

1690eP Stage III and IV malignant melanoma in Sweden: A nationwide study on health care resource utilisation, productivity loss and associated cost, prescription drug use and survival prognosis

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KEY FINDINGS & CONCLUSIONS

- This study highlights the significant burden of stage III and IV MM on the Swedish healthcare system and productivity, showing that individuals with distant recurrent MM experience the greatest impact through high healthcare utilisation, productivity loss and costs.
- These findings demonstrate substantial healthcare needs and economic consequences of advanced and recurrent MM underscoring the importance of targeted healthcare resources and policy interventions within the Swedish healthcare system.
- The findings of this study align with previous research, but the high prevalence observed in distant recurrent MM suggest unique challenges for this specific population in Sweden.
- Further research on recurrence patterns, quality of life and the long-term economic impact can help to guide effective resource allocation and improve patient outcomes.



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INTRODUCTION

- This study provides a comprehensive evaluation of prevalence, healthcare resource utilisation, and economic impact of stage III and IV malignant melanoma (MM) in Sweden, focusing on primary and recurrent cases.
- Malignant melanoma is an aggressive form of skin cancer with a rapidly increasing incidence globally and in Sweden^{1,2}.
- Advanced-stage disease (stage III–IV) is associated with a high risk of recurrence and substantially reduced survival, despite improvements in systemic treatments^{3–6}.
- In addition to the clinical burden, patients with advanced or recurrent MM require intensive healthcare resource utilisation, including inpatient and outpatient care, and often experience significant productivity losses due to disease morbidity^{1, 5–6}.
- Real-world evidence describing the societal and economic burden of primary and recurrent stage III and stage IV MM in Sweden is limited, particularly regarding resource use and indirect costs for these patients.
- This nationwide, register-based study aimed to address these gaps by providing a comprehensive analysis of prevalence, healthcare resource utilisation, productivity loss, the use of prescription drugs for MM and survival in primary stage III and stage IV and in recurrent cases.

RESULTS

Background characteristics

- Distant recurrent MM was the most common group, with a prevalence of 10.1 per 100,000, followed by locoregional recurrence (6.1 per 100,000), primary stage III (4.6 per 100,000), and primary stage IV (1.3 per 100,000) (Table 1).
- The mean follow-up was longest for patients with locoregional recurrence (3.8 years, SD 3.2) and primary stage III MM (3.4 years, SD 3.1). In contrast, patients with more advanced disease had shorter follow-up, with 2.1 years (SD 2.4) for primary stage IV MM and 1.7 years (SD 2.1) for distant recurrence, that could be reflected by the poorer prognosis in these groups.
- The mean age at diagnosis was comparable across all groups, ranging from 64.6 years (SD 16.5) in locoregional recurrent MM to 68.8 years (SD 14.4) in distant recurrent MM.
- Across all groups, a slightly higher proportion of patients were male.
- For patients with recurrence, the time to recurrence was 1.4 years (SD 1.9) for locoregional recurrent MM and 2.5 years (SD 2.1) for distant recurrent MM.

Table 1. Background characteristics

	Primary Stage III (N=653)	Primary Stage IV (N=289)	Loco-regional (N=606)	Distant recurrent (N=2,595)
Mean follow-up time (years), (SD)	3.4 (3.14)	2.1 (2.44)	3.8 (3.21)	1.7 (2.12)
Prevalence per 100,000	4.55	1.30	6.06	10.13
Age at diagnosis				
Mean (SD)	65.0 (15.3)	68.2 (14.6)	64.6 (16.5)	68.8 (14.4)
Median [Min, Max]	68.0 [18.0, 99.0]	71.0 [27.0, 97.0]	67.0 [18.0, 97.0]	71.0 [20.0, 101]
Sex				
Male	360 (55.1%)	174 (60.2%)	343 (56.6%)	1533 (59.1%)
Time to recurrence, years				
Mean (SD)	NA	NA	1.40 (1.91)	2.49 (2.08)
Median [Min, Max]	NA	NA	0.508 [0.247, 11.0]	1.83 [0.247, 11.1]

Abbreviations: NA, Not applicable; SD, standard deviation

Health care resource use and costs

- During the follow-up, the total number of inpatient stays and outpatient visits were highest in distant recurrent MM, with an average of three inpatient stays per person and an average length of stay of six days (Table 2).
- The average length of inpatient stay in the different categories ranged from four days to six days per person over the follow-up, the standard deviations exceeded the mean values, indicating variability of inpatient days across patients.
- The average number of outpatient visits ranged from 18 to 24 visits per person and was highest among patients with less advanced disease, over the follow-up.

Table 2. Number of inpatient stays and outpatient visits during follow-up period

	Primary Stage III (N=653)	Primary Stage IV (N=289)	Loco-regional (N=606)	Distant recurrent (N=2,595)
Mean follow-up time (years), (SD)	3.4 (3.14)	2.1 (2.44)	3.8 (3.21)	1.7 (2.12)
Inpatient resource use				
Visit, average per person	3	3	2	2
Length of stay (average days), (SD)	4.2 (5.6)	6.1 (7.3)	4.4 (5.6)	6.4 (7.9)
Total	1,811	819	1,073	7,784
Outpatient resource use				
Visit, per person	24	19	18	18
Total	15,430	5,440	10,829	45,645

Abbreviations: SD, standard deviation

- The total hospital cost of the different groups ranged from 78 million SEK in primary stage IV to 858 million SEK in distant recurrent MM group for the entire period (2010–2022) (Figure 2).

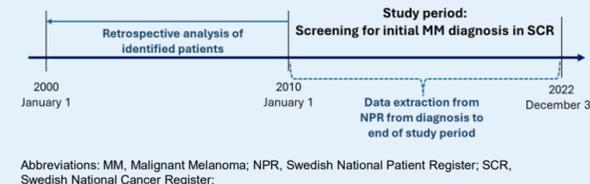
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METHODS

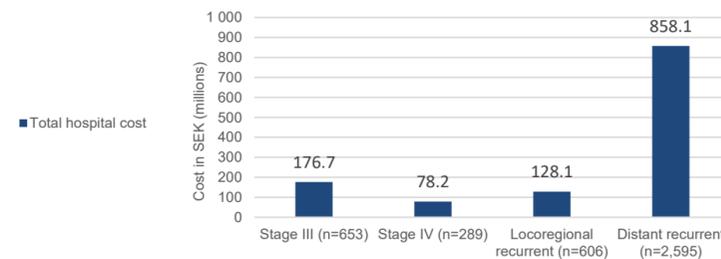
- This was a retrospective, non-interventional nationwide registry study conducted in Sweden.
- Adults aged ≥18 years who received a stage III or IV MM diagnosis between January 2010 and 31 December 2022 were identified through the Swedish National Cancer Register (SCR).
- To identify recurrence, retrospective data from before the study period, January 2000 to December 2009, were reviewed, but to avoid misclassification of recurrence, subjects with other primary cancer diagnoses recorded before the first occurrence of distant metastasis were excluded as a recurrence (Figure 1).
- Based on TNM staging in the SCR and an applied definition of recurrence, using a time window of ≥90 days after primary diagnosis to account for any potential delay in diagnosis reporting, misdiagnosis, or a case where a registration could be a simultaneous primary diagnosis rather than a true recurrence, patients were classified into four groups: primary stage III (n = 653), primary stage IV (n = 289), locoregional recurrent (n = 606) and distant recurrent (n = 2,595) MM.
- The SCR data were then linked to the Swedish National Patient Register (NPR), Swedish National Prescribed Drug Register, and the insurance database MIDAS to obtain detailed information on healthcare resource utilisation, prescription drug use, productivity loss and mortality.
- All analyses were descriptive.
- Follow-up time was calculated from the index date (diagnosis or entry into the cohort) to the date of death, recurrence, or end of the study period.

Figure 1. Study identification of subjects and extraction period



- Annual hospital costs per person were highest in distant recurrence MM (330,000 SEK) and locoregional recurrence MM (210,000 SEK), compared with much lower costs in primary stage III (30,000 SEK) and IV (45,000 SEK).

Figure 2. Total inpatient cost over the follow-up



Productivity loss in sickness compensation

- Sickness compensation in gross days, defined as the total number of calendar days during which an individual was registered as unable to work due to illness, disability, or incapacity, irrespective of part-time or full-time status, was analysed for long-term and short-term absence.
- The average number of compensated days per year for long-term absence for the respective groups ranged from 303 days to 341 days (Figure 3).
- For short-term absence, the highest numbers of compensated days per year were observed in primary stage IV and distant recurrent MM (177 days respectively).
- The cost for productivity loss in terms of long-term and short-term compensated days per person ranged from 170,200 SEK to 214,460 SEK per year, with highest cost seen for primary stage IV MM and distant recurrent MM (Figure 4).
- Total annual cost for sickness compensation was substantial, 821 million SEK, with the highest cost in distant recurrent MM (537 million SEK), followed by locoregional recurrent MM (112 million SEK), primary stage III MM (111 million SEK), and primary stage IV MM (62 million SEK).

Figure 3. Average number of gross days per person for short- and long-term benefit compensation

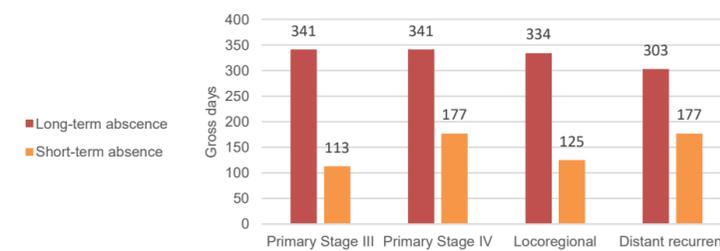
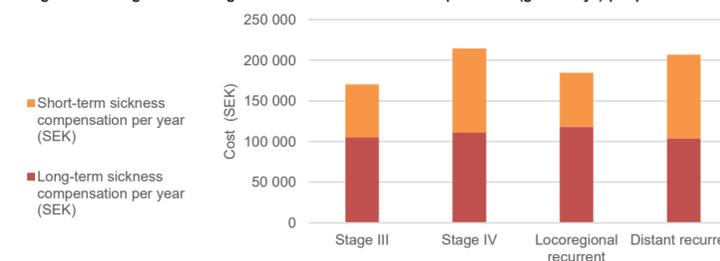


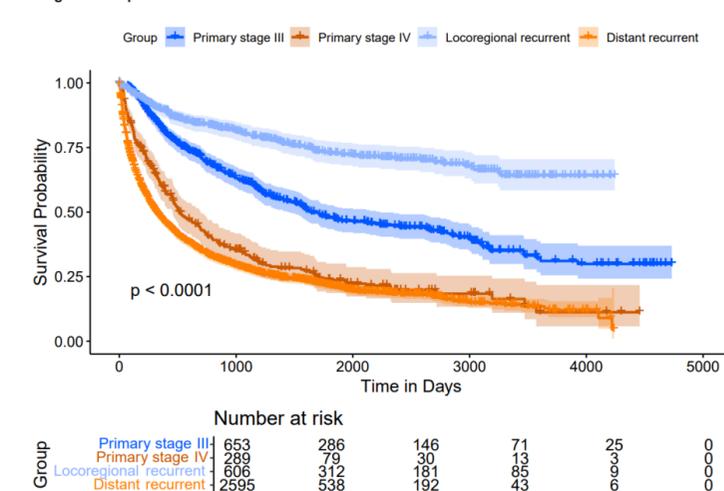
Figure 4. Average cost of long- and short-term sickness compensation (gross days) per person



Survival

- Kaplan–Meier estimated survival (Figure 5) showed a statistically significant difference in survival probabilities across all groups (p < 0.0001, log-rank test).
- The curves separated clearly by stage, with primary stage IV and distant recurrent MM experiencing the poorest survival probabilities compared to stage III and locoregional recurrent MM.

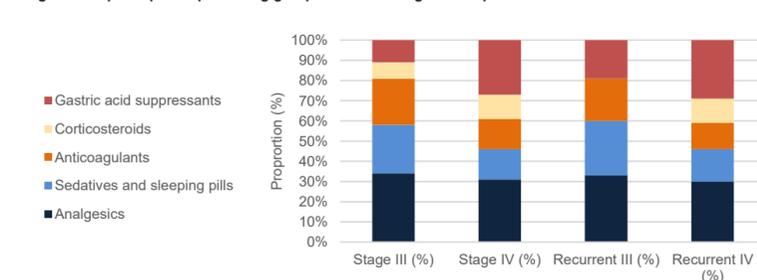
Figure 5. Kaplan–Meier estimated survival



Pharmacy dispensed drugs

- The analysis on drugs for these groups included all prescribed drugs collected at pharmacies across Sweden. However, it did not include information on drugs administered directly in hospitals or during inpatient care.
- Across all groups, the most frequently dispensed drugs for MM included analgesics, sedatives/sleeping pills, and anticoagulants (Figure 6), indicating pain, anxiety/sleep disturbance, and thromboembolic risk for these patients.
- Systemic corticosteroids and gastric acid suppressants were also frequently used, though at lower relative proportions.

Figure 6. Top five prescription drug groups for MM during follow up



Disclosures

Antonios Valachis, associate professor of oncology and senior consultant at the Department of Oncology Örebro university Hospital report institutional unrestricted research grant from Roche and MSD. Gustav Ullenhag, professor of cancer immunotherapy at Uppsala University, report potential conflicts of interest in the recent three years: Lectures sponsored by and/or expert meetings arranged by MSD, BMS, Novartis, Astellas, AstraZeneca, Sanofi, Regeneron and Pierre Fabre. Nordic Market Access, NMA AB, is a contract research organisation that was sponsored by Novartis to conduct this study. NMA was responsible for data management, aggregation, and statistical analysis. Axel Havell, employed at Novartis Sverige AB

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