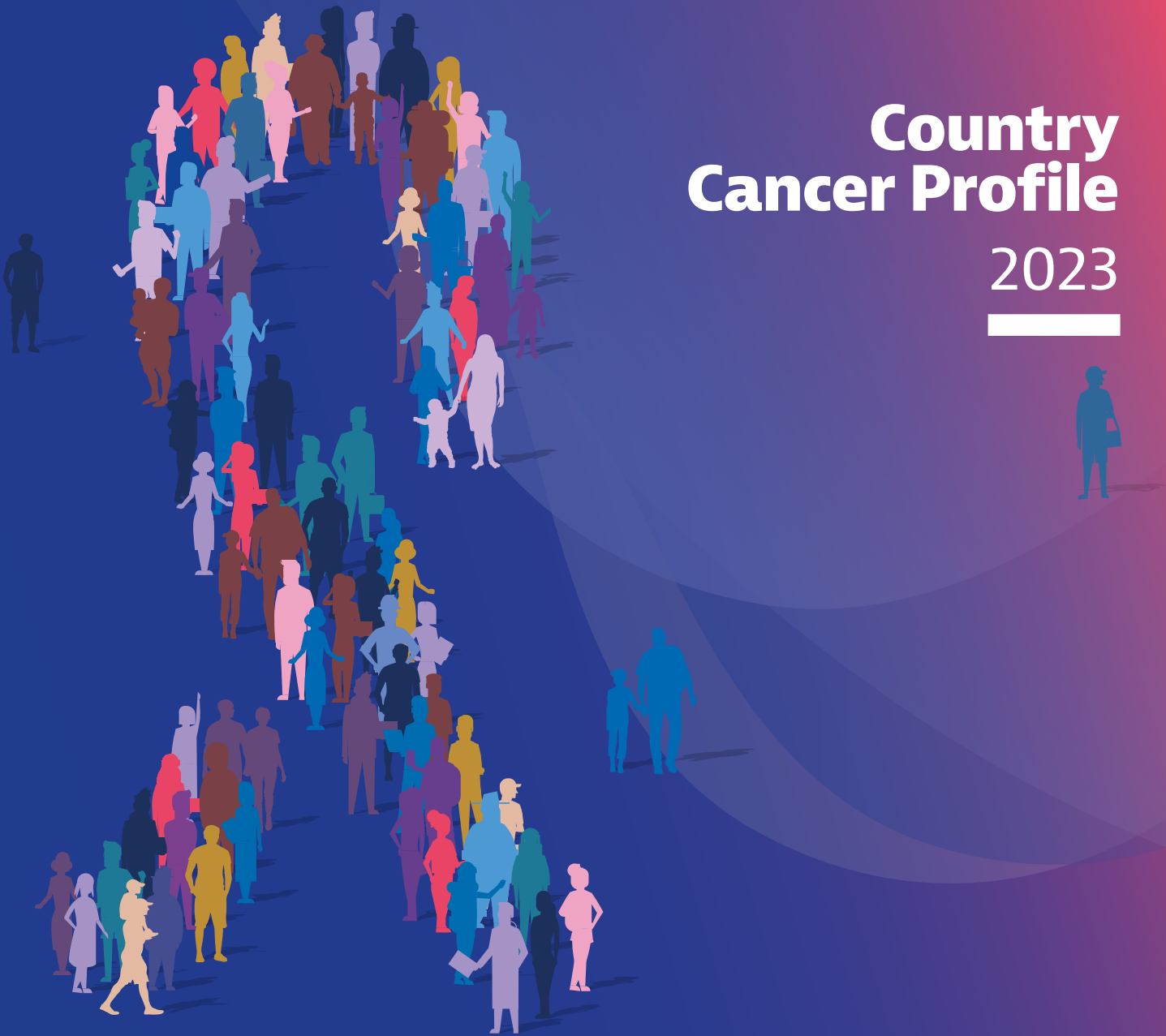




LUXEMBOURG

Country Cancer Profile

2023



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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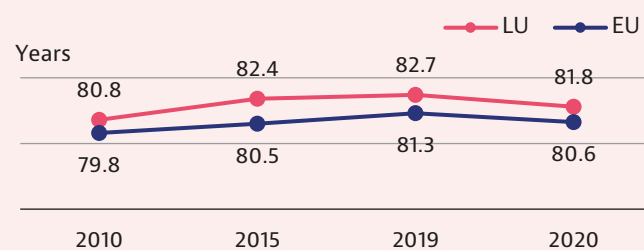
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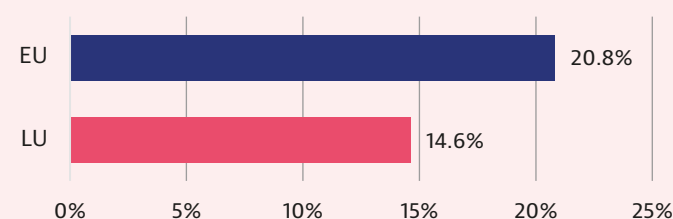
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Summary of the main characteristics of the health system

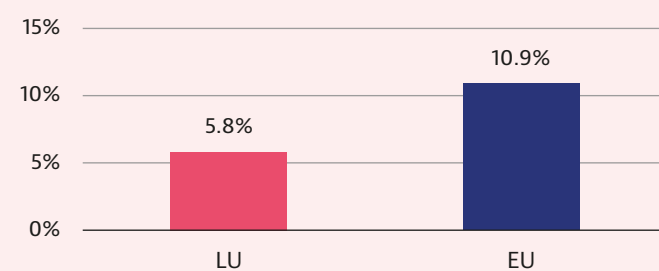
LIFE EXPECTANCY AT BIRTH (YEARS)



SHARE OF POPULATION AGED 65 AND OVER (2021)

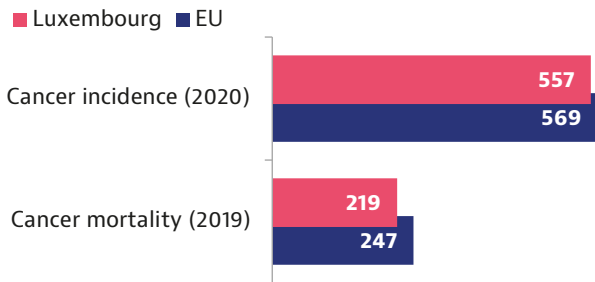


HEALTH EXPENDITURE AS A % OF GDP (2020)

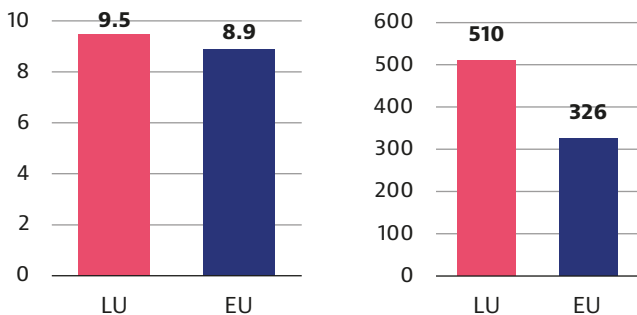
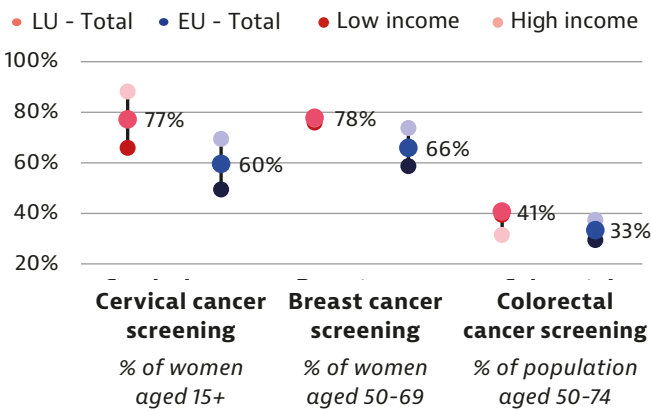
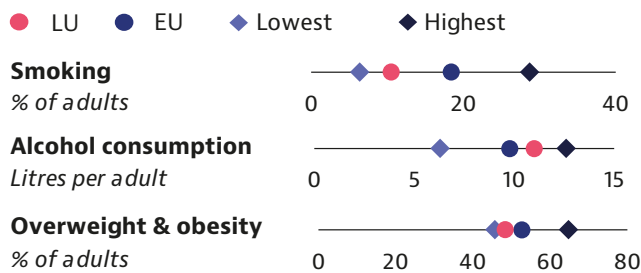


Source: Eurostat Database.

1. Highlights



Age-standardised rate per 100 000 population



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

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

Cancer in Luxembourg

An estimated 3 000 new diagnoses of cancer were expected in Luxembourg in 2020. Cancer mortality rates are among the lowest in the EU, and decreased significantly between 2011 and 2019 – including for lung and colorectal cancers, which cause the most cancer-related deaths in Luxembourg.

Risk factors and prevention policies

Behavioural risk factors for cancer such as alcohol consumption, obesity and tobacco smoking contribute significantly to Luxembourg’s cancer risk profile. Rates of alcohol consumption are among the highest in the EU, while human papillomavirus (HPV) vaccination rates are among the lowest.

Early detection

Luxembourg runs two organised screening programmes for breast and colorectal cancers. Cervical cancer smear tests are at the discretion of the individual and their clinician. However, screening uptake rates are around the top quartile in the EU.

Cancer care performance

In 2017, Luxembourg outperformed EU averages for potential years of life lost due to cancer per capita for all cancers and for each major cancer type except breast cancer. These trends reflect good performance of cancer care system. In 2018, cost of cancer per capital in Luxembourg was above the EU average. Accessibility of cancer services is good, but the availability of oncology professionals is a persistent issue. Care standardisation and understanding of how access and quality are affected by socioeconomic factors will constitute additional challenges in the coming years.

2. Cancer in Luxembourg

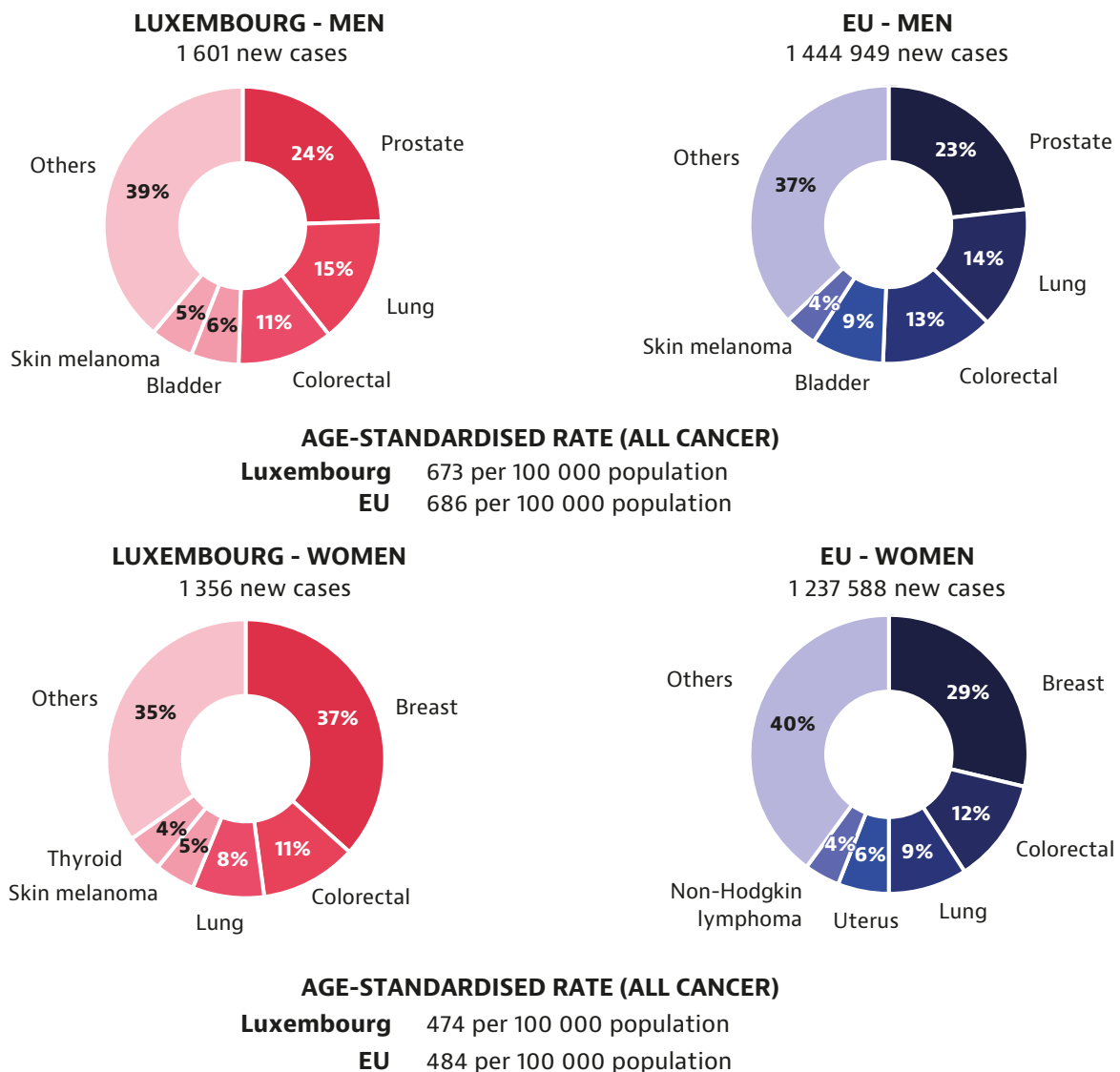
Incidence of cancer in Luxembourg is on a par with broader EU patterns

According to European Cancer Information System (ECIS) of the Joint Research Centre based on incidence trends from pre-pandemic years, around 3 000 new cases of cancer were expected in Luxembourg in 2020. Expected age-standardised incidence rates were just below EU averages

(Figure 1). The country was expected to register 673 new cancer diagnoses per 100 000 men, compared to 686 per 100 000 throughout the EU. Similarly, 474 new cancer diagnoses per 100 000 women were expected, which is just under the EU average of 484 per 100 000.

Figure 1. Nearly 3 000 new cancer diagnoses were expected in Luxembourg in 2020

Distribution of cancer incidence by sex in Luxembourg 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.

The main cancer types among men and women are consistent with broad EU patterns. For men, prostate cancer is the most common, constituting nearly one quarter of new diagnoses both in Luxembourg and across the EU, followed by lung, colorectal and bladder cancers and skin melanoma. For women, breast cancer is the most common, constituting 37 % of new diagnoses in Luxembourg, compared with 29 % throughout the EU. Colorectal and lung cancers are the next most common for women, consistent with broader EU patterns, but the five most common cancers in Luxembourg conclude with uterus cancer and non-Hodgkin lymphoma, whereas skin melanoma and thyroid cancer are more common across the EU.

For 2020, ECIS estimated 71 new cases of gastric (stomach) cancer in Luxembourg – 47 among men and 24 among women. This translates to an age-standardised rate of 13.7 cases per 100 000 population, just below the EU average of 15.8 cases per 100 000. The expected age-standardised incidence rate for skin melanoma in 2020 was 24.9 cases per 100 000 population. This number was higher than the EU average, which was 22.9 cases

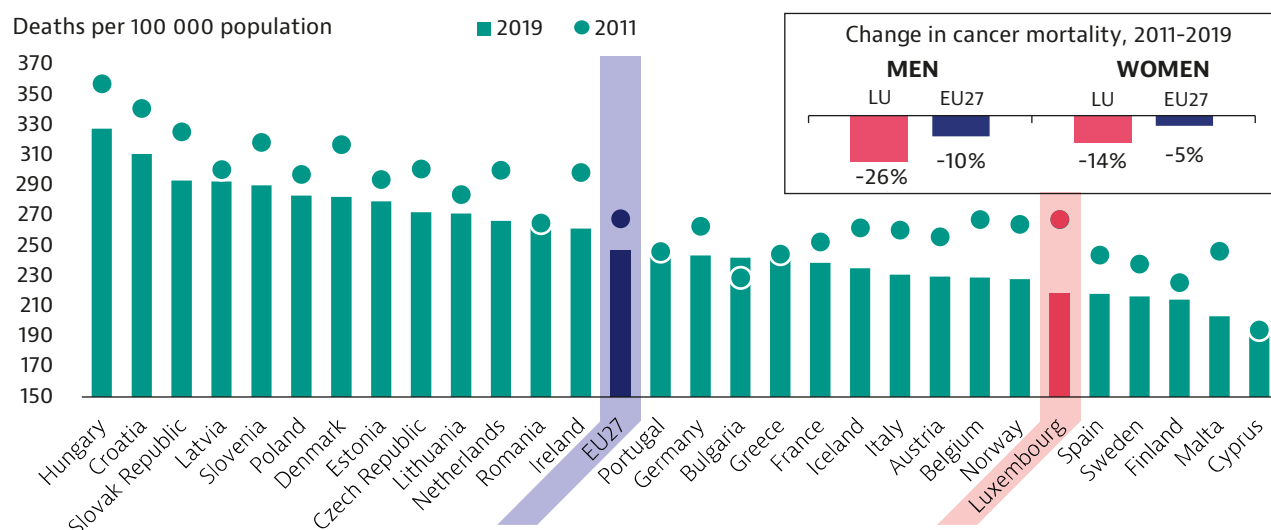
per 100 000. Skin melanoma constituted 5.1 % of new cancer diagnoses for men and 4.7 % per women.

Among children aged 0-14 years, around 4 new cancer cases per 100 000 was expected in Luxembourg each year. This rate is the lowest among EU countries; the EU average is 15 new cases per 100 000 children.

Cancer mortality per capita is among the lowest in the EU

Each year, roughly 1 100 people in Luxembourg (600 men and 500 women) die from cancer (Ministère de la Santé, 2020a). It is the leading cause of death among men and the second leading among women. However, cancer mortality rates have decreased for both men and women since the 1980s. Between 2011 and 2019, cancer deaths per capita fell by 20 % from 268 per 100 000 population to 219 per 100 000, which is among the lowest in the EU (Figure 2).

Figure 2. Luxembourg’s cancer deaths per capita decreased by 20 % between 2011 and 2019



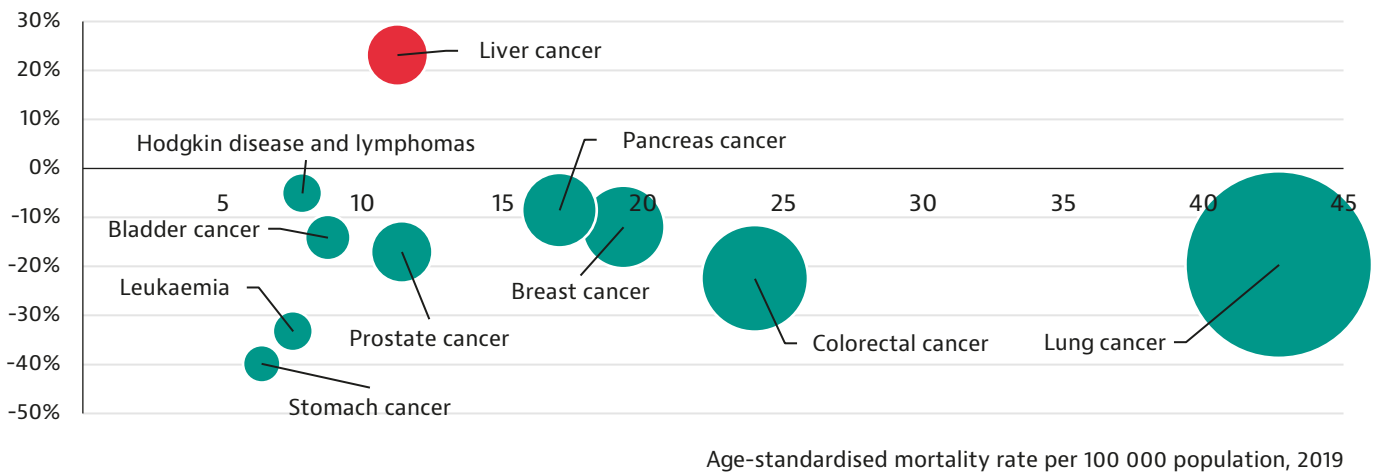
Note: The EU average is weighted (calculated by Eurostat for 2011-2017 and by the OECD for 2018-2019). Source: Eurostat Database.

Between 2011 and 2019, Luxembourg experienced decreases in mortality for all the 10 deadliest cancers except liver cancer, the mortality rate for which increased by 23 % during the period (Figure 3). In 2019, age-standardised mortality rates were 43 deaths per 100 000 population for lung (down 20 % since 2011), 24 per 100 000 for colorectal (down 23 %), 19 per 100 000 for breast (down 12 %) and 17 deaths per 100 000 for pancreatic cancer (down 9 %).



Figure 3. Lung and colorectal cancer were the largest causes of death by cancer in 2019

Change in cancer mortality, 2011-2019 (or nearest year)



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.

A new National Cancer Plan puts digital health tools at the forefront of progress

Luxembourg’s first National Cancer Plan, initiated in 2014, led the way for important achievements. These included the creation of new organisational infrastructures such as the National Centre for Human Genetics (within the National Health Laboratory) and the National Cancer Institute, as well as implementation of a national screening programme for colorectal cancer. Of the many objectives within the plan’s 10 areas of focus, just over 60 % were realised and nearly 30 % were in process by the time the Plan ended in 2018.

The country launched its second National Cancer Plan for 2020-2024 in 2020 (Ministère de la Santé, 2020a) to continue and develop the fight against cancer. The new Plan aims to bolster support for patients and improve quality of care, establishing eight main pillars of focus: governance and monitoring, system digitalisation and data sharing, patient rights and empowerment, prevention and screening, diagnostic testing and personalised plans for high-risk individuals, interdisciplinary care and patient support, specialised care for paediatric and geriatric populations, and clinical and multidisciplinary research.

One new ambition of the 2020 National Cancer Plan is the digitalisation of the cancer care system (see Section 5.2). The outlined plans are expected to facilitate better flow of information and data throughout a patient’s cancer care journey, including between specialists and across institutions. This is expected to improve quality

and reduce fragmentation in care for patients, while increasing overall efficiency and impact.

A wide range of stakeholders were engaged in preparing the second National Cancer Plan. A core group of experts met every few weeks to discuss challenges and opportunities for implementing the strategy. Each of the eight pillars had its own working group, with some experts contributing to more than one group. Patient involvement, although substantial for development of the first national plan, was strengthened throughout the process of creating the second. Patient organisations were represented in the core group and in two working groups.



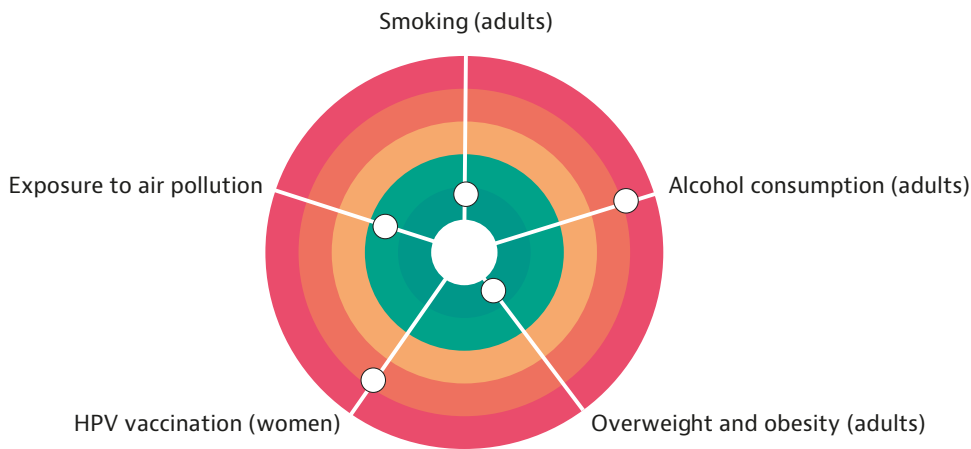
3. Risk factors and prevention policies

Lifestyle-related risk factors are key drivers of cancer incidence

Luxembourg demonstrates some performance rates above and some below EU averages for lifestyle choices that are cancer risk factors (Figure 4). Cigarette smoking rates are among the lowest in the EU, and have dropped faster than the average

in the past decade. However, alcohol consumption is higher than the EU average and within the top quartile of EU countries. Both these risk factors are of high importance for Luxembourg, which has devoted resources to developing strategic prevention plans for each.

Figure 4. Alcohol consumption and low human papillomavirus vaccination uptake are major 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), WHO for HPV vaccination (through the WHO/UNICEF Joint Reporting Form on Immunization) (2020) and Eurostat for air pollution (2019).

Cigarette smoking rates in Luxembourg are among the lowest in the EU

The Ministry of Health published its Anti-Tobacco Plan in 2016 – the first in Luxembourg (Ministère de la Santé, 2016). It laid out 14 measures and 53 actions for the period 2016-2020, grouped under five main axes: governance, health promotion and smoking prevention, support for long-term smoking cessation, workforce development, and research and evaluation. Political will to continue the fight against smoking is strong, and has seen significant progress.

Daily cigarette smoking rates in Luxembourg are among the lowest in EU countries. Only 10.5 % of people aged 15 years and over smoke cigarettes daily compared to the EU average of 18.4 %. This low rate is due in part to a recent surge of anti-tobacco awareness campaigns under the 2016 Anti-Tobacco Plan, the increased legal age

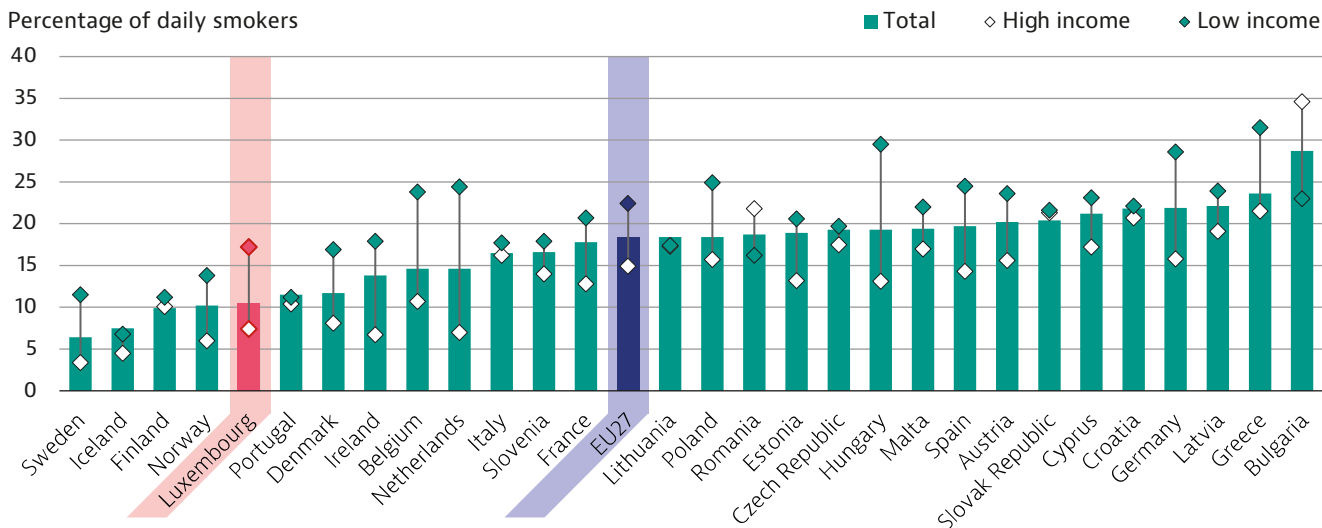
for purchasing tobacco products (raised from 16 to 18 years in 2017), and tax increases on tobacco products.

The difference in daily cigarette smoking rates between men and women is minimal, but the gap is larger when comparing different age groups, level of educational attainment and income. Only 7.4 % of people on higher incomes (fifth quintile) smoked cigarettes daily in 2019, compared to 17.2 % of those on lower incomes (first quintile) – a difference of nearly 10 percentage points (Figure 5). Of the 10.5 % of people in Luxembourg who smoked cigarettes daily, more than one third smoked around one pack – or 20 cigarettes – a day. In 2006, the country banned smoking in restaurants, government buildings, schools and hospitals, which contributed to a reduction in socioeconomic inequities in smoking (Tchicaya, Lorentz & Demarest, 2016). The government expanded this ban in 2014, adding

drinking establishments, shopping centres, hotels and indoor recreation facilities to the list. Despite this progress, the difference between the lowest and highest income groups persisted.

Although data on vaping patterns are less consistently available, it seems that rates are also lower than the EU average. In 2019, only 1.8 % of the population aged 15 years and over reported vaping regularly, compared to the EU average of nearly 2.3 %.

Figure 5. Socioeconomic inequalities in daily cigarette smoking rates remain substantial



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

Excessive alcohol consumption in adults is a major risk factor in Luxembourg

In 2020, people in Luxembourg aged 15 years and over consume 11 litres of pure alcohol on average per year, which puts the country in the top quartile of EU countries (Figure 6). This rate has fallen slowly but steadily since 2000, when average consumption was 13.4 litres per year. This rate remain notably higher than the EU average of 9.8 litres per year, although the EU average rate has decreased more slowly over time. Among those who consume alcohol in Luxembourg, 9.6 % report drinking alcohol daily, which is very close to the EU average of 9.2 %.

In terms of hazardous alcohol consumption (which involves drinking an average of more than 20 grams of pure alcohol daily for women and more than 40 grams daily for men), 4.9 % of people in Luxembourg qualify, which is nearly double the EU average of 2.7 % according to the EHIS. The difference between income groups in terms of hazardous alcohol consumption is stark; only 3.5 % of low-income earners drink amounts higher than the hazardous threshold, compared to 6.7 % of high-income earners. Both rates are higher than the EU average, which is 2.9 % of low-income earners and 3 % of high-income earners.

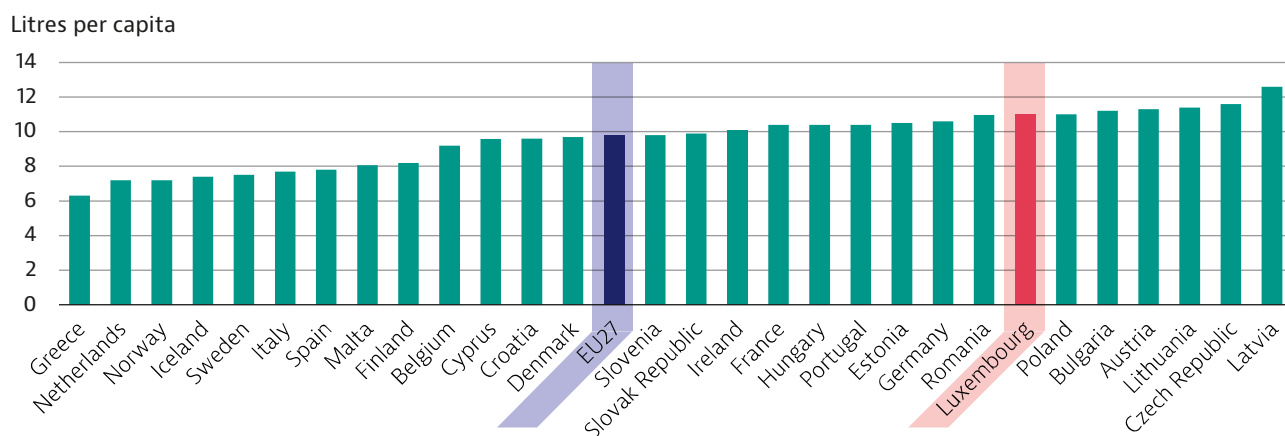
According to the World Health Organization’s International Agency for Research on Cancer, the 2020 per capita estimation of cancers attributed to alcohol consumption in Luxembourg (12.5 cases per 100 000 population) is very close to the EU average of 12.3 cases per 100 000. However, the rate among men in Luxembourg (15.7 cases) is lower than that among men throughout the EU (17.9 cases), while the rate among women in Luxembourg (9.9 cases) is higher than the EU average (7.7 cases).

The country’s most recent Action Plan against the Misuse of Alcohol was released in 2020 (Ministère de la Santé, 2020b). After laying out much context and research, it outlines a rigorous implementation plan, evaluation framework and provisional EUR 1 790 000 annual budget.

Adult overweight and obesity rates are among the lowest in the EU

According to the EHIS, overweight and obesity levels among those aged 15 years and over are among the lowest in the EU, after only Italy and France. In 2019, 48.4 % of people aged 15 years and older in Luxembourg were overweight or obese – a slight increase on the rate of 46.4 % in 2014. The EU average for overweight and obesity was 53 % in 2019. Men (58.5 %) were much more likely than women (38.4 %) to be overweight or obese in Luxembourg, but both of these rates remain below the EU averages.

Figure 6. Alcohol consumption levels in Luxembourg is higher than the EU average



Note: The EU27 average is unweighted (calculated by the OECD).
Sources: OECD Health Statistics 2022; WHO GISAH.

In Luxembourg, nutrition and physical activity contribute to keeping overweight and obesity rates relatively low. Just less than 40 % of people reported consuming between one and four portions of fruit or vegetables a day in 2019, and just 13.6 % reported having five a day. Consumption of vegetables is more common than consumption of fruit. The rate of people in Luxembourg participating in physical activity is consistently higher than EU averages, regardless of whether the data are broken down by sex, age or educational attainment. Overall, 44.9 % of people aged 15 years and over reported achieving at least 150 minutes of aerobic physical activity a week in 2019, up from 41.6 % in 2014. The EU average was 32.7 %.

Luxembourg’s national programme, “Eat Healthy, Move More,” promotes healthy diet and exercise and is under way, spanning the period 2018-2025. The cross-governmental programme promotes a balanced diet and regular and appropriate physical activity. It is based on six overarching objectives: strengthening governance, promoting adoption of a healthy lifestyle in all policies, implementing the programme nationally and consistently, consolidating and expanding the programme as appropriate and strengthening work with collaborators, ensuring widespread accessibility (for example, by elderly people and disadvantaged populations) and establishing an evaluation process.

The impact of air pollution is lower in Luxembourg compared to the EU

In 2019, exposure to PM₁₀¹ in Luxembourg reached 20.3 µg/m³, which is similar to the EU average (20.5 µg/m³). However, the concentration of PM_{2.5} was lower than in the EU (10.2 µg/m³ vs. 12.6 µg/m³).

¹ Particulate matter (PM) is classified according to size: PM₁₀ refers to particles less than 10 micrometres in diameter; PM_{2.5} to particles less than 2.5 micrometres in diameter.

According to the Institute for Health Metrics and Evaluation, ozone and PM_{2.5} exposure accounted for an estimated 2 % of all deaths in Luxembourg in 2019, a rate lower than the average across the EU.

Luxembourg’s human papillomavirus vaccination coverage rates are lower than the EU average

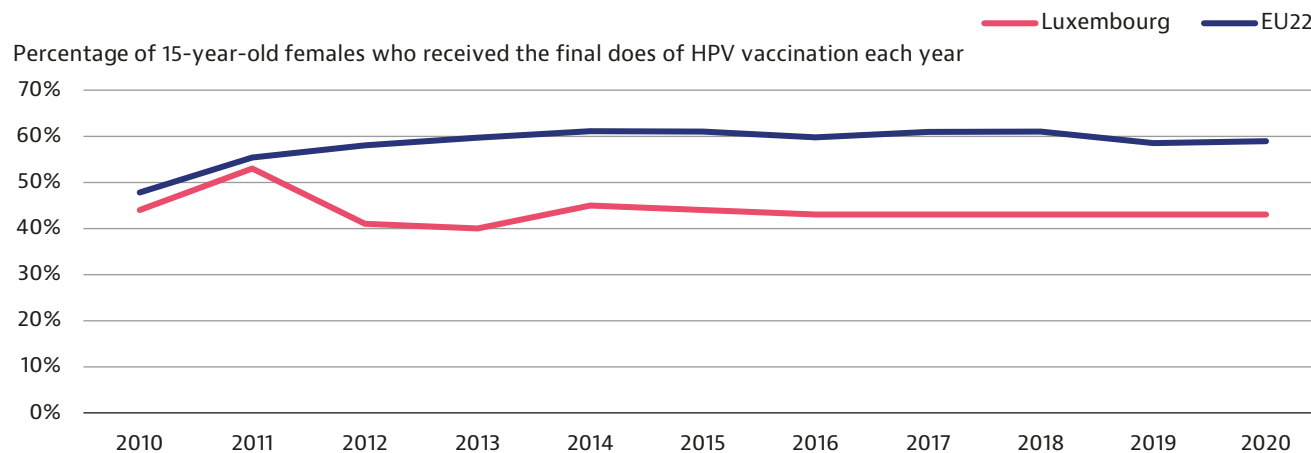
Persistent infection with an oncogenic HPV can lead to pre-cancerous lesions and then cancer, mainly in the cervix but also in other sites (anus, oropharynx, vulva, vagina, oral cavity, larynx and penis). The European Commission’s 2022 Council Recommendation on strengthening prevention through early detection recommends a comprehensive approach to cervical cancer prevention and control (EC, 2022). The recommended actions include interventions across the life course, such as HPV vaccination for children below the age of 15 years, HPV testing for women aged 30-65 years and cervical cancer screening goals of 90 % coverage of those who qualify.

Luxembourg’s HPV vaccination programme was introduced in 2008 and initially targeted girls aged 12-17 years and offered a choice between a bivalent or a quadrivalent vaccine. In 2015, the policy changed to offer only the bivalent vaccine to girls aged 11-13 years. This change was reported to have had little impact on vaccination patterns other than lowering the average age of initiating vaccination. There was no noticeable effect on the overall vaccination rate, which has been roughly consistent for Luxembourg at 43 % since (compared to the EU average of 59 %) (Figure 7). The HPV-related objectives of the National Cancer Plan state that a link should be established

between the national cancer programme and the HPV immunisation programme; that targeted information campaigns on cervical cancer should

be implemented; and that a cervical cancer screening programme should be set up.

Figure 7. Luxembourg's human papillomavirus vaccination rate is consistently below the EU average



Note: The EU average is unweighted (calculated by the OECD). The number of countries in the EU average varies depending on the year.

Source: WHO/UNICEF Joint Reporting Form on Immunization, 2020.

4. Early detection

Luxembourg runs population-based screening programmes for breast and colorectal cancer

Screening programmes for three main cancer types – breast, cervical and colorectal – have above-average participation rates in Luxembourg, although only two are official population-based programmes (screening offered to a specific at-risk target population) run by the Ministry of Health. The country runs free screening programmes for breast cancer (with a mammogram every two years) and colorectal cancer (with an annual blood stool test). Receiving a smear test for cervical cancer screening is a decision left to the discretion of individual patients and their clinicians or care teams, although implementation of a national programme was designated in both 2014 and 2020 National Cancer Plans.

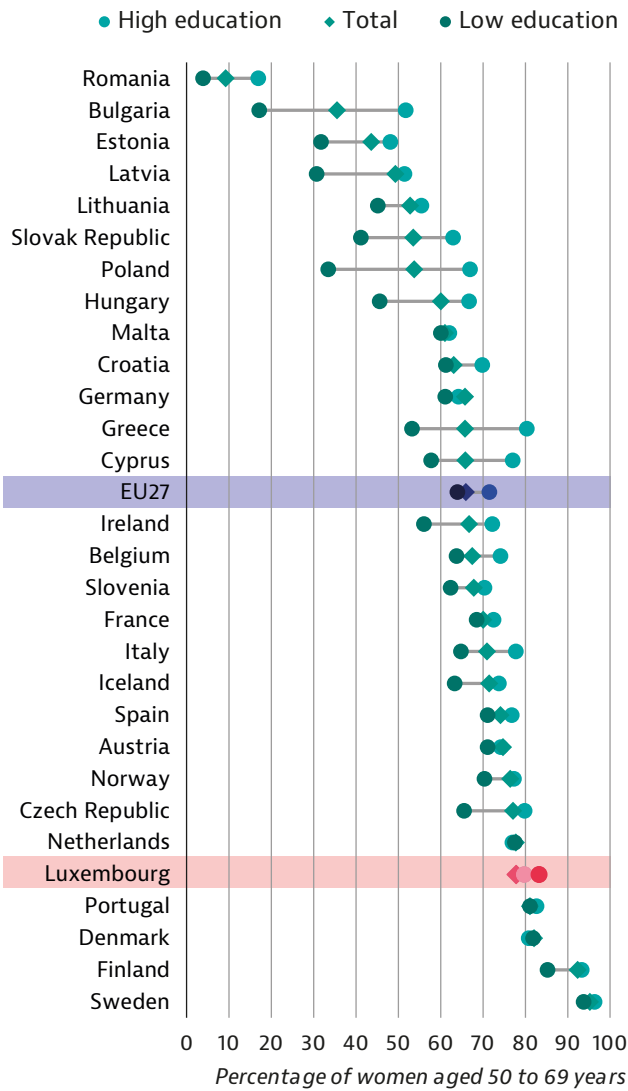
Luxembourg does not currently have plans to implement further screening programmes, such as for prostate or lung cancers.

Rates of breast cancer screening are among the highest in the EU

Luxembourg's mammogram programme began in 1992 and is open to women aged 50-69 years every two years. When the programme reached 25 years of operation in 2017, a report evaluating the quarter century of service was planned for 2020. However, it was never released, probably due to interruptions from the COVID-19 pandemic (see Section 5.4).

Luxembourg's breast cancer screening attendance rate is around the top quartile among EU countries. According to the EHIS, in 2019, 77.8 % of women aged 50-69 years reported having undergone a mammogram within the past two years, which is higher than the EU average of 65.9 %. Screening rates are similar between groups on lower and higher incomes. Disparities in screening attendance in the past two years by educational attainment are also smaller than in the EU: the rate was higher among those with lower secondary education or less (83.2 %) than tertiary education (79.7 %) (Figure 8).

Figure 8. The educational gap in breast cancer screening uptake is smaller than in most other countries



Note: The EU average is weighted (calculated by Eurostat). The figure reports the percentage of women aged 50 to 69 years who reported receiving a mammogram in the past two years. Source: Eurostat Database (EHIS). Data refer to 2019.

Luxembourg has the second highest participation rate for cervical cancer screening in the EU

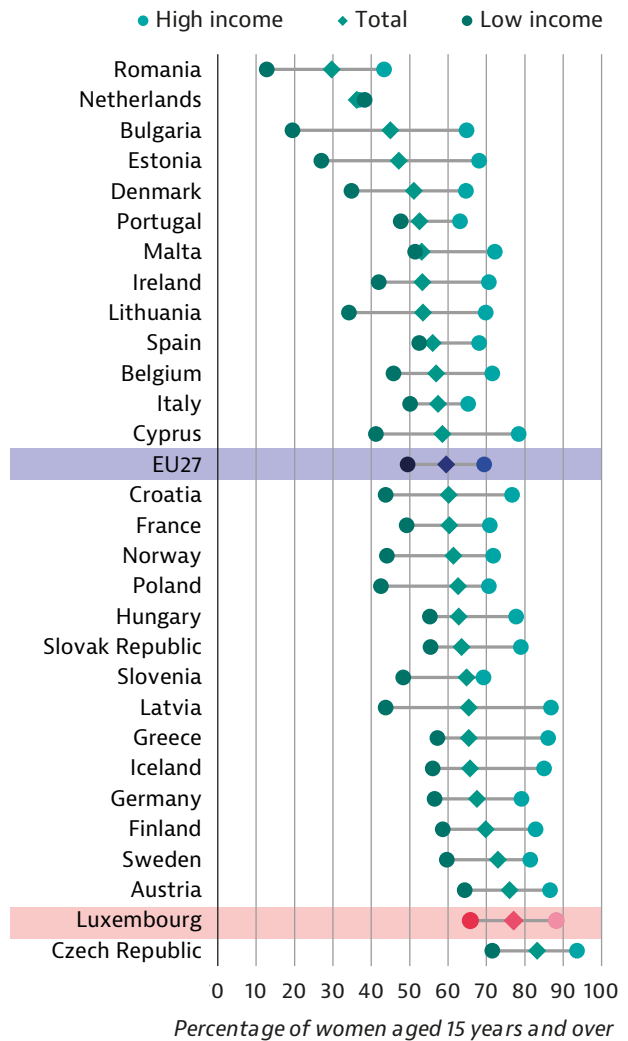
Before the 1960s, cervical cancer was the most common cause of cancer deaths among women in Luxembourg. Today, fatal cervical cancer is rare according to the ECIS: in 2020, the expected age-standardised mortality rate for cervical cancer was 3.6 per 100 000 women, below the EU average of 5.3 per 100 000 women.

Luxembourg does not have a population-based screening programme for cervical cancer; it is left to the discretion of patients and their clinicians. Despite this, shares of women who reported having a cervical smear test in the past three years are among the highest in the EU. Slightly more than 77 % of women aged 15 years and over reported

attending a cervical smear test within the past three years. That rate is higher among women on higher (88.2 %) than lower incomes (65.8 %) (Figure 9). It is also higher among women with higher (86.0 %) than lower (55.3 %) education levels.

One objective of the National Cancer Plan is to implement a national screening programme for cervical cancer. It was also a goal of the 2014 Plan, but has not yet been completed (see Section 2).

Figure 9. Socioeconomic disparities in cervical cancer screening uptake are similar in Luxembourg than in the EU



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.

Despite a national programme, colorectal cancer screening uptake remains limited

The national screening programme for colorectal cancer is open to men and women aged 55-74 years. The programme sends invitations to the homes of those eligible, followed by a stool blood test and an optional colonoscopy if appropriate or desired.

For faecal occult blood test, the country's self-reported participation rate of 40.6 % of people aged 50-74 years is higher than the EU average of 33.3 % according to the EHIS. Screening rates are consistent between men (39.9 %) and women

(41.2 %), but the difference between those with lower (44.0 %) and higher (37.6 %) education levels is more distinct. Colorectal cancer screening participation rates were also higher among people on lower (39.4 %) than higher (31.4 %) incomes.

5. Cancer care performance

5.1 Accessibility

Luxembourg provides comprehensive care coverage for cancer patients

Luxembourg employs a system of universal, compulsory health insurance coverage through the National Health Fund for everyone who is economically active or receiving social security benefits from the government. However, this system leaves gaps. People experiencing homelessness, residents whose welfare benefits are ending and irregular migrants are underinsured or completely uninsured. Nearly 900 people in 2019 reported being without health insurance or facing financial difficulties obtaining it, and this figure may be an underestimation (Médecins du Monde, 2019).

Ambulatory medical care costs covered by public insurance are paid out of pocket by the patient, who is then reimbursed by the National Health Fund. However, costs of care related to cancer treatment such as pharmaceutical products, hospital stays, and laboratory costs are paid directly by the National Health Fund to the service provider. Under the "third-party social payment" scheme, people on low incomes can apply to their local social welfare office for financial assistance whereby the National Health Fund pays the costs directly (CNS, 2022). This setup is usually valid for a maximum period of three months.

Luxembourg provides preferential coverage for severely or chronically ill people. As such, the coverage rate for cancer drugs is 100 %, and cancer patients are exempt from paying for outpatient or inpatient treatments and hospitalisations in standard rooms, with the exception of medical fees, according to the National Health Fund. Financial support is also provided to patients who incur travel costs related to seeking cancer care.

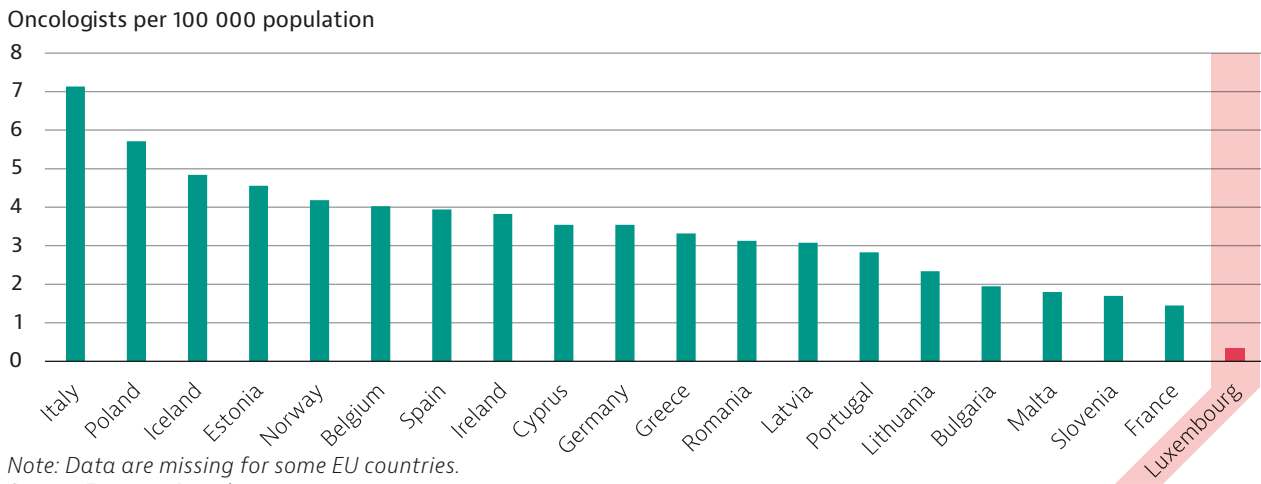
The general shortage of health professionals in Luxembourg affects cancer care

Partly due to Luxembourg's small population, it has difficulty maintaining a sizeable workforce in general, including oncology professionals and experts. The country consistently has the smallest ratio of oncologists per 100 000 compared to other EU countries (Figure 10). In 2015, Luxembourg had 0.35 oncologists per 100 000 people – up from 0.19 per 100 000 in 2012.

The University of Luxembourg began offering places on its Bachelor of Medicine degree – the first in the country – in September 2020, with the goal of increasing the domestic workforce pipeline for all health care professionals, including those related to cancer care. The three-year programme welcomed 125 students in its first year.

The National Cancer Plan outlines a formal strategy to clarify the roles and responsibilities of some care professionals, including specialised oncology nurses and case managers. While case managers are already part of breast cancer and prostate cancer care teams, one goal of the Plan is to integrate them more thoroughly to improve support for patients and flow of information for the team. Supporting the development of clinician-researchers who provide care while also conducting research is an additional priority of the Plan. Finally, continuous training to build the information technology skills of health care professionals is another objective, aligned with the key priority of greater digitisation of care delivery.

Figure 10. Luxembourg had the fewest oncologists per 100 000 population among countries that reported data in 2015



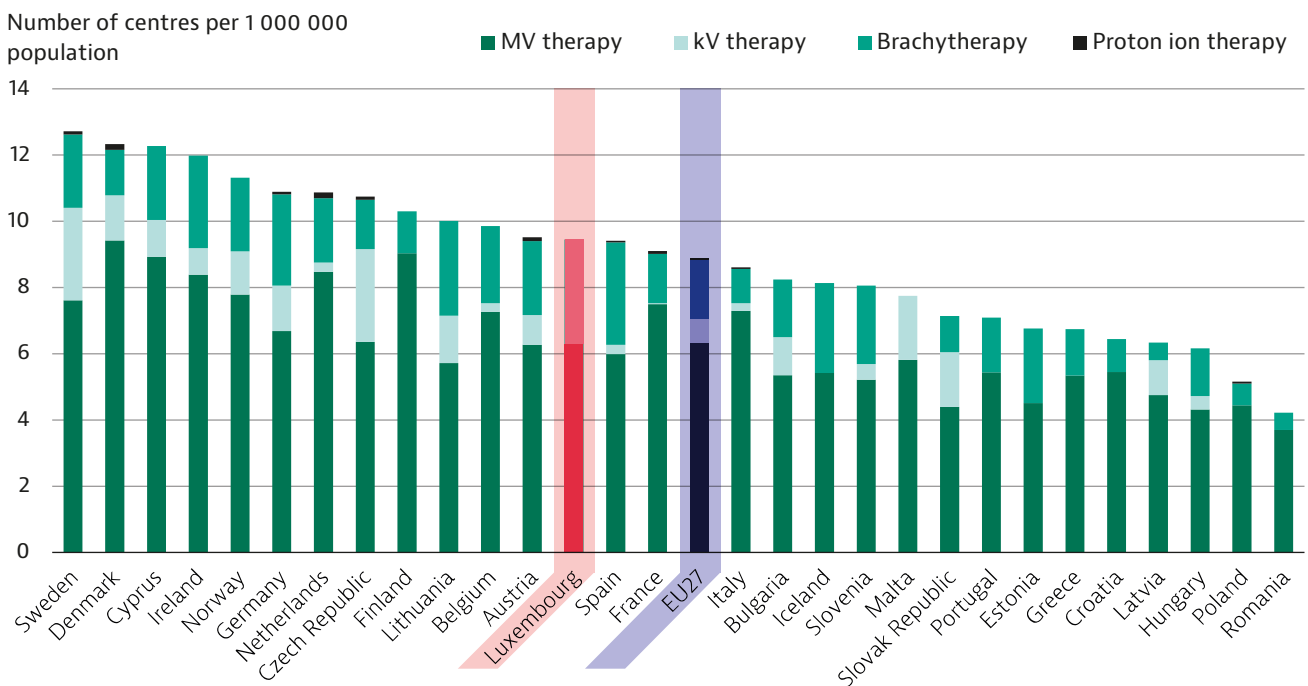
Note: Data are missing for some EU countries.
Source: Eurostat Database.

Luxembourg offers a range of cancer care facilities

Luxembourg has four general hospitals, each providing medical and surgical oncology care: the Hospital Centre of the North, the Emile Mayrisch Hospital Centre, the Hospital Centre of Luxembourg, and the Robert Schuman Hospitals group (Institut National du Cancer, 2020). In addition, there are specialised oncology care centres throughout the country, including a national department of onco-haematology at the Hospital Centre of Luxembourg that treats the most complicated cases, a dedicated department

of paediatric onco-haematology also within the Hospital Centre of Luxembourg, the François Baclesse Centre (the national radiotherapy centre) and the National PET Centre (which provides positron emission tomography and computerised tomography imaging services). Across these locations, Luxembourg had six radiotherapy units in 2020, four of which were acquired since 2002. Overall, Luxembourg has 9.5 particle therapy centres per 1 000 000 people, which is slightly higher than the EU average of 8.9 per 1 000 000 (Figure 11).

Figure 11. Luxembourg has more particle therapy centres per 1 000 000 population than the EU average



Note: The EU27 average is unweighted (calculated by the OECD).
Source: International Atomic Energy Agency.

In 2018, the National Institute of Cancer announced the start of MDLUX2, a molecular diagnostics programme funded by Luxembourg’s Cancer Foundation, the Kriibskrank Kanner Foundation and the Integrated BioBank of Luxembourg and implemented with the support of OncoDNA, a health technology company. The programme continues the work of MDLUX1, which was to assess the value and feasibility of implementing molecular diagnostics tests as part of cancer care. Such molecular diagnostic testing is not reimbursed by public health insurance.

Free palliative care is an important part of Luxembourg’s health care system

Luxembourg law states that palliative care must be provided to all people with an advanced or terminal uncurable condition, regardless of the cause. Among patients who sought palliative care services between 2009 and 2014, over 60 % did so due to a malignant tumour.

The National Health Fund covers all services provided to patients seeking palliative care, which vary according to the setting of care. In hospital, the individual receives palliative care hospitalisation days, which is a higher level of coverage than “normal” hospitalisation days. At home, the individual is entitled to all long-term

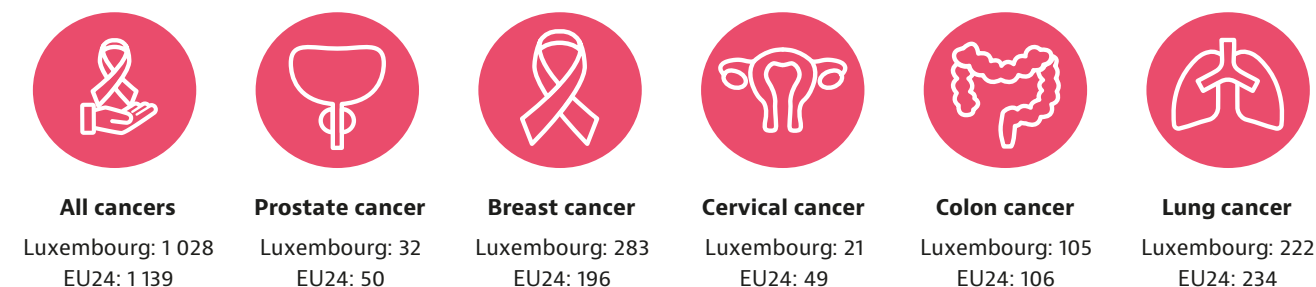
care insurance benefits, which include 14 hours per week of individual or group support such as nursing services, counselling for the patient and family and technical assistance. With an ageing population and growing prevalence of chronic diseases, palliative care will continue to play a significant role in cancer care and overall health care in Luxembourg.

5.2 Quality

Luxembourg’s rates of potential years of life lost per 100 000 population are lower than the EU averages

Luxembourg recorded a steady decline in potential years of life lost (YLLs) due to all cancers per 100 000 population aged up to 75 years: from 1 599 YLLs per 100 000 in 2000 to 1 028 YLLs per 100 000 in 2017 (Figure 12) – a drop of nearly 600 life years. The country consistently sees lower YLLs due to all cancers than the EU average, which was 1 139 in 2017. Luxembourg also typically records rates lower than the EU averages for specific cancer types, with the exception of breast cancer, which in 2017 had an estimated 283 YLLs per 100 000 population aged 75 years in Luxembourg, compared to the EU average of 196 per 100 000.

Figure 12. Potential years of life lost in Luxembourg are below EU averages except for breast cancer



Note: The EU average is unweighted (calculated by the OECD). All data are from 2017. Source: OECD Health Statistics, 2022.

Luxembourg is working to place patients at the centre of cancer care research and evaluation

The National Cancer Plan set up the National Centre for Translational Research, which launched in April 2022. Translational research focuses on applying and implementing biomedical research advances to interventions and programmes that affect people in their communities. The Centre fosters patient-oriented cancer research and provides patients with access to clinical studies and innovative treatments through a focus on digitalisation, data collection methods and

indicators, including patient-reported outcome and experience measures (PROMs and PREMs).

The Ministry of Health has recently mandated the Luxembourg Institute of Health to evaluate PROMs in breast cancer care at the national level, in line with the OECD’s Patient-Reported Indicator Surveys work. Implementation is expected to take place in the four public hospitals in 2023. Luxembourg will collect patient-reported data from women with a history of breast cancer on physical functioning, social and emotional well-being and satisfaction with information among women with a history of breast cancer.

The National Cancer Registry is the backbone of cancer care measurement and evaluation work

In 2013, the Ministry of Health mandated the Luxembourg Institute of Health to develop and manage a population-based cancer registry. The National Cancer Registry is the country's continuous, systematic, exhaustive and non-redundant database on all new cases of cancer diagnosed or treated in Luxembourg. It is agnostic regarding classifications of citizenship or residency in order to achieve a complete view of all patients treated in the country.

Luxembourg's National Cancer Registry operates under the supervision of the Ministry of Health, which entrusts the operational management, development, and scientific use of the Registry to the Luxembourg Institute of Health, a public institution with the authority and ability to protect patients' personal information. The activities of the National Cancer Registry are carried out in close collaboration with all hospitals in Luxembourg, clinicians, the National Cancer Institute, foundations involved in oncology, medical and scientific societies and the Ministry of Health. The aims of these activities include descriptive epidemiological surveillance, evaluation of public health initiatives related to prevention and screening, assessment of the quality of care provided to patients, monitoring of the National Cancer Plan and resource budgeting and supporting epidemiological and clinical research. The National Cancer Registry was also key in defining indicators and targets during development of the National Cancer Plan.

Digitalisation is a priority area of the National Cancer Plan

The National Cancer Plan devotes one pillar to e-medicine, the goals of which include a) improving the ease of information exchange with a medical record network shared by and inter-operable between the country's hospitals, the Centre François Baclesse (the National Centre for Radiotherapy) and the National Health Laboratory; b) supporting clinician decision making with web-based tools for choices related to screening, treatment and surveillance; c) digitising communication methods between the various touchpoints of a cancer patient's care journey; and d) automating data collection and integration. These goals are divided into more than 20 discrete actions to implement.

When achieved, these goals and actions will ideally improve the ability of cancer care professionals and institutions to share information in a reliable

and timely manner. A more efficient health record system with increased inter-operability will make it easier to track patients throughout their journey in the care system and conduct research into the future of cancer care. As it is, the entire population of Luxembourg is covered by the National Cancer Registry, which, thanks to pseudonymisation, links the data from the Registry's sources such as death certificates or the national screening programmes to produce population-based cancer registry data at a national level.

Luxembourg is one of three EU countries that has formally implemented the right to be forgotten

Like France and Belgium before it, Luxembourg introduced the right to be forgotten (a right that gives individuals the ability to exercise control over their personal data, including health information, by deciding what should be accessible to the public) in January 2020 to facilitate insurance access for people with a history of cancer (Scocca & Meunier, 2020). The regulation applies to life insurance taken out as collateral for a loan and estate loans for acquisition of a primary residence or professional facilities that cost less than EUR 1 000 000. The applicant can forgo declaring his or her history of cancer once active treatment (surgery, radiotherapy and chemotherapy) ended 10 years earlier or – when the applicant was diagnosed before the age of 18 years – when treatment ended 5 years earlier.

Care standardisation is more challenging in Luxembourg than other EU countries

As is the case for many other EU countries, harmonisation of steps and coordination of care is an important objective for the development of formal care pathways. However, this work is somewhat more challenging in Luxembourg due to the great diversity of education and training undergone by professionals working in cancer care. Until recently, Luxembourg did not have a medical school. Students received their professional training abroad, learning different techniques, performing different procedures and interacting with patients journeying through cancer care pathways that looked somewhat different from each other and different than those found at home in Luxembourg.

The development of formalised patient pathways and guidelines at the national level is part of the National Cancer Plan. This work is performed by the National Cancer Institute. Through its work mapping and aligning patient pathways and guidelines between hospitals and other care establishments, the National Cancer Institute

also fosters inter-institutional co-operation and promotes collaboration among medical and paramedical specialists. As of 2021, the National Cancer Institute has started utilising the standardised model developed by the European Commission’s Innovative Partnership for Action Against Cancer Joint Action for all pathways. For the development of national guidelines, widely accepted international guidelines are being supplemented with important national recommendations and references aimed at standardising the national practices.

A multidisciplinary perspective is an important aspect of cancer care in Luxembourg

Cross-disciplinary care was a clear feature of cancer care in Luxembourg for a long time, but it was only through first National Cancer Plan that the national concept for Multidisciplinary Oncology Consultation Boards was developed in 2016. These boards are a method for evaluating and improving professional practices and care decisions within a single care setting or throughout a care network. The first National Cancer Plan mobilised the creation of formalised boards for common cancer types directly at Luxembourgish hospitals as well as specialised, national boards at the National Cancer Institute for rare cancers and complex cases. Since 2016, the number and types of boards have increased significantly.

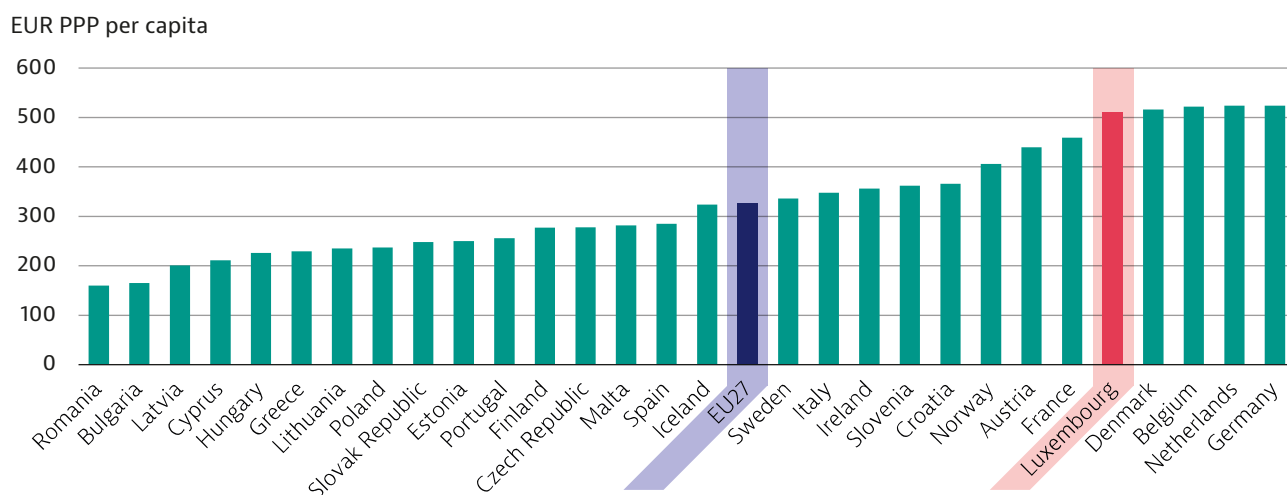
5.3 Costs and value for money

Spending on cancer in Luxembourg is among the highest in the EU

In 2018, Luxembourg spent EUR 363 per person on cancer care, plus an additional EUR 12 per person on cancer drugs (Hofmarcher et al., 2020). Overall, including direct costs such as expenditure on care and medication, as well as informal care costs and indirect costs such as productivity losses, cancer cost in Luxembourg was EUR 510 per capita in 2018 when adjusted for purchasing power parity (PPP) (Figure 13).

Substantial financial investment in preventive care can be an important tool for countries to improve the overall functionality of their health care systems, including cancer care. Luxembourg consistently devotes above the EU average share of its health care spending to preventive care. In 2020, the EU average was 3.4 %, while Luxembourg spent 5.3 %. This number has increased over time since 2000, when the rate was just 1.1 % of health care spending levels.

Figure 13. Spending on cancer care is among the highest in the EU



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

Luxembourg is a member of the Beneluxa initiative

Luxembourg participates in the Beneluxa initiative with Belgium, the Netherlands, Austria and Ireland. It aims to provide sustainable access to medications – usually high-cost or

difficult to obtain drugs – for the people of these relatively small countries (Beneluxa Initiative on Pharmaceutical Policy, 2022). Luxembourg joined the initiative in September 2015; with its Beneluxa peers, it collaborates on health technology assessments, horizon scanning, information sharing and policy exchange, and price negotiation.

5.4 COVID-19 and cancer: building resilience

Clinicians in Luxembourg turned to telemedicine during the COVID-19 pandemic

The first case of COVID-19 reached Luxembourg at the end of February 2020 and stay-at-home orders followed for March-May 2020, halting much non-emergency health care delivery. Medical oncologists aligned with the European Society for Medical Oncology guidelines, using a variety of information sharing methods, including social media, to keep up with the changing recommendations.

During the lockdown, medical oncologists shifted to teleconsultations. Of the 13 oncologists surveyed on their experience of providing care during the pandemic, 92 % noted that they switched to phone consultations for an average of 83 % of consultations, and 23 % of oncologists mentioned using video consultations (Backes et al.,2020). Some respondents went into detail about remote communication methods used consistently for all follow-up during the lockdown, but not for initial diagnostic visits.

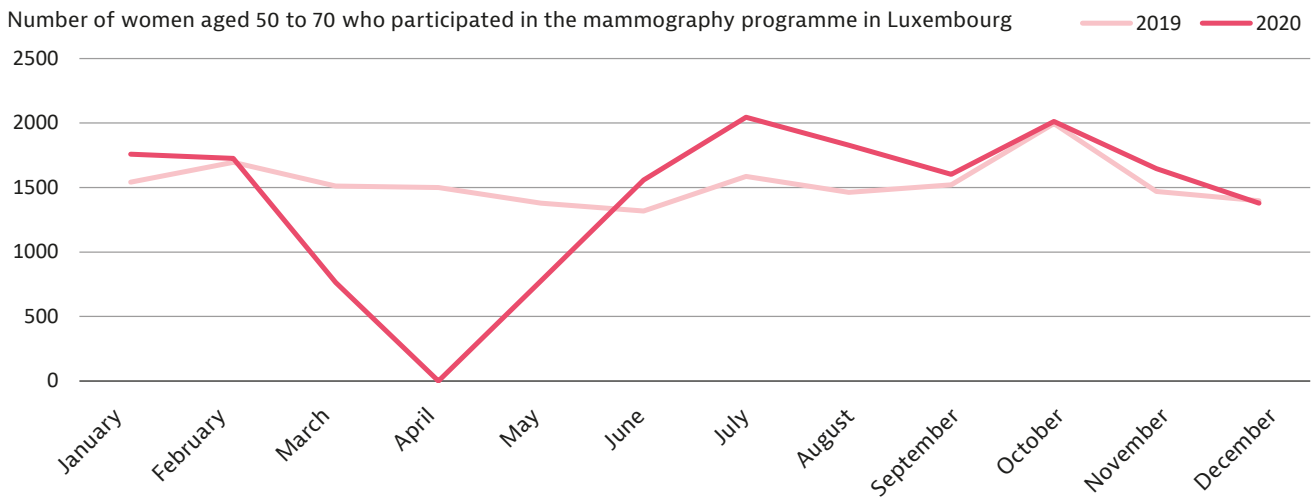
Lockdowns disrupted cancer service delivery

As a result of the lockdown and the overburdened health care system, cancer screening rates dropped and waiting times for those seeking screening grew long. The number of breast cancer screenings fell by 7 % in 2020 compared to 2019. The drop in the number of screenings was greatest during the first lockdown (Figure 14), but activity recovered by June 2020 with an increase in the number of breast cancer screenings compared to 2019.

Based on data from the National Health Laboratory regarding the number of pathological diagnoses of malignant tumours each month in 2019 and 2020, the Luxembourg’s Cancer Foundation estimates that approximately 10 % of expected cases of cancer were not detected and surgeries were not performed in 2020 (Mittelbrownn, 2021).

Palliative chemotherapy treatment plans saw the most significant disruption due to the pandemic – more than 50 % of plans were modified and 31 % were cancelled (Backes et al.,2020). The total number of radiotherapy sessions decreased by almost one third (23 %) between July and October 2020, compared to data from previous years.

Figure 14. Breast cancer screening dropped significantly during the first months of the pandemic



Source: General Inspectorate of Social Security of Luxembourg (2022).

Cancer treatment plans also changed, switching from systemic to oral chemotherapy, employing lower dose administrations and reducing the total number of cancer treatment sequences. Immunotherapy doses were doubled to reduce the number of hospital visits, or further modified by extending the treatment sequence duration from two weeks to four.



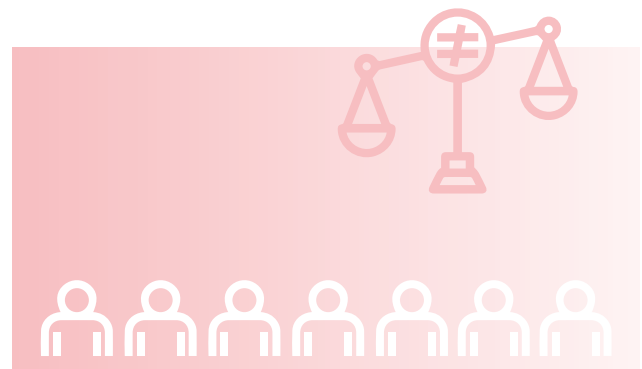
6. Spotlight on inequalities

Compared to other EU countries, inequalities in access to and quality of cancer care is less of an issue in Luxembourg. This is because much of the cost of cancer care in Luxembourg is free and financially accessible for patients, including transportation costs. However, challenges exist, including first and foremost understanding the depth and nature of inequalities within the cancer care system:

- People with low socioeconomic status, such as those on low incomes or with lower educational attainment, are more likely to engage in behavioural and lifestyle risk factors for cancer, such as smoking. Only 7.4 % of people on higher incomes smoked cigarettes daily in 2019, compared to 17.2 % of those on lower incomes.
- Hazardous alcohol consumption in Luxembourg is nearly double the EU average according to the EHIS, with stark differences between income groups: only 3.5 % of low-income earners have hazardous alcohol consumption compared to 6.7 % of high-income earners.
- Those with low socioeconomic backgrounds are also less likely to attend cancer screening programme, especially for cervical cancer, which lacks a population-based screening programme. Cervical cancer screening participation rates are higher for women with high incomes (88.2 %) than lower incomes (65.8 %) and higher among women with higher (86 %) compared with lower (55.3 %) education levels.
- While some political progress in cancer prevention – such as bans on smoking in public places and awareness campaigns on the importance of screening – have helped to reduce these gaps, inequalities in cancer care and prevention persist.

However, no targeted initiatives have been undertaken to achieve greater equality. National health authorities acknowledge that the first step must be to understand whether and where such inequality exists through thorough research. This research is under way: a study evaluating the link between breast cancer screening data and socioeconomic data to identify determinants of screening participation currently taking place. This is the first time such research has been conducted. Results are anticipated for the beginning of 2023.

One goal of the National Cancer Plan is to ensure that social and administrative rights, such as the right to be forgotten, are common knowledge among those who would benefit, to ensure that all who need them have equal access. The National Cancer Plan also advises action to identify further legislative grey areas, where equality is not necessarily guaranteed by law, to ensure equality for all current and former cancer patients.



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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.

Please cite this publication as:

OECD (2023), *EU Country Cancer Profile: Luxembourg 2023*, EU Country Cancer Profiles, OECD Publishing, Paris, <https://doi.org/10.1787/6c6cdb7d-en>.

ISBN 9789264570740 (PDF)

Series: EU Country Cancer Profiles

