NOGCA | National Oesophago-Gastric Cancer Audit

NOGCA short report

Socioeconomic differences in the impact of oesophago-gastric cancer on survival in England

Relative survival among patients diagnosed between 1 April 2013 and 31 March 2017 in England

NOGCA: short report 2023

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The National Oesophago-Gastric Cancer Audit is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP holds the contract to commission, manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies. www.hqip.org.uk/national-programmes

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GLOSSARY

"Deprivation gap" – the difference in relative survival between the least deprived group and most deprived group, expressed as percentage point differences

Overall survival – describes the survival experience of a cohort and gives estimates of the proportion of people alive at particular point in time

Performance status – measures how well a person is able to carry out ordinary daily activities

Relative survival – in a cohort of patients with cancer, relative survival is calculated as the ratio of the observed overall survival among patients after diagnosis and the expected overall survival among people in the general population, taking into account: age at diagnosis, sex, deprivation, geographical region, and time period. Relative survival therefore estimates the proportion of patients with cancer who will be alive at a particular time after diagnosis, given that they did not die from other causes (not their cancer).

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EXECUTIVE SUMMARY

Patterns of survival have been observed to vary among patients from different socioeconomic deprivation groups across several types of cancer. For some cancers, these differences can be explained partly by differences in stage at diagnosis across the groups. However, recent figures from the National Oesophago-gastric Cancer Audit (NOGCA) do not indicate that patterns of stage at diagnosis differ by deprivation group.

This short report compares the survival of people diagnosed with oesophago-gastric (OG) cancer in England in 2013-17 with survival in the general population, and examines whether relative survival varies by deprivation group. It also explores the extent to which differences in levels of fitness across the socioeconomic groups may contribute to this variation. Patients were stratified into five groups (1=most deprived, 5=least deprived) based on the Index of Multiple Deprivation (IMD) ranking of their area of residence. Fitness was measured using the WHO performance status index.

Relative survival of all patients with OG cancer was poor among the NOGCA cohort, at less than 20% at five years from diagnosis. Among patients with a plan for curative treatment, 5-year relative survival was over 40%.

There was a socioeconomic gradient in relative 5-year survival across the deprivation groups, from 19.8% in the least deprived group to 15.4% in the most deprived. A gradient was also evident among patients who had a plan for treatment with curative intent (43.2% in least deprived and 40.3% in most deprived group), and at one year from diagnosis among patients with a non-curative treatment plan (28.6% in least deprived and 25.4% in most deprived). A greater proportion of patients in the least deprived group had a plan for curative treatment (41% vs 24% in most deprived), but differences in stage at diagnosis were not observed across the deprivation groups.

After adjusting for performance status, the “deprivation gap” in 5-year relative survival was reduced, with the adjusted relative survival being estimated at 18.4% in the least deprived group and 17.9% in the most deprived. This suggests that patient fitness makes an important contribution to the observed differences in relative survival among patients with OG cancer in different socioeconomic deprivation groups.

Recommendation

1. For OG cancer patients with worse performance status who are being considered for curative treatment, multidisciplinary teams, NHS commissioners and relevant professional bodies should place emphasis on optimising patient fitness before, during and after treatment. Consideration could be given to more intensive prehabilitation, monitoring and follow-up. Relevant professional bodies include the Association of Chartered Physiotherapists in Oncology and Palliative Care (ACPOPC), British Dietetic Association (BDA), Royal College of Radiologists (RCR), Royal College of Anaesthetists (RCA), and Association of Upper GI Surgery of Great Britain and Ireland (AUGIS).

INTRODUCTION

Among patients diagnosed with oesophago-gastric (OG) cancer in England, studies have reported lower rates of relative survival among those in the most deprived compared to least deprived groups (Rachet et al 2010). For some cancers, variation in survival among deprivation groups may be explained in part by differences in stage at diagnosis (Rutherford et al 2013, Morris et al 2016, Barclay et al 2021), with a greater proportion of patients being diagnosed with advanced stage disease in more deprived groups. However, recent NOGCA data do not indicate differences in clinical stage by patient deprivation (NOGCA 2022 Annual Report). Other factors such as patient fitness may contribute more to the observed socioeconomic differences in OG cancer survival.

Relative survival is a method for understanding the extent to which a specific disease shortens life. The method involves comparing the survival of people who have a disease, such as OG cancer, with the survival of those who do not. This approach can be used to estimate differences in relative survival across social deprivation groups, and thereby demonstrate the impact of socioeconomic status on survival (Rutherford et al 2015a, Rutherford et al 2019).

In this short report, we estimate the relative survival of patients with OG cancer by deprivation groups to investigate the impact of socioeconomic differences on survival up to five years from diagnosis. Patterns of relative survival are evaluated among all patients diagnosed with OG cancer and separately for patients with 1) a plan for curative treatment and 2) a plan for non-curative (palliative) treatment. We also explore the extent to which patient fitness may contribute to socioeconomic differences in survival.

METHODS

Data

The National Oesophago-gastric Cancer Audit (NOGCA) collects information to assess the quality of care received by people diagnosed with OG cancer in England and Wales (https://www.nogca.org.uk/).

This report used NOGCA data for patients diagnosed with OG cancer in England over a four-year period between 1 April 2013 and 31 March 2017, linked to mortality data from the Office for National Statistics (ONS) up to the end of May 2022. Audit data from Wales were not included in this analysis because background mortality rates stratified by deprivation quintile were available for England only.

Relative survival analysis was used to compare the impact of OG cancer on survival across deprivation quintiles, accounting for the varying background mortality rates between deprivation groups. The analysis was restricted to those aged 30-99 years at diagnosis, which excluded 0.2% of the original cohort, to minimise the influence of sparse data at the extreme ends of the age distribution. Patients were categorised into one of five deprivation groups (1 = most deprived, 5= least deprived) based on national quintiles of the index of multiple deprivation (IMD) score. IMD scores were assigned based on patients' postcode at diagnosis. Information on IMD score was missing for 0.5% of patients, who were excluded from the analysis. Patient fitness was assessed using the Eastern Cooperative Oncology Group (ECOG)/World Health Organization (WHO)

performance status index. This scale was categorised as: 0 – fully active, 1 – unable to do strenuous activity but can do light work, 2 – able to walk and manage self-care but unable to carry out any work activities, and 3/4 – confined to bed >50% of day or completely disabled.

Analysis

Flexible parametric excess mortality models were fitted to estimate relative survival for patients with OG cancer, up to five years from diagnosis (using the *stpm2* command in Stata), for the whole cohort and by treatment intent (curative or non-curative) (Rutherford et al 2015b, Rutherford et al 2019). Sex, deprivation quintile and age at diagnosis (years) were included in the models to enable the estimation of the survival function for each covariate pattern, with the effect of age modelled using a flexible non-linear function (a restricted cubic spline function with three degrees of freedom). We explored the impact of patient fitness on socioeconomic differences in relative survival by additionally adjusting for performance status.

To estimate relative survival due to OG cancer, background population mortality rates were incorporated using national mortality data stratified by age, sex, IMD group and calendar year (Office for National Statistics).

RESULTS

In total, 39,167 people diagnosed with OG cancer between April 2013 and March 2017 were included in the study cohort (Table 1).

The distribution of clinical stage at diagnosis did not vary across deprivation groups (p=0.353), but patients in the least deprived group were more likely to have a plan for curative treatment (41% versus 34% in most deprived group). Compared to the least deprived group, patients in the most deprived group were younger (19% aged <60 years versus 13%, p<0.001), more likely to have significant comorbidity[1] (44% versus 39%, p<0.001) and had worse performance status (26% versus 35% fully active, p<0.001).

All patients

Among all patients diagnosed with OG cancer in 2013-2017, relative survival due to OG cancer was estimated to be 46.0% at one year from diagnosis and 17.8% at five years. Relative survival was highest among those in the least deprived group and lowest in the most deprived group, with a deprivation gap (percentage point difference in relative survival) of 7.8 percentage points at one year and 4.4 at five years (Table 2 and Figure 1a). Median survival time was 3.0 months longer among patients in the least deprived group than in the most deprived group. After adjusting for performance status, the deprivation gap in 5-year survival was reduced to 0.5 (Table 2 and Figure 1b), and the difference in median survival time to 1.2 months.

[1] From list: ischaemic heart disease, chronic renal impairment, cerebrovascular disease, liver failure or cirrhosis, Barrett's oesophagus, chronic respiratory disease (chronic obstructive pulmonary disease, asthma), diabetes, mental illness, or other condition significant to treatment of OG cancer

Table 1: Characteristics of patients diagnosed with OG cancer 2013-2017, by deprivation group

	Deprivation group					Total
	1-Most deprived	2	3	4	5-Least deprived	
N	**8,290 (21%)**	**8,023 (20%)**	**8,085 (21%)**	**7,914 (20%)**	**6,855 (18%)**	**39,167 (100%)**
Age group (years)						
<60	19%	18%	16%	14%	13%	**16%**
60-69	26%	25%	25%	25%	25%	**25%**
70-79	31%	31%	32%	33%	33%	**32%**
≥80	24%	26%	27%	28%	29%	**27%**
Clinical stage						
1	11%	11%	11%	12%	12%	**11%**
2	19%	19%	20%	20%	19%	**20%**
3	33%	33%	32%	33%	33%	**33%**
4	37%	37%	37%	35%	36%	**36%**
Presence of significant comorbidities	44%	44%	41%	40%	39%	**42%**
ECOG/WHO Performance status						
0 (fully active)	26%	30%	32%	34%	35%	**31%**
1	33%	33%	34%	35%	35%	**34%**
2	23%	21%	19%	18%	18%	**20%**
3/4 (limited self-care / completely disabled)	17%	15%	15%	13%	12%	**15%**
Curative intent (treatment plan)	34%	37%	37%	40%	41%	**38%**

Table 2: Relative survival at one year (non-curative cohort) and five years (curative cohort) and median survival among patients diagnosed 2013-2017, by deprivation group and treatment intent

	Model 1		Model 2	
	Relative survival (%)	Difference in median survival (months)	Relative survival (%)	Difference in median survival (months)
All patients	**5 years**		**5 years**	
1-Most deprived	15.4%	3.0	17.9%	1.2
5-Least deprived	19.8%		18.4%	
Curative treatment plan	**5 years**		**5 years**	
1-Most deprived	40.3%	7.1	41.4%	3.6
5-Least deprived	43.2%		42.5%	
Non-curative treatment plan	**1 year**		**1 year**	
1-Most deprived	25.4%	1.0	26.4%	0.4
5-Least deprived	28.6%		26.6%	

Model 1 – including sex, age, deprivation; Model 2 – additionally adjusted for performance status; Difference in median survival: difference in median survival time between least deprived and most deprived groups.

Figures 1a and 1b: Relative survival of all patients diagnosed with OG cancer 2013-2017, by deprivation group

Figure 1a: From flexible parametric excess mortality model including sex, age, deprivation

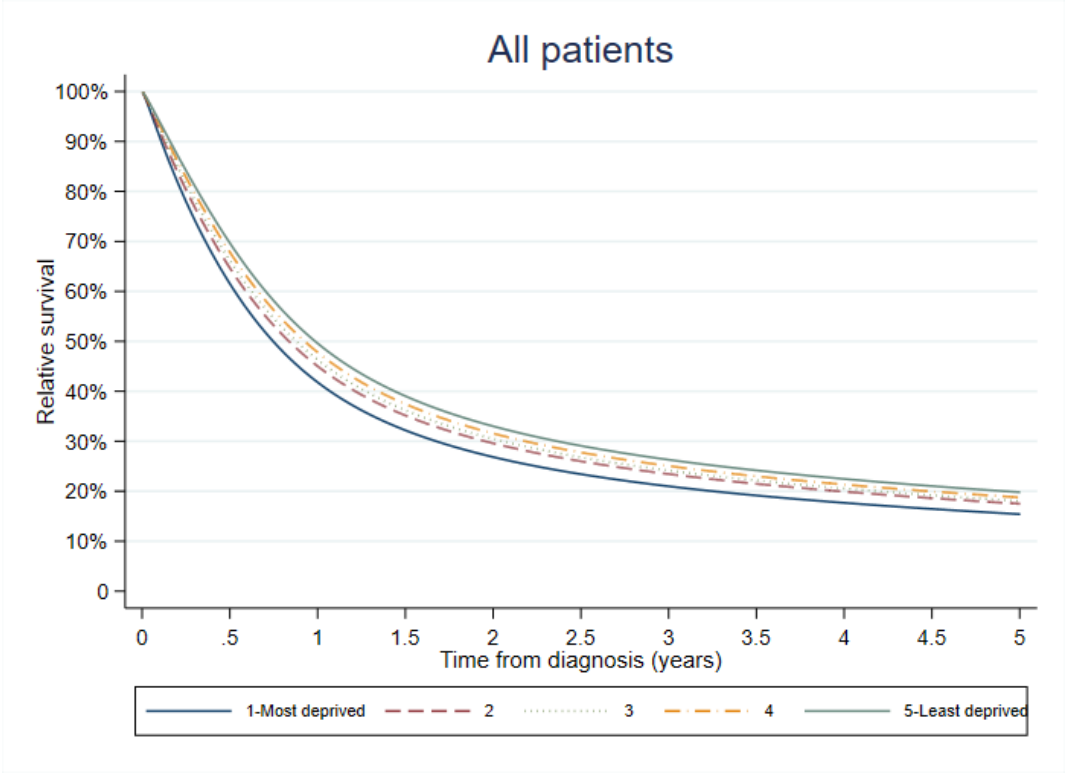
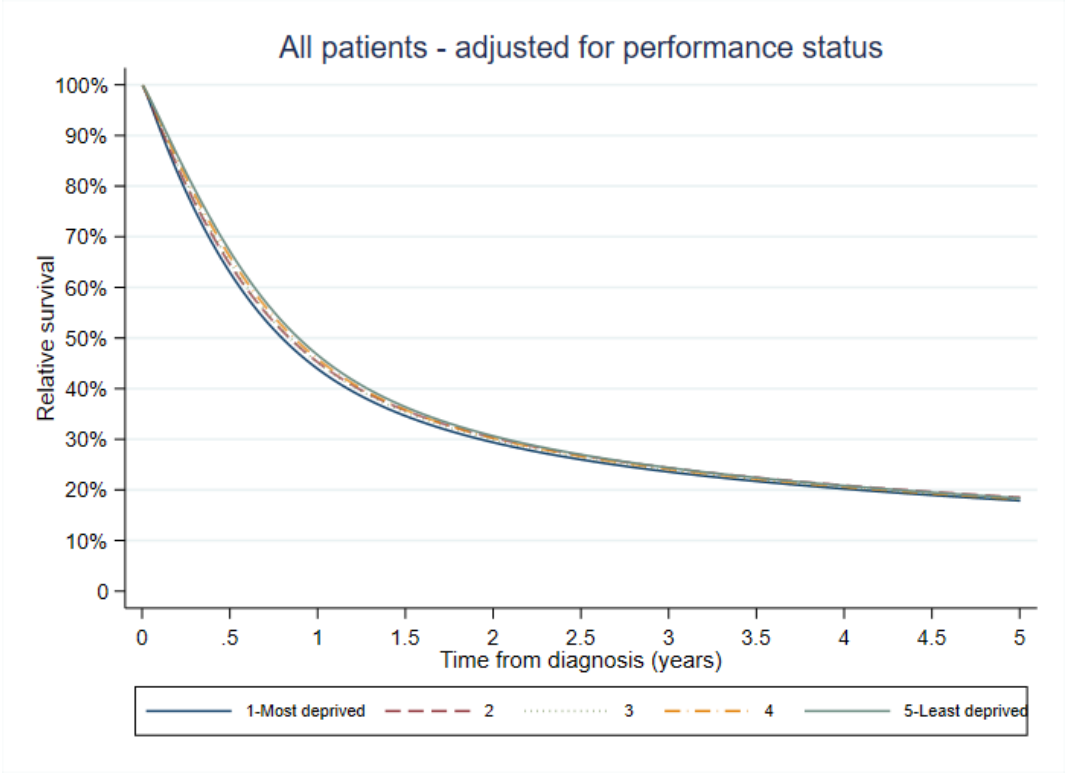


Figure 1b: From flexible parametric excess mortality model including sex, age, deprivation and performance status



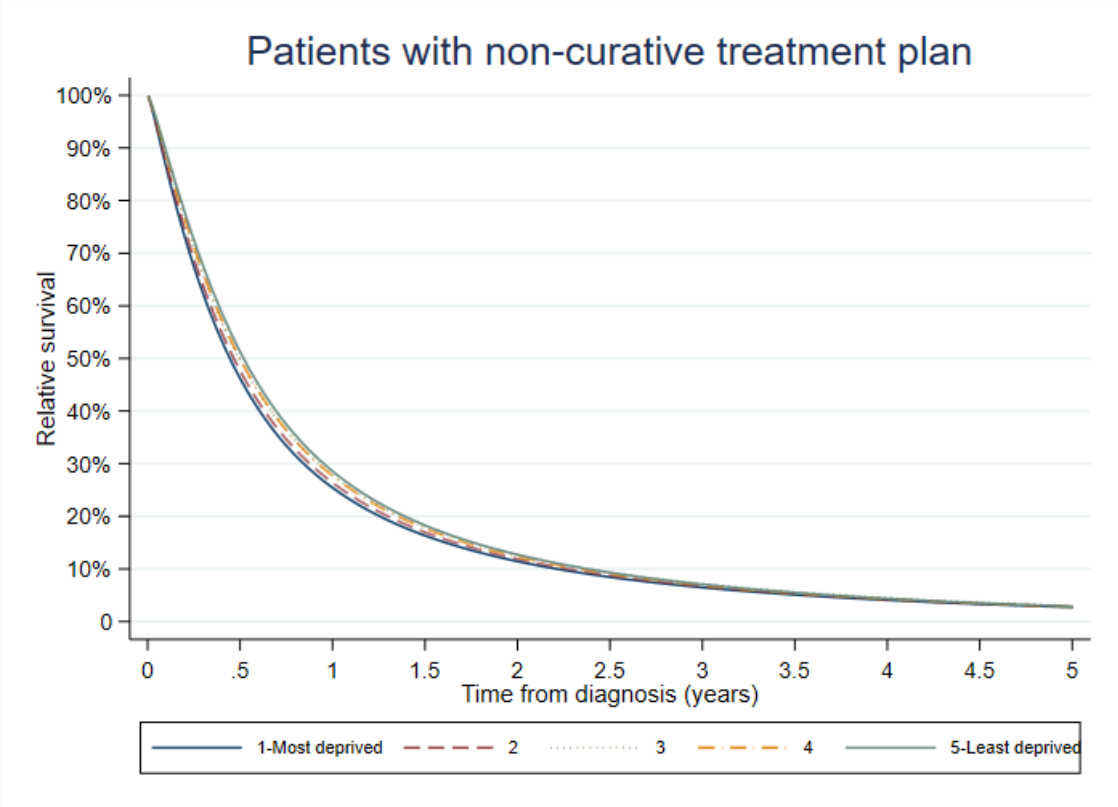
Analysis by treatment intent

Among patients with a plan for non-curative treatment, relative survival was estimated to be 27.1% at one year from diagnosis and 2.8% at five years. For patients with a plan for curative treatment, relative survival was 80.1% at one year and 41.9% at five years.

A socioeconomic gradient in relative survival was observed among patients with a plan for non-curative treatment at one year from diagnosis, with relative survival 3.2 percentage points higher in the least deprived group than in the most deprived group (Table 2, Figure 2). The difference in median survival time between patients in the least and most deprived groups was one month. After adjusting for performance status, the deprivation gap in 1-year relative survival was reduced to 0.2 percentage points, with a difference in median survival time of 0.4 months.

Among patients with a plan for curative treatment, a socioeconomic gradient in relative survival was observed at one year (deprivation gap: 2.8 percentage points) and at five years (2.9 percentage points) (Table 2, Figure 3a). The difference in median survival between the least and most deprived groups was 7.1 months. Adjustment for performance status reduced the deprivation gap in 5-year relative survival from 2.9 percentage points to 1.1 (Table 2, Figure 3b), and the difference in median survival to 3.6 months. In exploratory analyses, additional adjustment for the number of significant comorbidities and clinical stage did not further reduce the socioeconomic gap in relative survival.

Figure 2: Relative survival of patients with non-curative treatment plan for OG cancer diagnosed 2013-2017, by deprivation group.



From flexible parametric excess mortality model including age, sex and deprivation.

Figures 3a and 3b: Relative survival of patients with curative treatment plan for OG cancer diagnosed 2013-2017, by deprivation group

Figure 3a: From flexible parametric excess mortality model including sex, age, deprivation

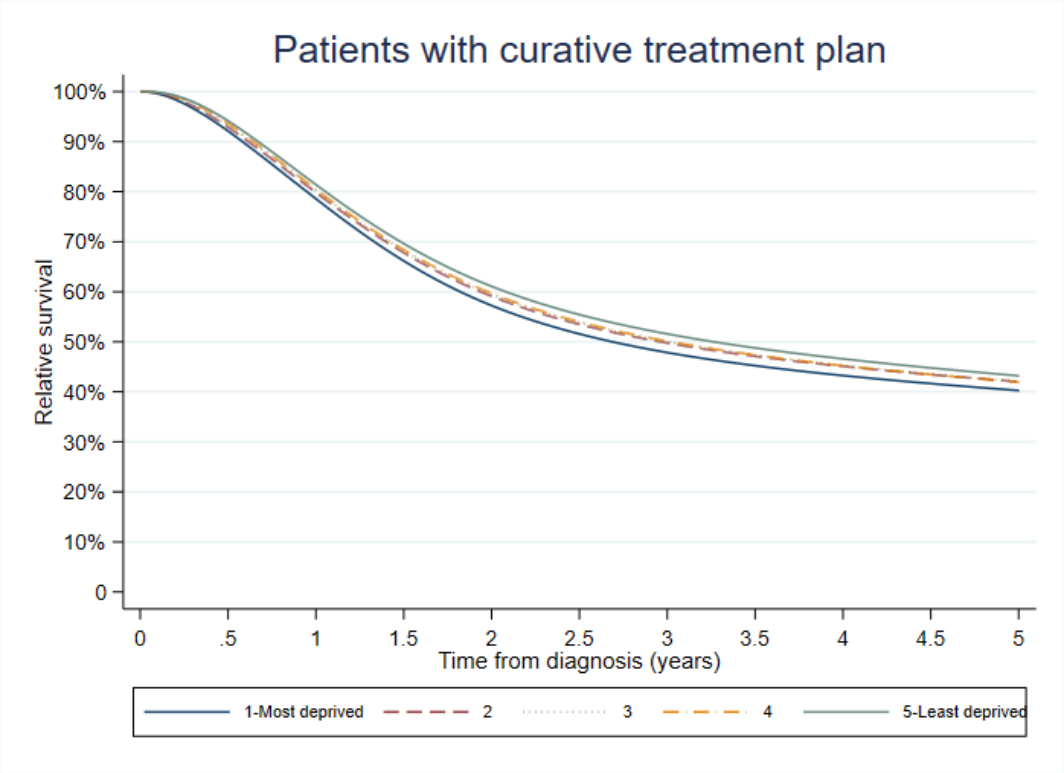
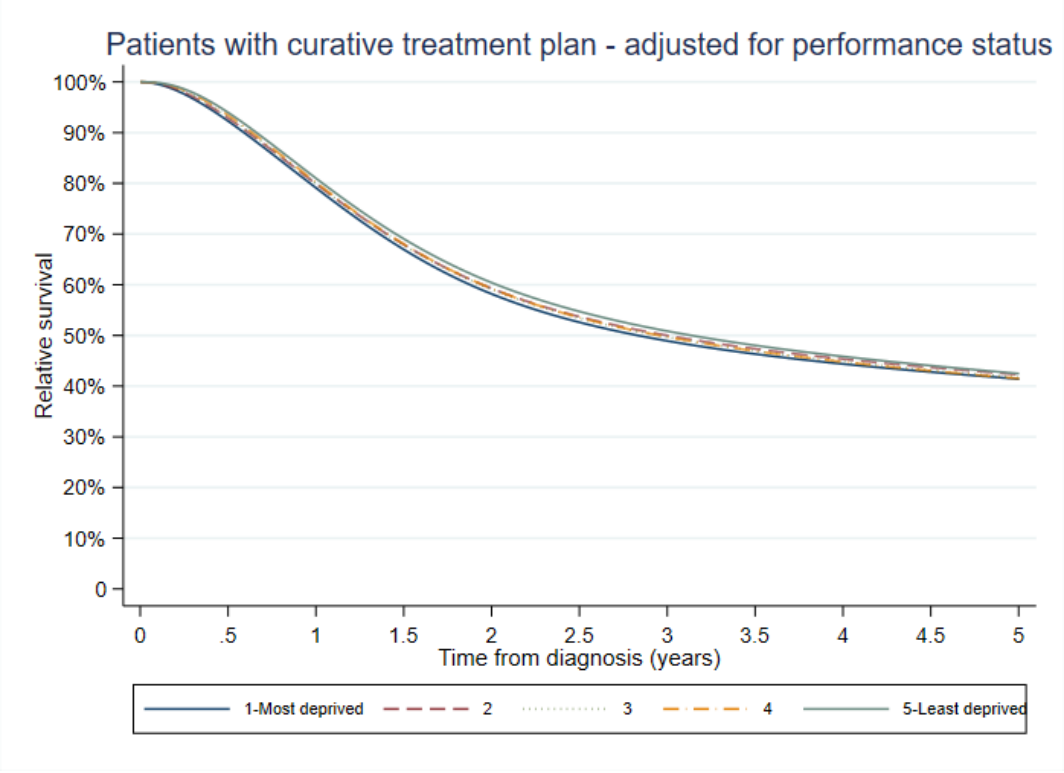


Figure 3b: From flexible parametric excess mortality model including sex, age, deprivation and performance status



CONCLUSION

This analysis showed that relative survival of patients with OG cancer was poor among patients diagnosed in England in 2013-2017, at less than 20% at five years from diagnosis. Among patients with a plan for curative treatment, 5-year relative survival was over 40%.

There was a socioeconomic gradient in relative 5-year survival across the deprivation groups, with lowest relative 5-year survival among patients in the most deprived group and highest in the least deprived group. This gradient was evident among patients who had a plan for treatment with curative intent, and at one year from diagnosis among those with a non-curative treatment plan. A greater proportion of patients in the least deprived group had a plan for curative treatment (41% vs 24% in most deprived), but differences in stage at diagnosis were not observed across the deprivation groups.

After adjusting for performance status, the "deprivation gap" in 5-year relative survival among patients with a plan for curative treatment was reduced by almost two-thirds. Similarly, the socioeconomic gradient in 1-year relative survival among patients with non-curative treatment intent was attenuated after adjustment for performance status. This suggests that the observed socioeconomic differences in relative survival can be explained to a large extent by differences in patient fitness between the most and least deprived groups, and focus should be on optimising fitness before, during and after treatment. This may include more intensive prehabilitation programmes, which prepare people for cancer treatment through the promotion of healthy behaviours such as smoking cessation and prescribing of exercise, nutrition, and psychological support (Macmillan Cancer Support 2020). Patients from the most deprived groups, who are most likely to have poor fitness, may also be less able to navigate complex health care systems, and particular attention should be paid to supporting access to services for these patients.

The development of targeted prehabilitation strategies to reduce socioeconomic disparities in patient fitness will require collaboration between multidisciplinary teams, NHS commissioners and professional organisations including the Association of Chartered Physiotherapists in Oncology and Palliative Care (ACPOPC), British Dietetic Association (BDA), Royal College of Radiologists (RCR), Royal College of Anaesthetists (RCA), and Association of Upper GI Surgery of Great Britain and Ireland (AUGIS).

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