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THE ECONOMIC BURDEN OF CUTANEOUS MALIGNANT MELANOMA IN GREECE: ANALYSIS OF REAL-WORLD HEALTH INSURANCE DATA

Kapaki V[1], Kotsopoulos N[2], Constantopoulos A[2], Mathioudakis K[3]

[1]University of Peloponnese, Corinth, Greece; [2]University of Athens, Department of Economics (UoA MBA), Athens, Greece; [3]IDIKA, Athens, Greece

Background

- Cutaneous malignant melanoma (CMM) imposes considerable morbidity and mortality in developed, primarily fair-skinned, countries.[1]
- In 2020, CMM accounted for 4.0% of all new cancer cases and 1.3% of all cancer deaths, making CMM the fifth most common malignancy in the EU-27.[2]
- Improved comparative accuracy of ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET)-CT imaging, has increased diagnostic precision and has facilitated disease staging.[3]
- Innovative forms of treatment, including monotherapies, combinations and sequential therapies with checkpoint inhibitors and inhibitors targeting the mitogen activated protein kinase (MAPK) pathway, have resulted in decrease in mortality reductions. Nevertheless, patients diagnosed with stage IV disease continue to experience poor survival.[4,5] At the same time, new diagnostic and treatment protocols have resulted in escalating costs for healthcare systems worldwide.[6,7]
- This study assessed the period prevalence and outpatient direct medical costs of CMM, from the perspective of the National Organization for the Provision of Health Services (EOPYY) in Greece, for the period 2017-2019.

Methods & Data

- A prevalence-based, cost-of-illness (COI) analysis conducted from the perspective of the third-party payer in Greece (EOPYY).
- Outpatient healthcare resource utilization (HCRU) data were extracted from the electronic prescription records of the e-Government Centre for Social Security Services (IDIKA SA), the only population-based dataset in Greece that includes outpatient examinations and pharmaceuticals, classified by disease, from the time of diagnosis until death or the last follow-up.
- This dataset also includes demographic data (age, gender), ICD10 and ATC5 codes, barcodes and the commercial names of examinations and pharmaceuticals, and the number of prescriptions prescribed and executed.
- Data for the following ICD-10 codes were extracted: C43–C43.9 (Table 1).
- The period prevalence of CMM was computed by dividing the sum of unique patients with prescriptions and exam referrals with the average population of Greece, in the period 2017-2019.
- Annual costs were calculated by applying unit costs to individual HCRU.
- Unit costs were obtained from the pharmaceuticals reimbursement list of EOPYY, including the sub-list with high-cost pharmaceutical products. Unit costs for examinations were obtained from state tariffs reported by EOPYY. Rebates and clawbacks were not included in the analysis.
- Costs were reported at Euro 2020 prices.
- Analyses were conducted using Microsoft Excel 2010.

Table 1: ICD10 codes

ICD10 code*	ICD10 title
C43	Malignant melanoma of skin
C43.0	Malignant melanoma of lip
C43.1	Malignant melanoma of eyelid, including canthus
C43.2	Malignant melanoma of ear and external auricular canal
C43.3	Malignant melanoma of other and unspecified parts of face
C43.4	Malignant melanoma of scalp and neck
C43.5	Malignant melanoma of trunk
C43.6	Malignant melanoma of upper limb, including shoulder
C43.7	Malignant melanoma of lower limb, including hip
C43.8	Malignant melanoma of overlapping sites of skin
C43.9	Malignant melanoma of skin, unspecified

*These are billable/specific ICD10 codes that can be used to define diagnosis for reimbursement purposes.

Source: WHO, ICD10 version 2019

Conclusion

- This real-world COI analysis quantified the costs, with a view to providing relevant information for the health policy decision-makers at all stages of decision-making, on the magnitude of CMM-attributable outpatient costs and to assisting them in more efficient health resource allocation.
- The diagnosis and treatment of CMM incur a considerable and escalating cost to the healthcare system in Greece.

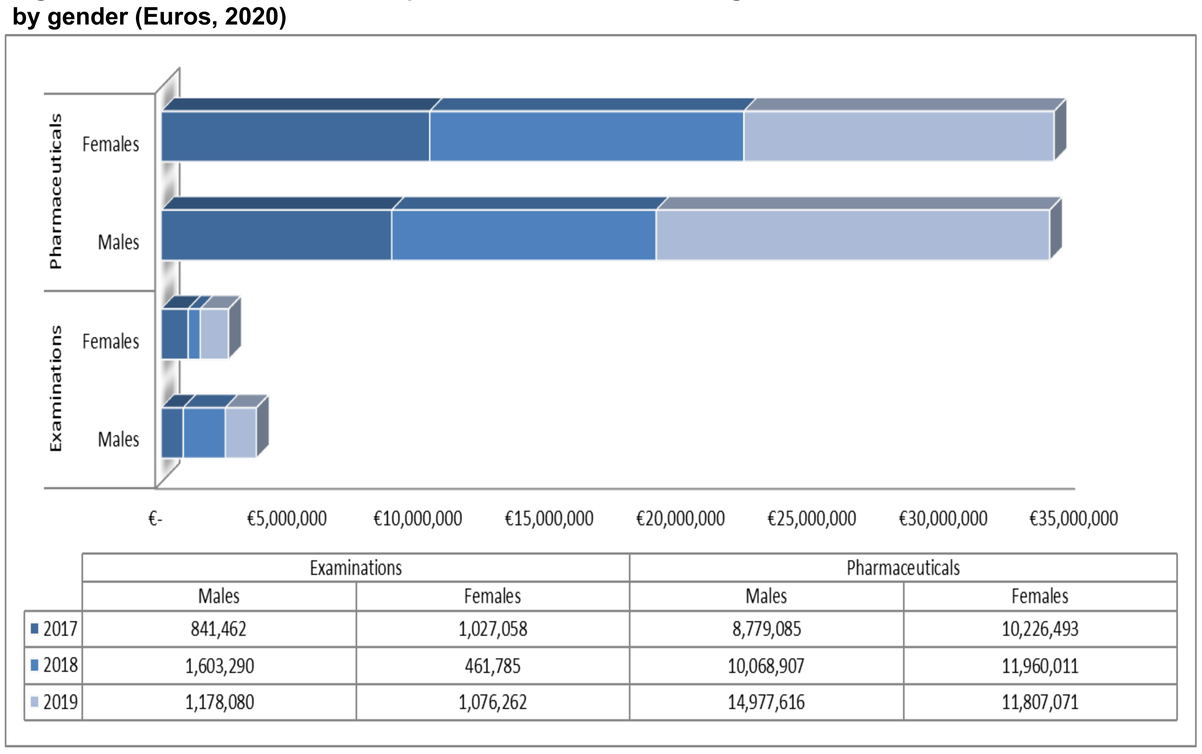
Results

- The period prevalence of CMM was estimated at 46 cases per 100,000 population (47 and 45 per 100,000 population for males and females, respectively).
- The total outpatient costs of CMM in Greece, during 2017–2019 amounted to € 74,007,121.
- Pharmaceuticals accounted for a remarkably high proportion of the total cost [91.6% of total outpatient costs (€ 67,819,184)].
- Examinations accounted for 8.4% of the total outpatient costs (€ 6,187,937) (Table 2).
- Male patients were responsible for higher examination costs, by € 1,057,727 compared to females (€ 3,622,832 vs € 2,565,105 for males and females, respectively) (Figure 1).
- Imaging (radiological) examinations were the most frequently prescribed examinations associated with considerable costs (€ 2,601,291) (Table 3).
- Protein kinase inhibitors (L01XE) were the major cost component of outpatient pharmaceutical costs (€ 46,287,830) (Table 4).

Table 2: Annual total outpatient costs of diagnosis and treatment of CMM in Greece by cost component (Euros, 2020)

Year	Pharmaceuticals (€)	Examinations (€)	Total (€)
2017	19,005,578	1,868,519	20,874,097
2018	22,028,919	2,065,075	24,093,994
2019	26,784,687	2,254,342	29,039,029
Total	**67,819,184**	**6,187,937**	**74,007,121**

Figure 1:Annual examination and pharmaceutical costs of diagnosis and treatment of CMM in Greece by gender (Euros, 2020)



	Examinations		Pharmaceuticals	
	Males	Females	Males	Females
2017	841,462	1,027,058	8,779,085	10,226,493
2018	1,603,290	461,785	10,068,907	11,960,011
2019	1,178,080	1,076,262	14,977,616	11,807,071

Table 3: Total examination costs of CMM in Greece by costliest examination category code (Euros, 2020)

Code	Examination categories	Examinations, n (%)	Costs (€)
04. Radiology	X-rays, computed tomography (CT), bone densitometry (radiology and nuclear medicine), ultrasound	50,211 (13.5)	2,601,291
24. Magnetic resonance imaging (MRI)	MRIs	6,438 (1.7)	1,293,917
13. Biochemical assays (ELISA)	Biological material exams 1 (Biopathology) (hematological, biochemical, microbiological exams)	228,790 (61.7)	813,433
49. Scintigraphy	Scintigraphies	2,352 (0.6)	624,543
16. Hormone assays (ELISA)	Biological material exams 2 (biopathology and nuclear medicine) (immunological, hormone exams)	18,161 (4.9)	207,860
56. Biomarkers	Biomarkers	1,683 (0.5)	172,423

Table 4:Total pharmaceutical costs of CMM in Greece by costliest ATC4 code (Euros, 2020)

ATC4 code	Clarification	Pharmaceuticals, n (%)	Costs (€)
L01XE	Protein kinase inhibitors	25,637 (23.7)	46,287,830
L01XC	Monoclonal antibodies	11,178 (10.3)	19,245,684
B03XA	Other antianemic preparations	582 (0.5)	446,558
L03AB	Interferons	6,111 (5.7)	348,324
V08AB	Water-soluble, nephrotropic, low osmolar X-ray contrast media	8,978 (8.3)	243,489
N02AB	Phenylpiperidine derivatives	2,740 (2.5)	169,786
H02AB	Glucocorticoids	7,588 (7.0)	150,262
L03AA	Colony stimulating factors	567 (0.5)	145,475
V08CA	Paramagnetic contrast media	2,822 (2.6)	139,500
B01AB	Heparin group	4,720 (4.4)	136,454

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Contact: vkapaki2005@gmail.com