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Healthcare resource utilization and costs of locally advanced or metastatic urothelial carcinoma in Sweden: a national registry study comparing patients with matched population controls

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CONCLUSIONS

- Patients with locally advanced or metastatic urothelial carcinoma (la/mUC) in Sweden have substantially higher healthcare resource utilization (HCRU) than matched population controls
- Patients with la/mUC experience markedly more hospital admissions, longer hospital stays, more outpatient visits, and greater medication use than matched controls
- Individuals with la/mUC have approximately 10-fold higher direct medical costs than individuals without UC (€49,393 vs €4,621 per patient per year [PPPY])
- Inpatient care is the primary driver of costs, accounting for 83.6% of total direct medical expenditures in patients with la/mUC
- These findings demonstrate a substantial economic burden of la/mUC on the Swedish public healthcare system
- As the treatment landscape continues to evolve, further research is needed to understand if the adoption of newer therapies into clinical practice influences these costs

PLAIN LANGUAGE SUMMARY

- In this study, researchers used national databases to assess healthcare use and costs associated with advanced bladder cancer in Sweden
- People with advanced bladder cancer use more healthcare services than those without the disease
- Compared with people without the disease, those with advanced bladder cancer spend more time in hospital, are admitted more often, attend more outpatient appointments, and use more medicines
- Healthcare costs for people with advanced bladder cancer are about 10 times higher than for people without bladder cancer
- Most of these medical costs come from hospital stays, which account for more than 80% of total healthcare spending
- Overall, advanced bladder cancer places a significant financial burden on Sweden's healthcare system

BACKGROUND

- UC is the most common type of bladder cancer, and patients with la/mUC often face poor clinical outcomes and substantial healthcare needs[1]
- As new treatment options emerge, understanding the real-world economic burden of this disease is increasingly important for healthcare planning[2]
- National registry data combined with Diagnosis-Related Group (DRG)–based cost estimates can provide robust estimates of the healthcare costs associated with la/mUC; however, data on these costs in Sweden are limited[3]
- Matched-control studies provide important context by comparing HCRU in patients with la/mUC with healthcare use in the general population

Study objectives

- This study assesses the real-world HCRU and direct medical costs associated with la/mUC in Sweden using nationwide registry data and compares these with matched population controls

METHODS

- This was a retrospective, longitudinal, nationwide case-control study using linked Swedish healthcare and population registers
- Patients with incident la/mUC diagnosed between 2006 and 2021 were identified and matched to controls without UC based on age, sex, and region
- Patients were followed up from the index date (first recorded la/mUC diagnosis for patients; corresponding date for matched controls) until death or end of study, whichever occurred first
- Data were obtained through linked Swedish national registers, including the National Cancer Register, National Patient Register (NPR), Prescribed Drug Register (PDR), Cause of Death Register, and Total Population Register
- HCRU measures included inpatient admissions, hospital days, outpatient visits, and pharmacy dispensations and were reported as PPPY to account for varying follow-up
- Healthcare costs were estimated using DRG codes recorded in the NPR, and prescription costs were obtained from the PDR using recorded drug purchase prices
- Because outpatient DRG codes were available only from 2012, healthcare cost analyses were restricted to patients with an index date on or after 1 January 2012 and reported in euros (€) PPPY and inflation-adjusted to 2021 values

Ethics approval

- The study protocol was approved by the Swedish Ethical Review Authority (Etikprövningsmyndigheten Dnr 2022-04632-01)

RESULTS

- Inpatient admissions were approximately 14-fold higher among patients with la/mUC than in controls, with a mean of 8.2 vs 0.6 admissions PPPY (**Table 1**)
- Outpatient HCRU was approximately 6-fold higher in patients with la/mUC than in matched controls (mean, 15.6 vs 2.6 visits PPPY)
- Mean duration of hospital stay was greater in patients with la/mUC, who spent an average of 59.6 days in hospital per year, compared with only 3.7 days per year for controls
- Mean pharmacy dispensations were higher among patients with la/mUC than matched controls, average 62.1 vs 40.9 PPPY, respectively
- High SDs observed across all utilization measures indicate substantial variability in HCRU among patients with la/mUC

Table 1. All-cause HCRU PPPY of follow-up in patients and controls

	Patient with la/mUC (N=2,026)	Matched controls (N=10,125)	p value
Inpatient admissions			<0.001
Mean (SD)	8.24 (12.54)	0.59 (1.51)	
Median (Q1-Q3)	5.75 (2.31-10.74)	0.13 (0.00-0.60)	
Min-max	0.00-365.25	0.00-40.58	
Outpatient visits			<0.001
Mean (SD)	15.59 (15.81)	2.56 (6.38)	
Median (Q1-Q3)	12.25 (6.59-20.67)	1.37 (0.41-3.07)	
Min-max	0.00-365.25	0.00-264.47	
Duration of hospital stay (days)			<0.001
Mean (SD)	59.6 (69.54)	3.7 (11.96)	
Median (Q1-Q3)	34.8 (10.31-82.02)	0.21 (0.00-2.65)	
Min-max	0.00-365.25	0.00-301.33	
No. of pharmacy dispensations			<0.001
Mean (SD)	62.1 (58.74)	40.92 (60.16)	
Median (Q1-Q3)	47.44 (26.08-78.27)	20.56 (8.42-41.86)	
Min-max	0.00-569.79	0.00-689.92	

HCRU, healthcare resource utilization; **la/mUC**, locally advanced or metastatic urothelial carcinoma; **PPPY**, per patient per year; **Q**, quartile.

- Patients with la/mUC indexed in 2012-2021 incurred substantially higher total medical costs than matched controls, with mean medical costs of €49,393 vs €4,621 PPPY (**Table 2**)
- Median costs showed a similar pattern, with median total medical costs of €34,859 PPPY in patients with la/mUC vs €1,493 PPPY in controls
- Inpatient care was the primary driver of costs in patients with la/mUC, accounting for €41,289 PPPY on average, compared with €2,956 PPPY in controls. Inpatient costs represented approximately 84% of total medical costs among patients
- Outpatient healthcare services contributed meaningfully to the overall cost burden, with mean outpatient costs of approximately €6,300 PPPY
- The distribution of costs was skewed, with median total costs lower than mean costs, suggesting that a subset of patients incurred particularly high healthcare expenditures
- The predominance of inpatient costs suggests that hospitalizations and hospital-based care are the primary contributors to the economic burden experienced by patients with la/mUC

Table 2. All-cause costs PPPY of follow-up in patients and controls

	Patients with la/mUC (N=1,438)	Matched controls (N=7,185)	p value
Inpatient costs			<0.001
Mean (SD)	41,288.80 (56,143.58)	2,956.48 (9,633.49)	
Median (Q1-Q3)	26,757.34 (10,621.46-54,947.81)	0.00 (0.00-2,525.3)	
Min-max	0.00-1,004,744.00	0.00-276,396.9	
Outpatient costs			<0.001
Mean (SD)	6,342.58 (6,347.31)	863.2 (2,518.29)	
Median (Q1-Q3)	5,024.19 (2,622.84-8,360.38)	382.83 (54.94-982.63)	
Min-max	0.00-117,812.10	0.00-109,881.90	
Prescription cost benefit			<0.001
Mean (SD)	1,413.10 (2,678.37)	632.73 (2,684.35)	
Median (Q1-Q3)	778.02 (143.63-1,840.09)	121.09 (2.49-581.38)	
Min-max	0.00-66,568.46	0.00-134,729.60	
Prescription cost to patient			<0.001
Mean (SD)	348.98 (697.50)	168.78 (269.45)	
Median (Q1-Q3)	251.87 (168.65-387.88)	164.86 (80.05-219.88)	
Min-max	0.00-17,122.42	0.00-10,551.63	
Total prescription cost			<0.001
Mean (SD)	1,762.03 (2,771.86)	801.49 (2,714.02)	
Median (Q1-Q3)	1,189.44 (444.79-2,244.37)	309.20 (94.83-816.57)	
Min-max	0.00-66,936.68	0.00-134,774.20	
Direct inpatient + outpatient cost			<0.001
Mean (SD)	47,631.38 (58,206.37)	3,819.68 (10,524.71)	
Median (Q1-Q3)	32,856.62 (14,650.61-63,200.84)	925.67 (103.02-3,628.70)	
Min-max	0.00-1,004,744	0.00-290,242.40	
Direct medical cost + total prescription cost			<0.001
Mean (SD)	49,393.41 (58,254.47)	4,621.17 (11,498.56)	
Median (Q1-Q3)	34,859.17 (16,417.99-65,269.35)	1,493.48 (381.53-4,594.33)	
Min-max	0.00-1,004,744.00	0.00-290,710.40	

la/mUC, locally advanced or metastatic urothelial carcinoma; **PPPY**, per patient per year; **Q**, quartile.

STRENGTHS AND LIMITATIONS

Strengths

- Use of linked national healthcare registers enabled comprehensive capture of inpatient care, specialist outpatient care, prescription dispensations, mortality, and demographic characteristics across the entire follow-up period
- Matched control group (matched on age, sex, and region) provided a benchmark for quantifying the incremental HCRU and economic burden associated with la/mUC
- Cost estimation based on national DRG reimbursement data and prescription registers provides a consistent and transparent method for estimating healthcare costs across Sweden
- The inclusion of a large number of patients with la/mUC and matched controls strengthens the reliability and stability of the study findings

Limitations

- Treatment-specific costs were not directly available, and healthcare costs were estimated using DRG codes. Consequently, costs may not fully reflect actual patient-level treatment expenditures, particularly for inpatient administered oncology therapies
- Primary care visits were not captured in the available data sources. As a result, total HCRU and costs are likely underestimated
- Outpatient DRG data were unavailable before 2012, requiring restriction of cost analyses to patients diagnosed from 2012 onward. This reduced the sample size for cost analyses and limited assessment of earlier years
- The study relied on administrative and registry data, which are subject to miscoding, incomplete reporting, and potential misclassification of diagnoses, procedures, and healthcare encounters
- Findings are most applicable to Sweden and healthcare systems with similar universal healthcare structures, which may limit generalizability to countries with different care delivery models and reimbursement systems

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