EPIDEMIOLOGY OF MYXOID ROUND CELL LIPOSARCOMA (MRCLS) IN EUROPE AND CANADA – AN EXTRAPOLATION FROM THE UNITED STATES (US) SURVEILLANCE, EPIDEMIOLOGY, AND END RESULTS (SEER) RESEARCH DATABASE

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Background

- MRCLS is a rare cancer with high unmet medical needs[1,2,3]
- Innovative therapies are being developed to treat advanced/metastatic MRCLS
- Estimating the number of patients affected by MRCLS helps inform medicine development
- Epidemiologic data for MRCLS in Europe and Canada is scarce due to limited population-based, nationally representative data sources that can specifically identify MRCLS patients

Objectives

- To estimate the incidence and prevalence of patients with MRCLS in EU27, six individual European countries (Germany, Spain, Italy, France, the Netherlands, and the UK), and Canada, by extrapolating data from US SEER database

Methods

- The US SEER18 registries (November 2020 submission) were used to produce the 5-year (2014–2018) average annual incidence rates and 10-year (2009–2018) limited duration prevalence (LDP) rates of MRCLS (cases identified based on ICD-O-3 histology codes) stratified by 10-year age groups and sex
    - Ten-year LDP of MRCLS represents the number of people alive on July 1, 2018, who were diagnosed with MRCLS within the past 10 years
- To obtain counts of MRCLS patients in each specific population of interest, the incidence rates were age-standardised and applied to the following July 2020 age- and sex-stratified populations:
    1) Eurostat database: EU27, Germany, Spain, Italy, France, the Netherlands[4]
        - July 2020 population as an average of January 2020 and January 2021 estimates
    2) UK's Office for National Statistics: the UK[5]
    3) US Census Bureau's International Database: Canada[6] (sourced from Statistics Canada)
- Such extrapolation methods were used in previous epidemiologic studies[7,8]
- To examine if the difference in race/ethnicity groups between the US and Europe/Canada, which this study was not able to account for due to lack of appropriate data sources, might affect the results, sensitivity analyses were conducted to produce incidence/prevalence counts of MRCLS in Europe/Canada by extrapolating only from epidemiologic rates of MRCLS among US populations who were classified into the White race/ethnicity
- Two major assumptions below were made for this study:
    - The US epidemiologic rates of MRCLS were similar to those of Europe and Canada, based on the available data[9,10,11]
    - Epidemiologic rates of MRCLS were assumed to be stable over the past 10 years. This is based on a descriptive analysis (unpublished) in US SEER showing similar incidence rates over years from 2009–2018 (data available upon request)
    - There was no published literature on the temporal trend of liposarcoma subtypes. Only one study reported an increase in incidence of liposarcoma between 2001–2016.[12] Therefore, to validate this assumption, a sensitivity analysis estimated the incidence counts of MRCLS in Europe and Canada based on the 10-year annual average incidence rates in the US

Results

- Out of ~450 million people in EU27 in July 2020, there were an estimated 792 new MRCLS cases within the last year and 6259 living MRCLS patients who were diagnosed in the past 10 years (**Table 1**)
- For both incidence and prevalence:
    - Over 95% of MRCLS cases were adults (aged >19 years); around 58% were male (**Table 1**)
    - Among 10-year age groups, those aged 50–59 years constituted the largest proportion of patients (>20%), although the number of incident cases in 40–49 years old seemed to be similar (**Table 1**)
    - Approximately one-third of the MRCLS cases were patients aged ≥60 years (**Table 1**)

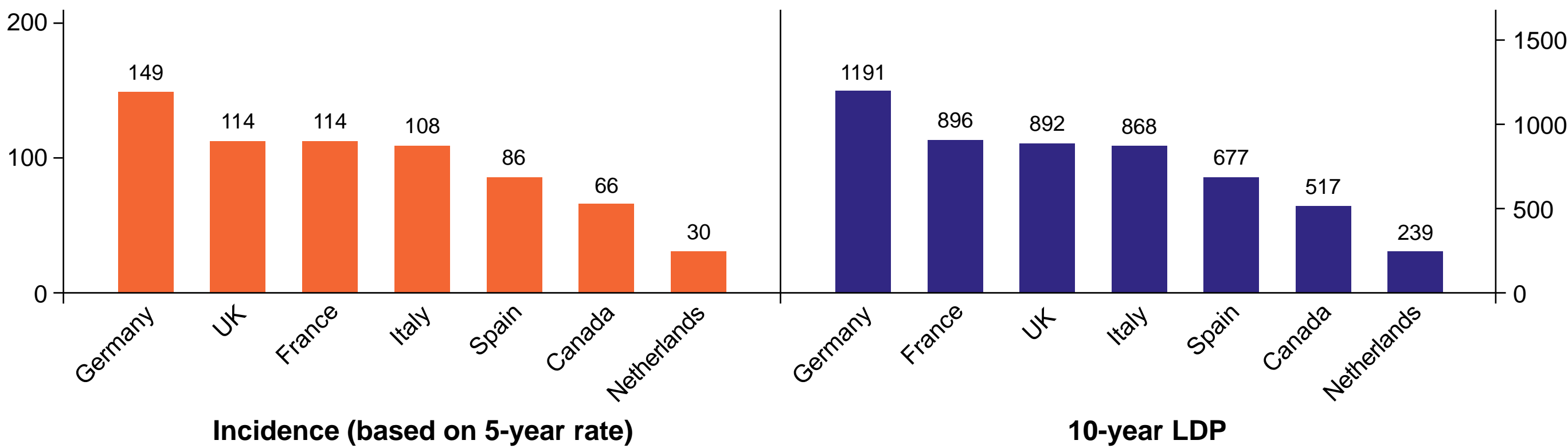**Table 1. Estimates of incidence and prevalence counts of MRCLS in EU27 in July 2020**

Age range	Sex	Projected incidence counts (based on 5-year rate)	Projected 10-year LDP counts
Overall EU27 MRCLS patients		**792**	**6259**
0–9 years	Male	1	5
	Female	0	0
10–19 years	Male	14	31
	Female	19	68
20–29 years	Male	36	183
	Female	23	222
30–39 years	Male	79	547
	Female	58	385
40–49 years	Male	99	823
	Female	60	425
50–59 years	Male	90	837
	Female	70	517
60–69 years	Male	70	622
	Female	45	463
70–79 years	Male	54	437
	Female	35	267
80+ years	Male	18	249
	Female	20	175

Where EU27† is the row label spanning the age ranges.

[†]EU27 2020 population estimated to be 447,269,340 based on sum of stratum-specific rates. Countries included in EU27 are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.
EU27, European Union; LDP, limited duration prevalence; MRCLS, myxoid round cell liposarcoma.

Results (continued)

- The estimated incidence and prevalence counts of MRCLS in Canada and the six individual European countries are shown in **Figure 1**

Figure 1. Estimated incidence and prevalence counts of MRCLS by country in July 2020

Incidence (based on 5-year rate): Germany 149, UK 114, France 114, Italy 108, Spain 86, Canada 66, Netherlands 30.
10-year LDP: Germany 1191, France 896, UK 892, Italy 868, Spain 677, Canada 517, Netherlands 239.

- The sensitivity analysis, which used the US SEER data restricted to populations who were classified into the White race/ethnicity to estimate the MRCLS incidence/prevalence in Europe and Canada, showed similar estimates as those generated in the main analyses (**Table 2**)

Table 2. Sensitivity analysis: MRCLS incidence/prevalence estimates based on extrapolation from US SEER data restricted to populations who were classified into the White race/ethnicity

Country	Projected incidence counts (based on 5-year average rate)	Projected 10-year LDP counts
EU27	836	6747
UK	121	961
France	120	966
Germany	157	1282
Spain	90	730
Italy	114	934
Netherlands	32	258
Canada	69	557

- For validation, the current study output was also compared to limited publicly available epidemiology data in Europe (e.g. that from French registries) (**Table 3**), which showed similar estimates
- The sensitivity analysis to estimate the epidemiology of MRCLS in Europe and Canada based on the US 10-year annual average incidence rates also showed similar results to that in the main analyses using the 5-year annual average incidence rates (data available upon request)

Table 3. Comparison of extrapolation estimates for incidence of MRCLS with existing literature from France†

	Country	Time frame	Counts of annual incidence
Extrapolation estimates	France	5-year rate in July 2020	**114**
National registry estimate[9]	France	2013–2016	**96–108** (differ by year)

[†]Some unpublished data from the UK and the Netherlands (not shown in this poster) were also used for comparison to the current output and showed similar estimates.

Limitations

- Other than age and sex, factors that may influence occurrence of MRCLS (e.g. race/ethnicity and healthcare) could not be accounted for in the analysis. However, the sensitivity analysis extrapolated using the US SEER data restricted to populations who were classified into the White race/ethnicity did not show a material difference in the estimates of MRCLS
- Although the two major assumptions (see Methods) made for this study are also inherent limitations of this study, the sensitivity analyses conducted and the validation against existing limited literature, however, have indicated the validity of these assumptions to the extent possible

Conclusions

- Despite being rare, MRCLS impacted hundreds of new patients in Europe and Canada in 2020
- The proposed extrapolation method appears to provide a good approximation of the actual counts of MRCLS in Europe and Canada based on a comparison of results with the limited existing literature
- Future studies using European and Canadian datasets, when available, are needed to confirm our findings and to further estimate patient segments by tumour characteristics, biomarkers, and treatment settings of interest

Abbreviations

EU, European Union; LDP, limited duration prevalence; MRCLS, myxoid round cell liposarcoma; SEER, Surveillance, Epidemiology, and End Results Program.

Disclosures

Dazhe Chen has nothing to disclose. **Lindsey Powers Happ** and **Huifen Wang** declare employment of and hold stocks/shares in GSK.

Acknowledgments

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