

Economic burden of cervical cancer in Bulgaria

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Background

- Cervical cancer (CC) is the 4th most common type of cancer diagnosed in female patients.¹ The prevalence of cervical cancer in Bulgaria showed an increase from 431.1/100,000 inhabitants (15,691 cases) in 2017 to 445.5/100,000 inhabitants (16,006 cases) in 2019.^{2,3} Cervical cancer is the leading cause of death for women between 15 and 44 years of age in Bulgaria.⁴ This mortality is among the highest in the EU, followed by Latvia, Lithuania, and Romania. The 5 years’ net survival from cervical cancer in Bulgaria is below average for the EU and among the lowest in the EU from 2000 to 2004 and 2010 to 2014. ⁵ Cervical cancer is a vaccine-preventable disease, with high-level efficacy against the most oncogenic HPV types.⁶ Although fully funded for 10- to 13-year-old girls, vaccine coverage rate (VCR) is below 10%.⁷
- Cervical cancer imposes a considerable economic burden on society and individuals.⁸ Understanding the burden of the disease is crucial for the decision-making process and budget planning.⁹

Objective

The study aims to identify direct healthcare costs of cervical cancer in Bulgaria and to calculate indirect costs and years of life lost associated with cervical cancer.

Methodology

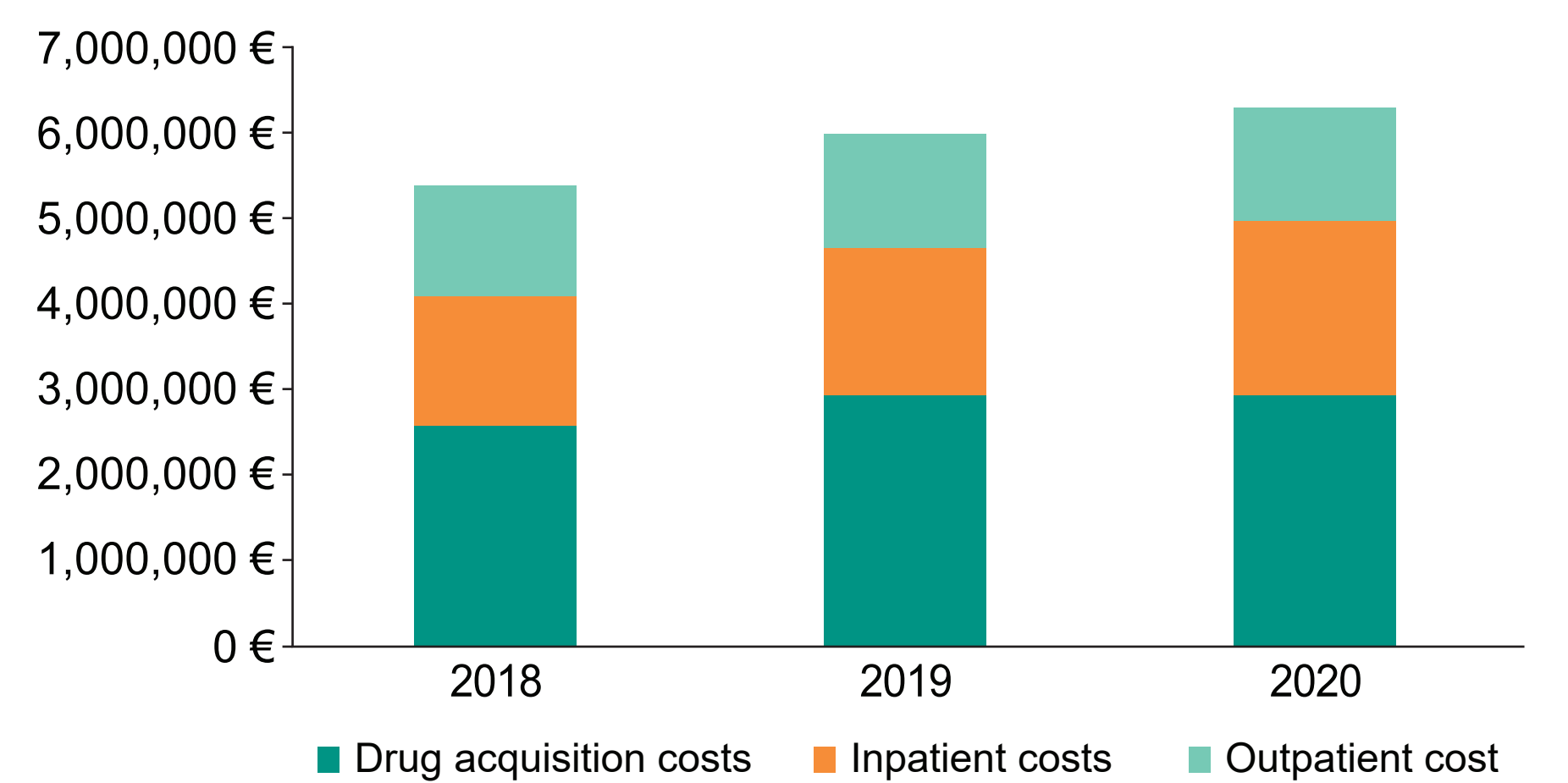
- Prevalence-based cost of illness study
- Time horizon: 2018-2020
- Population: Patients diagnosed with cervical cancer (ICD-10 code: C53.0, C53.1, C53.8, C53.9)
- Cost profile:
 - Direct costs (resource utilization for inpatient and outpatient care events related to treatment and follow-up)
 - Indirect costs due to productivity loss as % of GDP incurred to society due to cancer-specific premature mortality (human capital approach)
- Data sources:
 - National Health Insurance Fund (NHIF)
 - National Statistical Institute (NSI)
- Population

Table 1. Study sample

Year	2018	2019	2020
Patients indexed in the database (n)	1194	1214	1132
Patients in inpatient treatment (n)	916	904	937
C53.0 (Malignant neoplasm of endocervix) – n (%)	259 (28%)	219 (24%)	220 (23%)
C53.1 (Malignant neoplasm of exocervix) – n (%)	428 (47%)	472 (52%)	537 (57%)
C53.8 (Malignant neoplasm of overlapping sites of cervix uteri) – N (%)	103 (11%)	112 (12%)	86 (9%)
C53.9 (Malignant neoplasm of cervix uteri, unspecified) – n (%)	126 (14%)	101 (11%)	94 (10%)

Source: NHIF

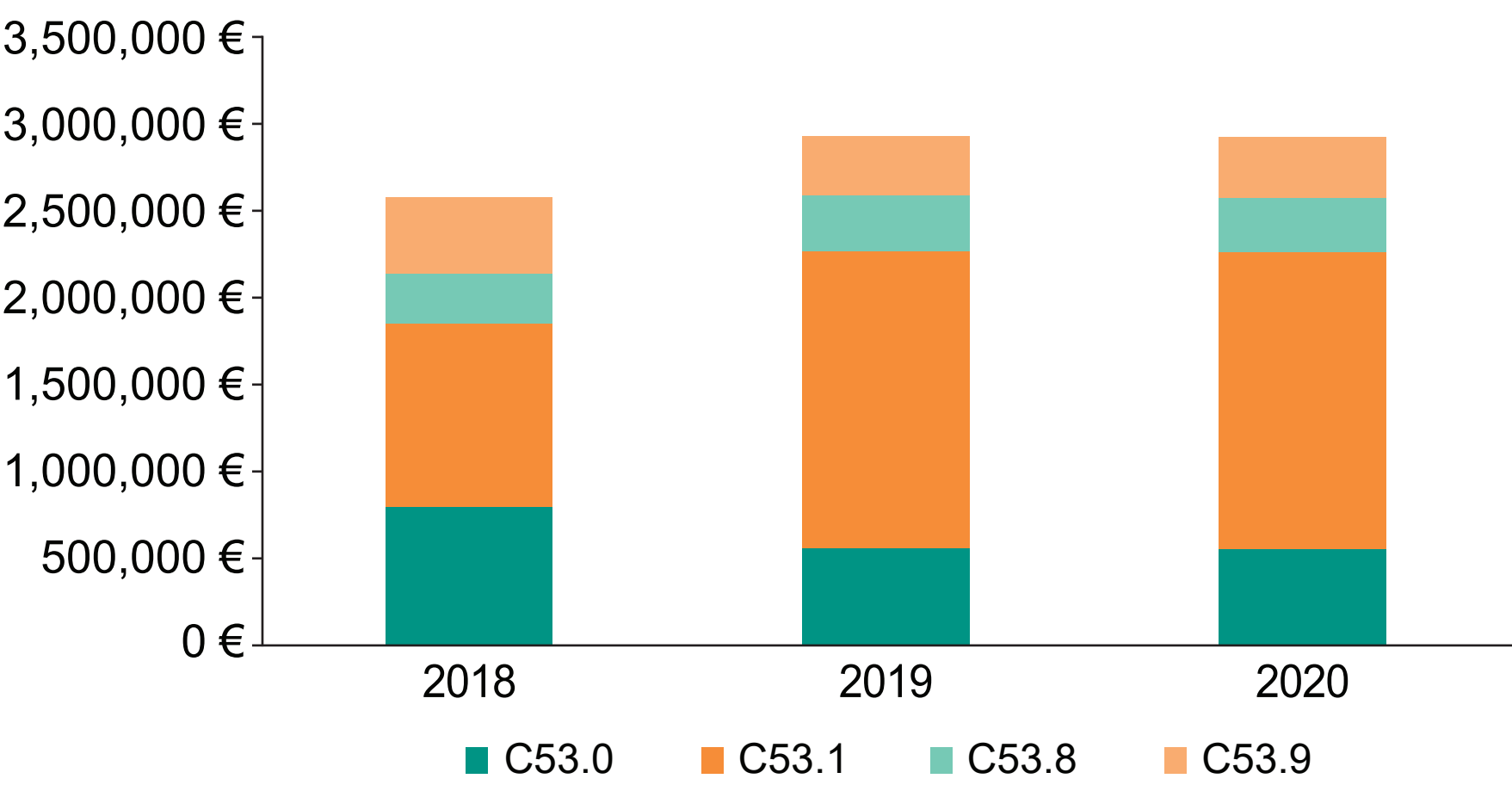
Results



Source: NHIF

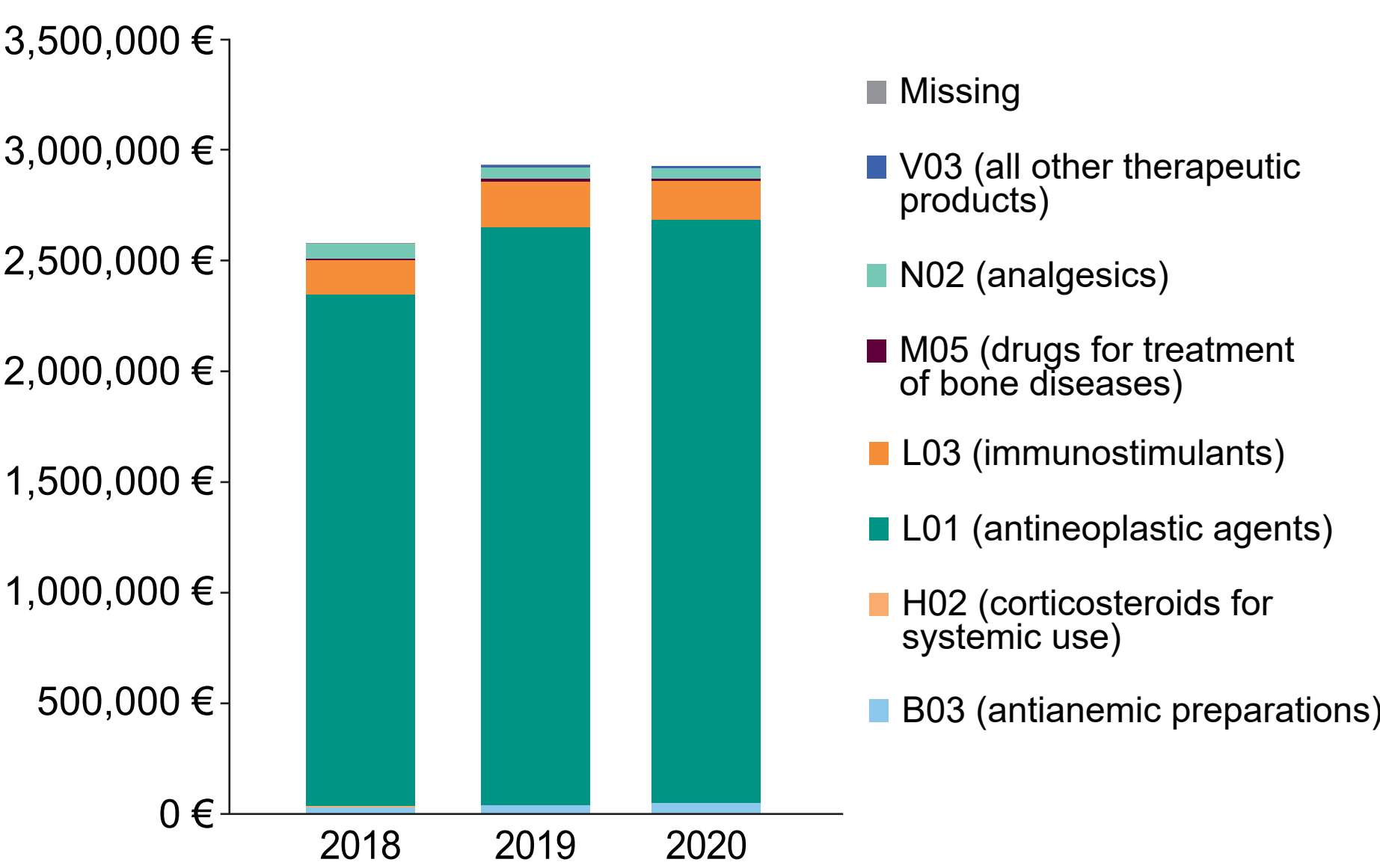
Figure 1. Direct costs, 2018-2020

Drug therapy costs



Source: NHIF

Figure 2. Drug acquisition costs, 2018-2020



Source: NHIF

Figure 3. Drug acquisition costs by class, total

Drug administration costs were estimated at €367,910.30 (2018), €377,762.89 (2019), and €442,040.46 (2020), representing 14%, 13%, and 15% of the drug acquisition costs.

Inpatient costs

- Radiotherapy costs
- Staging costs
- Inpatient procedure costs (hysterectomy, surgical interventions, robot-assisted gynecological surgeries)

The expenditures on robotic-assisted surgeries were also the main driver for the increase in inpatient costs from €1,505,268 in 2018 to €2,047,723 in 2020.

Table 2. Inpatient costs, 2018-2020

	2018	2019	2020
Radiotherapy	€674,880	€695,817	€669,596
Staging costs	–	€82,216	€190,813
Procedure costs	€830,379	€963,468	€1,187,316
Total inpatient costs	€1,505,259	€1,741,501	€2,047,724

Outpatient costs

- Monitoring the therapeutic response
- Determining a treatment plan
- PET/CT and SPEC/CT procedures
- Diagnostic tests (blood count, ultrasound tests, NMR, X-ray, etc)
- Follow-up costs

10% decrease in outpatient visits due to COVID-19 restrictions in 2020

Table 3. Outpatient costs, 2018-2020

	2018	2019	2020
Outpatient procedures	€862,462	€885,402	€946,071
Diagnostic tests	€12,906	€15,736	€15,307
Follow-up costs	€420,543	€426,591	€375,344
Total	€1,295,911	€1,327,730	€1,336,723

Years of life lost

- A 20% increase in the number of deaths by cervical cancer was recorded – from 304 deaths in 2018 to 364 deaths in 2020. This tendency is observed also in the group of deaths up to 61 years of age – 30% increase in 2020 vs 2018 (173 in 2020 vs 137 in 2018).
- For the study period, a total of **5,092 years of working life were lost** (1,624 for 2018, 1,507 for 2019, and 1,961 for 2020). The productivity losses amount to 3 million euros per year.

Indirect costs due to productivity loss

Table 4. Indirect costs due to productivity loss

	2018	2019	2020
N of deaths (all ages)	304	318	364
Average age of death (years, range)	62.33 (24-96)	62.97 (21-93)	61.47 (30-90)
N of deaths up to 61 years of age	137	133	173
Years of life lost	6294.75	6401.93	7749.71
Years of working life lost	1624	1507	1961
GDP per employed – current prices (EUR*)	€15,965.23	€17,420.61	€17,767.83
Lost GDP (not produced GDP), EUR per year	€2,187,236.80	€2,316,941.70	€3,073,835.04

Limitations

- Our study presents costs incurred in the public sector. Therefore, the true economic burden of cervical cancer in Bulgaria is likely higher due to out-of-pocket payments not captured in our study
- As our study could not account for the effect of the COVID-19 pandemic on C53-related deaths in 2020, there is a risk of potential overestimation of years of life lost and productivity loss in that year

Conclusions

- Cumulative direct costs of cervical cancer in Bulgaria amount to 17.68 million euros for 2018-2020; considering the share of HPV-related cervical cancer (**89%**), **15.74 million euros can potentially be attributed to HPV**
- The largest share is attributed to **drug acquisition and administration costs (62%-64%)**, followed by inpatient treatment costs (17.59% in 2020)
- The low diagnostic costs are generally due to **high-rate out-of-pocket costs**
- A considerable **decrease** is observed also in the **number of outpatient visits in 2020**, which is inevitably influenced by the COVID-19 pandemic and the restricted access to primary healthcare services
- The number of years of life lost due to cervical cancer is **gradually increasing**
- The HPV vaccine is recommended and fully funded by the Bulgarian government for girls 12-13 years of age, with the cohort being extended to 10-13 years of age in 2021. However, the preset vaccination coverage rate of 75% **was never achieved**, with VCR for the last 6 years below 10%

Funding

This study was funded by MSD Bulgaria.

Ethical approval

The current study has obtained approval by the Ethics Committee for Clinical Trials (Ministry of Health, Republic of Bulgaria) as a non-interventional cost of illness study (notification letter # ECCT-1116/16.03.2022).

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