

Improvement in early survival of cancer in South West Victoria

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Abstract

Background The Victorian Cancer Plan aims to increase survival. As such, our study investigated the improvement in 12-month survival for newly diagnosed cancer patients in South West Victoria.

Methods Patients diagnosed in 2009–10 and 2014–15 and their treatment pathways are recorded in the Evaluation of Cancer Outcomes Barwon South West (ECOBSW) Registry. 12-month survival was compared and any association with demographics, diagnostic measures and treatment analysed.

Results 12-month survival was 77% for 2009–10 and 79% for 2014–15. Improvement in survival was found for those aged older than 70 years (increased by 5%), females (4%), those residing in higher socioeconomic regions (4%), head and neck cancers (4%), those who had surgery (3%), and surgery and a systemic agent (6%). There was no improvement in survival for any other combination of treatments.

Conclusion Although the overall 12-month survival did not significantly change, the improvement in some subsets of patients, particularly surgery, is promising.

Introduction

The Victorian Cancer Plan focuses on improvement in cancer outcomes¹. Positive changes in 5-year survival have been reported^{2,3}, with significant increases for prostate cancer, kidney cancer, non-Hodgkin lymphoma and breast cancer². However, the first outcome measure is 12-month survival. Early survival is likely to be related to tumour progression at presentation and timeliness of treatment. In Victoria, 12-month survival from 2006 to 2009 improved by 2%¹. The goal is now to double that improvement to 4%. Whilst such an increase for all cancer

patients as a group might be considered challenging, there are likely to be subsets of patients where this goal is achievable.

Early detection improves survival. As such, timely diagnostic procedures, treatment and care is the responsibility of the health service. Regional and rural areas are supported by both public and private health services with links in communication across the stream of services. How well they respond to a patient's need may influence outcomes. One such region is in South West Victoria where the health services have worked towards better

communication, treatment and care supported by the Barwon South Western Regional Integrated Cancer Services (BSWRICS). The vision is to improve the patient experience and outcomes by connecting care and driving best practice.

BSWRICS is supported by the Evaluation of Cancer Outcomes Barwon South West (ECOBSW) Registry that records treatment pathways for all newly diagnosed cancer patients in the region^{4,5} – this dataset allows analysis of patterns of short-term survival. The goal of this study was to identify subsets of patients where short-term survival rates have not have increased over the years and where further attention by the health services might be needed.

Methods

The ECOBSW Registry collects clinical information on all newly diagnosed cancer patients in South West Victoria (population 418,103)^{4,5}. The Registry records the entire patient journey, including diagnosis, treatment and outcomes. This study reports on 12-month survival for patients diagnosed in 2009 and 2010 and compares this to patients diagnosed 5 years later in 2014 and 2015, accessed from Births, Deaths and Marriages. We hypothesise that survival will have improved for some subcategories of cancer patients and may be related to demographics, tumour stream, or type of treatment received.

The Barwon South Western Region spans from the city of Geelong to the South Australian border. The region encompasses the smaller towns of Colac, Warrnambool, Camperdown, Hamilton and Portland. The connecting landscape is mostly farming with some industrial regions, smaller farmlets and timber industry. The region is surrounded to the south by coastal towns with many tourist attractions and coastal resorts. There is a large influx in population during the summer season; however, this report details the cancer journey of permanent residents.

Socioeconomic scales used in this paper were established from the Australian Bureau of Statistics SEIFA codes linked to town or postcode. The lowest tertile of the scales are the most disadvantaged regions.

Statistical analysis

The goal of the study was to assess the change in survival over two time periods and with independent groups of patients. We acknowledge that some subsets may have poor survival in 2009–10 and improved, stayed the same or decreased in 2014–15, while other subsets may have had a good survival rate in 2009–10 and improved, stayed the same or decreased. Our interest was in any change in survival. By analysing the 12-month survival for newly diagnosed cancer patients in 2009–10 and using a Chi-square statistic to compare 12-month survival for those diagnosed in 2014–15, we were able to assess changes in early survival rates within subcategories. To avoid significance due to multiple comparisons, while acknowledging that a Bonferroni correction

can produce false negatives, we reduced the level of significance by half to $p=0.025$.

Results

Newly diagnosed cancer patients numbered 3,858 for the years of 2009–10 and 3,965 for 2014–15. Twelve months after diagnosis, 2,988 (77%) and 3,125 (79%) of patients survived ($p=0.13$), respectively.

There was an improvement in early survival for those aged older than 70 years (65% to 70%) and females (78% to 82%) ($p<0.01$) and no difference for those younger than 70 years (88% to 87%) and males (77% to 76%) ($p>0.05$) (Figure 1). Survival for those with the marital status of single improved over the time periods (70% to 74%, $p=0.02$). There was no difference in survival rates across time periods for history of smoking and country of birth. Patients residing in the highest socioeconomic regions had increased survival rates for Index of Relative Socio-Economic Disadvantage (81% to 84%) and Index of Relative Socio-Economic Advantage and Disadvantage (81% to 85%) (Figure 2).

Survival rates increased for two health services in the region that were the diagnosing organisation labelled C (79% to 89%, $p<0.01$) and G (82% to 94%, $p=0.02$) (Figure 3), and for patients with head and neck cancer (76% to 90%, $p<0.01$) (Figure 4). There was no significant change in early survival for public or private patients or for different stages of tumour at diagnosis.

There was no significant difference in survival rates for patients whose cases were presented to a multidisciplinary meeting (Figure 5). Survival for patients that had surgery increased over the time periods from 92% to 95% ($p=0.02$) and those who had surgery and received a systemic agent from 91% to 97% ($p=0.01$). There was no significant change in the rate of survival for all other combinations of treatments.

Discussion

This study reports on changes in early survival across a 5-year time period in a regional/rural setting of South West Victoria. Some of the subsets analysed have lower than average early survival in the first analysed time period and improvement might have been inevitable. Cancer is more common in older age and is often associated with more comorbidities complicating treatment decisions. Indeed, advanced age is one of the risk factors for high mortality in the first 12 months from diagnosis^{6,7}. However, optimistically, this current study has found a 5% increase in short-term survival for the older age group of patients.

Health services with high volumes of surgery have reported better outcomes than low volumes⁸. This study reports on higher than average early survival rates for patients in a regional/rural setting who have had surgery and, in addition, an improvement over the 5-year time period. The increasing use and refinement of minimally invasive and robotic techniques in cancer surgery may have contributed to improvement in early survival. Recent

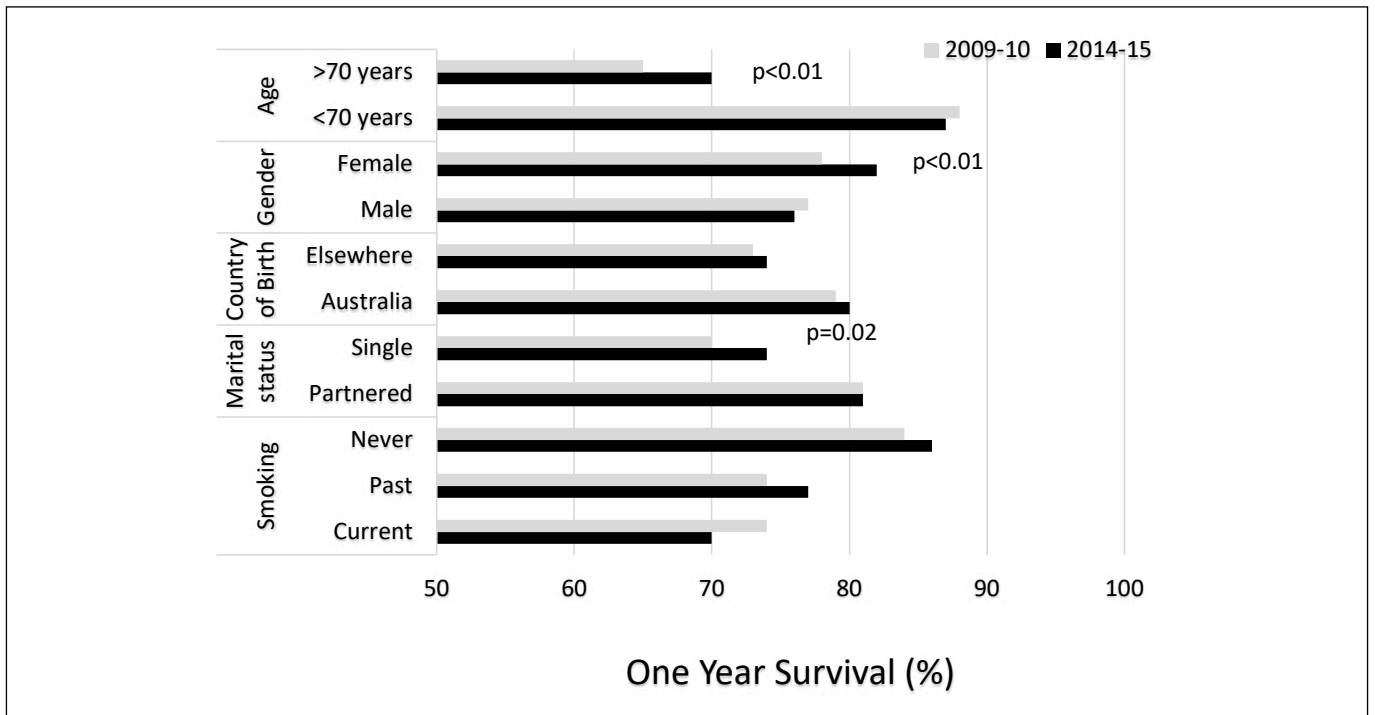


Figure 1. 12-month survival for patients diagnosed in 2009–10 and 2014–15 by demographics. p value is shown for significant change in survival.

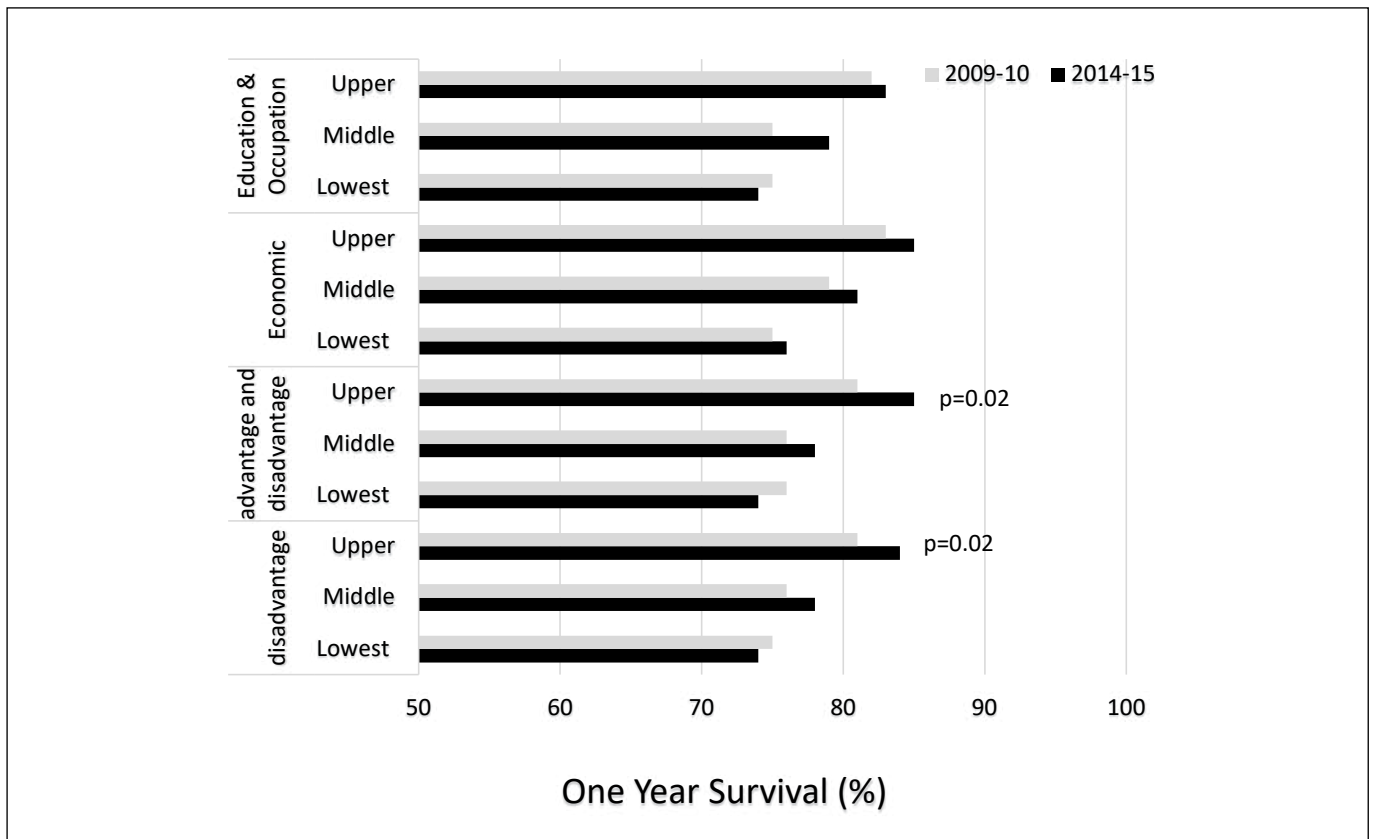


Figure 2. 12-month survival for patients diagnosed in 2009–10 and 2014–15 by socioeconomic code associated with residential address. Socioeconomic levels are the upper, middle or lowest tertile with the lowest the most disadvantaged. p value is shown for significant change in survival.

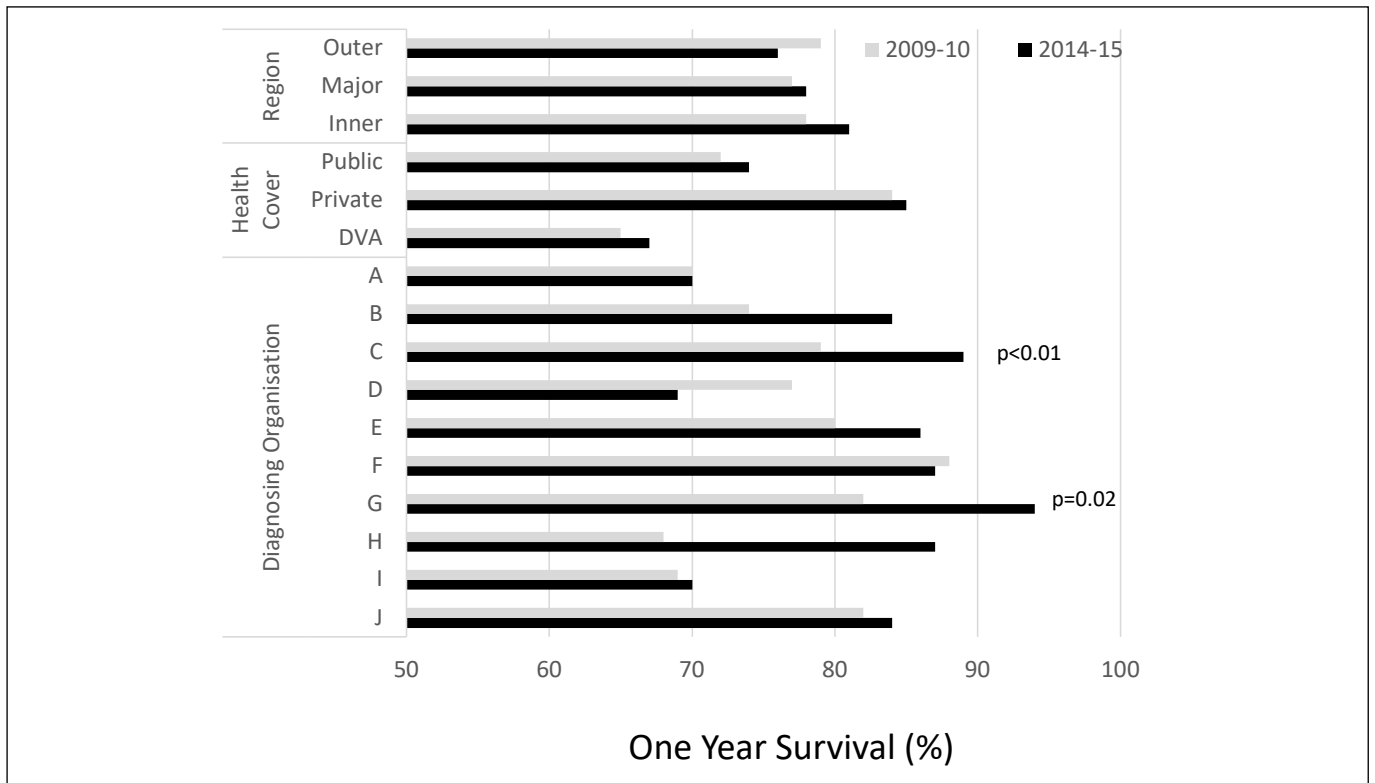


Figure 3. 12-month survival for patients diagnosed in 2009–10 and 2014–15 by region of residence, health cover and diagnosing organisation. The Outer region includes the far South West from Hamilton to the South Australian border, the Inner is from Hamilton to outer Geelong, and the Major is the Greater Geelong region. p value is shown for significant change in survival.

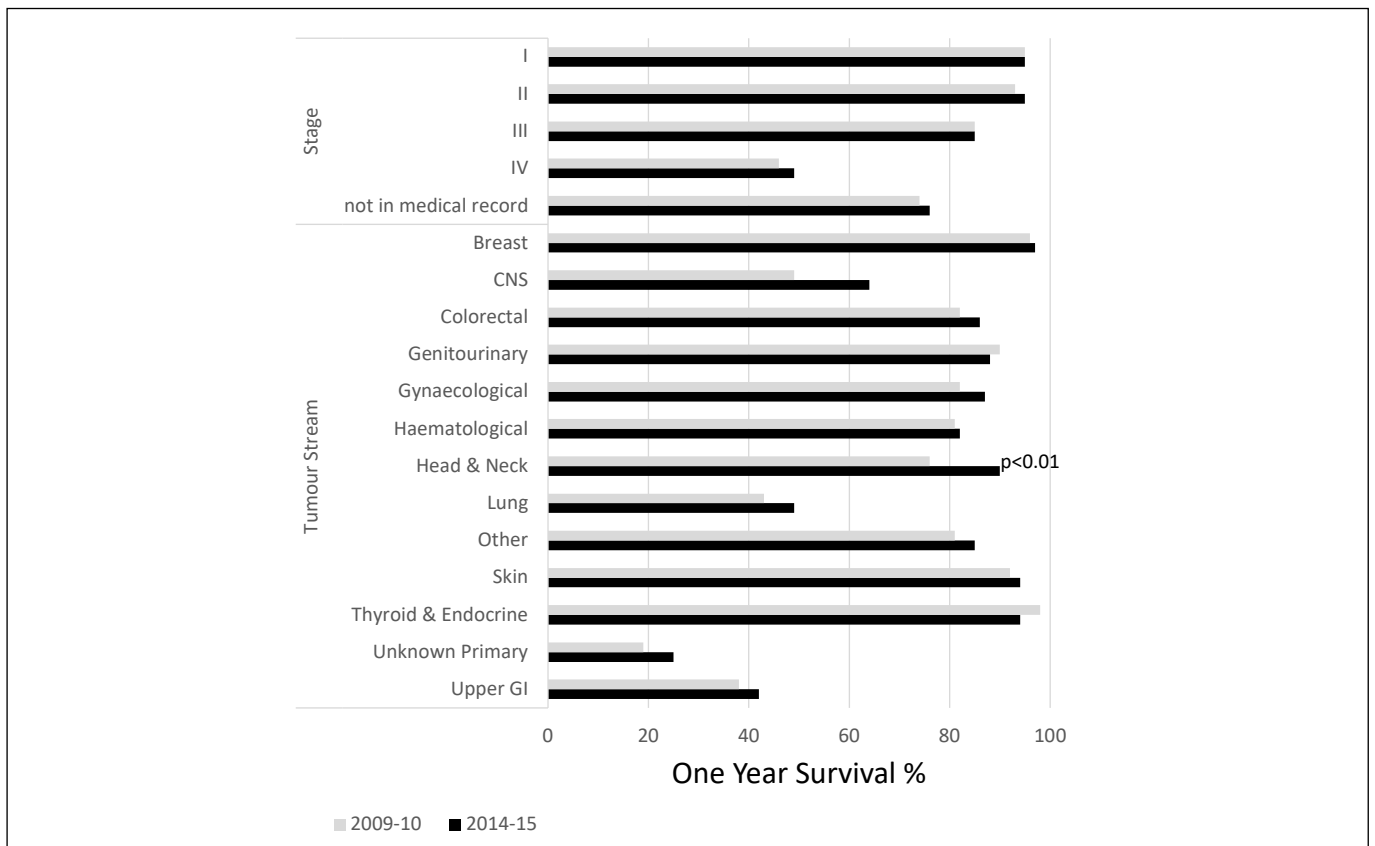


Figure 4. 12-month survival for patients diagnosed in 2009–10 and 2014–15 by tumour stage and tumour stream. p value is shown for significant change in survival.

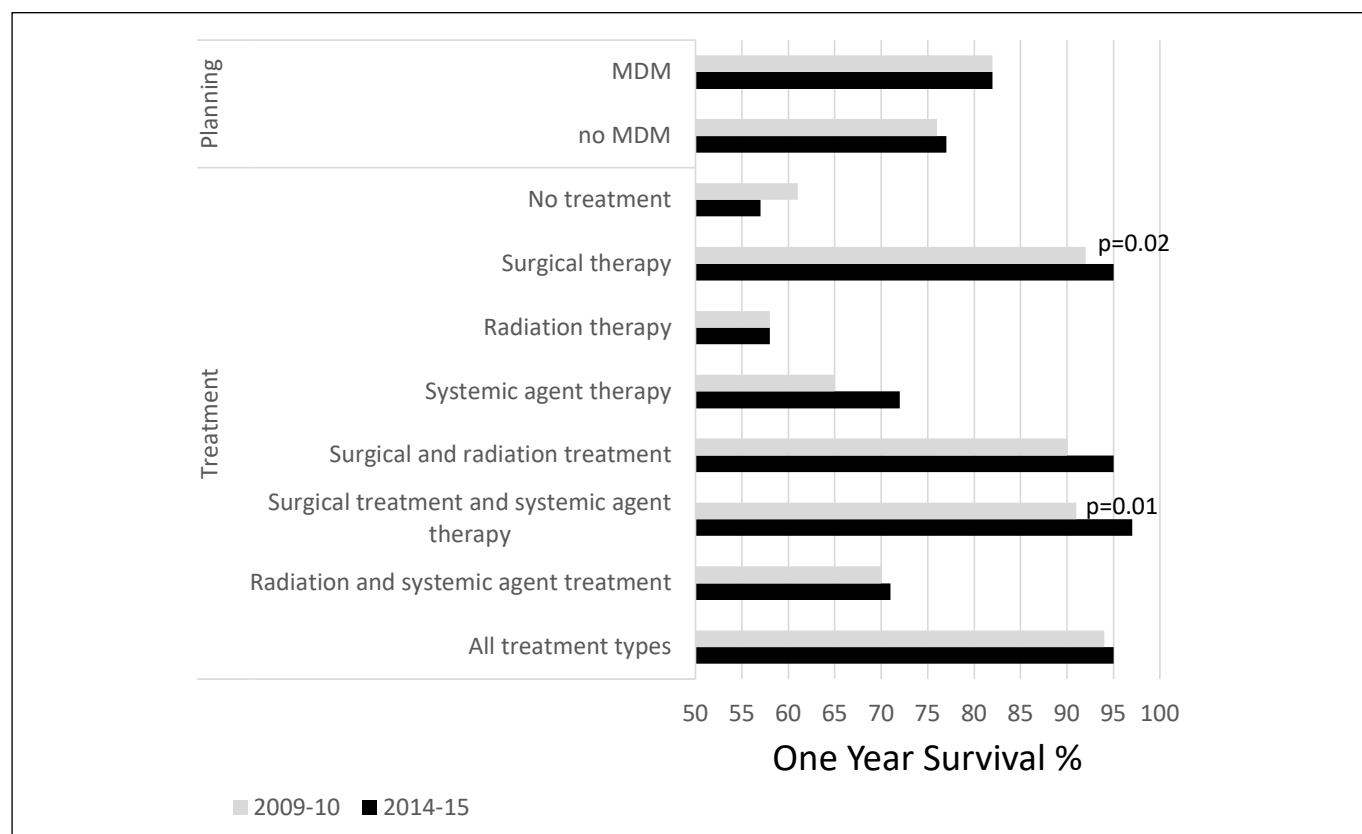


Figure 5. 12-month survival for patients diagnosed in 2009–10 and 2014–15 by treatment planning and treatment. *p* value is shown for significant change in survival.

studies suggest that minimally invasive surgery is associated with reduced perioperative morbidity and mortality in select cancers⁹. Improved early outcomes in lower stage cancer treated with surgery are thus expected to improve 1-year survival rates.

The improvement in survival for patients treated with surgery may also be the result of better patient selection. With increasing evidence for curative intent radiotherapy in some cancers, patients with surgical risk factors such as poor functional status or significant comorbidities may be referred on for radiotherapy in place of surgical resection. Patient selection has been enhanced by joint decision-making at multidisciplinary team meetings and clinics which are becoming the standard of practice.

In addition, trends in the use of neoadjuvant or adjuvant therapy may explain the improvement seen in the group treated with a combination of surgery and systemic therapy¹⁰⁻¹³. Neoadjuvant chemotherapy is increasingly used to downstage cancer prior to surgical resection. Adjuvant chemotherapy is becoming more prevalent in the setting of resected early stage cancer with lymph node involvement. The improvement in early survival of head and neck cancers might be reflective of this improvement in surgery.

We cannot suggest an explanation for the improvement in early survival for females, as breast cancer survival remained fairly constant; however, gynaecological cancers appeared to show a non-significant improvement and may have contributed to this association. Of interest, there were no significant decreases in early survival for any subcategories.

Prior studies have reported many factors related to short-term survival which are often tumour stream dependent. Short-term survival for oesophageal squamous cell carcinoma was related to gender, stage, type of surgery and infection post-surgery¹⁴. Comorbidities and frailty¹⁵ are often complicating factors in both treatment and optimal outcomes; however, we recognise for our current study that comorbidity data was not available. We acknowledge that we have not performed in-depth analysis within tumour streams where patterns might alter considerably; however, it is promising to see improvement in early survival for some subsets of cancer patients. Whether the improvement continues on to 2019–20 remains to be seen but the early changes are promising.

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