Inequalities in the diagnosis and survival of 30,071 people consecutively diagnosed with CLL in England between 2014 and 2021: preliminary analysis from the UNCOVER Study Group

Temitope Erinfolami[1], Amelia Fisher[2,3], Indrani Karpha[1,4], Yeong Lim[1,4], Nurunnahar Akter[1], Toyyib Abdulkareem[1], Brogan Johnston[4], Catrin Tudur Smith[1], Hilary Lindsay[5], Shaun Bowden[5], Debbie Yates[5], Lelia Duley[5], David Allsup[6] , Hanhua Liu[7], Andrew Pettitt[1,4], Nagesh Kalakonda[1,4], Mark Bishton[8,9], Nicolas Martinez-Calle[8]

1. University of Liverpool, Liverpool, UK; 2. University of Leeds, Leeds UK; 3. Leeds Teaching Hospitals NHS Trust, Leeds, UK; 4.Clatterbridge Cancer Centre NHS Foundation Trust, Liverpool, UK; 5. CLL support Association, UK; 6. University of Hull, Hull, United Kingdom (UK); 7. National Disease Registration Service, NHS England, UK; 8. Nottingham University Hospitals NHS Trust; 9.University of Nottingham, Nottingham, UK

INTRODUCTION

- ✧UNCOVER is a blood cancer health data research programme that utilises routinely collected NHS data provided by the National Disease Registration Service (NDRS).
- ✧UNCOVER data is a quality-assured collation from multiple sources and includes unselected patients diagnosed with haematological malignancies in England from 2014 to 2021.
- ✧The present study reports UNCOVER data focused on describing recent epidemiology of CLL in England.

METHODS

- ✧Patients 18 years and older, diagnosed with CLL from January 2014 to December 2021 were included, with follow-up until July 2023.
- ✧Post-mortem diagnosis were were excluded.
- ✧Incidence rate ratios (IRR) were calculated using Poisson regression to examine associations between incidence and baseline characteristics.
- ✧Cox proportional hazards regression was applied to assess associations between baseline characteristics and overall survival (OS).
- ✧Fine-Gray (F-G) competing risk regression was utilised to estimate sub-distribution hazard ratios (sHR) for mortality from CLL vs other causes. Net survival was calculated using the Pohar-Perme estimator.
- ✧Models covariates: Gender, age at diagnosis (categorised), ethnicity, government region, indices of multiple deprivation (IMD) quintiles, and year of diagnosis. Cox and F-G models also included the Charlson comorbidity index (CCI).

RESULTS

✧30071 patients met inclusion criteria.

Incidence analysis

✧Median age at diagnosis 71 (IQR 65-80).
✧Incidence 8.12/100.000 population, increases with age, predominates in Caucasic males (62% males) and dependent on IMD quintile.

Table 1. Adjusted Poisson Regression Models Estimating the Incidence Rate Ratios (IRR) and 95% Confidence Intervals of CLL in England from 2014-2021

	N= 30,104	Poisson – Multivariable Model		
Co-Variable	**N (%)**	**IRR[1]**	**95% CI[1]**	**p-value**
Sex				<0.001
Male	18,785 (62%)	—	—	
Female	11,319 (38%)	0.51	0.50, 0.52	
Age Group				<0.001
80+	8,168 (27%)	—	—	
70 - 79	10,049 (33%)	0.71	0.69, 0.74	
60 - 69	7,435 (25%)	0.38	0.37, 0.40	
50 - 59	3,359 (11%)	0.14	0.13, 0.14	
40 - 49	917 (3.0%)	0.04	0.04, 0.04	
30 - 39	143 (0.5%)	0.01	0.01, 0.01	
below 30	33 (0.1%)	0.00	0.00, 0.00	
Ethnicity				<0.001
White	26,221 (87%)	—	—	
Mixed	102 (0.3%)	0.13	0.11, 0.16	
Asian	629 (2.1%)	0.27	0.25, 0.29	
Black or Caribbean	338 (1.1%)	0.35	0.32, 0.39	
Other	338 (1.1%)	0.63	0.56, 0.70	
Region				<0.001
North East	1,728 (5.7%)	—	—	
North West	4,330 (14%)	1.01	0.96, 1.07	
Yorkshire and The Humber	3,337 (11%)	1.02	0.96, 1.09	
East Midlands	2,914 (9.7%)	1.00	0.94, 1.06	
West Midlands	3,147 (10%)	0.96	0.91, 1.02	
East of England	3,467 (12%)	0.91	0.86, 0.97	
London	3,062 (10%)	1.11	1.04, 1.18	
South East	4,684 (16%)	0.82	0.78, 0.87	
South West	3,435 (11%)	0.87	0.82, 0.93	
IMD Quintile				0.012
1 - most deprived	4,590 (15%)	—	—	
2	5,352 (18%)	0.96	0.92, 1.00	
3	6,369 (21%)	0.95	0.91, 0.99	
4	6,828 (23%)	0.94	0.90, 0.97	
5 - least deprived	6,965 (23%)	0.94	0.90, 0.98	
Diagnosis Year				<0.001
2014	3,981 (13%)	—	—	
2015	4,064 (14%)	0.98	0.94, 1.02	
2016	3,944 (13%)	0.93	0.89, 0.98	
2017	3,814 (13%)	0.90	0.86, 0.95	
2018	3,784 (13%)	0.86	0.82, 0.90	
2019	3,848 (13%)	0.85	0.81, 0.89	
2020	3,211 (11%)	0.71	0.68, 0.75	
2021	3,421 (11%)	0.69	0.66, 0.73	

[1]IRR = Incidence Rate Ratio, CI = Confidence Interval

Table 2. Patients Diagnosed with CLL in England, additional baseline characteristics

Variable	N (%)
Charlson Comorbidity Index (CCI) (N=30,104)	
0	20,411 (68%)
1	4,289 (14%)
2	2,734 (9.1%)
3	1,335 (4.4%)
4+	1,335 (4.4%)
Route to Diagnosis (2014-2017 only; N=15,834)	
Emergency	2157 (14%)
GP routine	7237 (46%)
GP urgent	3145 (20%)
Other	1362 (9%)
Unknown	2033 (13%)

[1]IRR = Incidence Rate Ratio, CI = Confidence Interval

Figure 1. IRR by year of diagnosis of the entire cohort (A) and seggregated by ethnicity (B) age at diagnosis (C) and IMD quintile (D).

Survival analysis

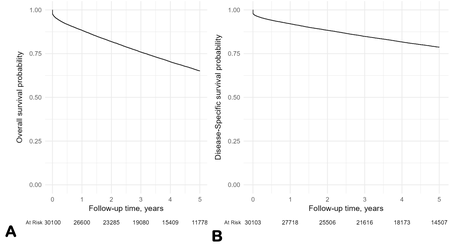

Figure 2. Overall Survival (A) and disease-specific survival (B) of CLL in England, 2014-2021

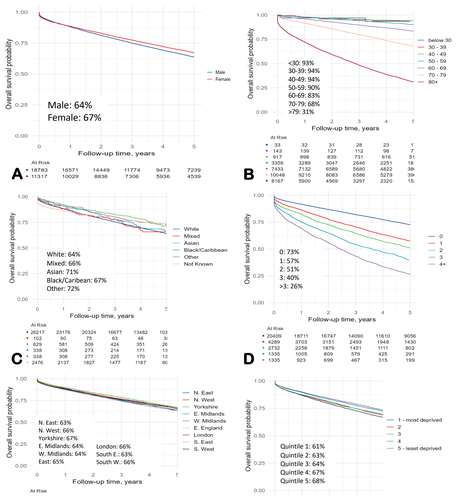

Figure 3. CLL overall survival by sex (A), age (B), ethnicity (C), CCI (D), region (E) and IMD quintile (F). Percentages indicated are 5-year overall survival.

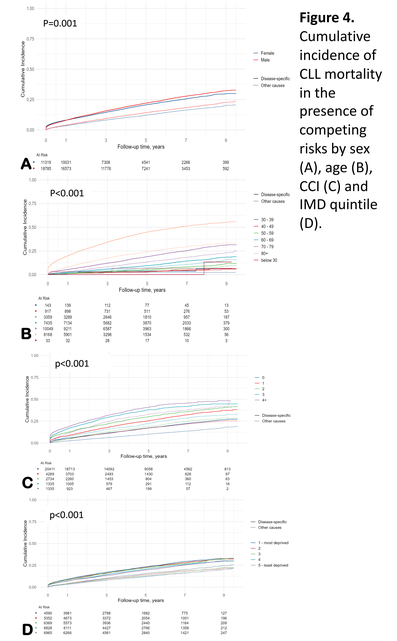

Figure 4. Cumulative incidence of CLL mortality in the presence of competing risks by sex (A), age (B), CCI (C) and IMD quintile (D).

Table 3. Fine-Gray competing risks regression model estimating the cause-specific hazard of death due to CLL with mortality from other causes as competing risks

	N= 30,104	Fine-Gray – Multivariable Model		
Co-Variable	**5-year mortality % (95% CI)**	**HR[1]**	**95% CI[1]**	**p-value**
Sex				<0.001
Male	22% (21%, 23%)	—	—	
Female	21% (20%, 21%)	0.82	0.78, 0.87	
Age Group				<0.001
80+	45% (44%, 46%)	—	—	
70 - 79	19% (18%, 20%)	0.38	0.36, 0.40	
60 - 69	9.4% (8.7%, 10%)	0.20	0.18, 0.21	
50 - 59	5.6% (4.8%, 6.5%)	0.11	0.10, 0.13	
40 - 49	3.0% (2.0%, 4.3%)	0.07	0.05, 0.09	
30 - 39	3.7% (1.4%, 7.9%)	0.07	0.03, 0.16	
below 30	-	0.03	0.00, 0.19	
Ethnicity				<0.001
White	22% (21%, 22%)	—	—	
Mixed	27% (18%, 36%)	1.64	1.11, 2.42	
Asian	16% (13%, 20%)	0.76	0.62, 0.93	
Black or Caribbean	19% (15%, 24%)	1.00	0.78, 1.28	
Other	15% (14%, 23%)	1.11	0.86, 1.42	
Charlson comorbidity index				<0.001
0	17% (17%, 18%)	—	—	
1	25% (24%, 27%)	1.20	1.12, 1.28	
2	30% (28%, 32%)	1.36	1.26, 1.46	
3	38% (35%, 41%)	1.60	1.45, 1.77	
4+	41% (38%, 44%)	1.59	1.44, 1.76	
IMD Quintile				<0.001
1 - most deprived	23% (22%, 25%)	—	—	
2	23% (21%, 24%)	0.91	0.83, 0.99	
3	22% (21%, 23%)	0.83	0.76, 0.90	
4	21% (20%, 22%)	0.76	0.70, 0.82	
5 - least deprived	20% (19%, 21%)	0.70	0.65, 0.76	
Diagnosis Year				<0.001
2014	21% (20%, 23%)	—	—	
2015	20% (19%, 21%)	0.92	0.85, 1.00	
2016	20% (19%, 21%)	0.85	0.79, 0.93	
2017	20% (19%, 22%)	0.81	0.75, 0.89	
2018	21% (20%, 23%)	0.86	0.78, 0.94	
2019	22% (20%, 24%)	0.88	0.80, 0.96	
2020	20% (18%, 21%)	0.99	0.89, 1.10	
2021	14% (13%, 16%)	0.86	0.77, 0.96	

[1]HR = Hazard Ratio, CI = Confidence Interval

CONCLUSIONS

- ✧UNCOVER Is the largest European study of CLL epidemiology.
- ✧We demonstrate independent associations between demographic, socioeconomic, and clinical variables with INCIDENCE and SURVIVAL in CLL.
- ✧Incidence was higher and survival shorter for males, older individuals, and those from more economically deprived areas.
- ✧The COVID-19 pandemic was associated with fewer diagnoses and increased mortality.
- ✧CLL diagnosis was predominant in early stage and with low CLL-specific mortality suggesting that competing risks dictate survival outcomes.
- ✧Further analysis of the data including timing and type of treatment is underway and will provide further insight into the correlations observed.

REFERENCES

1.English indices of deprivation 2019 - GOV.UK [Internet]. [cited 2025 May 2]. Available from: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019
2. Estimates of the population for England and Wales - Office for National Statistics [Internet]. [cited 2025 May 2]. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/estimatesofthepopulationforenglandandwales
3. Revision of the European Standard Population - Report of Eurostat's task force - 2013 edition [Internet]. [cited 2025 May 2]. Available from: https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-ra-13-028
4. Perme MP, Stare J, Estève J. On Estimation in Relative Survival. Biometrics. 2012 Mar;68(1):113-20.
5. Pohar Perme M, Estève J, Rachet B. Analysing population-based cancer survival - settling the controversies. BMC Cancer. 2016 Dec;16(1):933.
6. Cancer survival smoothed life tables - Office for National Statistics [Internet]. [cited 2025 May 2]. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/datasets/cancersurvivalsmoothedlifetables
7. R Core Team. R: A language and environment for statistical computing [Internet]. Vienna, Austria: R Foundation for Statistical Computing; 2024 [cited 2022 Dec 9]. Available from: https://www.R-project.org/

Poster 1705, presented at 2025 IWCLL meeting. Contact information: Nicolás Martínez Calle. Nottingham University Hospitals. Email: n.martinez-calle@nhs.net