Quantifying standard of care (SoC) hospital-related resource utilisation for metastatic uveal melanoma (mUM) patients in NHS England (NHSE) using the Hospital Episodes Statistics (HES) dataset

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Background

- In Europe, uveal melanoma (UM) is a rare disease (www.eurordis.org) annually affecting 2 to 8 Caucasians per million population – with an increasing incidence from southern to northern latitudes [1, 2].
- Despite radical ocular intervention(s), ~50% of patients subsequently experience metastatic recurrence (mUM).
- In the absence of effective therapeutic options, the reported median time-to-progression for patients with mUM is 2-3 months and median overall survival is 7-12 months [3].
- As a consequence of the rarity of the disease, there is significant variation in the treatment pathway [4]. Coupled with low survival, this results in sparse data on the disease burden of mUM to NHSE.
- In 2015, the UK published their first national uveal melanoma guidelines [1], which subsequently received accreditation from the National Institute for Health and Care Excellence (NICE).

Objectives

- This study aimed to evaluate the patterns of care and medical resource use associated with a validated cohort of mUM patients identified within the Hospital Episodes Statistics (HES) database [5].

Methods

- A cohort of UM and mUM patients were identified and validated within the HES dataset [5] (observational period: April 2012 – June 2017). For full methods see **ISPOR 2017, Glasgow - Poster PRM3**.
- Medical procedures and tariff costs for NHSE inpatient, outpatient and Accident and Emergency (A&E) admissions were analysed. Clinical diagnoses were also available for inpatient admissions.
- Following publication of the national guidelines [1], specialist care for UM patients is typically coordinated via 3 specialist supra-regional ocular oncological centres within England (London, Sheffield or Liverpool).
- Due to data protection laws, hospital-specific data were unavailable. However, the city of treatment was accessible. Therefore, any inpatient treatment that occurred in London, Sheffield or Liverpool, was assumed to have occurred at a supra-regional ocular oncological centres.
- To assess specific mUM resource utilisation, admissions prior to the index metastasis were omitted.
- This analysis excluded costs not captured within HES (e.g. High Cost Drugs, Specialised Services, non-hospital palliative care).
- Longitude and latitude for the patient's home city and treatment city were found using Google maps. The distance between home and treatment cities were calculated using the Haversine formula. All programming was completed in R (3.4.1 – R Foundation for Statistical Computing, Vienna, Austria).

Results

- 2,484 UM patients and 501 mUM patients were identified within HES and contributed inpatient data.
- Data on outpatient and A&E visits were only available for a cohort of mUM patients assembled using an earlier version of the final mUM definition. Patients who were included in this earlier cohort and in the inpatient cohort could be considered in joint analyses of inpatient admissions and outpatient or A&E episodes. This condition was fulfilled for N = 462 UM patients and 383 mUM patients.

Before the diagnosis of metastases (UM)	After the diagnosis of metastases (mUM)
89% of first inpatient admissions for primary UM occurred in supra-regional centre areas (London, Liverpool and Sheffield);	43% of first inpatient admissions of metastatic disease (mUM) occurred in the supra-regional centre areas;
90% of all UM inpatients (n = 2,260) were treated at some point in a supra-regional centre area.	51% of all mUM inpatients (n = 258) were treated at some point in a supra-regional centre area.
"Ophthalmology" was the most frequent speciality treating inpatients at the 1st UM admission (91%) and at anytime whilst with a UM diagnosis (62% admissions).	"Oncology" was the most frequent (58%) treatment speciality treating inpatients at anytime whilst with a mUM diagnosis.
43% of inpatients were treated ≥40 km from home.	31% of inpatients were treated ≥40 km from home.

Over the observational period:

- The total cost to NHSE for mUM inpatient admissions was £3.1 million (mean:£6,451/patient; range:£118–65,947)
- The cohort attended 5,056 outpatient appointments and had 899 A&E visits.

Figure 1. (A & B) Resource use, **(C)** Costs of care, and **(D, E & F)** Distance travelled for the HES cohort: during the 1st two-weeks of their index UM admission; the month before; and the month after their index mUM admission; and their last month

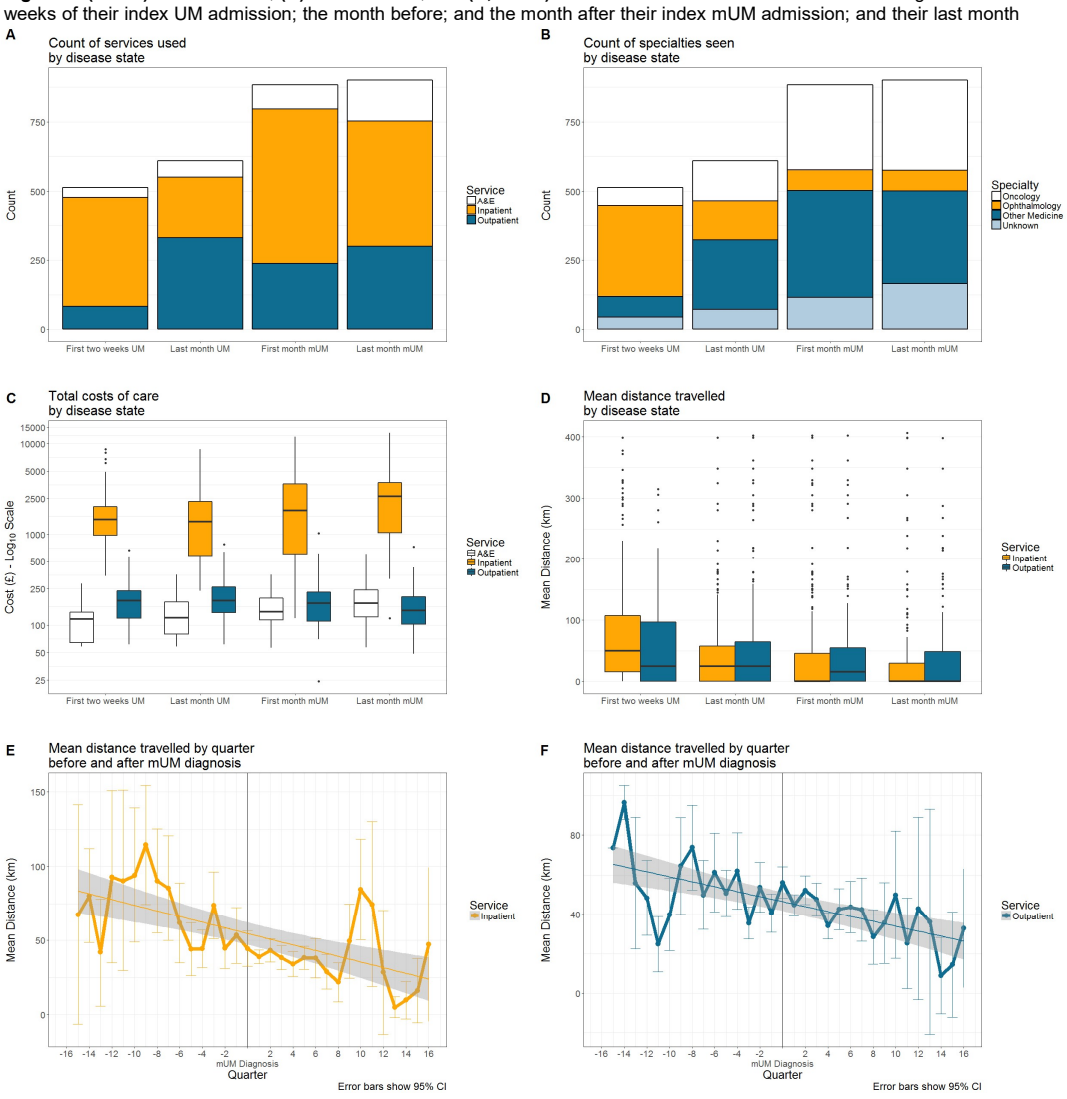
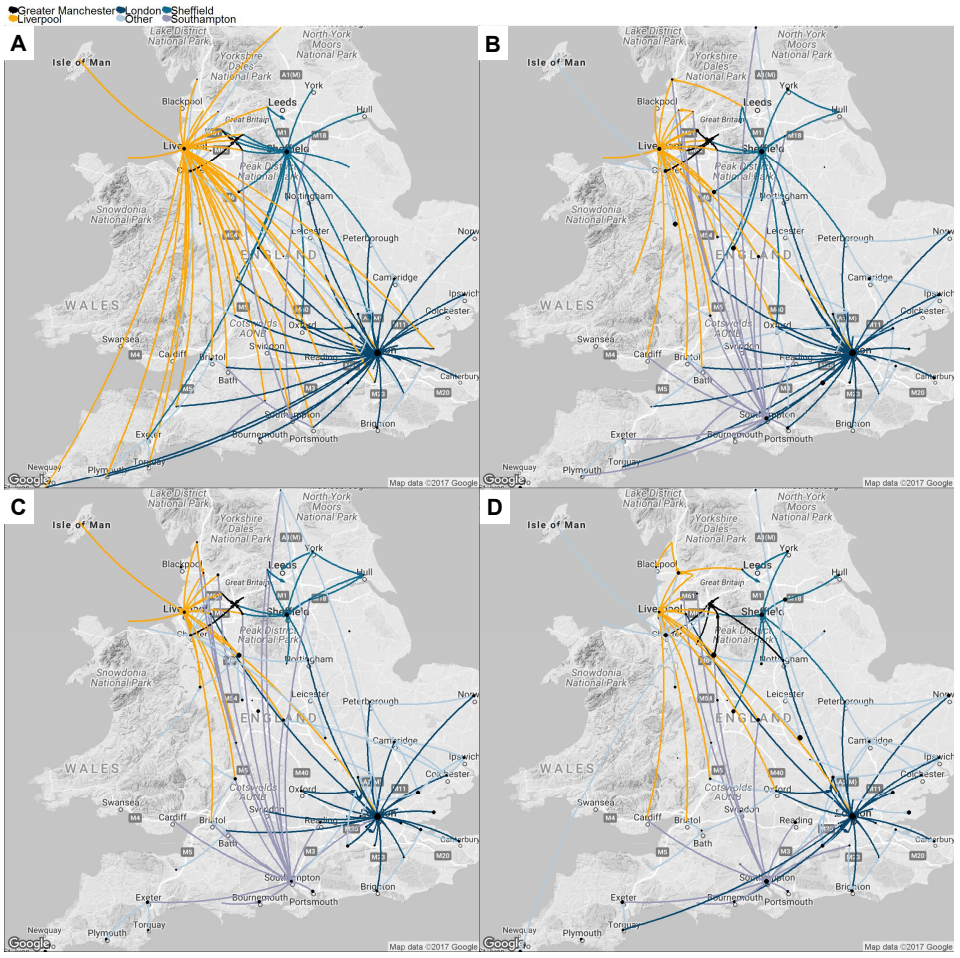


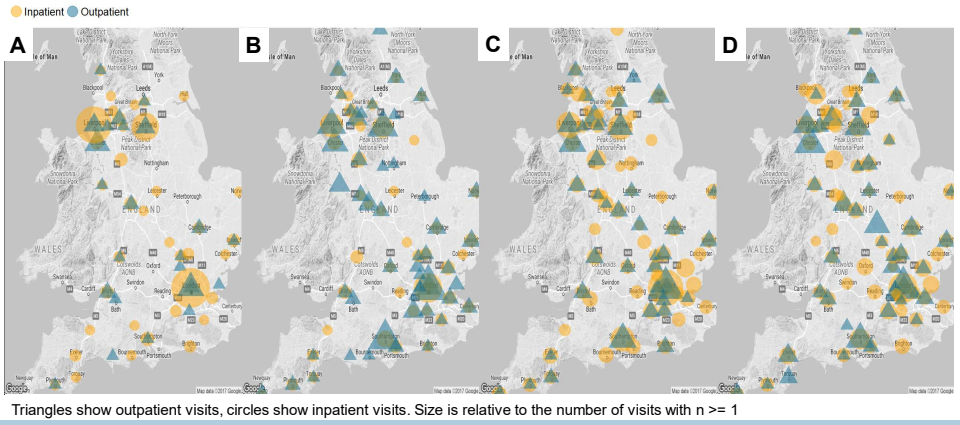
Figure 1B: 'Other Medicine' categorized as any visit in the data not coded as ophthalmology or oncology. 'Unknown' categorized as any visit where data was missing. **Figure 1E**: Linear model fit to data. Mean distance = -1.67quarter + 55.88. R^2 = 0.335. **Figure 1F**: Linear model fit to data. Mean distance = -1.25quarter + 46.54. R^2 = 0.432

Figure 2. Patient journeys by disease state
(A) First two weeks UM **(B)** Last month UM **(C)** First month mUM **(D)** Last month mUM



Note: Arrows show the movement of patients for treatment at different time periods in their UM and mUM journeys. Dots in the map indicate treatment at the same location to residency i.e. **did not** travel to that location and were treated locally. Larger dots imply more treatment visits.

Figure 3. Inpatient and outpatient services used by disease state
(A) First two weeks UM **(B)** Last month UM **(C)** First month mUM **(D)** Last month mUM



Triangles show outpatient visits, circles show inpatient visits. Size is relative to the number of visits with n >= 1

Discussion

- Where patients receive care, before and after mUM diagnosis, shows a distinct difference and may be as a result of different treatment options being available, for different stages of disease.
- Ocular-oncological surgery for primary UM and surveillance were mainly provided in the supra-regional centres, whereas hepatic surgery and systemic therapies (immunotherapy and chemotherapy) were also given in non-supra-regional centres.
- Many outpatient visits occur in the data one month prior to mUM diagnosis. Unfortunately, diagnosis of mUM was only available within inpatient records. It may be possible that mUM was detected or treated in an outpatient setting prior to being recorded as an inpatient diagnosis. See **Figures 2B & 3B** to see this trend.

Conclusions

- mUM was identified in ~90% of our UM cohort whilst under surveillance at specialist centres.
- Large variations in mUM medical resource utilisation were observed, reflecting the heterogeneity in: disease progression, local-regional care pathways and treatment effectiveness.

References & Acknowledgements

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Many thanks to Dr Michael Harvey for producing analysis and figures for the poster.
Funding Statement: This research was funded by Immunocore Ltd.