

REVIEW ARTICLE



Clinical Studies

Diagnosing cancer earlier: what progress is being made?

M. A. Richards^{1,4}, Sara Hiom^{2,4} and Willie Hamilton^{3,4}

© Crown 2023

British Journal of Cancer (2023) 128:441–442; <https://doi.org/10.1038/s41416-023-02171-8>

Fifteen years ago, the Cancer Reform Strategy [1] put earlier diagnosis of cancer at the forefront of plans to improve cancer outcomes and galvanised an ambitious, coordinated effort to research and identify how to accelerate progress. In 2009, the *British Journal of Cancer* published a supplement [2] assembling the contemporary evidence to support the *National Awareness and Early Diagnosis Initiative* (NAEDI), a key commitment in this 2007 Strategy. A further supplement was published in 2015 [3] reviewing and presenting progress. Our paper reflects on the past 15 years, revisits the rationale for earlier diagnosis, and looks to future prospects that could transform the landscape in the next fifteen.

The benefits of screening asymptomatic populations for cancers such as breast, cervix and bowel, are now largely accepted. Randomised controlled trials (RCTs) demonstrated reductions in mortality (e.g. breast and bowel) and/or provided evidence that screening can prevent the development of some of these cancers (e.g. cervix and bowel). Screening generally detects cancers at an earlier stage and may also detect premalignant lesions, removal of which can prevent cancer developing (e.g. colorectal polyps). Yet still only around 6% of all cancers in this country are detected through screening. The remaining 94% present symptomatically.

While major differences in survival between patients presenting with early or advanced-stage disease have long been recognised across a wide range of cancers, the impact on survival of delays in diagnosis of patients presenting symptomatically have until recently been much more controversial—and are not amenable to study by RCT. Indeed when one of us sought funding for a systematic review of observational studies of delays in diagnosis of breast cancer in the 1990s, this was initially declined as one reviewer of the proposal stated that there was no way that delays of only a few months could impact on survival. A second reviewer equally recommended that the study should not be funded as it was ‘obvious’ that delays would lead to poorer outcomes. The study went ahead and showed overwhelming evidence that delays do impact on survival at least in breast cancer [4].

A further systematic review showed similar effects for some (but not all) cancers [5], though observational studies cannot fully accommodate the fact that the timeline of symptom experience and the timeline of tumour growth are not synchronised, and differ across cancers. Furthermore, patients with advanced disease at presentation are more ill, and thus are identified more quickly

(the so-called ‘sick-quick’) leading to the paradox that many patients receiving a rapid diagnosis have poor survival. Even so, modern modelling methods have been able to estimate the survival disadvantage for the major cancers caused by delay—with a very broad figure of 1% worse survival for every week’s extra delay [6].

One of the key drivers for the NAEDI initiative came from international comparisons of cancer survival, including the EURO CARE studies. These showed that 1 year survival in the UK was particularly poor, lending support to the idea that patients in the UK were diagnosed at a later stage. Others showed that survival at 3 and 6 months was worse in England than elsewhere, again supporting late diagnosis as a significant factor [7]. However, direct comparisons of stages across countries were not available at that time. The impact of relatively worse survival in Britain is not trivial. A paper in the 2009 BJC supplement estimated that the number of deaths from cancer that could be avoided if Britain matched the European countries with highest survival was over 10,000 p.a. in patients diagnosed between 1995 and 1999 [8].

The International Cancer Benchmarking Partnership (ICBP), developed as part of NAEDI, confirmed the EURO CARE survival findings and also showed possible reasons for later UK diagnosis. The UK public was more worried about wasting their GP’s time [9] and UK GPs were less likely to investigate or refer patients than those elsewhere [10]. Early studies of initiatives to promote awareness and earlier help-seeking behaviour were included in the BJC supplements.

So, what progress has been made? There is undoubtedly greater recognition of the importance of early diagnosis to cancer outcomes. This is reflected in the government’s ambition to diagnose 75% of cancers at stage 1 or 2 by 2028, confirmed in the 2019 NHS Long-Term Plan [11]. Improvements in the determination of stage at diagnosis have made it possible to monitor progress against this ambition robustly at a national level since around 2015, but up to the start of the pandemic little progress had been observed, with only around 55% being diagnosed at stage 1 or 2. Worryingly, many clinicians have expressed concerns that more patients have been diagnosed with advanced-stage disease since March 2020.

Improvements in data collection and linkage by the national cancer registration and analysis service (NCRAS) have also enabled changes in routes to diagnosis to be monitored over recent years.

¹Cancer Research UK, London, UK. ²Cancer Intelligence, GRAIL Europe, London, UK. ³Uni of Exeter, Exeter, UK. ⁴These authors contributed equally: M. A. Richards, Sara Hiom, Willie Hamilton. ✉email: profmikerichards@gmail.com

In 2006 almost one-quarter of cancer patients presented as emergencies, with these patients having a particularly poor prognosis [12]. Encouragingly, the most recent data indicate that this has now fallen to around 19%, though recent international comparisons suggest that England still fares somewhat worse on this metric than comparator countries [13]. In parallel with this, the proportion of patients diagnosed following an urgent (2-week wait) referral has increased from 37 to 52%. This route carries a better prognosis. This change may well reflect the greater awareness of the importance of early diagnosis and the publication of guidance on criteria for urgent referral by NICE in 2015 [14].

Despite the huge challenges resulting from the Covid-19 pandemic, there are realistic prospects for further improvements in early diagnosis in the future, though these will be dependent on NHS funding, additional equipment and facilities, and workforce expansion. Full implementation of the recommendations of Richards' review of diagnostics will be critical to this [15, 16].

Improvements to existing cancer screening programmes and the potential rollout of new programmes could considerably increase the proportion of cancers diagnosed through screening. Expansion of endoscopy capacity would enable the starting age for bowel screening to be lowered and the faecal immunochemical test (FIT) threshold for investigating patients to be reduced. There is strong evidence for both of these changes. RCTs of low-dose CT scanning for lung cancer screening demonstrate reductions in lung cancer mortality and pilots undertaken by NHS England have shown encouraging results. The UK National Screening committee has recently recommended that lung screening should be introduced for smokers and ex-smokers. Looking further ahead, multicancer early detection (MCED) tools are now being tested in the UK with the potential to detect many different cancers through a single blood sample.

Progress can also be anticipated on earlier diagnosis of symptomatic cancers. The development of effective triage tools and new diagnostic pathways should enable identification of patients who need rapid specialist investigation and those that can be observed with safety netting in primary care. The use of FIT in patients with bowel symptoms is an example, but other tests are being investigated. As diagnostic capacity is increased GPs should be given better access to diagnostic tests including CT. This could reduce time to diagnosis for patients who do not qualify for urgent specialist referral. Assessment and referral by community pharmacists are also being trialled.

In conclusion, earlier diagnosis is now widely accepted as being critical to improving cancer outcomes. However, despite improvements, the UK still lags behind comparator countries on cancer survival with late diagnosis being a significant contributor to this. While more research in this area is undoubtedly needed, implementation of what is already known (and done in other countries) should be a high priority. Many deaths could be avoided each year.

REFERENCES

1. Cancer Reform Strategy 2007. Department of Health.

2. Richards MA and Hiom S (Eds) Diagnosing cancer earlier: evidence for a national awareness and early diagnosis initiative. *Br J Cancer*. 2009;101, Supplement 2.
3. Hiom S. Diagnosing cancer earlier: reviewing the evidence for improving cancer survival. *Br J Cancer*. 2015;112:S1–5. Supplement 1
4. Richards M, Westcombe A, Love S, et al. Influence of delay on survival in patients with breast cancer: a systematic review. *Lancet*. 1999;353:1127–31.
5. Neal RD, Tharmanathan P, France B, Din NU, Cotton S, Fallon-Ferguson J, et al. Is increased time to diagnosis and treatment in symptomatic cancer associated with poorer outcomes? Systematic review. *Br J Cancer* 2015. 2015;112:S92–S107. <https://doi.org/10.1038/bjc.2015.48>.
6. Sud A, Torr B, Jones M, Broggio J, Scott S, Loveday C, et al. Effect of delays in the UK two-week wait cancer referral pathway during the COVID-19 pandemic on cancer survival: a modelling study [Appendix 1, supplementary Table 3]. *Lancet Oncol*. 2020;21:1035–44.
7. Holmberg L, Sandin F, Bray F, et al. National comparisons of lung cancer survival in England, Norway and Sweden 2001–2004: differences occur early in follow up. *Thorax*. 2010;65:436–41.
8. Abdel-Rahman M, Stockton D, Rachet B, Hakulinen T, Coleman MP. What if cancer survival in Britain were the same as in Europe: how many deaths are avoidable? *BJC*. 2009;101:S115–S124.
9. Forbes LJJ, Simon AE, Warburton F, et al. Differences in cancer awareness and beliefs between Australia, Canada, Denmark, Norway, Sweden and the UK (the International Cancer Benchmarking Partnership): do they contribute to differences in cancer survival? *Br J Cancer*. 2013;108:292–300.
10. Rose PW, Rubin G, Perera-Salazar R, et al. Explaining variation in cancer survival between 11 jurisdictions in the International Cancer Benchmarking Partnership: a primary care vignette survey. *BMJ Open*. 2015;5:e007212.
11. The NHS Long Term Plan (2019). www.longtermplan.nhs.uk
12. McPhail S, Elliss-Brookes L, Shelton J, Ives A, Greenslade M, Vernon S, et al. Emergency presentation of cancer and short-term mortality. *Br J Cancer*. 2013;109:2027–34. <https://doi.org/10.1038/bjc.2013.569>. <https://www.nature.com/articles/bjc2013569>
13. McPhail S, Swann R, Johnson SA, Barclay ME, Abd Elkader H, Alvi R, et al. Risk factors and prognostic implications of diagnosis of cancer within 30 days after an emergency hospital admission (emergency presentation): an International Cancer Benchmarking Partnership (ICBP) population-based study. *Lancet Oncol*. 2022;23:587–600. [https://doi.org/10.1016/s1470-2045\(22\)00127-9](https://doi.org/10.1016/s1470-2045(22)00127-9).
14. Suspected cancer: recognition and referral. NICE Guideline 12;2015. www.nice.org.uk/guidance/ng12/chapter/recommendations
15. Price S, Spencer A, Zhang X, Ball S, Lyrtzopoulos G, Mujica-Mota R, et al. Trends in time to cancer diagnosis around the period of changing national guidance on referral of symptomatic patients: a serial cross-sectional study using UK electronic healthcare records from 2006–2017. *Cancer Epidemiol*. 2020;69:101805 <https://doi.org/10.1016/j.canep.2020.101805>. <http://www.sciencedirect.com/science/article/pii/S1877782120301399>
16. Richards MA. Diagnostics: recovery and renewal – report of the independent review of diagnostic services for NHS England. 2020

COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

Correspondence and requests for materials should be addressed to M. A. Richards.

Reprints and permission information is available at <http://www.nature.com/reprints>

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.