung – including trachea and bronchus (2 013 deaths), colorectal (1 264 deaths) and prostate (809 deaths) cancers. Among women, lung (870 deaths), colorectal (839 deaths) and breast cancer (757 deaths) were the most common. Paediatric cancer (children aged 0-14 years) in Croatia had an age-standardised estimated rate of 3.2 deaths per 100 000 population in 2020. This is among the highest in the EU, and significantly higher than the 2.2 per 100 000 population EU average (Sung et al, 2021).

Age-standardised cancer mortality per 100 000 population for the cancer types with higher mortality improved during 2011-2019 (Figure 4). Breast cancer saw the largest improvement, with a 25 % reduction in the mortality rate, suggesting

### Figure 4. Cancer mortality decreased for most cancers




*Note: Red bubbles signal an increase in the percentage change in cancer mortality during 2011-2019; green bubbles signal a decrease. The size of the bubbles is proportional to the mortality rates in 2019. The mortality of some of these cancer types is low; hence, the percentage change should be interpreted with caution. Bubble sizes for mortality rates are not comparable between countries.*
*Source: Eurostat Database.*

important therapeutic advances, increases in early stage diagnoses and better screening, but also improvement in reporting cause of death. Improvements in mortality rates for other cancers – including lung, prostate and colorectal – were less pronounced (up to 5 % in the same period). On the other hand, bladder cancer mortality increased by almost 15 %.

### The cancer burden is greatest for cancers that are affected by lifestyle and early detection

Measured in disability-adjusted life-years (DALYs), the cancer burden in the country was the fourth highest among EU countries in 2019. Among cancer types, colorectal and lung cancer accounted for 49 % of the cancer DALYs in men, while breast, colorectal and lung cancers accounted for 54 % of the cancer DALYs in women.

### Croatia's cancer care plan focuses on prevention, coordination, treatment quality and access

Croatia launched the National Strategic Framework for Cancer 2020-2030 in December 2020. It defines the governance, legal and operational frameworks, and sets objectives for cancer care for the next 10 years (Box 1). In line with the Europe's Beating Cancer Plan (European Commission, 2021), the framework aims to improve cancer care in Croatia to match EU's best performing levels, and to deal with country-specific challenges such as the trade-off between efficiency and decentralisation (Parliament of Croatia, 2020). Patient associations participated in the creation of the NSFC, bringing up a special focus on improving patient experience.

**Box 1. The National Strategic Framework for Cancer 2020-2030**

Croatia launched the National Strategic Framework for Cancer 2020-2030 in December 2020. It describes the governance, legal and operational organisation; defines activities; and sets objectives and targets for cancer care for a 10-year period. The strategic goal is to improve the health of citizens, reduce cancer incidence and mortality, and extend and increase the quality of life of cancer patients.

The national plan addresses three priorities in particular:

- creating a national oncology network and patient registry
- enhancing primary and secondary prevention
- improving access to modern radiotherapy

Each of the 12 chapters of the Framework is dedicated to a specific area of cancer care, including prevention, treatment, rehabilitation and palliative care, among others. Furthermore, it describes the roles of 135 stakeholders, organised as 21 specific working groups. There is a special focus on creating indicators that facilitate performance and cost evaluations, together with creating and managing actionable data.

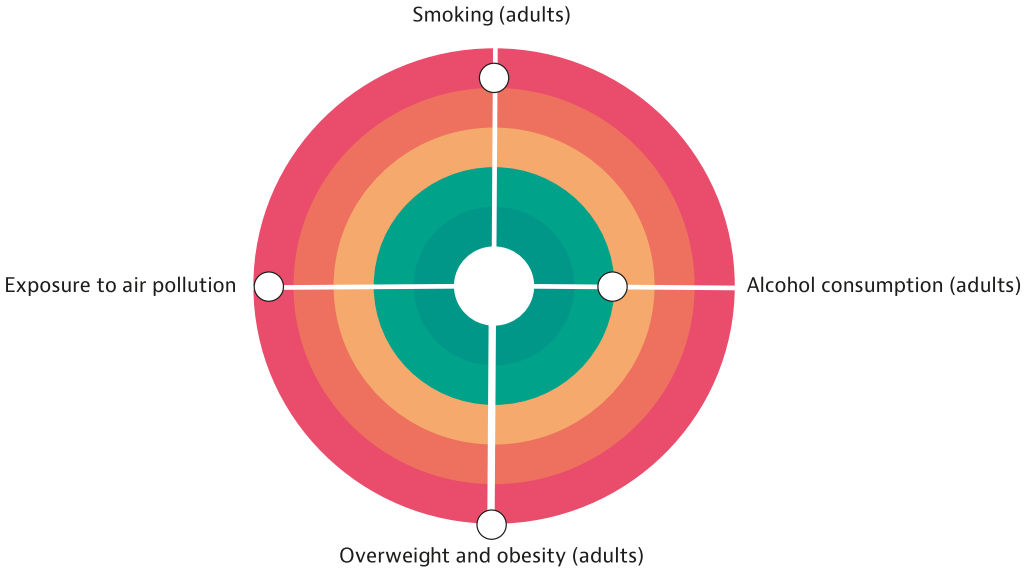
It is estimated that the cost of implementing the Framework requires an injection of EUR 200 million. In time, it is expected to save 113 000 quality-adjusted life-years, resulting in a cost of EUR 1 345 per quality-adjusted life-year.

*Note: Quality-adjusted life-year is a measure of health in which the length of life is adjusted to reflect the quality of life. One quality-adjusted life year is equal to 1 year of life in perfect health.*
*Source: Parliament of Croatia (2020).*

# 3. Risk factors and prevention policies

In Croatia smoking, overweight and obesity, and exposure to air pollution, are higher risk factors for cancer than in other EU countries (Figure 5). Behavioural risk factors were estimated to be responsible for more than a third (36 %) of the total lost years of life because of cancer in 2016, and for 44 % of all deaths in 2019 (six percentage point over the EU average). This calls for more effective prevention. In 2020, expenditure on prevention corresponded to 3.1 % of total health expenditure (lower than the EU average of 3.4%).

**Figure 5. Smoking, air pollution and overweight/obesity are important risk factors**




*Note: The closer the dot is to the centre, the better the country performs compared to other EU countries. No country is in the white "target area" as there is room for progress in all countries in all areas.*
*Sources: OECD calculations based on the European Health Interview Survey (EHIS) 2019 for smoking and overweight/obesity rates, OECD Health Statistics 2022 and WHO Global Information System on Alcohol and Health (GISAH) for alcohol consumption (2020), and Eurostat for air pollution (2019).*

## The number of daily cigarette smokers in Croatia is among the highest in the EU

In 2014, a quarter of the Croatian population declared that they were regular cigarette smokers; this fell to 22 % in 2019. Despite the reduction, prevalence of adult daily smoking is still the fifth highest in the EU (Figure 6). Smoking affects males disproportionally: in 2019, 25 % of men were daily smokers compared to 19 % of women (although the gender gap was narrowed overtime). For both sexes, this is higher than the EU averages in 2019 of 22 % for men and 15 % for women. There are large disparities by age group, with a 17 percentage point difference between smoking prevalence among those aged 15-64 years (28 %) and those aged 64 years and over (11 %). Disparities by education and income levels for smoking rates are less pronounced.

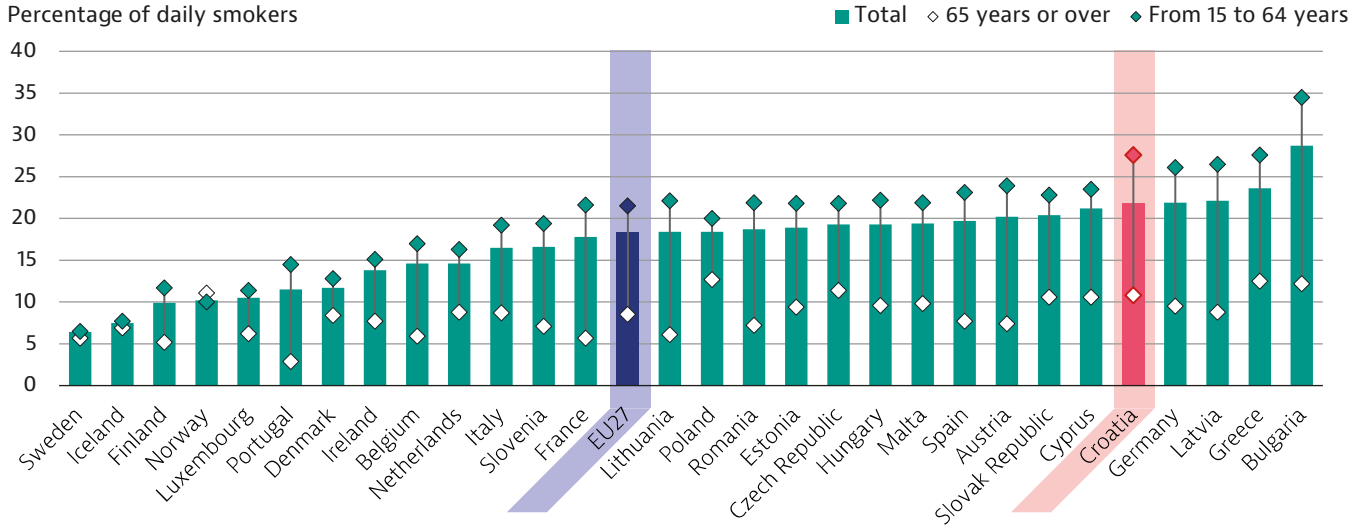
Croatia lags behind other countries in terms of implementation of effective tobacco control policies. The country has introduced self-help materials and school-based programmes, and celebrates the World No Tobacco Day. However, significant scope remains to strengthen policies such as those on smoke-free places, media campaigns against tobacco use and smoking cessation interventions with documented effectiveness – including behavioural and pharmacological therapy. In 2008, WHO established the MPOWER plan against the global tobacco epidemic (Monitor tobacco use and prevention policies; Protect people from tobacco smoke; Offer help to quit smoking; Warn about the dangers of tobacco; Enforce bans on tobacco advertising, promotion and sponsorship; Raise taxes on tobacco). In 2017, Croatia adopted the Law on Restricting the Use of Tobacco and Related Products, which transposes the European Tobacco Products Directive into national law. However, only two of the six MPOWER measures to reduce tobacco consumption were completely adopted in Croatia, despite WHO's 2016 warning of an estimated 636 000 premature deaths attributable to smoking in the country.

## People who are overweight or obese represent 65 % of the population – the highest rate in the EU

In 2019, Croatia had the highest rates of overweight or obese people among EU countries (64.8 % compared to the EU average of 52.7 %), and this has increased for both sexes. Among men, the share increased by 7.4 percentage points, from 65.8 % in 2014 to 73.2 % in 2019. Among women, the share increased by 11.7 percentage points, from 46.8 % in 2014 to 58.5 % in 2019 – the largest increase among EU countries.

Older people and those with lower education levels are disproportionately affected by overweight and obesity. In 2019, 74 % of the population aged 65 years and over were overweight or obese, compared with 60 % of people aged 15-64 years.

**Figure 6. Croatia has the fifth highest smoking prevalence in the EU**




*Note: The EU average is weighted (calculated by Eurostat).*
*Source: Eurostat Database (EHIS). Data refer to 2019.*

Similarly, 73 % of people with low educational attainment were overweight or obese, compared to 53 % of people with tertiary education.

These high levels are directly related to healthy diet and physical activity. In 2019, only 20 % of the population reported 150 minutes or more of physical activity a week outside work-related activities, which is 40 % lower than the EU average. Populations with low educational attainment are disproportionally at risk: in 2019, only 11 % of people with lower education levels reported adequate levels of physical activity, compared to 31 % of people with tertiary education. Moreover, in 2014 only 7 % of the population consumed the daily recommended five portions of fruit and vegetables, which was the second lowest rate in the EU, and well below the EU average of 12 %. These findings are consistent with the Childhood Obesity Surveillance Initiative 2018/2019 launched by the Croatian Institute of Public Health, which showed that 35 % of the country's children were overweight or obese. Fruit and vegetable consumption was better than the EU average in 2019, when 59 % of the population reported eating fruit and 61 % eating vegetables at least once a day. This is ahead of the EU averages of 56 % for fruit and 51 % for vegetables.

## Alcohol consumption levels in Croatia have fallen faster than the EU average

In 2020, Croatia consumed on average 9.6 litres of pure alcohol per capita a year, which was 2 % below the EU average of 9.8 litres. However, average consumption in the country was 14.1 litres in 2000, which was above the EU average of 10.7 litres. The diminution in consumption in Croatia between 2000 and 2020 (a fall of 4.5 litres per capita) was the largest reduction in the EU during this period.

## Exposure to air pollution is higher in Croatia than in the EU

In 2019, exposure to $PM_{10}$[2] in Croatia reached 30.9 µg/m³, the highest concentration among EU countries and 50 % higher than the EU average (20.5 µg/m³). The concentration of $PM_{2.5}$ was 16 µg/m³, higher than the EU average of 12.6 µg/m³. According to the Institute for Health Metrics and Evaluation, ozone and $PM_{2.5}$ exposure accounted for an estimated 6 % of all deaths in Croatia in 2019, a rate higher than the average across the EU (4%).

## Prevention policies are focused on vaccinations and public health campaigns

The Croatian Public Health Institute launched the Healthy Living Programme in 2002, with five components: health education, health and physical activity, health and nutrition, health and the workplace and health and the environment. The Programme includes initiatives targeting healthy nutrition in schools and marking food products with a "Healthy living" guarantee brand, awarded for a period of three years. This incentivises manufacturers to develop their products in accordance with the recommended criteria for energy and nutritional intake in EU Regulation no. 1169/2011 on the provision of food information to consumers.

2 *Particulate matter (PM) is classified according to size: $PM_{10}$ refers to particles less than 10 micrometres in diameter; $PM_{2.5}$ to particles less than 2.5 micrometres in diameter*

Croatia also participates in numerous EU projects aimed at improving and encouraging healthy lifestyles and diet among young people, such as the Joint Action on Nutrition and Physical Activity and Reducing Alcohol-related Harm. Further, the country has a preventive campaign based on vaccinations against viruses associated with cancer of several organs (Box 2).

**Box 2. Hepatitis B virus and human papillomavirus vaccines are freely available**

Two vaccines are currently available to reduce the incidence of infections associated with cancer: the vaccine for hepatitis B virus, which is linked to liver cancer, and the vaccine for human papillomavirus (HPV), which is linked to cervical and other cancers.

The HPV vaccine is quadrivalent, offering protection against HPV subtypes 6, 11, 16 and 18, to prevent diseases such as precancerous lesions, cancer of the cervix, vulva and vagina, anus and genital warts. Croatia made the HPV vaccination available free of charge in 2016, and recommended it to boys and girls in the eighth grade (14-15 years old) from 2018. However, vaccination coverage was lower than 10 % in 2017. Low literacy levels among parents, education authorities and children were recognised as a possible cause.

Universal hepatitis B virus vaccination has been mandatory for all sixth graders (12-13 years old) since 1999. Infants (0-1 years old) were included in the programme in 2007. Hepatitis incidence was reduced by 50 % compared to pre-vaccination rates.

*Source: Parliament of Croatia (2020).*

# 4. Early detection

### Croatia launched its national cancer plan in 2020

The National Strategic Framework for Cancer 2020-2030 describes population-based screening programmes (screening offered to a specific at-risk target population) for breast, cervical and colorectal cancer. It includes descriptions of the target age, testing method, invitation plan, coverage goals and pathway to follow after abnormal test results (Box 1). The Framework complements screening with specifications about opportunistic screening for these and other types of cancer. Implementation of the programmes depends directly on regional public health authorities, which might generate challenges for smaller and rural authorities.

### Self-reported coverage of breast cancer screening in Croatia is lower than the EU average

The National Breast Cancer Screening Programme was launched at the end of 2006, and new guidelines were released in 2017. Breast cancer screening follows a population-based approach. Following EU recommendations, the Programme targets females aged 50-69 years, who are invited to have a mammogram every two years. In 2019, 63 % of females aged 50 to 69 years reported having been screened in the previous two years. This is slightly lower than the EU average (66%). As in many EU countries, Croatian data suggest inequalities by education groups. For instance, there is a 9 percentage-point difference in breast screening uptake between women in the highest (70%) and lowest education groups (61%).

### Women with lower education and income levels have lower rates of cervical cancer screening

The National Cervical Cancer Screening Programme started in 2012 and was organised as a population-based programme in 2016. The Programme targets women aged between 25-64 years, inviting them to have a cytology test every three years. The National organised programme was stopped in 2016, and a pilot program using a combination of cytology and HPV testing is underway in one county. Typically, cervical cancer screening coverage is higher than breast cancer screening coverage, despite the latter having a smaller eligible population. This is explained in part by a positive correlation between cervical cancer screening and widespread practices of contraception.

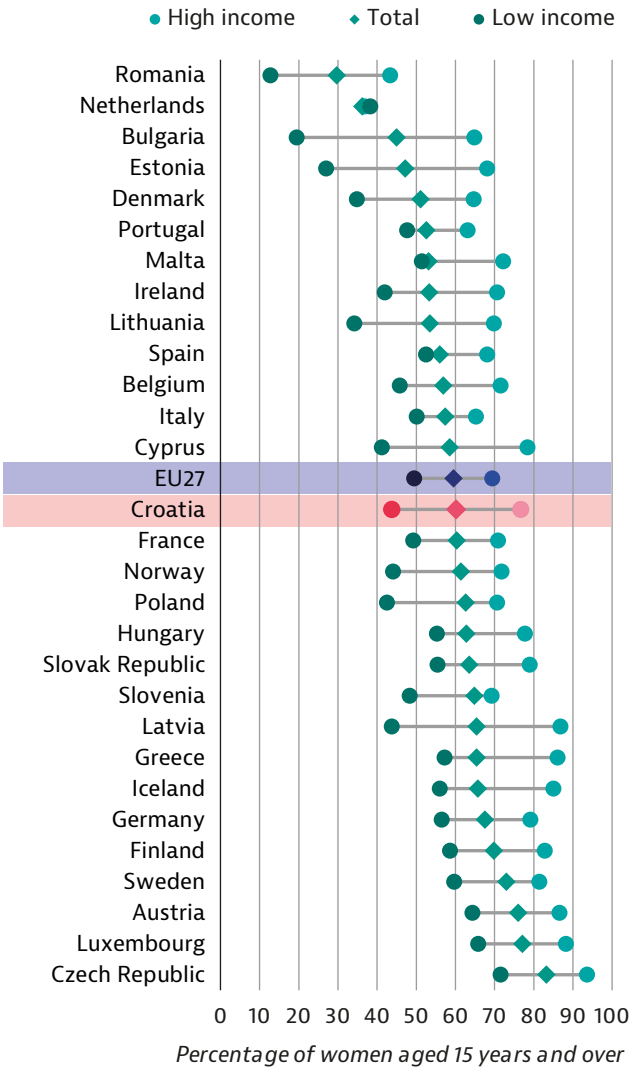
In 2019, 60 % of women aged 15 years and over reported having a cervical smear test in the last three years, which is lower than the proportion in 2014 (64 %). Although participation rate is similar

to the EU average (60 %), the difference between the highest (77 %) and lowest (44 %) income quintiles is considerably above the EU average (69 % vs. 49 %) (Figure 7). In addition, only 33 % of women with lower education levels reported having a cervical smear test in the past three years in 2019, compared to 80 % among women with tertiary education. Disparities by education group are higher in Croatia than the EU average, and have increased over time.

### Rural areas are at risk of low colorectal cancer screening rates

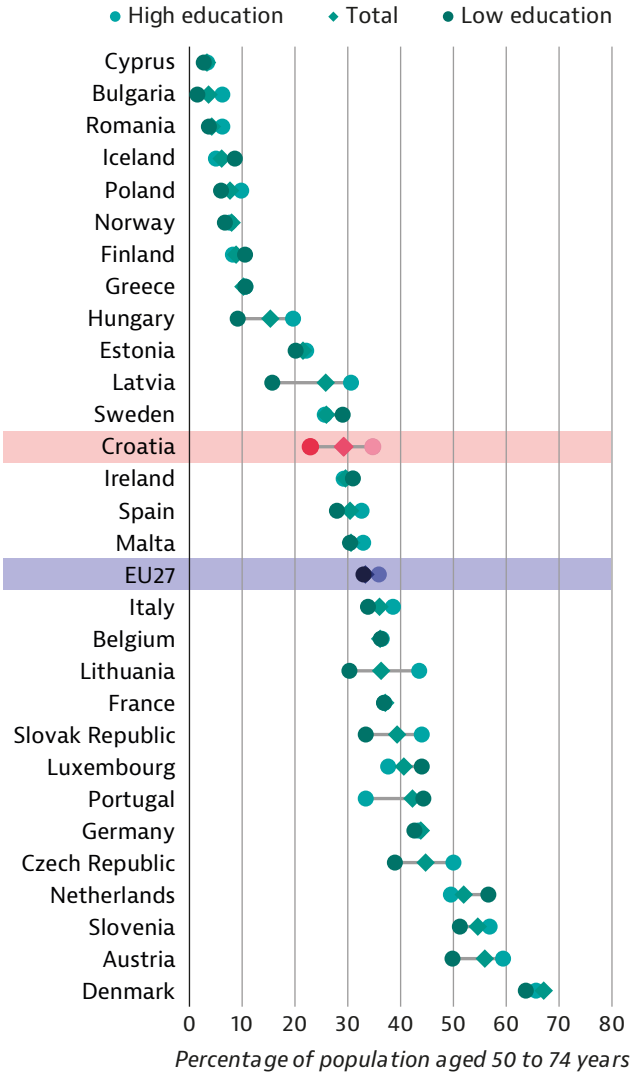
The National Programme for Early Detection of Colon Cancer began at the end of 2007. The Programme targets people aged 50-74 years who are invited to perform a gFOBT (occult blood in the stool) test every two years and a follow-up colonoscopy when adenomas are detected. The coverage goal is 45 %. While in 2014 Croatians who lived in cities had participation rates similar to EU average levels (30 % vs. 28 % in the EU), Croatian living in rural areas (17 %) had much lower screening coverage than in the EU (30%). Moreover, only 23% of people with lower education levels reported screening within two years in 2019, which is lower than among those with high education levels (35 %) (Figure 8). Disparities in colorectal cancer screening by age, sex and income were small in 2019.

**Figure 7. Disparities in cervical cancer screening uptake by income level are marked**




*Note: The EU average is weighted (calculated by Eurostat). The figure reports the percentage of women aged 15 years and over who reported having a cervical smear test in the past three years.*
*Source: Eurostat Database (EHIS). Data refer to 2019.*

**Figure 8. Colorectal cancer screening rates are lower among people with lower education levels**




*Note: The EU average is weighted (calculated by Eurostat). The figure reports the percentage of population aged 50 to 74 years who reported having a faecal occult blood test in the past two years.*
*Source: Eurostat, EHIS. Data refer to 2019.*

### Croatia is developing new cancer screening programmes, including for lung cancer

Based on the latest evidence indicating that prostate-specific antigen screening leads to a 21 % reduction in prostate cancer mortality, Croatian authorities are considering creating a single-test screening programme for males aged 55 years. Likewise, three types of stomach cancer screening – including screening for gastric (stomach) cancer with endoscopy or fluoroscopy, screening for precancerous lesions by determining the ratio between pepsinogene and pepsinogene II and screening for the bacterium Helicobacter pylori (a carcinogen for gastric/stomach cancer) – are considered awaiting for more definitive evidence of cost-effectiveness. Croatia was a pioneer in the EU in implementing screening for lung cancer (Box 3) and the NSFC sets the bases for further developing screening and early detection of cancer.

**Box 3. Screening for lung cancer is under way**

The National Lung Cancer Screening and Early Detection Programme started in 2020, making Croatia the first EU country to introduce nationwide screening for early lung cancer detection. The screening method is through computerised tomography of low-dose radiation, administered annually to active smokers with 30 pack-year aged 50-70 years, as well as those who quit smoking within the last 15 years. New national evidence links the Programme to a potential 25 % reduction in lung cancer mortality. It is estimated to cost between EUR 11 500 and EUR 71 600 (2020) per quality-adjusted life-year, where interventions costing EUR 36 000 can be considered economically viable in Croatia. The goals of the Programme include achieving a target population turnout of 60 % and increasing five-year survival to 15 %.

# 5. Cancer care performance

## 5.1 Accessibility

### The Croatian Health Insurance Fund provides comprehensive coverage of cancer care

The Croatian Health Insurance Fund (CHIF) provides universal health insurance coverage to the whole Croatian population and non-Croats living in Croatia. Funding sources of the insurance scheme are contributions made by economically active people and state budget transfers to cover people who are not economically active and vulnerable people who cannot contribute. The benefits package covers all curative and preventive cancer health services, from primary prevention to treatment, rehabilitation, reintegration into the labour market and palliative care. All essential inpatient cancer care drugs are fully covered, but patients have to pay in full for outpatient pharmaceuticals not included in the benefits package. However, out-of-pocket expenditure represented 11.5 % of health spending (lower than the EU average of 15.4 %), and 1.3 % of household consumption (the lowest in the EU) in 2019 (Džakula et al., 2021).

The impact of co-payments is low, thanks to high public coverage for services and exemptions for certain population groups – including children, students, people with disabilities, people on low incomes and people with chronic conditions. Cancer patients fall into this category, and are exempt from user charges. Overall, the co-payment system seems not to affect the ability of Croatians to access health care, as only 0.3 % of the population reported unmet health needs due to cost.

Treatment of rare cancers is also covered, and if a particular treatment is not available in the country, it is publicly funded for treatment abroad. Transport costs related to cancer care are also covered if the health facility is more than 50 km away.

### Shortages of health professionals and medical technology limit access to cancer care

Numbers of nurses, doctors and medical technologies have steadily increased in Croatia since 2013, but are still below EU average levels

(OECD/European Observatory on Health Systems and Policies, 2021) (Figure 9). In 2020, there were 572.5 physicians per 1 000 cancer cases, which is 17 % lower than the EU average of 690. Similarly, there were 130 oncologists (3.1 per 100 000 inhabitants), while the EU average was already 10 % higher in 2015 (3.4 oncologists/100 000 inhabitants) (Kelemenic-Drazin & Budisavljevic, 2020).

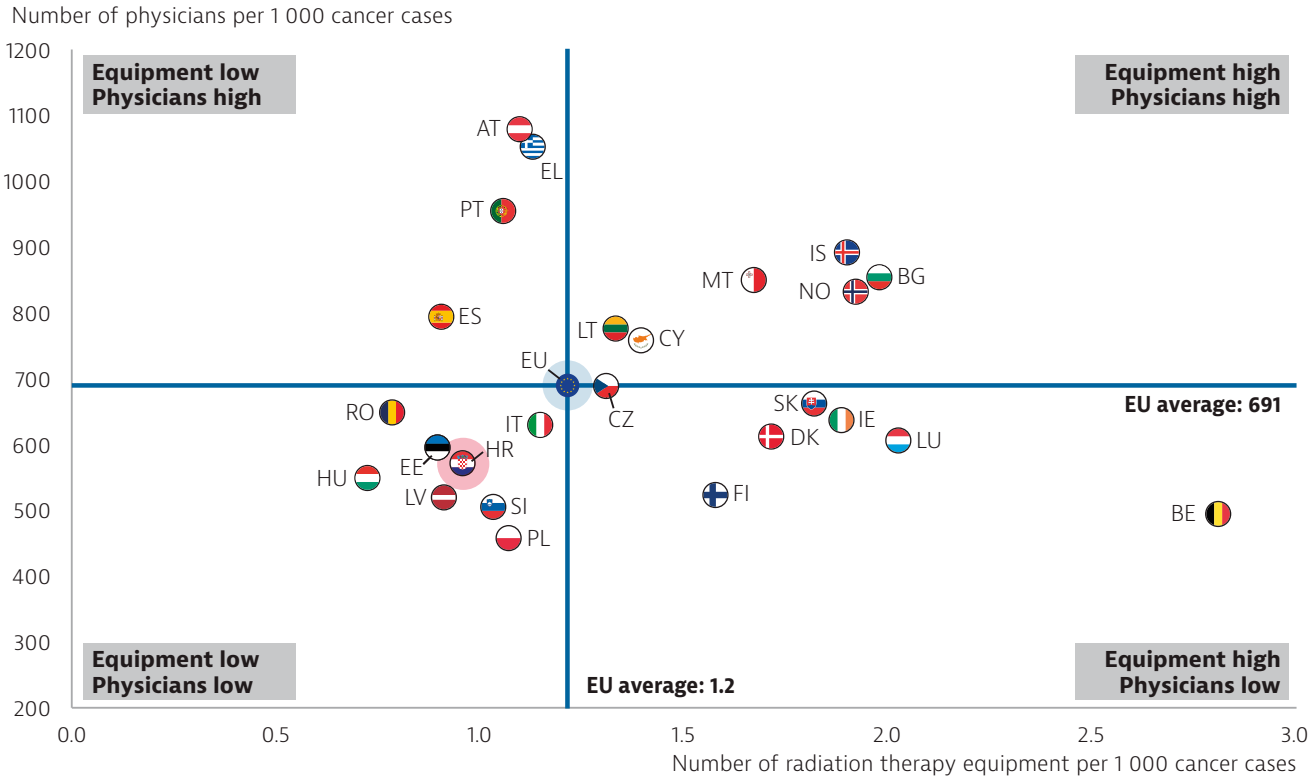
Radiation is an essential treatment in cancer care. Croatia had 0.6 linear accelerators per 100 000 inhabitants in 2019, which is 25 % lower than the EU average of 0.8 per 100 000 inhabitants. Similarly, computerised tomography (CT) scanners and magnetic resonance imaging (MRI) units are essential medical technologies for prompt diagnosis and to complement cancer treatment. Croatia had 2 CT scanners and 1.3 MRI units per 100 000 inhabitants in 2019, compared to the EU averages of 2.4 and 1.6. One of the main priorities of the National Strategic Framework for Cancer 2020-2030 is improving access to the latest medical technologies and reducing waiting times.

### Efforts to reduce waiting times between cancer diagnosis and treatment have had limited results

To speed up the care pathway after cancer diagnosis, the government launched the 72-hour Programme in 2015. This aimed to strengthen coordination of insurance managers and providers at the primary and secondary care levels with the objective of reducing waiting times between first diagnosis and treatment to 72 hours. The Programme was discontinued in 2016 by the newly elected health administration, with the argument that every patient with malignant disease should be the health system highest priority and their care should not require any additional legislative measures. In 2017, a priority waiting list was created, aiming to accelerate specialist care for patients with suspected serious illnesses such as cancer.

The priority list, however, has had limited results. In 2020 only 15 linear accelerators (radiotherapy equipment) of a total 24 were functioning and the waiting time to receive radiotherapy was 2.5 months (Kelemenic-Drazin & Budisavljevic, 2020).

**Figure 9. Croatia has lower levels of physicians and radiation equipment than the EU averages**




*Notes: The EU average is unweighted (calculated by the OECD). Radiation therapy equipment is from hospitals and providers of ambulatory care. Data refer to medical doctors only.*
*Sources: Eurostat and OECD Health Database (data refer to 2020 or nearest year).*

### Rural areas have less access to treatment options

Croatia's cancer care is affected by important geographical disparities. Data from 2020 show that 48 % of the population live in counties without clinical oncology centres (Kelemenic-Drazin & Budisavljevic, 2020). This may in part explain why proportionally more people in Croatia (0.6 % of the population) reported unmet medical needs because of geographical distance in 2020 than in any other EU country (EU average of 0.1 % of the population).

Differences in cancer care availability within the country are directly related to the fact that cancer care occurs almost exclusively in clinical hospital centres and general hospitals. Most cancer care facilities are concentrated in the city of Zagreb, while smaller cities and rural areas have a much lower density of cancer services. Of the 130 oncologists in the country in 2020, 106 (82 %) worked in clinical oncology centres (which have a higher degree of specialisation), and 24 (18 %) in non-clinical oncology centres (Kelemenic-Drazin & Budisavljevic, 2020). Further, all 24 linear accelerators are found in hospitals, while on average across the EU 15 % of radiation therapy equipment is available in ambulatory care.

### Although progress has been made in organising palliative care, further improvements are needed

The Palliative Care Model 2014-2020 restructured palliative care to facilitate better integration between providers and across level of care. Guidelines have been adopted and palliative care services established in inpatient and outpatient settings. In 2021, there were 353 palliative beds in secondary care, while 12 mobile palliative teams and 29 palliative care coordinators were contracted by the CHIF in primary care (OECD/European Observatory on Health Systems and Policies, 2021). The country has one specialised establishment for palliative care: Hospice Marija Krucifiksa Kozulić in Rijeka. This has 14 beds and employs nurses and physiotherapists, while doctors from the nearby Clinical Hospital Centre perform regular visits and patient check-ups. The establishment treats around 250-300 patients a year, 90 % of whom are cancer patients.

Although progress has been made, more and better qualified personnel, and organisational structures and implementation plans according to the local context are still needed, as is a clear scope and definition of responsibilities among palliative care stakeholders (Vočanec et al., 2022).

### The Croatian health system has a lower number of clinical trials than other EU countries

According to the EU Clinical Trials Registry, 208 cancer clinical trials took place in Croatia in 2022. Trial numbers were 762 in Ireland and 645 in Norway – countries with similar population sizes. Croatia is at the lower/middle end of the scale in terms of number of clinical trials among countries from central and eastern Europe, demonstrating room for improvement in awareness and recruitment of experimental treatments and the need to strengthen alliances with research institutions.

## 5.2 Quality

### Cancer survival rates are among the lowest in the EU

The quality of cancer care is lower in Croatia than in other EU countries. According to IHME, an estimated 282 113 life year were lost due to cancer in 2019, amounting to 6 641 per 100 00 inhabitants, 15 % higher than the EU average of 5 717 in the same year. Five-year cancer survival rates following common cancers (breast, colon, cervical, prostate and lung cancer) are significantly below the EU averages, based on the most recent data available for people diagnosed in 2010-14 (Figure 10). Croatia compares well with other EU countries for five-year survival rates only for childhood leukaemia, and for child five-year survival rates following brain tumours and lymphomas. Further, adult survival rates for rectum (48 %) and stomach (20 %) cancers are also significantly behind the EU averages (59 % and 27 %, respectively).

Although noticeable improvements have been seen in survival rates compared to people diagnosed between 2000 and 2004 (with a 9 % increase for colon cancer and 23 % increase for prostate cancer, for example), cancer survival rates in other EU countries improved more rapidly over the same period.

### Reform to establish a cancer care network is under way

Cancer care in Croatia is fragmented and lacks a coordinated structure. This issue has been acknowledged, and is addressed in the National Strategic Framework for Cancer 2020-2030. The current structure is composed of oncology centres (hospitals wards or specialised providers) created in the last 20 years under local governance and with insufficient grounding in criteria such as demand and alignment with national priorities. The Framework establishes a cancer care network to enhance coordination among all oncology

**Figure 10. Cancer survival rates for most common cancer types are well below the EU averages**

| Prostate cancer | Childhood leukaemia | Breast cancer | Cervical cancer | Colon cancer | Lung cancer |
|---|---|---|---|---|---|
| Croatia: 81% | Croatia: 85% | Croatia: 79% | Croatia: 63% | Croatia: 51% | Croatia: 10% |
| EU24: 87% | EU24: 82% | EU24: 83% | EU24: 64% | EU24: 60% | EU24: 15% |

*Note: Data refer to people diagnosed between 2010 and 2014. Childhood leukaemia refers to acute lymphoblastic cancer.*
*Source: CONCORD Programme, London School of Hygiene and Tropical Medicine.*

centres in the country and to foster high-quality, multidisciplinary and patient-centred care. Further, the new organisational structure is designed to find a balance between centralising care provision because of fiscal constraints and providing timely and accessible care to improving the patient experience.

The Framework describes provider roles and responsibilities involved in each step of the cancer care pathway. It includes a description of the stakeholders involved in creation of the oncology network, cancer research, quality control and economic assessment (Parliament of Croatia, 2020).

### Quality measures are being developed to improve care quality

Health system performance assessment indicators are being created with the expert support of Italy's Sant'Anna School of Advanced Studies, including patient-reported indicators in cancer care as part of the Developing Health System Performance Assessment (HSPA) in Croatia project, financed by the European Commission. According to the project activities, the Croatian HSPA report will be ready at the end of February 2023.

### Cancer data infrastructure will be enhanced by the National Strategic Framework for Cancer 2020-2030

National registries collect data on public health priorities and are accessible via the national public health information system, which is managed by the Croatian Institute of Public Health (CIPH). It is mandatory for providers to make pseudonymised cancer data available in the National Cancer Registry – one of the registries managed by the Institute. Data integration works well at the primary care level, but there is little standardisation of data at the secondary care level, and – owing to interoperability issues – it is not possible to trace patients along the cancer care pathway. Furthermore, the national cancer registry does not include socioeconomic characteristics, or advanced staging data, and instead uses a simplified version of cancer staging with three categories: localised, spread and metastatic. Together, these limitations undermine the opportunity to assess the relevance and coordination of care and to monitor disparities in cancer care. The reorganisation of health resources during the pandemic meant cancer care registries were partially disregarded because of more pressing needs. This influenced the performance assessment and monitoring of services other than COVID-19-related services. However, the cancer registry data for 2020 is expected to be published in November 2022, earlier than many other European countries. Preliminary data indicate a 10% drop in the number of cancer diagnoses as compared to 2019 (see section 5.4).

A centralised information system hosts the national screening registry that supports screening programmes. This information system is linked to the primary health care information system; however, it does not support active searching, dissemination of invitations for target populations, creation of quality and performance measures or a direct link with cancer registries. Further, links between screening registries and the Cancer National Registry is only possible on an ad hoc basis, with a degree of expertise on the part of the researcher.

The National Strategic Framework for Cancer 2020-2030 sets out plans for creation of a national database of oncology to monitor the burden of disease and cancer care performance, and to inform policy action. To maximise the success of the new database, the information system managed by the CHIF is expected to be used as a structural platform. This information system, called the Central Health Information System, is integrated and inter-operable at all health care levels – including laboratories and pharmacies – and is updated in real time. Further, the CHIF regularly publishes performance measures related

to the diagnosis-related group payment system to enable benchmarking between hospitals, and there are plans to use these effective data capabilities to create more actionable indicators for care providers at all levels.

## 5.3 Costs and value for money

### Co-payments are capped at around EUR 266 per episode of illness

The mandatory health insurance scheme covers the entirety of cancer care. However, there is a uniform 20 % co-payment, together with fixed amounts calculated as percentages of the budgetary salary base for certain goods and services (3.01 % of the budgetary base per day for hospital care and 30.08 % for dental care, for example). The most significant co-payments are for drugs outside the basic list, for which a 10-30 % co-payment is required. Drugs administered during hospital care are free of charge. Co-payments are defined by the CHIF. On top of universal mandatory health insurance covering the entire Croatian population, two forms of complementary insurance cover co-payments and access to other non-essential services. In all cases, cost-sharing is capped at EUR 266 (HRK 2 000) per episode of illness in secondary or tertiary care, which directly relates to most cancer cases.

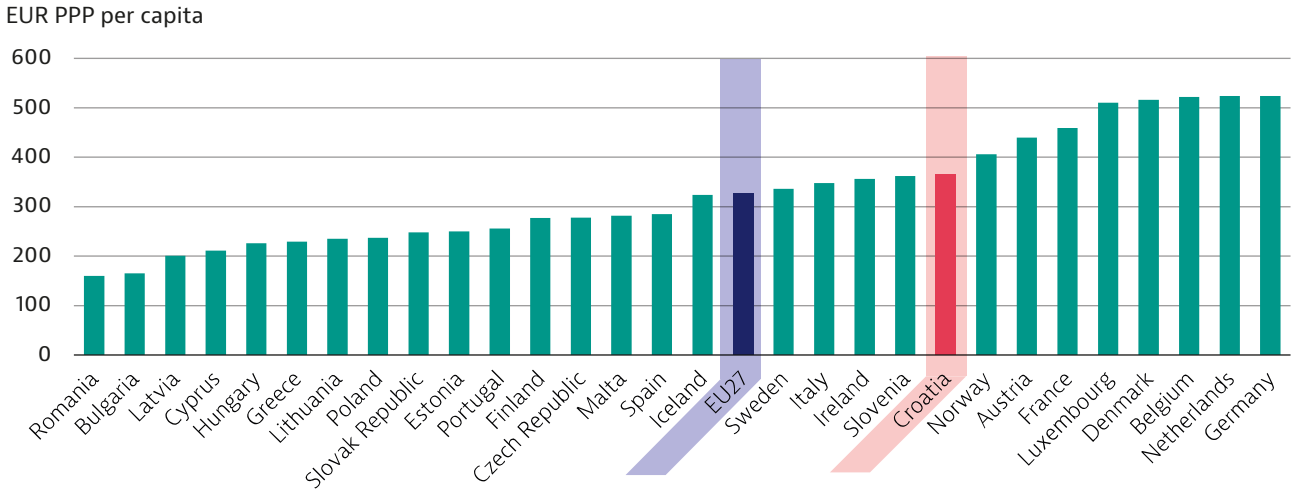
### Cancer care costs are larger than the EU average

In 2018, cancer care amounted to 7 % of Croatia's total health expenditure, while the EU average was 6 %. This difference has been consistent over time: in 1995, cancer care costs amounted to 6.9 % of total health expenditure in Croatia and 5.9 % across the EU, and in 2014, the proportions were 6.9 % in Croatia and 6.1 % across the EU.

Although direct costs per capita for cancer treatment are significantly lower than in other EU Member States (Kelemenic-Drazin & Budisavljevic, 2020), Croatia has a higher total cost of cancer care than the EU average. In 2018, this was EUR 366 – adjusted for purchasing power parity (PPP) – which is 11 % higher than the EU average of EUR 326 (Figure 11). However, in the past Croatia had lower costs than the EU average: in 2014 per capita expenditure was EUR 80 vs. the EU average of EUR 164.

The share of total cancer expenditure that different cost components represent in Croatia differs significantly from the EU average. Productivity loss due to morbidity accounted for 44 % of cancer care costs in Croatia – a proportion more than three times the EU average of 13 %. On the other hand, 26 % of total cancer expenditure in Croatia is due to health care expenditure (including drugs), while the EU average is 49 %.

**Figure 11. Per capita expenditure on cancer care is above the EU average**




*Note: The EU27 average is unweighted (calculated by the OECD).*
*Source: Hofmarcher et al. (2020).*

### Croatia aims to achieve savings through joint public procurement with other EU Member States

Cancer drugs represent 15 % of cancer costs in Croatia – close to the EU average. However, Croatia spends more than the EU average on pharmaceuticals and medical devices overall, accounting for 22.8 % of total health spending in 2019, compared to the EU average of 18.4 % (Džakula et al., 2021). To reduce health spending on medicines and treatments, including cancer care, Croatia participates in the Valletta Declaration – a multinational negotiating co-operation (Box 4).

**Box 4. The Valetta Declaration**

The heads of state of Croatia, Cyprus, Greece, Ireland, Italy, Malta, Portugal, Romania, Slovenia and Spain expressed their political will to co-operate in full trust, loyalty, solidarity and transparency for better access to medicines on 8 May 2017 in Valletta, Malta. The objectives of the co-operation can be summarised as:

- guaranteeing patients access to new and innovative medicines and therapies;
- ensuring sustainability of national health systems; and
- achieving collaboration between countries, leading to synergies.

In practice, the collaboration entails joint clinical assessment and economic evaluation of medicines; it acts as a conglomerate (representing 160 million citizens and 31.5 % of the EU population) in joint price negotiations for selected medicines. Cancer care pharmaceuticals are one of the focus areas of the Valetta Declaration, and a proposal to include technologically advanced cancer medicines – such as CAR-T cell therapies – in the agenda was discussed at a 2019 meeting in Zagreb.

## 5.4 COVID-19 and cancer: building resilience

### One tenth of patients experienced changes in cancer treatment during the pandemic

Croatia maintained access to cancer care during the COVID-19 pandemic thanks to a prioritisation policy, although mobility and care restrictions were in force. Nevertheless, a cross-sectional observational study of 422 oncology patients who received treatment during the pandemic found that 10.2 % reported changes in cancer treatment (Kelemenic-Drazin et al., 2021). Most patients did not change their treatment location (98 %), and only 15 % of patients perceived changes in quality of treatment. The proportion of patients reporting changes in cancer treatment was high during the first lockdown, but this share decreased progressively as containment measures were loosened. Only 4.5 % of patients discontinued treatment, among whom 63 % did so based on a doctor's recommendation because of a higher risk of COVID-19 infection. Patients who missed treatments did so because they were not able to go to the hospital (57.1 %) or feared the pandemic (28.6 %).

### Disruption in cancer screening led to fewer early detected breast cancers

Screening programmes were suspended from March to May 2020, after which services resumed. During the first lockdown between April 2020 and June 2020, screening services were reduced by 11 %, leading to a 24 % reduction in newly diagnosed breast cancer cases compared with the same three months of 2019. However, the Croatian health system showed resilience and compensated for the reduction in services after the first formal lockdown so that by the end of 2020 only 1 % fewer new cases were detected than in 2019. Comparing the incidence registered in 2020 to what was expected using the linear trend of previous years, the diminution escalates to 6% (Vrdoljak et al., 2021).

Colorectal cancer screening and surgeries in a Zagreb hospital underwent few changes during 2020 except for the month of April, when services were suspended. The number of colonoscopies returned to an average rate three months later (in July 2020), while the number of surgeries remained stable throughout 2020 (Kirac et al., 2020).

# 6. Spotlight on inequalities

Croatia has a national health system that offers coverage to the whole population, based on residence. Small co-payments are required, but they do not represent a financial constraint due to high public coverage of services and exemptions for certain population groups, including cancer patients. High estimated incidence rates, high prevalence of risks factors and low five-year survival rates for several cancer types suggest room for improvement in cancer care quality and prevention.

- The proportion of obese and overweight people is 20 % higher among those aged 65 years and over, and 38 % higher among those with low education levels, showing the need for better primary prevention targeted at vulnerable population groups.
- The country also has one of the EU highest share of smokers, with young males being disproportionally affected.
- Despite population-based screening programmes for cervical, breast and colorectal cancers, access to early diagnosis is limited for population groups in rural areas and those with low education and income levels. Cervical cancer screening participation rates is 2.4 times higher among women with tertiary education than women with lower education levels. For breast cancer, there is a 9 percentage-point difference in screening participation rates between women in the highest (70%) and lowest education groups (61%).
- Colorectal cancer screening participation in rural areas is almost half that in urban areas, and cervical cancer screening participation is significantly lower among population groups with low education and income levels.
- Lower than average human and technological capacities – together with a concentration of resources in the capital and professional migration – undermines the health system's capacity to provide timely access to high-quality diagnosis and treatment. In Croatia, 48 % of the population live in counties without a clinical oncology centre, and most oncologists and medical technologies are concentrated in the capital.

The policies described in the National Strategic Framework for Cancer 2020-2030 address important factors driving cancer care inequalities. They focus on primary and secondary prevention, together with better organisation and integration of cancer care at the national level, and the introduction of data intelligence to improve access to quality treatment. To secure the future effectiveness of these policies, extra efforts should be made to avoid disruptions of otherwise highly effective interventions.

The comprehensive approach and evidence-based policies described in the National Strategic Framework for Cancer have high expectations for improving cancer care in Croatia. To secure successful implementation and reduce existing inequalities, there is a need to focus on practical guidelines describing care pathways in detail, to use multidisciplinary teams and to target cancer action for the most vulnerable people who face higher risk factors and lower access to diagnostic services.

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**Country abbreviations**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Austria | AT | Denmark | DK | Hungary | HU | Luxembourg | LU | Romania | RO |
| Belgium | BE | Estonia | EE | Iceland | IS | Malta | MT | Slovak Republic | SK |
| Bulgaria | BG | Finland | FI | Ireland | IE | Netherlands | NL | Slovenia | SI |
| Croatia | HR | France | FR | Italy | IT | Norway | NO | Spain | ES |
| Cyprus | CY | Germany | DE | Latvia | LV | Poland | PL | Sweden | SE |
| Czech Republic | CZ | Greece | EL | Lithuania | LT | Portugal | PT | | |

European Cancer Inequalities Registry

# Country Cancer Profile 2023

The European Cancer Inequalities Registry is a flagship initiative of the Europe's Beating Cancer Plan. It provides sound and reliable data on cancer prevention and care to identify trends, disparities and inequalities between Member States and regions. The Registry contains a website and data tool developed by the Joint Research Centre of the European Commission (https://cancer-inequalities.jrc.ec.europa.eu/), as well as an alternating series of biennial Country Cancer Profiles and an overarching Report on Cancer Inequalities in Europe.

The Country Cancer Profiles identify strengths, challenges and specific areas of action for each of the 27 EU Member States, Iceland and Norway, to guide investment and interventions at the EU, national and regional levels under the Europe's Beating Cancer Plan. The European Cancer Inequalities Registry also supports Flagship 1 of the Zero Pollution Action Plan.

The Profiles are the work of the OECD in co-operation with the European Commission. The team is grateful for the valuable comments and suggestions provided by national experts, the OECD Health Committee and the EU Expert Thematic Group on Cancer Inequality Registry.

Each Country Cancer Profile provides a short synthesis of:

- the national cancer burden
- risk factors for cancer, focusing on behavioural and environment risk factors
- early detection programmes
- cancer care performance, focusing on accessibility, care quality, costs and the impact of COVID-19 on cancer care.

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