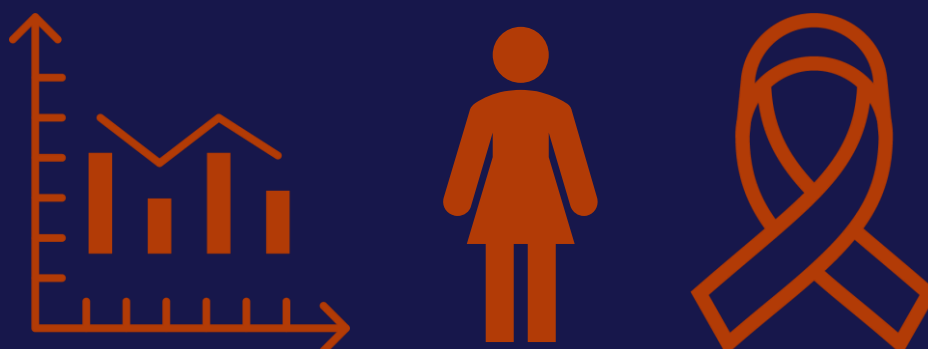


Cancer Dashboard for Poland - Women's cancers

Bardh Manxhuka and Thomas Hofmarcher



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Purpose and content

This report is a part of an international initiative aiming to facilitate the exchange of best practices in cancer care among European countries. The core of the report is a dashboard for Poland with an illustrative description of a selected set of key indicators. The dashboard focuses in more detail on women's cancers. Although a multitude of metrics is needed to fully describe the cancer control status of women's cancers, the selected indicators relate to outcomes, resources, and process metrics in all areas of cancer control.

The dashboard is intended to support the implementation of the National Oncology Strategy in Poland and other ongoing initiatives to improve cancer control in the country. The description seeks to support Polish policymakers in the decision-making and prioritization of initiatives in cancer care, and more specifically for women's cancers. The dashboard is supposed to be a living document. It will be updated when newer data become available. It can also be extended to additional areas and indicators that become relevant based on developments in Poland or the EU.

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Foreword

Dear Audience.

On behalf of the “Blue Butterfly” Patient Association, which supports patients affected by gynecological cancers, I wholeheartedly invite you to read this report. The study provides an overview of the state of oncological care and suggests specific recommendations that can be implemented based on best practices.

Issues such as prevention (including vaccinations), screening tests, comprehensive diagnostics, access to specialists, and modern treatment play a crucial role in achieving the main goal, which is the chance to avoid disease or have a longer life. In Poland, the mortality rates due to cervical and uterine cancer are not improving despite a decrease in the number of new cases, and they significantly differ from the European average. Therefore, it is necessary to offer effective, integrated care from early prevention to advanced treatment.

At the moment of diagnosis, a woman's life is turned upside down. Surgeries, tests, the fight for medication - for most patients it is a new, difficult, and incomprehensible reality. The fear of death causes feelings of loneliness, confusion, and helplessness. It is important to remember that the disease affects not only the patient but also her closest surroundings - family and friends.

I hope that this report will serve as a catalyst for constructive discussions on the optimization of treatment for women's cancers and ultimately translate into longer and better-quality lives for many patients.

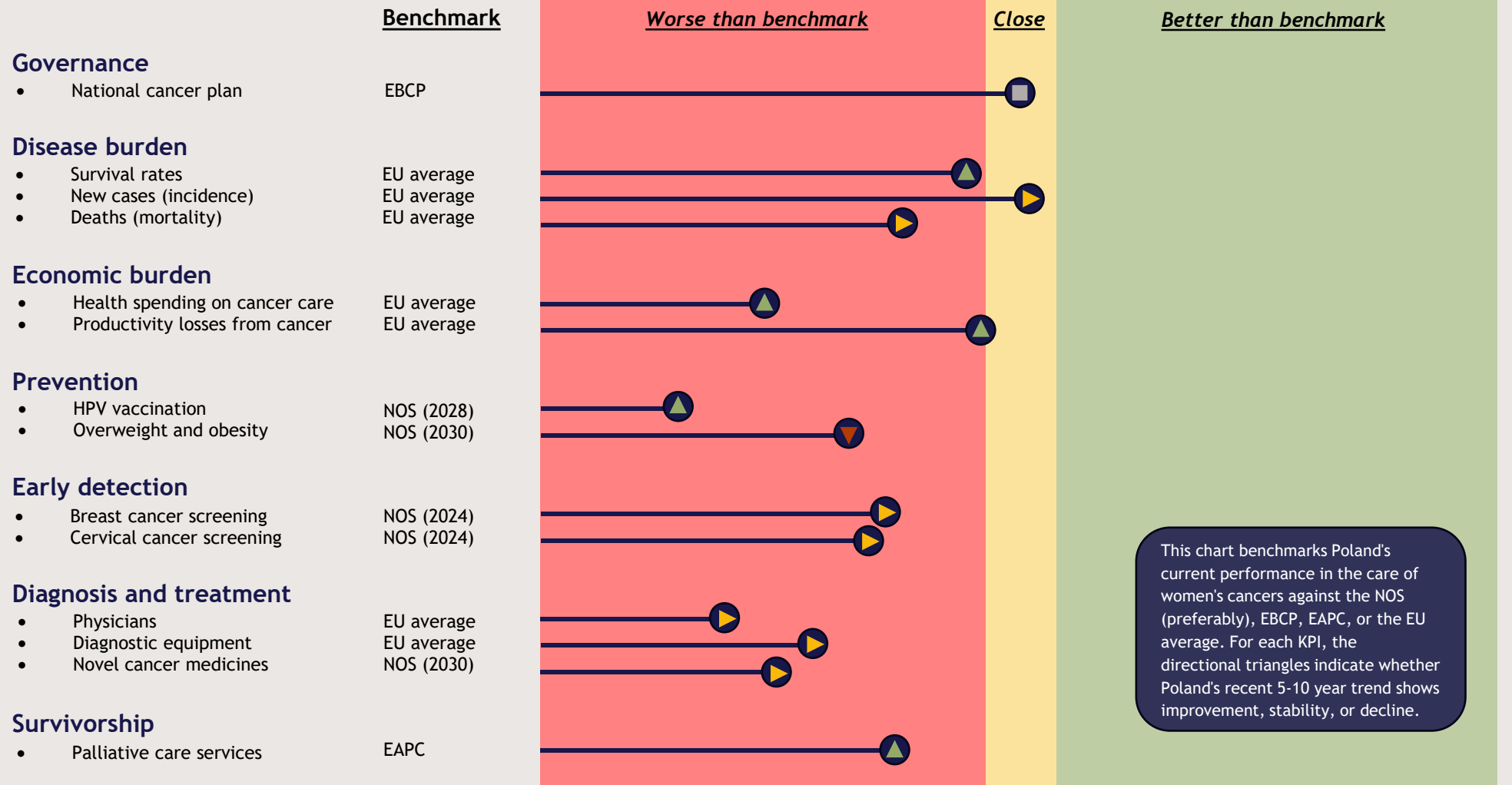
Barbara Górska

*President of the
“Blue Butterfly” Association.*



Dashboard overview Poland – Women’s cancers

Comparative Performance: Poland vs. Benchmark



This chart benchmarks Poland's current performance in the care of women's cancers against the NOS (preferably), EBCP, EAPC, or the EU average. For each KPI, the directional triangles indicate whether Poland's recent 5-10 year trend shows improvement, stability, or decline.

Legend: ▲ Positive development, ▶ Stable development, ▼ Negative development, ■ No data or not applicable

Notes: EBCP = Europe's Beating Cancer Plan, NOS = National Oncology Strategy, EAPC = European Association for Palliative Care, KPI = key performance indicator. Numbers for breast and cervical cancer screening are an average of self-reported data and program-based data.

High-level recommendations

In Poland, cancer cases in women have seen a stronger increase than in men in the past. Forecasts from the National Cancer Registry predict that by 2026 more women (99,500) than men (90,400) will get cancer. More than one third of new cancer cases in women are caused by “women’s cancers”, including breast cancer, uterine cancer, ovarian cancer, and cervical cancer. Although public funding of cancer care by the NFZ has increased and survival rates have improved, both the spending level and the survival rates are below the EU average and low compared to other V4 countries.

Governance

- ✓ Continue to implement the “National Oncology Strategy” for the years 2020-2030 and draw inspiration from the aims set out by the Europe’s Beating Cancer Plan.

Funding

- ✓ The current use of health care expenditure and resources in cancer care should be reviewed and optimized by the NFZ. In the mid-term, more public funding of cancer care (and health care in general) by the NFZ seems necessary to improve outcomes for cancer patients.

Prevention

- ✓ Intensify communication campaigns about HPV vaccination to support the rollout of the gender-neutral vaccination program. Consider switching the administration setting of HPV vaccines from medical centers to schools.
- ✓ Consider nationwide campaigns to raise awareness of cancer-related risks with overweight/obesity, physical inactivity, smoking, and alcohol consumption. Implement targeted nutrition education programs in schools and work settings and further raise the tax on sugar-sweetened beverages.

Early detection

- ✓ Ensure that invitations to screening programs are sent out to all eligible women.
- ✓ Consider targeted information campaigns about screening to women of lower socioeconomic status.
- ✓ Monitor and improve the registration process to capture screenings performed in the private sector to more accurately assess the population covered by the screening programs.
- ✓ Switch from Pap tests to HPV tests as the main screening method for cervical cancer.

Diagnosis and treatment

- ✓ Improve coordination between primary care, diagnostic services, and treatment services along the patient pathway and address bottlenecks in infrastructure and human resources.
- ✓ Continue to invest in training and recruitment of medical staff to improve the quality of cancer care services and mitigate inequalities in access to services across the country.
- ✓ Increase the number of mammography machines and radiologists to meet the increasing demand from the expanded target age group (now 45-74 years, before 50-69 years) for breast cancer screening.
- ✓ Allocate an adequate budget for the reimbursement of the increasing number of new cancer medicines, and prioritize medicines with substantial clinical benefits.

Survivorship

- ✓ Train and recruit more palliative care personnel to cater for the increasing number of cancer patients.
- ✓ Enhance the integration between treatment services and palliative care services to provide comprehensive support for cancer patients.

Background

Cancer is the second-leading cause of death after cardiovascular diseases in men and women in Poland, accounting for around a quarter of all deaths (1). Recognizing the high and growing disease burden of cancer, the Polish government adopted the National Oncology Strategy for 2020-2030 in February 2020 (2).

Polish National Oncology Strategy

The National Oncology Strategy for the years 2020-2030 is a multiannual program which includes activities in five strategic areas:

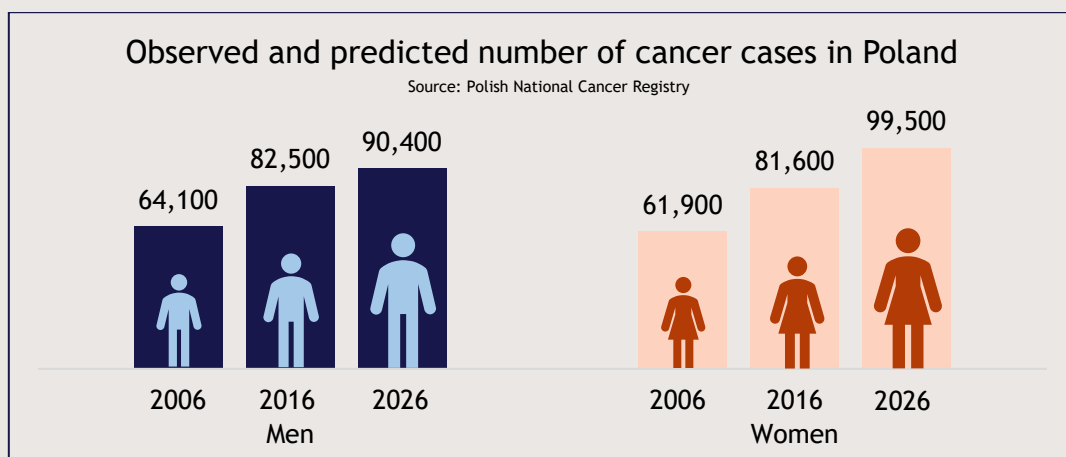
1. **Investments in human resources:** Improving the staffing situation and the quality of education in the field of oncology.
2. **Investments in education, primary prevention, and lifestyle:** Reducing the incidence of cancer through risk reduction in the field of primary prevention.
3. **Investments in patients, secondary prevention:** Improving the effectiveness of secondary prevention.
4. **Investments in science and innovation:** Increasing the potential of scientific research and innovative projects in Poland to enable patients to benefit from the most effective diagnostic and therapeutic solutions.
5. **Investments in the cancer care system:** Improving the organization of the cancer care system by ensuring patients' access to high-quality diagnostic and therapeutic services as well as comprehensive care along the entire patient pathway.

There is earmarked funding to support the implementation of the National Oncology Strategy. For the years 2024-2030, the annual funding amounts to PLN 500 million.

Women's cancers

Information from the Polish National Cancer Registry shows that the number of new cancer cases has been steadily increasing over the past decades (3). Much of this increase is caused by population aging, because the risk of getting cancer typically increases with age. Developments in various risk factors, such as smoking, obesity, alcohol consumption, infection with cancer-causing viruses, and sunbathing, also influence the number of new cancer cases.

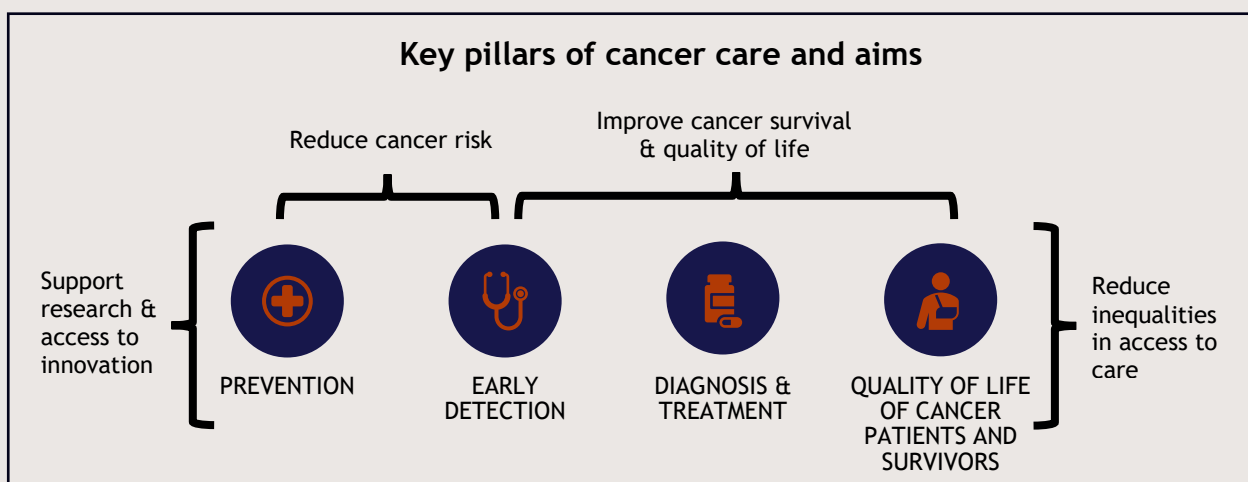
Cancer cases in women have seen a stronger increase than in men in the past. Forecasts from the National Cancer Registry predict that by 2026, more women (99,500) than men (90,400) will get cancer (2).



This report focuses on cancer types that are (almost) exclusive to women. These are called “women’s cancers”. They include breast cancer and gynecological cancers, which comprise cancers of the uterus, cervix, ovaries, vagina, and vulva. These cancer types account for 38% of new cancer cases and 31% of cancer deaths among women in Poland. The four biggest types are breast cancer, uterine cancer, ovarian cancer, and cervical cancer, whereas vaginal and vulvar cancers are less common. This report focuses on the four big women’s cancers.

Structure of the dashboard

The structure of this report is based on the aims and pillars of the Europe's Beating Cancer Plan (EBCP), which was launched by the European Commission in February 2021 (4). The EBCP contains four key pillars of cancer care - **prevention, early detection, diagnosis & treatment, survivorship** - which follow the patient pathway as shown in the figure below. There are also several simultaneous aims of cancer care. One aim is to prevent what is preventable. Around 30-50% of cancer cases could be theoretically avoided because they are caused by modifiable risk factors (5). Another aim is to improve the survival and quality of life of patients - through early detection (such as screening programs), diagnosis and treatment (such as through access to modern diagnostic tools and treatments), and follow-up care for survivors. Cross-cutting aims are to reduce inequalities in access to care (e.g., of different socio-economic groups to screening) and to support research and access to innovation to be able to advance cancer care from the status quo.



The report starts with a comprehensive description of the disease burden and the economic burden of women's cancers. It emphasizes the role of investment in cancer care to achieve reductions in the disease burden, which will have a positive impact on both patients and the economy.

Choice of indicators

For each pillar of the EBCP, several indicators were selected that are important in relation to women's cancers. The indicators were supposed to relate to the five strategic areas of the Polish National Oncology Strategy as well as the aims of the EBCP.

- **Prevention** (2 indicators): Human papillomavirus (HPV) which causes cervical cancer; overweight/obesity which is a major risk factor for breast cancer, uterine cancer, and ovarian cancer. Other less impactful risk factors such as smoking (linked to breast cancer and cervical cancer), physical inactivity (linked to breast cancer and uterine cancer), and alcohol consumption (linked to breast cancer) were not considered.
- **Early detection** (2 indicators): Screening for breast cancer and cervical cancer
- **Diagnosis and treatment** (3 indicators): Human resources, equipment for diagnosis, cancer medicines
- **Survivorship** (1 indicator): Palliative care services

For each indicator, this report provides:

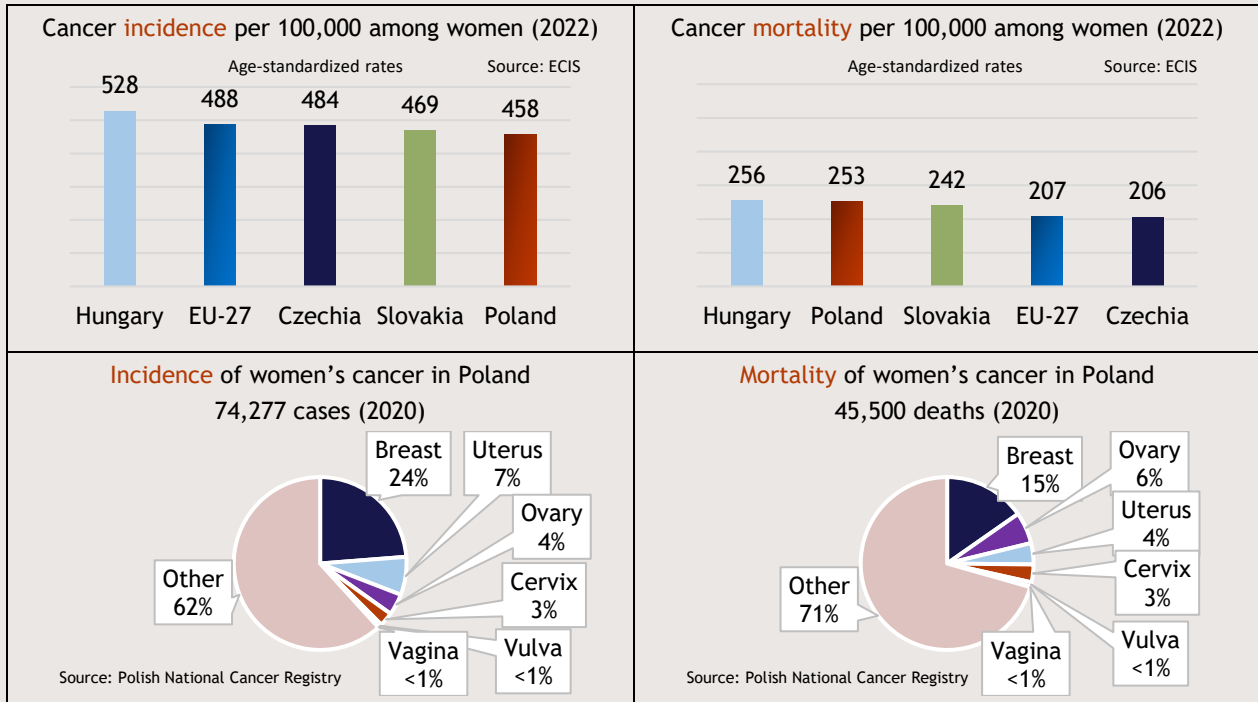
- General description of why this indicator is important and how it relates to Poland's National Oncology Strategy and the EBCP
- Description of the current status in Poland and comparison with other countries
- Recommendations for improvement

For the comparison with other countries, this report benchmarks Poland against Czechia, Hungary, and Slovakia (the Visegrád Group, the V4) as well as the EU-27 average whenever data are available.

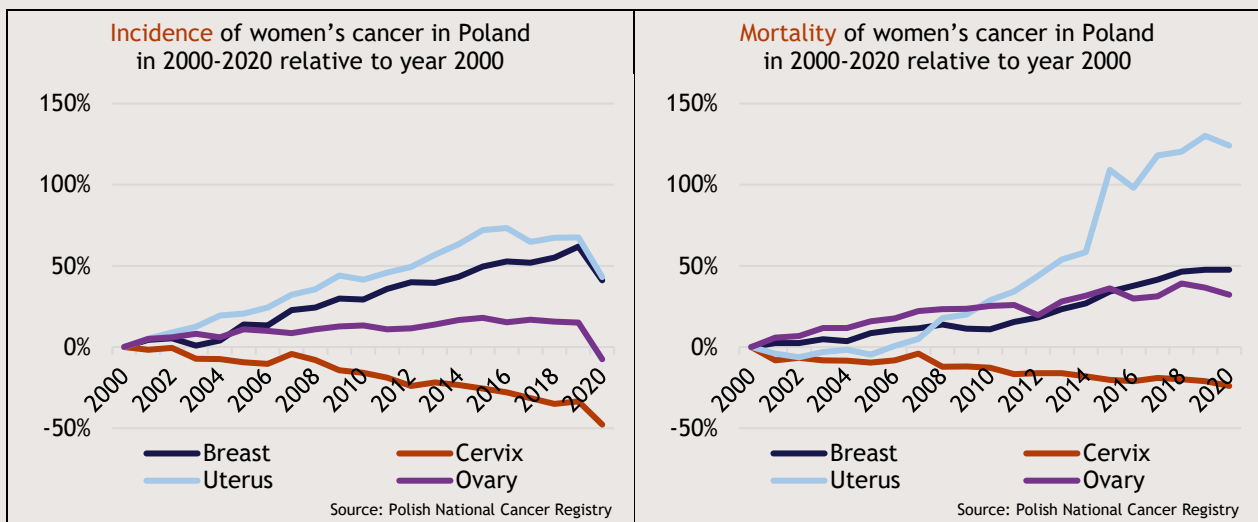
Disease burden of cancer

Incidence and mortality

The estimated cancer incidence rate among women in Poland was 458 cases per 100,000 women in 2022, which was the lowest rate of the V4 countries and lower than the EU average. However, Poland had the second-highest mortality rate among women of the V4 countries with 253 deaths per 100,000 women (6). This suggests that, on average, women in Poland have relatively lower chances of surviving cancer. Breast cancer is the most commonly diagnosed cancer type among Polish women, accounting for 24% of cases, followed by uterine cancer (7%), ovarian cancer (4%), cervical cancer (3%), and cancers of the vulva and vagina (each less than 1%). Breast cancer is the leading cause of cancer death among Polish women, responsible for 15% of all cancer-related deaths. It is followed by ovarian cancer (6%), uterine cancer (4%), and cervical cancer (3%) (3).



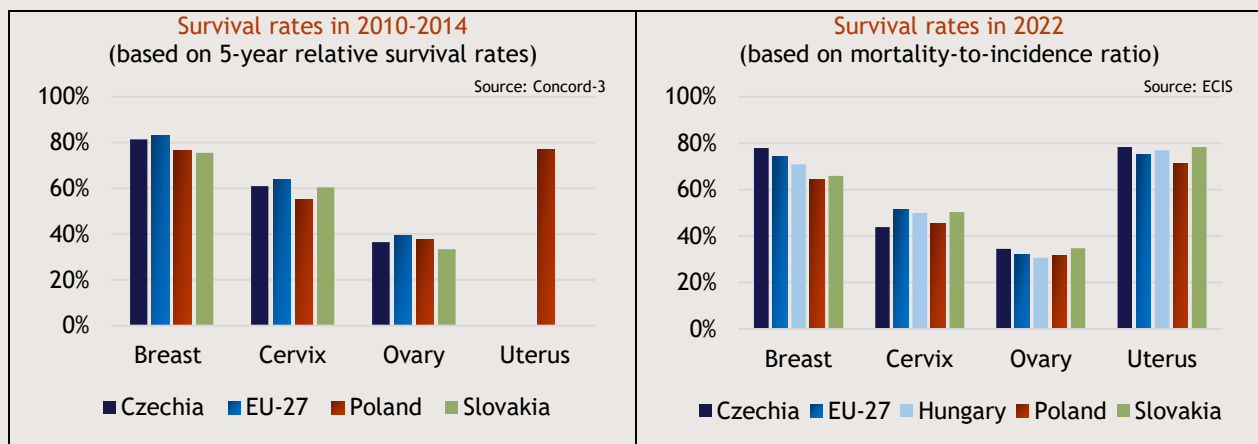
In the past two decades, the incidence rates of breast and uterine cancer have notably risen by more than 50%, while cervical cancer rates have declined by more than 30%. Mortality rates have increased for all women's cancers except for cervical cancer (3). The stronger increase in mortality rates than incidence rates for ovarian and uterine cancer as well as the lower decrease in mortality rates than incidence rates for cervical cancer appear to be contradictory to the advancements in care achieved for these cancer types over the observed period; see the section on "Survival" below. This contradictory pattern might be attributed to potential challenges in comprehensive data registration in the Polish National Cancer Registry or impaired diagnostics and ineffective screening programs. The drop in incidence and mortality rates from 2019 to 2020 is likely related to the impact of the Covid-19 pandemic.



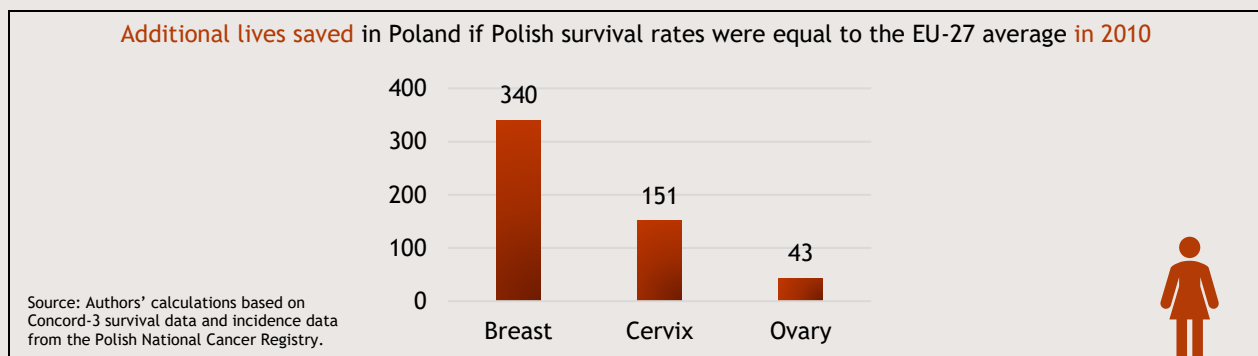
Survival

In Poland, survival rates differ between women's cancers (3). Breast cancer had the highest 5-year relative survival rate at 79% in the diagnosis period 2010-2015, followed by uterine cancer at 77%, cervical cancer at 57%, and ovarian cancer at 41%. Poland's 5-year survival rates for breast, cervical, and ovarian cancers were all lower than the EU-27 average in the diagnosis period 2010-2014 (7). Among the V4 countries, Poland generally ranks low on survival for most women's cancer types, and this situation has probably not changed much over the last decade. In 2022, the estimated population-based survival rates (based on the mortality-to-incidence ratio) confirm the comparatively low ranking of Poland among the V4 countries and compared to the EU-27 average for all women's cancers (6).

Improvements in survival for all women's cancers have been achieved over time. According to the National Cancer Registry, the 5-year relative survival rate for breast cancer increased from 73% to 78% between the period 2000-2005 and 2010-2015 (3). For cervical cancer the increase was from 53% to 57%, for ovarian cancer from 36% to 41%, and for uterine cancer from 73% to 77%.



The low survival rates in Poland compared to other European countries are worrisome. If Polish survival rates were in line with the EU-27 average, more lives of Polish women could be saved. For women diagnosed with cancer in 2010, the lives of 340 breast cancer patients, 151 cervical cancer patients, and 43 ovarian cancer patients could have been saved in 2010 alone.



Economic burden of cancer

In Poland, the overall economic burden of cancer amounted to €5.3 billion corresponding to €140 per capita in 2018 (8). Most of the burden is caused by lost productivity among working-age patients (48%) and not by health care expenditure (41%).

The economic burden of cancer consists of:



Health care expenditure (direct costs):

- Resources of the health care system (medical equipment, staff, medicines, etc.) funded both by public and private sources



Costs of lost productivity (indirect costs):

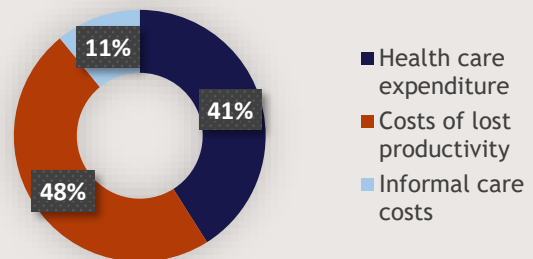
- Productivity losses from sickness absence, permanent incapacity & disability, and premature mortality of working-age patients



Informal care costs:

- Value of the time forgone by relatives and friends to provide unpaid care

Composition of the economic burden of cancer in Poland in 2018

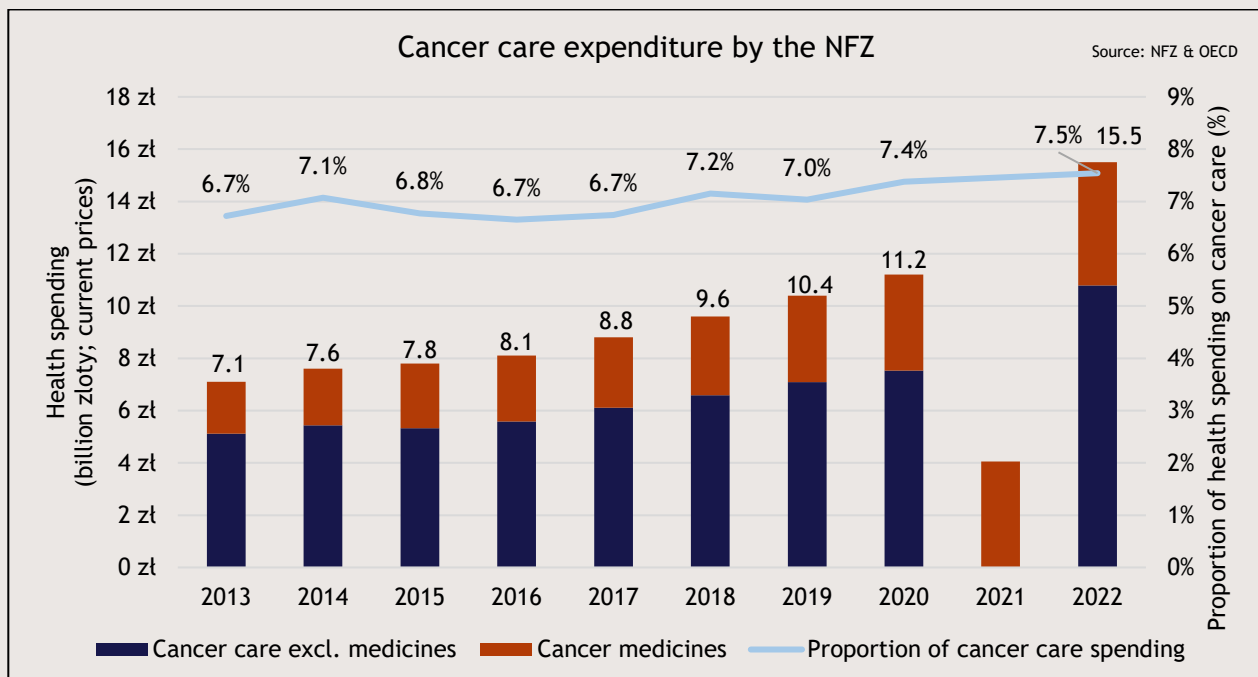


Source: Hofmarcher et al. (2020)

Health spending on cancer care

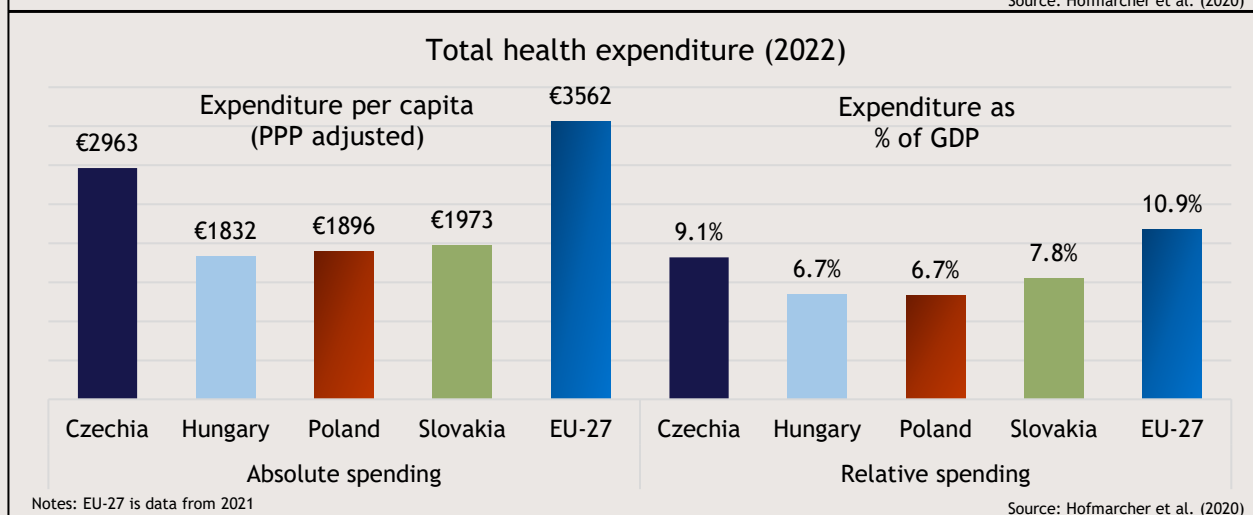
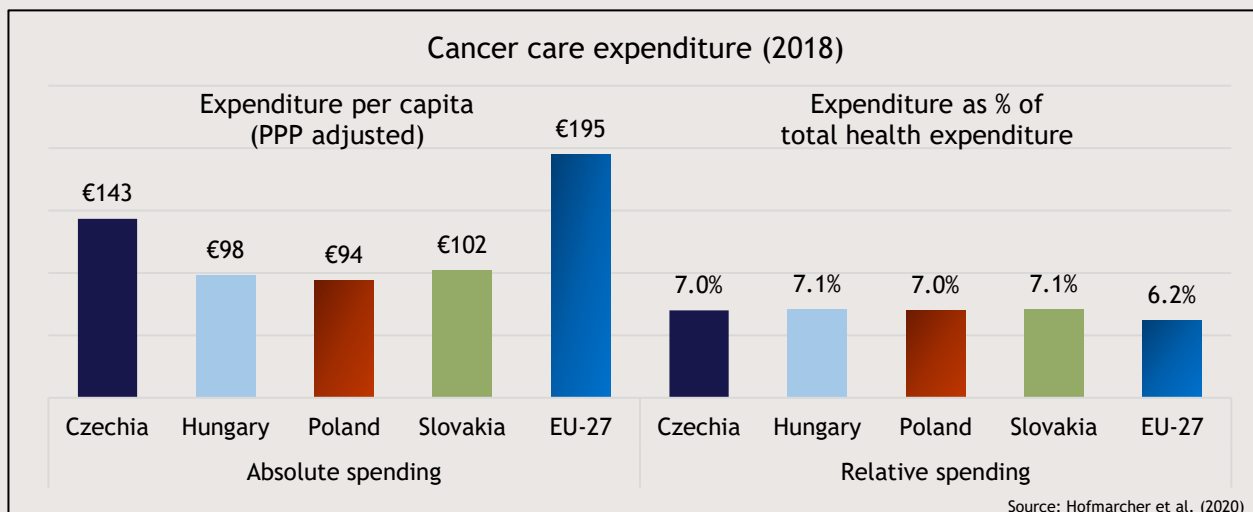
The total amount of Poland's health care expenditure that is used specifically for cancer care is not precisely known. The total amount consists of public expenditure by the National Health Fund (NFZ) and private out-of-pocket payments by cancer patients for cancer care services. Yet co-payments by patients for oncology services and cancer medicines are very small compared with other health care services in Poland (9).

The NFZ has significantly increased spending on cancer care in recent times. Between 2013 and 2022, spending more than doubled from 7.1 billion to 15.5 billion zloty (in current prices) (10, 11). However, overall health expenditure also increased during this period from 106 to 206 billion zloty (in current prices) (12). Therefore, the proportion of health spending on cancer care only rose slightly from 6.7% to 7.5% between 2013 and 2022. Expenditure on cancer medicines by the NFZ (consisting of innovative oncology medicines, chemotherapy, and medicines dispensed in open pharmacy) increased during this period from 2.0 to 4.7 billion zloty (in current prices) (13), but their proportion of cancer care expenditure was close to 30% throughout the period.



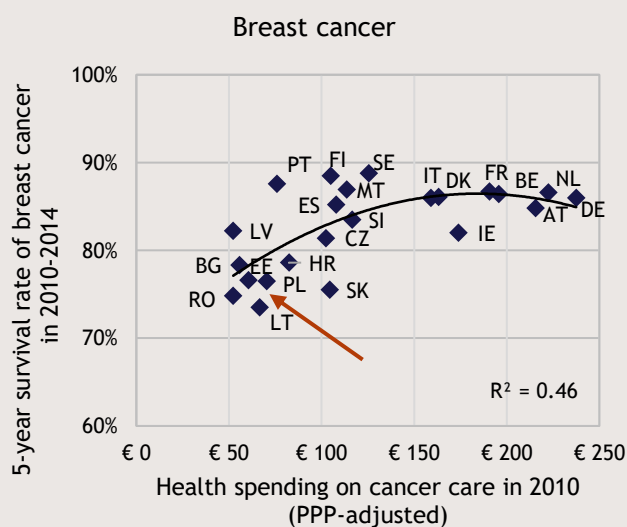
Cancer care expenditure in Poland in 2018 were estimated to be around €94 per capita (all figures adjusted for PPP) (8). This was the lowest amount among the V4 countries, and much lower than the EU average of €195. The main reason for the low level of spending on cancer care in Poland was not that a small proportion of health expenditure went to cancer care. In fact, Poland and the other V4 countries all spent around 7% of total health expenditure on

cancer care, which was more than the EU average of 6.2%. However, overall spending on health care in Poland is low, reaching 6.7% of GDP (of which 75% are from public sources), compared to the EU average of 10.9% and 9.1% in Czechia. The absolute spending level on health care in Czechia (€2963 per capita) is 56% higher than in Poland (€1896 per capita). Limited overall spending on health care makes it difficult to adequately fund cancer care services and to provide high-quality cancer care for all patients.



Health spending on cancer care & survival rates

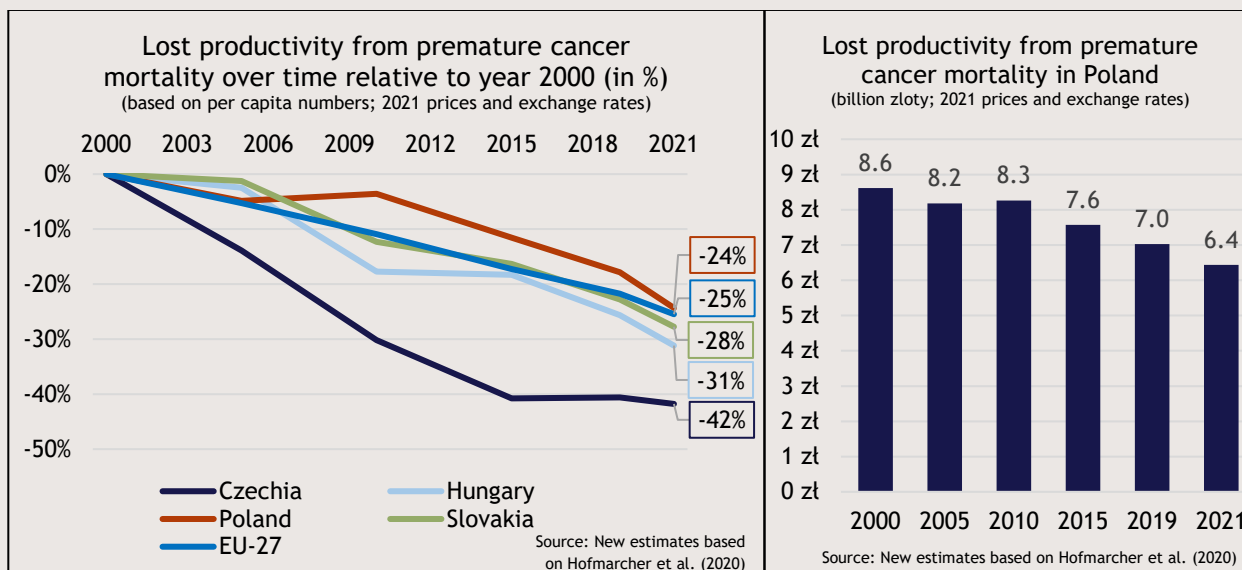
The ultimate aim of health spending on cancer care is to improve patients' chance to survive and their quality of life. The figure below shows how the amounts of cancer care expenditure in the EU-27 countries relate to survival rates in breast cancer. This is a crude way of exploring whether there is a link between spending and patient outcomes (14). The upward sloping trend line indicates that countries with higher spending tend to record higher survival rates (mostly in Northwestern Europe) and countries with lower spending tend to record lower survival rates (mostly in Eastern Europe). However, this association is only clearly visible for the spending range from €50 to €150 per capita (PPP-adjusted). Spending beyond €150 per capita (in year 2010) does not seem to be associated with further increases in survival rates. The spending level in Poland was at €70 per capita (in year 2010; PPP-adjusted). Thus, additional spending on cancer care might lead to survival gains. In addition, since Poland is below the trend line, there seems to be room to improve patient outcomes through optimizing the current processes of using existing resources more effectively and thereby increasing the added value for each additional zloty spent.



Productivity gains for the economy

Cancer imposes a financial burden on the economy outside the health care system. This burden originates from cancer patients of working age who have to be on sick leave, retire early, or die before reaching retirement age. The work that these patients could have done in the absence of getting and dying from cancer represents a productivity loss to the economy.

The improvement in survival rates in recent decades has led to a gradual reduction of the productivity loss from premature cancer mortality (i.e., death before retirement age). In Poland, this type of productivity loss decreased by 24% from €49 to €37 per capita between 2000 and 2021 (in 2021 prices and exchange rates; not PPP-adjusted).¹ This is close to the EU average of a 25% reduction, whereas the other V4 countries have seen even larger reductions. In absolute numbers, this type of productivity loss decreased from 8.6 billion zloty in 2000 to 6.4 billion zloty in 2021 (in 2021 prices and exchange rates). These reductions represent the financial benefits for the economy from improved survival rates and the investment made in cancer care.



The lost productivity from premature mortality of women's cancers differs in Poland in 2021 (new estimates based on Hofmarcher et al. (2020) (8)). The greatest loss stems from breast cancer with €81 million (€2.2 per capita), followed by ovarian cancer with €30 million (€0.8 per capita), cervical cancer with €27 million (€0.7 per capita), and uterine cancer with €6 million (€0.2 per capita). A recent publication for countries in Central and Eastern Europe has found similar numbers for the lost productivity from premature mortality of breast cancer, amounting to €85 million (€2.2 per capita) in Poland in 2019 (15). The differences between cancer types are partly a result of the frequency of these cancer types as well as the typical age of onset. Cervical cancer, which affects comparatively young women, has a disproportionate impact compared to its incidence rate.

¹ The methodology used to calculate new estimates for this report is consistent with the study by Hofmarcher et al. (2020) on the economic burden of cancer in Europe (8).

Pillar 1:

Prevention

KPI:

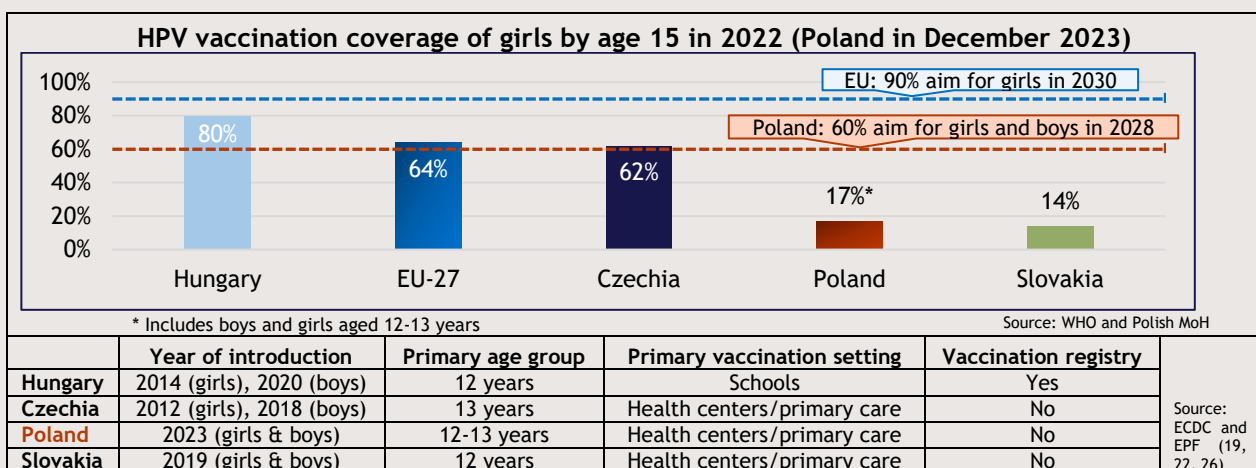
Vaccination against human papillomavirus (HPV)

Background

- HPV is a group of sexually transmitted viruses that causes around 2.5% of all cancers in women and men in Europe (16). Vaccination against HPV became initially available in 2006 in the EU. It has been found to be an effective and cost-effective way to prevent cervical cancer and other types of HPV-related cancers, including cancers of the vulva and vagina. According to the World Health Organization (WHO), the best option is to vaccinate girls and boys around age 9-14, just before puberty and the start of sexual activity (17).
- Cervical cancer is the fourth most common cancer among women in Poland. Poland had the fourth highest incidence (19.4 per 100,000) and mortality (10.5 per 100,000) rates of cervical cancer of the EU-27 countries in 2022, with both rates being around twice as high as the EU average (6).
- In Poland, HPV vaccination has been recommended in the national immunization program for girls since 2008, and it was expanded to girls aged 13-18 years in 2010 (18, 19). In 2022, HPV vaccination was recommended for both girls and boys aged 9 and over, however, it has never before been fully reimbursed (20).
- Poland's National Oncology Strategy includes the aim to vaccinate at least 60% of girls and boys against HPV by the end of 2028 (2). The EBCP includes the aim of a 90% HPV vaccine coverage rate (VCR) of girls in the EU and to significantly increase the VCR in boys by 2030 (4).

Current status in Poland

- In June 2023, Poland was the last EU country to introduce a nationwide HPV program for girls and boys aged 12-13 with 100% public funding (no patient copay) (20). The vaccine is dispensed in general practitioners (GPs) offices without prescription, but parents need to actively make an appointment for their child to get vaccinated.
- Official statistics of the HPV VCR are scarce. The POLKA 18 questionnaire study found that 16% (432/2,701) of final-year students reported to be vaccinated against HPV in 2019, with slightly higher vaccination among girls (18%) (21). Other recent VCR estimates for girls are around 7.5-10% (19) and <30% (22). Jankowski et al. (2023) estimated the HPV VCR for the eligible population to be 7% in July 2023 (20). Based on vaccination numbers by the Ministry of Health (December 2023) (23), the VCR of boys and girls aged 12-13 is estimated to be around 17%.
- Hungary is the V4 country with the highest HPV VCR of 80% for girls. It is also the only V4 country with a school-based HPV vaccination delivery strategy. Several scientific reviews have concluded that a school-based system generally achieves the highest HPV VCR (24, 25).
- Knowledge about the benefits of the HPV vaccine (health literacy) is crucial for beneficiaries' willingness to get vaccinated. Jankowski et al. (2023) found that only 51% of the adult respondents in their questionnaire study were aware of the free HPV vaccination program in July 2023. Furthermore, only 32% of the respondents correctly identified boys and girls aged 12-13 as the eligible population for the program (20).



Recommendations

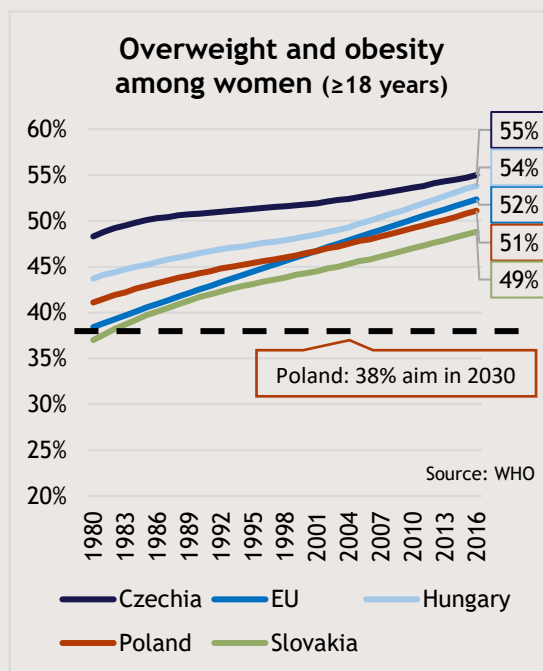
- Establish a public HPV VCR monitoring system with regional data, e.g., similar to the existing monitoring system for the breast and cervical cancer screening programs or the tracking system for COVID-19 vaccinations.
- Strengthen educational programs targeted systematically at parents and adolescents in order to build up awareness on the consequences of HPV infection and the benefits of HPV vaccination.
- Enable vaccinations in a wider range of facilities, including offices of GPs, pediatricians, and gynecologists.
- Consider switching the primary setting of HPV vaccinations from GP offices to schools (similar to Hungary).

Background

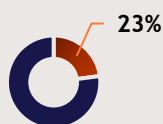
- Overweight (defined as a body mass index (BMI) of ≥ 25) and obesity (BMI of ≥ 30) is a medical condition that increases the risk of various health problems, including cardiovascular disease, diabetes, and certain cancers (27). Obesity and overweight have been linked to the development of 13 cancer types, including breast cancer (in post-menopausal women), uterine cancer, and ovarian cancer (28). Around 7-9% of all cancer cases in women are linked to obesity and overweight in Europe (29, 30).
- Poland's National Oncology Strategy includes two aims related overweight/obesity (2). First, to reduce the percentage of girls and boys aged 11-15 who are overweight and obese from 13.7% and 29.3%, respectively, to 10% and 25% by the end of 2030. Second, to reduce the percentage of overweight and obese women and men from 41% and 59%, respectively, to 38% and 55% by the end of 2030.
- The EBCP aims to evaluate the current EU action plan on obesity and propose a follow up (4). In relation to obesity, the European Code Against Cancer recommends to (i) maintain a healthy body weight, (ii) be physically active in everyday life and limit the time you spend sitting, and (iii) have a healthy diet, including eating plenty of whole grains, pulses, vegetables and fruits, and limiting high-calorie foods (foods high in sugar or fat) and avoiding sugary drinks (31). The WHO "Acceleration plan to stop obesity" emphasizes the role of fiscal policies (including taxes and subsidies to promote healthy diets) to fight obesity (32).

Current status in Poland

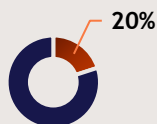
- Poland has seen a steady rise in overweight and obesity in women from 41% in 1980 to 51% in 2016 (33). This resembles the trends observed in other V4 countries and the EU. Poland had the second lowest obesity rate among the V4 countries in 2016, behind Slovakia (49%) and just below the EU average, but far off the national aim of 38% in 2030.
- Poor knowledge of the health-related risks of obesity can reduce the incentives to live healthier. According to self-reported data from Eurostat, a lower education level is associated with a higher obesity rate in Poland. Women with lower secondary education are more than twice as likely to be obese than women with tertiary education (23% vs. 10%) (34).
- Poland introduced an excise tax on sugar-sweetened beverages to fight obesity on January 1st, 2021 (35). The proportion of beverages that contained $>5g$ of sugar/100 mL decreased from 70% in 2020 to 44% in 2021 (35). Previous studies show a clear link between the consumption of sugar-sweetened beverages and obesity (36).



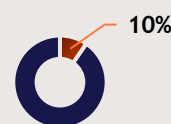
Lower secondary education



Upper secondary education



Tertiary education



Self-reported obesity among women in Poland by level of educational attainment in 2019 (Source: Eurostat)

Recommendations

- Consider nationwide campaigns to raise awareness about the cancer-related risks of obesity and overweight and the importance of maintaining a healthy body weight to prevent cancer.
- Implement targeted nutrition programs in schools and public workplaces to support healthy food choices.
- Consider raising the excise tax on sugar-sweetened beverages and introducing subsidies for fruits and vegetables in line with WHO recommendations.
- Promote physical activity in schools and at workplaces and provide physical activity counselling as part of routine primary health care services.

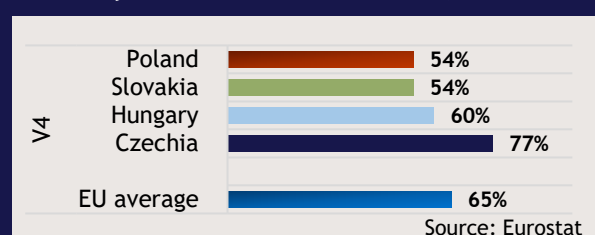
Background

- The goal of breast cancer screening is to detect a tumor as early as possible when it is still small and amenable to curative treatment (37). In early disease stages, survival rates are highest and treatment costs lowest (38).
- The EBCP includes the aim that 90% of the target population in each country should be invited for breast cancer screening by 2025 (4). The updated screening recommendation by the Council from 2022 states that screening with mammography should be conducted in women aged 45-74 years (previously 50-69 years) (39).
- Poland introduced the National Breast Cancer Screening Program (NBCSP) in 2007. Despite screening services being available since 2007, breast cancer is still the second most common cause of death among women behind lung cancer. Poland had also the third highest breast cancer mortality rate of the EU-27 countries in 2022 (6). Poland's National Oncology Strategy includes the aim to increase screening participation to 60% by the end of 2024 and to 75% by the end of 2027 (2).

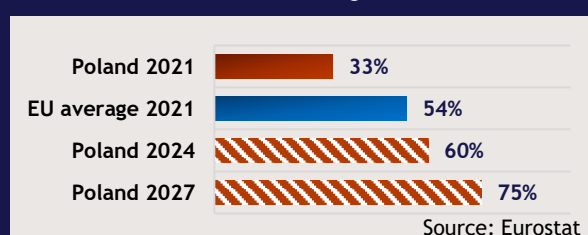
Current status in Poland

- The NBCSP is fully covered by the NFZ. Since 1 November 2023, the NBCSP primarily targets women aged 45-74 years (previously 50-69 years) to be screened with mammography every 2 years (40).
- Previously, invitations to mammography were sent out via letters to women in the target population. Nowadays, general recommendations for screening are offered instead of formal invitations, unless a woman has additional risk factors (41). In comparison, Czechia uses personalized invitations for mammography aimed at women who have not undergone screening for breast cancer over an extended period of time (42).
- Program data from 2021 show that about 33% of women in the target population in Poland have undergone mammography (43). This is much lower than the EU average (54%), and far off the national target for 2024 (60%). As of December 1, 2023, population coverage for mammography in Poland is roughly 26% (44).
- According to self-reported data from 2019, 54% of women aged 50-69 have had mammography within less than two years, a slight decrease compared to 2014 (59%) (45). The Polish screening rate ranks lowest among the V4 countries together with Slovakia, whereas Czechia achieves screening rates of 77%, above the EU average of 65%.
- Knowledge about the benefits of screening (health literacy) and easy geographical access are crucial for women's participation in mammography screening. In Poland, self-reported data from 2019 indicate large differences in screening participation according to education level (33% in women with lower secondary education vs. 67% in women with tertiary education) and residential area (49% in women living in rural areas vs. 58% in women living in major cities) (43, 45).

Self-reported screening rate among women aged 50-69 by educational attainment level, 2019



Program-based screening rates in 2021 and national goals



Lower sec. education



Upper sec. education



Tertiary education



Source: Eurostat

Recommendations

- Consider implementing personalized invitations for mammography, especially for women who have not undergone screening for an extended period.
- Enhance health literacy, emphasizing the crucial role of breast cancer screening in reducing mortality, and educate women about the benefits of early detection and available screening resources, particularly among women with lower education levels and women living in rural areas.
- Consider using mobile breast screening units to improve access in rural areas.

Pillar 2:

Early detection

KPI:

Cervical cancer screening

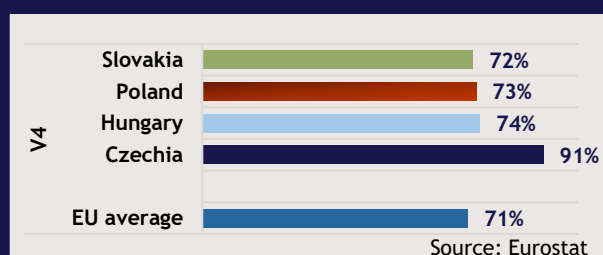
Background

- The aim of cervical cancer screening is to detect a cancer before the onset of symptoms or even earlier in its pre-stages. In early disease stages, survival rates are highest and treatment costs lowest (46, 47). Cervical cancer screening used to be done with a Pap smear test every three years. The discovery of HPV as the cause of cervical cancer has led to the development of HPV tests as a screening method (17).
- The EBCP includes the aim that 90% of the target population in each country should be invited for cervical cancer screening by 2025 (4). Moreover, the updated screening recommendation by the Council from 2022 states that countries should use HPV tests and screen women aged 30-65 at an interval of five years or more (39).
- Poland has a national screening program for cervical cancer. Poland's National Oncology Strategy includes the aim to increase screening participation to 60% by the end of 2024 and to 80% by the end of 2027 (2).

Current status in Poland

- The population-based screening program for cervical cancer offers a Pap test every three years. The screening program is fully covered by the NFZ. As of 1 November 2023, it targets primarily women aged 25-64 years (previously 25-59 years) to be screened with a Pap test every three years (40).
- Among the V4 countries, Poland and Hungary are yet to implement HPV testing as a screening method for cervical cancer in line with the latest Council recommendation. Slovakia and Czechia are currently using both PAP tests and HPV tests (22).
- Program data from 2021 show that about 12% of women in the target population in Poland have undergone cervical cancer screening (43). This is around 5 times less than the EU average during the same year (49%), and far off the national target for 2024 (60%). However, the actual population undergoing cervical cancer screening may be significantly underestimated because of non-registered tests performed in the private sector (2). As of December 1, 2023, the population coverage for cytology in Poland is roughly 11% (44).
- According to self-reported data from 2019, about 73% of women aged 20-69 had undergone cervical cancer screening within the last three years, unchanged from 2014 (72%) (48). Poland ranks behind Hungary (74%) and Czechia (91%) but stands just above the EU-27 average (71%).
- Knowledge about the benefits of screening (health literacy) and easy geographical access are crucial for women's participation in cervical cancer screening. In Poland, self-reported data from 2019 indicate large differences in screening participation according to education level (45% in women with lower secondary education vs. 87% in women with tertiary education) and residential area (69% in women living in rural areas vs. 77% in women living in major cities) (43, 48).

Self-reported screening rate among women aged 20-69 by educational attainment level, 2019



Lower sec. education



Upper sec. education

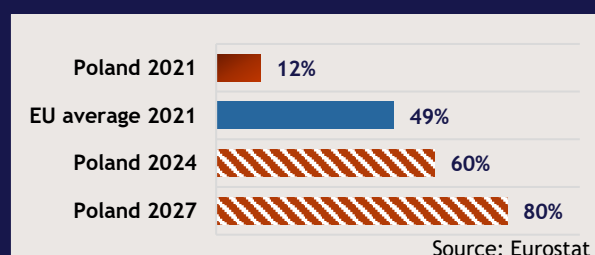


Tertiary education



Source: Eurostat

Program-based screening rate (2021) and national goals



Recommendations

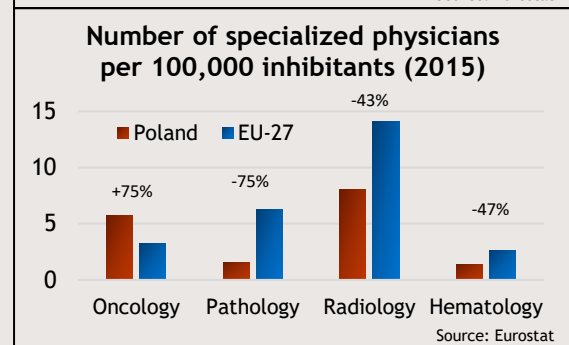
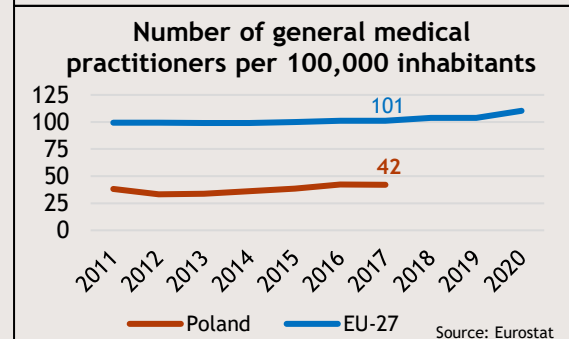
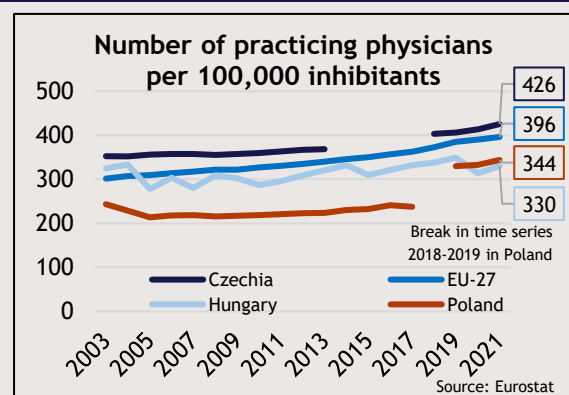
- Start monitoring cervical cancer screenings in the private sector to get a full picture of the screening rates.
- Switch from Pap test to HPV test as the primary screening method. Ensure a screening interval of five years or more with the HPV test. Explore the possibility of introducing HPV self-sampling kits, especially in rural areas.
- Consider targeted information campaigns about screening to women of lower socioeconomic status.

Background

- Modern cancer care is highly specialized and requires competence from different medical fields. This includes pathologists and diagnostic radiologists for the diagnosis of cancer, and surgeons, radiologists, medical oncologists, and hematologists for the treatment. General practitioners (GPs) play a key role in facilitating early diagnosis in primary care as they refer patients with signs and symptoms to the appropriate specialist.
- Poland's National Oncology Strategy acknowledges shortages of specialized physicians working in oncology (2). It also notes that an insufficient number of physicians are willing to train in oncological specialties as evidenced by the fact that only around 70% of the training places are filled in units accredited to conduct specialty training.
- Improving the staffing situation is one of the central aims of Poland's National Oncology Strategy (2). This includes amongst others (i) to increase the use of vacant training places in specializations within oncology to 100% by the end of 2024, and (ii) to increase the number of physicians specializing in oncology and related fields (radiology, pathology, clinical genetics, oncological rehabilitation, etc.) by 10% by the end of 2028.

Current status in Poland

- Poland has one of the lowest densities of practicing physicians (of any specialty) in the EU in 2021, with 344 per 100,000 inhabitants, lagging behind the EU-27 average of 396 physicians (49). In comparison, Czechia exceeds the EU-average with 426 physicians per 100,000 inhabitants and Hungary has a similar number as Poland.
- The low number of practicing physicians in Poland is partly a result of emigration to other EU countries and the UK. A survey in Warsaw found that 16% of physicians (n = 60/374) expressed their intention to emigrate between 2014-2020, primarily due to low salaries (50). Higher earnings, better working conditions, and better work-life balance abroad were also found as main reasons for Polish physicians intending to emigrate in other studies (51, 52).
- Poland records the lowest density of general medical practitioners (GPs) in the EU-27, standing at 42 per 100,000 inhabitants in 2017, less than half of the EU-average of 101 physicians (53). The lack of GPs in primary care impedes accessibility for patients with signs and symptoms of cancers, which hinders early diagnosis.
- Poland seems to face shortages of specialized physicians involved in the diagnosis and treatment of cancer, such as pathology, radiology, and hematology, when compared to the EU-average (data from 2015) (53). For instance, pathologists are essential in diagnosing and classifying breast cancer, while radiologists use imaging techniques for detecting and monitoring cancers, particularly relevant in the care of women's cancers. An analysis by the OECD from 2023 also finds a considerable shortage of oncological specialists, in particular pathologists (54).



Recommendations

- Recruit and train more specialist physicians working in oncology in line with the aims of the National Oncology Strategy. This will help to improve the quality of services and mitigate inequalities in patient access to services.
- Develop retention strategies, with a focus on higher salaries and better working conditions, to motivate physicians to stay in Poland rather than to emigrate to other EU countries.

Background

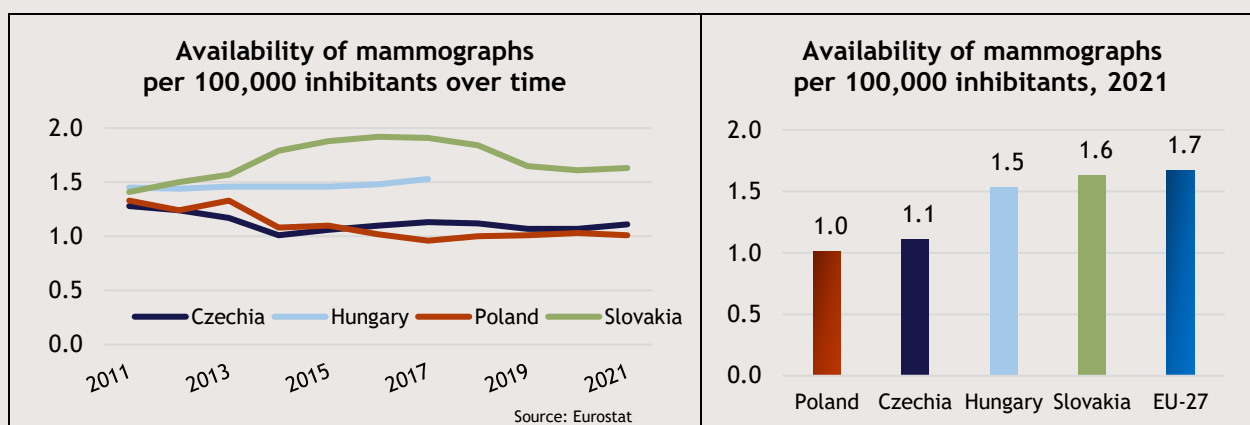
- An essential part between the diagnosis of cancer and the start of treatment is the diagnostic process. Diagnostic imaging is one part of this process with the purpose of locating the tumor and determining its spread in the body. This helps to inform the most adequate treatment approach.
- The diagnostic process for women’s cancers differs between cancer types. For breast cancer, mammography machines are essential for diagnosis (and also for screening). Keeping the time between diagnosis and treatment start as short as possible has been shown to increase the chances of survival in many cancer types (55). For instance, breast cancer patients with a long delay of ≥ 61 days between diagnosis and start of neoadjuvant systemic therapy have a 28% increased risk of subsequent mortality compared to patients with a short delay of 0-30 days (56). A shortage of mammography machines may lead to access problems in terms of geographic proximity and/or waiting times for breast cancer diagnosis and screening. This will slow down the referral pathways, delay timely initiation of treatment, and ultimately impair patient outcomes.



- There are no established guidelines or benchmarks for the optimal number of mammography machines per population. Poland’s National Oncology Strategy includes several aims relating to mammography machines, but these aims primarily to the breast cancer screening program (2). One aim is to increase the intensity of quality controls of mammography examinations. Another aim is to make the use of digital mammography mandatory.

Current status in Poland

- Poland had 382 mammography machines in 2021, of which 217 were located in hospitals and 165 in providers of ambulatory health care (57).
- The availability of mammography machines per 100,000 inhabitants in Poland has been on a decreasing trend over the last decade. However, since 2017 the negative trend seems to have abated (57).
- The latest comparable data from 2021 show that Poland’s availability of mammography machines was 1.0 per 100,000 inhabitants, which is notably less than the EU-27 average of 1.7 machines per 100,000 inhabitants (57). Poland also falls behind Czechia (1.1 machines per 100,000), Hungary (1.5 machines per 100,000), and Slovakia (1.6 machines per 100,000).



Recommendations

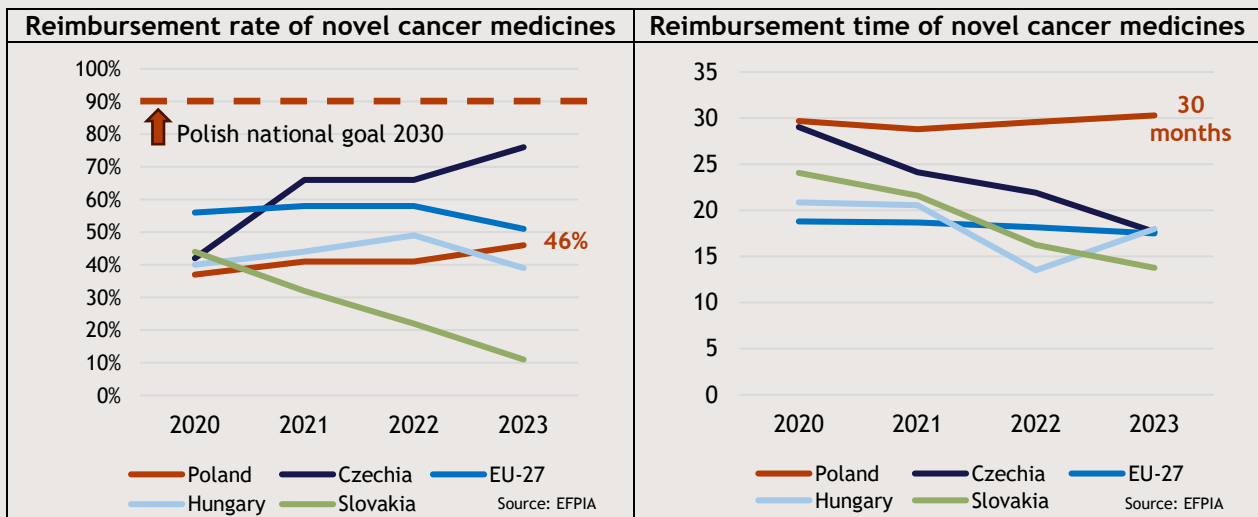
- Increase the number of mammography machines in view of the increasing number of breast cancer patients and the extended target age group (45-75 years instead of 50-69 years) of the breast cancer screening program.
- Review the location of existing mammography machines and the local demand for mammograms in order to place additional machines in areas in most need to reduce waiting times and improve geographical accessibility.
- Monitor the utilization of mammography machines closely to adapt to changing screening patterns and ensure efficient use in the updated breast cancer screening program.

Background

- Cancer medicines are one of three treatment modalities, besides surgery and radiation therapy, used in the treatment of women’s cancers. The last decade has seen the approval of around 100 new cancer medicines by the European Medicines Agency (EMA) (14).
- The availability (i.e., local reimbursement in a country) of novel cancer medicines with approval by the EMA differs considerably between EU countries (58). Many common reasons for the unavailability and delays in the time until local reimbursement of novel medicines at the country level have been identified across the EU (59), such as (i) limited public budgets for medicines, (ii) late company submission or late start of the national pricing & reimbursement process, (iii) lack of clearly defined timelines for pricing & reimbursement, (iv) the complexity of the health technology assessment (HTA) process.
- At the EU level, a revision of the EU pharmaceutical legislation is underway, where one main objective is to reduce country differences in the availability of new medicines and to shorten the time from EMA approval until patient access (60). In addition, the new EU HTA regulation will apply for cancer medicines from 12th January 2025 (61). This will entail a joint (cross-country) clinical assessment of the effectiveness of new medicines.
- Poland’s National Oncology Strategy includes the aim to increase the availability of cancer medicines and achieve an availability of at least 90% of all EMA-approved cancer medicines by 2030 (2).

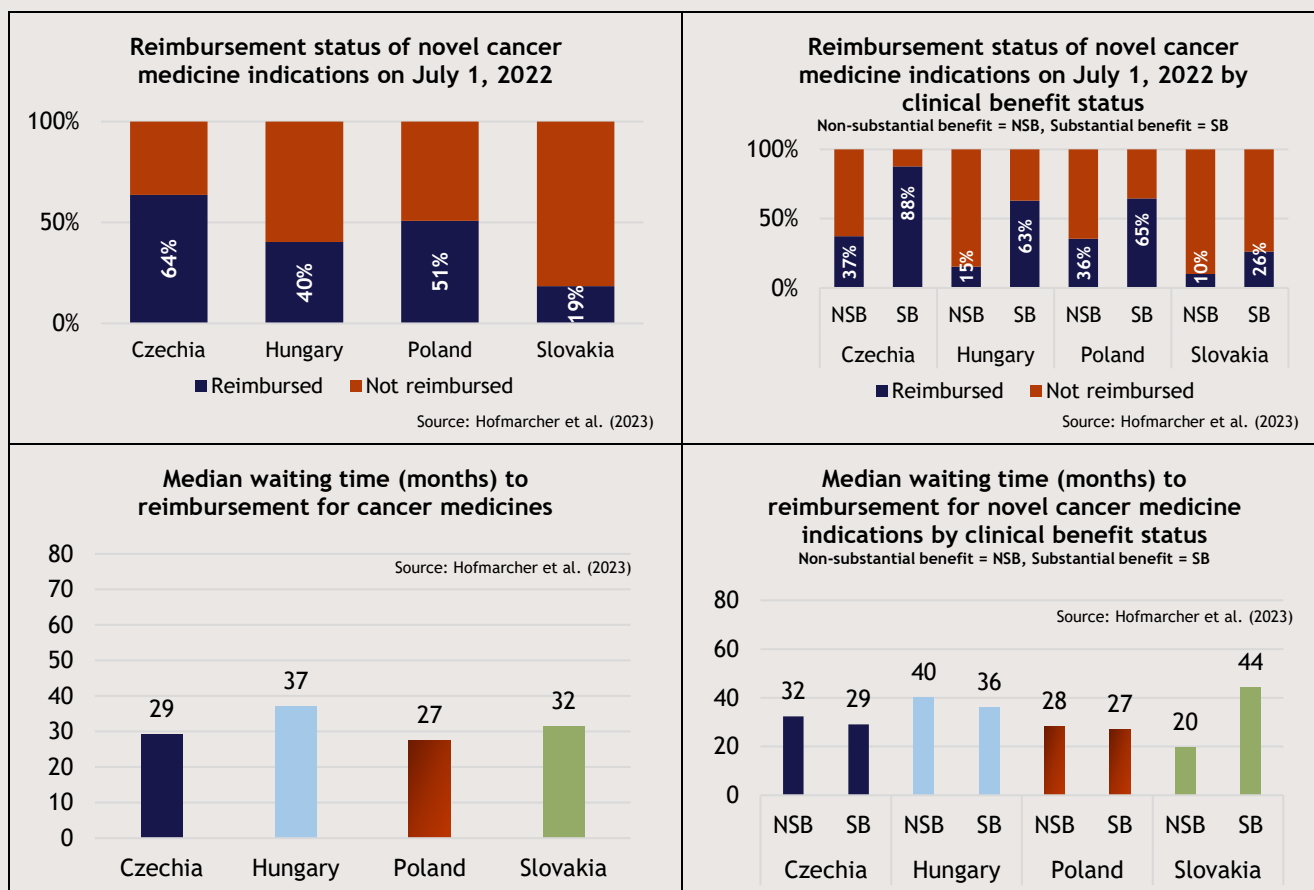
Current status in Poland

- According to the EFPIA Patients W.A.I.T. Indicator Survey, the reimbursement rate for novel cancer medicines (EMA approved in 2018-2021) was 46% in Poland on January 1st, 2023 (58). This puts Poland just below the EU average of 51%. Among the V4 countries, only Czechia had a considerably higher reimbursement rate (76%).
- Poland has achieved a slight improvement in the reimbursement rate since 2020, up from 37% in 2020 (58, 62-64). Poland shares this positive development with Czechia, whereas Hungary remained stable, and Slovakia saw a great decrease. However, to meet the national goal of at least a 90% reimbursement rate by the end of 2030, Poland would need to double its current reimbursement rate within the next 7 years.
- According to the EFPIA Patients W.A.I.T. Indicator Survey, the average time period from EMA approval until local reimbursement in Poland is among the three longest ones of all EU countries. It takes on average 30 months for new cancer medicines to be reimbursed in Poland, which is almost twice as long as the EU average of 18 months (58).
- The reimbursement time in Poland has remained stable over the last few years at around 30 months 2020 (58, 62-64). In contrast, the reimbursement duration has decreased in the other V4 countries.



(description continues on the next page)

- A recent study for the V4 countries analyzed the reimbursement status and timelines of 124 indications of 51 cancer medicines with marketing authorization by the EMA in 2011-2020 (65). The follow up was until July 1st, 2022. The main findings differ somewhat from the EFPIA Patients W.A.I.T. Indicator Survey because new indications of existing medicines were also included. The findings are as follows:
 - The reimbursement of indications varied considerably among the V4 countries, ranging from 19% in Slovakia to 64% in Czechia, with Poland being second at 51%.
 - Across all countries a significantly higher proportion of indications with a substantial clinical benefit (SB), defined according to the ESMO-MBCS scale, were reimbursed compared to indications without a substantial clinical benefit (NSB). In Poland, 36% of indications with an NSB were reimbursed vs. 65% with an SB.
 - Poland exhibited the shortest median time from EMA approval until local reimbursement among the V4 countries with 27 months.
 - The median time until reimbursement did not significantly differ between indications with an NSB (28 months) and an SB (27 months) in Poland, similar to the other V4 countries. This indicates a lack of prioritization of fast access to treatment options delivering a substantial benefit.



- The local reimbursement of specific cancer medicines/indications for the different types of women’s cancers is less well studied.
 - For breast cancer, the above described study for the V4 countries found that the reimbursement of rate of 18 indications approved by the EMA in 2011-2020 was 45% in Poland on July 1st, 2022, trailing Hungary (50%) and Czechia (72%) (65). Similarly, another analysis of 16 medicines in breast cancer recommended in guidelines by the European Society for Medical Oncology (ESMO) found that on average 55% of the medicines are reimbursed in the V4 countries, with Poland at a rate of 50% in 2023 (66).
 - For ovarian cancer, an analysis of three medicines (PARP inhibitors) found that two of them are reimbursed in Poland and Czechia and only one in Hungary and Slovakia in 2023 (67).

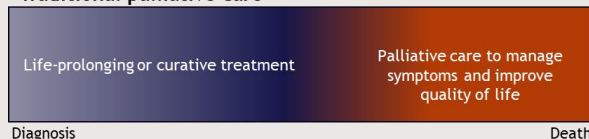
Recommendations

- Use the introduction of the EU HTA regulation in January 2025 as an opportunity to streamline the national HTA process and to review the evidence requirements for cancer medicines. One aim should be to improve the timelines of the reimbursement process to get closer to the EU average. The new Polish Reimbursement Act effective as of November 1st, 2023 might already accelerate timelines.
- A clearer prioritization of cancer medicines with a substantial clinical benefit for reimbursement could help to spend the limited public resources of the NFZ more efficiently.

Background

- In Poland, the share of the population aged 65 and older has nearly doubled during the two last decades, currently standing at 20% (68). This results in an increasing demand for palliative care (PC) services.
- Cancer is the most frequent cause of need for PC among life threatening or life-limiting health conditions (69). Within oncology, PC has traditionally had a strong focus on the end-of-life-stage but more recent definitions emphasize its relevance earlier in the disease pathway (70).
- The availability of PC services in a country is one metric to assess the capacity and potential access to PC. Another metric is the degree to which PC is integrated with the overall health care system (71). The European Association for Palliative Care (EAPC) recommends two specialized PC services for every 100,000 inhabitants (69).
- Poland’s National Oncology Strategy includes the aim to equalize and increase access to palliative care services at the regional level, regardless of a patient’s place of residence, by the end of 2024. By 2026, the aim is to build a network of palliative and hospice care centers for cancer patients (2).

Traditional palliative care

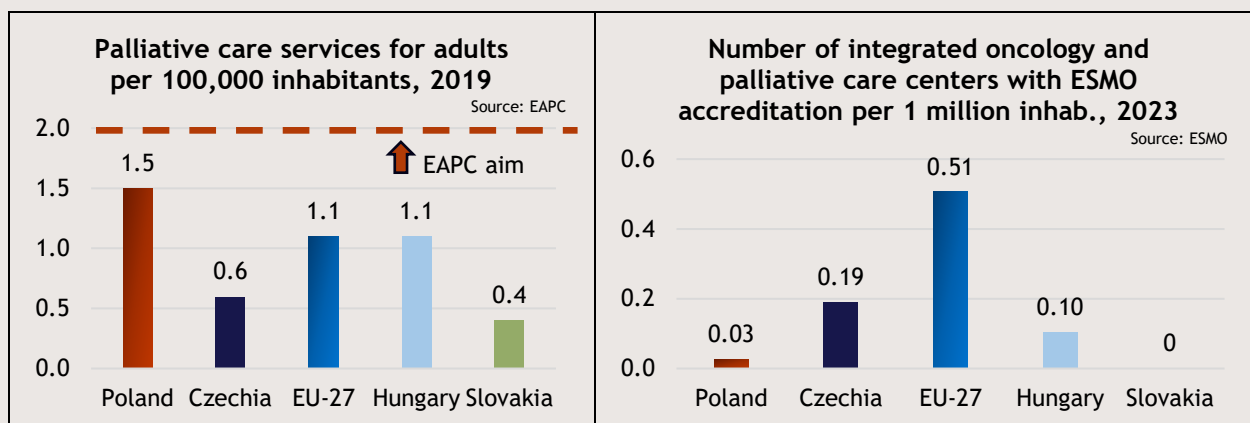


Integrated palliative care



Current status in Poland

- In 2019, Poland had 1.5 (non-cancer-specific) PC services per 100,000 inhabitants, which was higher than the other V4 countries and the EU-27 average. Neither the EU-27 average nor any of the V4 countries meet the EAPC recommendation of 2 PC services per 100,000 inhabitants. Poland shows a positive development, as the availability has increased from roughly 1.3 PC services per 100,000 in 2012 (72).
- Based on a voluntary ESMO accreditation system of cancer centers, a comparison of the integration of PC with oncology care can be made (73). At present, the Maria Skłodowska-Curie National Research Institute of Oncology is the only Designated Center of Integrated Oncology and Palliative Care with an ESMO accreditation in Poland, which translates to 0.03 centers per 1 million inhabitants. This is lower than both Czechia (0.19 per million) and Hungary (0.10 per million), and substantially lower than the EU-27 average (0.51 per million).



Recommendations

- Expand and improve PC services in response to the growing elderly population, with a focus on accessible and integrated care with treatment services to provide comprehensive support for cancer patients.
- Strive to meet the EAPC recommendation of two specialized PC services per 100,000 inhabitants.
- Recruit more PC personnel and ensure adequate training.

References

1. OECD/European Union. Health at a Glance: Europe 2022: State of Health in the EU Cycle. Paris: OECD Publishing, 2022.
2. Ministerstwo Zdrowia. Narodowa Strategia Onkologiczna na lata 2020 - 2030. 2020.
3. Polish National Cancer Registry. Reports. [Nov 1, 2023]. Available from: <https://onkologia.org.pl/en/report>.
4. European Commission. Europe's Beating Cancer Plan (ECBP): Communication from the commission to the European Parliament and the Council. 2021.
5. World Health Organization (WHO). Cancer: Key facts. 2022. Available from: <https://www.who.int/news-room/fact-sheets/detail/cancer>.
6. European Commission. ECIS - European Cancer Information System - Incidence and mortality estimates 2022. Available from: <https://ecis.jrc.ec.europa.eu/index.php>.
7. Allemani C, Matsuda T, Di Carlo V, Harewood R, Matz M, Niksic M, et al. Global surveillance of trends in cancer survival 2000-14 (CONCORD-3): analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. *Lancet*. 2018;391(10125):1023-75.
8. Hofmarcher T, Lindgren P, Wilking N, Jonsson B. The cost of cancer in Europe 2018. *Eur J Cancer*. 2020;129:41-9.
9. Ruszkowski J. Colorectal cancer management in Poland: current improvements and future challenges. *Eur J Health Econ*. 2010;10 Suppl 1:S57-63.
10. Ministerstwo Zdrowia. Krajowa Sieć Onkologiczna. [Nov 18, 2023]. Available from: <https://www.gov.pl/web/zdrowie/krajowa-siec-onkologiczna>.
11. NFZ. Wydatki na onkologię w latach 2013-2018. 2020.
12. OECD. OECD Health Statistics 2023. [Nov 14, 2023]. Available from: <https://www.oecd.org/health/health-data.htm>.
13. NFZ. (internal analysis of funds for innovative oncology medicines, chemotherapy, open pharmacy).
14. Hofmarcher T, Brådvik G, Svedman C, Lindgren P, Jönsson B, Wilking N. Comparator Report on Cancer in Europe 2019 - Disease Burden, Costs and Access to Medicines. Lund: IHE, 2019.
15. Bencina G, Chami N, Hughes R, Weston G, Baxter C, Maciejczyk A, et al. Breast cancer-related mortality in Central and Eastern Europe: years of life lost and productivity costs. *J Med Econ*. 2023;26(1):254-61.
16. European Cancer Organisation. A Four Step Plan for Eliminating HPV Cancers in Europe. 2020.
17. World Health Organization (WHO). Cervical cancer. [Oct 25, 2023]. Available from: <https://www.who.int/news-room/fact-sheets/detail/cervical-cancer>.
18. European Centre for Disease Prevention and Control (ECDC). Guidance on HPV vaccination in EU countries: focus on boys, people living with HIV and 9-valent HPV vaccine introduction. 2020.
19. European Centre for Disease Prevention and Control. Guidance on HPV vaccination in EU countries: focus on boys, people living with HIV and 9-valent HPV vaccine introduction. 2020.
20. Jankowski M, Grudziak-Sekowska J, Wrzesniewska-Wal I, Tyszko P, Sekowski K, Ostrowski J, et al. National HPV Vaccination Program in Poland-Public Awareness, Sources of Knowledge, and Willingness to Vaccinate Children against HPV. *Vaccines (Basel)*. 2023;11(8).
21. Drejza M, Rylewicz K, Lewandowska M, Gross-Tyrkin K, Lopinski G, Barwinska J, et al. HPV Vaccination among Polish Adolescents-Results from POLKA 18 Study. *Healthcare (Basel)*. 2022;10(12).
22. European Parliamentary Forum for Sexual & Reproductive Rights (EPF). HPV Prevention Policy Atlas 2023. [Dec 6, 2023]. Available from: <https://www.epfweb.org/node/552>.
23. Telewizja Polska. MZ: przeciw HPV zaszczepiono ponad 138 tys. dzieci. [Dec 18, 2023]. Available from: <https://krakow.tvp.pl/74542412/mz-przeciw-hpv-zaszczepiono-ponad-138-tys-dzieci>.
24. Loke AY, Kwan ML, Wong YT, Wong AKY. The Uptake of Human Papillomavirus Vaccination and Its Associated Factors Among Adolescents: A Systematic Review. *J Prim Care Community Health*. 2017;8(4):349-62.
25. Nguyen-Huu NH, Thilly N, Derrough T, Sdonà E, Claudot F, Pulcini C, et al. Human papillomavirus vaccination coverage, policies, and practical implementation across Europe. *Vaccine*. 2020;38(6):1315-31.
26. Colzani E, Johansen K, Johnson H, Pastore Celentano L. Human papillomavirus vaccination in the European Union/European Economic Area and globally: a moral dilemma. *Euro Surveill*. 2021;26(50).
27. World Health Organization. Obesity. [Dec 9, 2023]. Available from: https://www.who.int/health-topics/obesity#tab=tab_1.
28. Centers for Disease Control and Prevention. Obesity and Cancer. [Dec 9, 2023]. Available from: <https://www.cdc.gov/cancer/obesity/index.htm>.
29. Arnold M, Pandeya N, Byrnes G, Renehan PAG, Stevens GA, Ezzati PM, et al. Global burden of cancer attributable to high body-mass index in 2012: a population-based study. *Lancet Oncol*. 2015;16(1):36-46.
30. Sung H, Siegel RL, Torre LA, Pearson-Stuttard J, Islami F, Fedewa SA, et al. Global patterns in excess body weight and the associated cancer burden. *CA Cancer J Clin*. 2019;69(2):88-112.
31. International Agency for Research on Cancer. European Code Against Cancer: 12 ways to reduce your cancer risk. [Oct 30, 2023]. Available from: <https://cancer-code-europe.iarc.fr/index.php/en/>.

32. World Health Organization. WHO acceleration plan to stop obesity. Geneva: WHO, 2023.
33. World Health Organization. Overweight, females. [Dec 18, 2023]. Available from: https://gateway.euro.who.int/en/indicators/h2020_8-overweight-females/#id=17079.
34. Eurostat. Overweight and obesity - BMI statistics. [Oct 30, 2023]. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Overweight_and_obesity_-_BMI_statistics#Education_level_and_overweight.
35. Wierzejska RE. The Impact of the Sweetened Beverages Tax on Their Reformulation in Poland-The Analysis of the Composition of Commercially Available Beverages before and after the Introduction of the Tax (2020 vs. 2021). *Int J Environ Res Public Health*. 2022;19(21).
36. Qin P, Li Q, Zhao Y, Chen Q, Sun X, Liu Y, et al. Sugar and artificially sweetened beverages and risk of obesity, type 2 diabetes mellitus, hypertension, and all-cause mortality: a dose-response meta-analysis of prospective cohort studies. *Eur J Epidemiol*. 2020;35(7):655-71.
37. World Health Organization (WHO). A short guide to cancer screening: increase effectiveness, maximize benefits and minimize harm. WHO. 2022.
38. Manzano A, Hofmarcher T. Improving the care of women with triple-negative breast cancer. Lund: IHE, 2023.
39. Council of the European Union. Council Recommendation of 9 December 2022 on strengthening prevention through early detection: A new EU approach on cancer screening replacing Council Recommendation 2003/878/EC. 2022.
40. NFZ. For the patient: Prevention programs. Available from: <https://www.nfz.gov.pl/dla-pacjenta/programy-profilaktyczne/>.
41. Website of the Ministry of Health and the National Health Fund. Breast cancer prevention. 2023. Available from: <https://pacjent.gov.pl/program-profilaktyczny/profilaktyka-raka-piersi>.
42. MAMO. Personalized invitations of Czech citizens to cancer screening programmes. 2014. Available from: <https://www.mamo.cz/news-detail/en/137-personalised-invitations-of-czech-citizens-to-cancer-screening-programmes/>.
43. Eurostat. Cancer screening statistics. [Dec 9, 2023]. Available from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Cancer_screening_statistics.
44. National Health Protection Fund (NFZ). Data on the implementation of prevention programs. Available from: <https://www.nfz.gov.pl/dla-pacjenta/programy-profilaktyczne/dane-o-realizacji-programow/>.
45. Eurostat. Self-reported last breast examination by X-ray among women by age and degree of urbanisation. [Dec 9, 2023]. Available from: https://ec.europa.eu/eurostat/databrowser/view/hlth_ehis_pa7u/default/table?lang=en.
46. Cancer Research UK. Survival for cervical cancer. [Dec 2, 2023]. Available from: <https://www.cancerresearchuk.org/about-cancer/cervical-cancer/survival>.
47. McGarvey N, Gitlin M, Fadli E, Chung KC. Increased healthcare costs by later stage cancer diagnosis. *BMC Health Serv Res*. 2022;22(1):1155.
48. Eurostat. Self-reported last cervical smear test among women by age and degree of urbanisation. [Dec 9, 2023]. Available from: https://ec.europa.eu/eurostat/databrowser/view/hlth_ehis_pa8u_custom_8923599/default/table?lang=en.
49. Eurostat. Health personnel. [Nov 8, 2023]. Available from: https://ec.europa.eu/eurostat/databrowser/product/view/hlth_rs_prs2.
50. Szpakowski R, Dykowska G, Fronczak A, Zajac P, Czerw A. Migrations of nurses and doctors from Poland: data for the years 2014-2020 based on the sample of the capital city of Warsaw. *Arch Med Sci*. 2019;15(3):811-20.
51. Domagala A, Dubas-Jakobczyk K. Migration intentions among physicians working in Polish hospitals - Insights from survey research. *Health Policy*. 2019;123(8):782-9.
52. Domagala A, Kautsch M, Kulbat A, Parzonka K. Exploration of Estimated Emigration Trends of Polish Health Professionals. *Int J Environ Res Public Health*. 2022;19(2).
53. Eurostat. Physicians by medical speciality - historical data (1985-2016). [Nov 7, 2023]. Available from: https://ec.europa.eu/eurostat/databrowser/view/hlth_rs_spec/default/table?lang=en.
54. OECD. EU Country Cancer Profile: Poland 2023. 2023.
55. Hanna TP, King WD, Thibodeau S, Jalink M, Paulin GA, Harvey-Jones E, et al. Mortality due to cancer treatment delay: systematic review and meta-analysis. *BMJ*. 2020;371:m4087.
56. de Melo Gagliato D, Lei X, Giordano SH, Valero V, Barcenas CH, Hortobagyi GN, et al. Impact of Delayed Neoadjuvant Systemic Chemotherapy on Overall Survival Among Patients with Breast Cancer. *Oncologist*. 2020;25(9):749-57.
57. Eurostat. Devices for medical imaging. [Nov 8, 2023]. Available from: https://ec.europa.eu/eurostat/databrowser/product/view/hlth_rs_medim.
58. European Federation of Pharmaceutical Industries and Associations. EFPIA Patients W.A.I.T. Indicator 2022 Survey. 2023.
59. European Federation of Pharmaceutical Industries and Associations. The root cause of unavailability and delay to innovative medicines: Reducing the time before patients have access to innovative medicines. 2023.

60. European Commission. Reform of the EU pharmaceutical legislation. [Dec 10, 2023]. Available from: https://health.ec.europa.eu/medicinal-products/pharmaceutical-strategy-europe/reform-eu-pharmaceutical-legislation_en.
61. European Commission. Regulation on Health Technology Assessment. [Dec 10, 2023]. Available from: https://health.ec.europa.eu/health-technology-assessment/regulation-health-technology-assessment_en.
62. European Federation of Pharmaceutical Industries and Associations. EFPIA Patients W.A.I.T. Indicator 2019 Survey. 2020.
63. European Federation of Pharmaceutical Industries and Associations. EFPIA Patients W.A.I.T. Indicator 2020 Survey. 2021.
64. European Federation of Pharmaceutical Industries and Associations. EFPIA Patients W.A.I.T. Indicator 2021 Survey. 2022.
65. Hofmarcher T, Szilagyi P, Gustafsson A, Dolezal T, Rutkowski P, Baxter C, et al. Access to novel cancer medicines in four countries in Central and Eastern Europe in relation to clinical benefit. *ESMO Open*. 2023;8(4):101593.
66. G.A.P. Disease landscape - Breast Cancer. [Dec 10, 2023]. Available from: <https://gapv4.eu/gapv4/disease-landscape/breast-cancer.html>.
67. G.A.P. Disease landscape - Ovarian Cancer. [Dec 10, 2023]. Available from: <https://gapv4.eu/gapv4/disease-landscape/ovarian-cancer.html>.
68. World Bank. Population ages 65 and above (% of total population) 2022. Available from: https://data.worldbank.org/indicator/SP.POP.65UP.TO.ZS?locations=PL&most_recent_value_desc=true.
69. European Association for Palliative Care (EAPC). EAPC Atlas of Palliative Care in Europe 2019.
70. Kaasa S, Loge JH, Aapro M, Albrecht T, Anderson R, Bruera E, et al. Integration of oncology and palliative care: a Lancet Oncology Commission. *The Lancet Oncology*. 2018;19(11):e588-e653.
71. Arias-Casais N, Garralda E, Sánchez-Cárdenas MA, Rhee JY, Centeno C. Evaluating the integration of palliative care in national health systems: an indicator rating process with EAPC task force members to measure advanced palliative care development. *BMC Palliative Care*. 2021;20(1):36.
72. Arias-Casais N, López-Fidalgo J, Garralda E, Pons JJ, Rhee JY, Lukas R, et al. Trends analysis of specialized palliative care services in 51 countries of the WHO European region in the last 14 years. *Palliat Med*. 2020;34(8):1044-56.
73. European Society for Medical Oncology (ESMO). ESMO Accredited Designated Centres. 2023 [2023-11-22]. Available from: <https://www.esmo.org/for-patients/esmo-designated-centres-of-integrated-oncology-palliative-care/esmo-accredited-designated-centres>.

Appendix: Methodology and sources for indicators

Prevention	
HPV vaccination rate	WHO immunization database: Indicator - HPV vaccination coverage by age 15. Unweighted EU-average with data not available for Croatia, Czechia, Greece, Poland, Romania, and Slovakia. Data for Poland: Ministry of Health announcement.
Obesity level	<u>1st graph</u> : WHO European Health Information Gateway. Indicator: Age-standardized prevalence of overweight (defined as BMI \geq 25 kg/m ²) in females aged 18 years and over (WHO estimates) (%). Weighted EU-average. <u>2nd graph</u> : Eurostat: Body mass index (BMI) by sex, age and educational attainment level.
Early detection	
Breast cancer screening	<u>1st graph</u> : Eurostat. Specification: Self-reported last breast examination by X-ray among women; age 50-69 years; X-ray within "less than 2 years" (year 2019). Unweighted EU-average. <u>2nd graph</u> : Eurostat. Specification: Self-reported last breast examination by X-ray among women; age 50-69 years; X-ray within "less than 2 years" (year 2019) split by education level ISCED 2011. <u>3rd graph</u> : Eurostat. Specification: Preventive cancer screenings - programme data; Females; Malignant neoplasm of breast (year 2021). Unweighted EU-average, with data not available for Belgium, Bulgaria, Greece, and Romania. National goals for Poland sourced from the National Oncology Strategy.
Cervical cancer screening	<u>1st graph</u> : Eurostat. Self-reported last cervical smear test among women; age 20-69 years; cervical smear test within "less than 3 years" (year 2019). Unweighted EU-average. <u>2nd graph</u> : Eurostat. Self-reported last cervical smear test among women; age 20-69 years; cervical smear test within "less than 3 years" (year 2019) split by education level according to ISCED 2011. <u>3rd graph</u> : Eurostat. Specification: Preventive cancer screenings - programme data; Females; Malignant neoplasm of cervix uteri (year 2021). Unweighted EU-average, with data not available for all countries. National goals for Poland sourced from the National Oncology Strategy.
Diagnosis and treatment	
Number of physicians	<u>1st graph</u> : Eurostat. Specification: Number of practicing physicians per 100,000 inhabitants (years 2003-2021). Data not available for Greece and Portugal. Data not available for Czechia 2014-2017, for Ireland for 2003-2010, for Malta for 2003-2008, for Netherlands for 2003-2013. Unweighted EU-average. <u>2nd graph</u> : Eurostat. Specification: Physicians by medical speciality - historical data (1985-2016). Number of generalist medical practitioners per 100, 000 inhabitants. Data not available for Slovakia. Data for Czechia only available for 2012-2013. Data not available for Hungary for 2012-2016. Unweighted EU-average. <u>3rd graph</u> : Eurostat. Specification: Physicians by medical speciality - historical data (1985-2016). Number of "Hematology", "Oncology", "Pathology", "Radiology" per 100,000 inhabitants (year 2015). Data not available for all EU countries. Unweighted EU-average.
Availability of mammography machines	Eurostat. Specification: Devices for medical imaging (years 2011-2021). Mammographs. Hospitals and providers of ambulatory care. <u>1st graph</u> : Data not available for Hungary for 2018-2021. <u>2nd graph</u> : 2021 or nearest available year. Data not available for Netherlands and for some countries only for mammographs in hospitals or in ambulatory care. Weighted EU-average.
Availability of novel cancer medicines	<u>1st and 2nd graph</u> : EFPIA Patients W.A.I.T. Indicator Surveys. Data refers to rate of availability and estimates of time to availability of new cancer medicines. For most countries, availability is the point at which products gain access to the reimbursement list. Data in 2022 not available for Malta, data in 2020-2021 not available for Malta, Cyprus, Luxembourg. Unweighted EU-average. The year 2020 refers to EMA medicine approvals in 2015-2018. The year 2021 refers to EMA medicine approvals in 2016-2019. The year 2022 refers to EMA medicine approvals in 2017-2020. The year 2023 refers to EMA medicine approvals in 2018-2021. The EFPIA data only refer to new medicines and not new indications of already approved medicines. <u>3rd to 6th graph</u> : Hofmarcher et al. (2023) Access to novel cancer medicines in four countries in Central and Eastern Europe in relation to clinical benefit. ESMO Open. 8(4):101593.
Survivorship	
Availability of palliative care services	<u>1st graph</u> : Report by the European Association for Palliative Care (EAPC). Unweighted EU-average. <u>2nd graph</u> : Data sourced from ESMO's website (73). Unweighted EU-average with no data for Croatia, Cyprus, Malta, Latvia, Lithuania, Slovakia, Sweden.

