

Socioeconomic position and delays in lung cancer diagnosis: should we target the more deprived?

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Lung cancer incidence and mortality increase with all measures of socioeconomic deprivation primarily because of the fact that smoking rates also increase with the same measures. This powerful association means that we see double the number of people with lung cancer in the most deprived quintile compared with the least deprived. Socioeconomic deprivation is associated with reduced survival, more early deaths (within 30 or 90 days) and lower treatment rates.^{1–3} Possible explanations include a failure to present and seek help from doctors early and less effective primary healthcare in deprived communities, both factors postulated to result in delays in diagnosis and later stage at presentation. The systematic review and meta-analysis by Forrest *et al*⁴ concludes that there is no association between socioeconomic position (SEP) and either stage at diagnosis or time intervals on the lung cancer pathway. More deprived patients were more likely to present as emergencies. The most important limitation, acknowledged by the authors, is the potential for masking of the effect of SEP on delays in the pathway by the ‘sicker quicker’ effect. This refers to the finding that sicker patients progress more quickly through the pathway, thus potentially cancelling an effect of SEP on late presentation. This factor was not accounted for in the included studies. They also raise concerns about whether all studies that contain information about the factors studied have been included. Despite these important limitations, the authors say that the implication of their findings for policy is that early diagnosis campaigns do not need to be targeted to the more deprived and that these should be applied irrespective of SEP. Back-tracking somewhat, they also say it may be prudent to target the more deprived groups purely because of the increased incidence of lung cancer. So, do we target the more deprived or not?

Factors that consistently have the strongest association with survival in lung cancer are age, performance status (PS) and stage.^{5–8} These determine the type of treatment that also has a major effect on survival, particularly with respect to curative versus palliative intent.⁹ The effect of comorbidity is also very important but more difficult to measure and hence often shows a less marked independent effect and not least because it influences PS.^{5–7} Current smoking and comorbidity are related and both are higher in the more deprived sectors of society and may partly explain the ‘independent’ effect of SEP as they are difficult to accurately separate from SEP. The crucial question is whether, apart from smoking cessation, there are other ways of improving survival in the more deprived patients. Forrest *et al*⁴ suggest targeting the more deprived groups is not one. Contrary to this is the evidence that people in more deprived sectors of society are less willing to participate in healthcare interventions, including smoking cessation and screening, and this may reflect a delay in seeking help.^{10–12} This effect of SEP will be lessened if, for the large majority of patients, outcome is determined by the biology of the tumour with little influence from early presentation. This was suggested by recent work where it has been shown that the majority of people with lung cancer have symptoms caused by their cancer and the symptom lead time is short, so that earlier symptomatic presentation can have little effect on mortality for the majority.¹³ However, the lead time was around 3 months, and for patients with lung cancer, this is a long time, when both stage and PS in particular can change to influence treatment. As better treatments become available for advanced disease, this will become more important; time to treatment is associated with better survival in cancers in which treatment is more effective.^{14–15} Another consideration is that a significant minority of patients, with much longer lead times, will be symptomatic from comorbidities and here there is a real possibility for cancer to be detected early.¹³ It is for this group that the lack of engagement in healthcare could have a major effect on

outcome. So, what is the answer for the significant minority that may benefit? This probably lies in further developing methods to identify and engage with those at risk and then building on the work on clear referral criteria and easy access to services.

IDENTIFYING AND ENGAGING WITH THOSE AT RISK

As Forrest *et al* point out, although there were differences in the way SEP was measured, all measures included a geographical component. It is thus sensible to target by area, accepting that this may include some lower risk individuals. In many countries, there are good data on lung cancer incidence by area and not surprisingly, these map to areas of higher deprivation. It is important, however, not to forget those in less deprived areas but here there may be less need for tailored methods to engage individuals. We know that people who are ex-smokers and in less deprived groups are more likely to participate in CT screening trials and are less likely to die from lung cancer within 90 days.¹⁶ These individuals may therefore respond better to global campaign material. An interesting finding by Forrest *et al* was that in some reports, the stage at diagnosis was later in the better educated and less deprived. This finding raises the issue of patient and primary care interaction in groups perceived to be at lower risk and in populations with a lower prevalence of lung cancer. Here both patient and clinician awareness and hence speed of recognition and referral may be less. Contrast this with the findings that lower SEP in high prevalence areas in Scotland are associated with earlier stage.¹⁷

Those least likely to respond to conventional (and cheaper) methods are more likely to respond to personalised materials and face-to-face contact.¹⁰ The Be Clear on Cancer Campaign has included both global methods and material distributed within communities, but further targeting may be appropriate.¹⁸ The effects of the campaign may be augmented by more tailored methods including language and delivery in communities at high risk.^{10–19} Special attention to those making attempts to quit smoking, who may be becoming more health conscious but remain at risk, may be appropriate; these can be approached through the smoking cessation services. Patients registered in medical practices might have a more accurate risk assessment and be targeted with material personalised to their SEP. If CT screening is introduced, all of these methods might be applicable to improve participation rates.

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CLEAR REFERRAL CRITERIA

There has been much work on risk prediction and the development of tools for use in primary care to guide when to investigate or refer for lung cancer. The latest National Institute for Health and Care Excellence guidelines on recognition and referral base recommendations on symptom/risk factor combinations that give a positive predictive value of at least 3%.²⁰ They do not recommend more sophisticated multivariable tools that may have better accuracy and hence both save money and reduce the anxiety that patients feel who are referred for suspected cancer.^{21–23} These tools will inevitably identify a majority of people in the more deprived sectors but only when they present with symptoms. The same or modified tools might be used to target individuals at risk but further work is needed to establish their accuracy in both scenarios. The use of such tools will allow primary care or other healthcare professionals to clearly identify those at risk and act promptly; a recent study showed that patients at risk of early death from lung cancer were frequently attending before referral, suggesting a possible missed opportunity.¹ Once the decision to refer or investigate is made there needs to be prompt availability and reporting of chest X-rays.

EASY AND EQUITABLE ACCESS TO SERVICES

Both distance to hospital and the type of facility patients are referred to have an influence on treatment rates. Distance has been shown in Australia and the UK, to be associated with less treatment.^{24 25} It is important therefore to ensure that travel is made easy, as this may be more difficult for those in more deprived groups. Difficulty in travelling was the most commonly cited practical barrier to participation in the UK Lung Screen trial²⁶ in which more deprived groups were least likely to participate. Treatment is also more likely if a patient is first referred to a larger centre. Surgical resection rates were shown to be 18% among patients first referred to a centre with thoracic surgical services on site compared with 12% for non-thoracic surgical hospitals.²⁷ This may be explained by distance to travel and by differing levels of specialisation in the diagnostic team. Policy is needed to mitigate this effect. The lung cancer commissioning guidance developed by the National Health Service England Clinical Reference Group for lung cancer includes recommendations to address these issues.²⁸

Forrest *et al* have used the best methods available to show that, accepting the

important limitations, SEP is not associated with either time along the pathway or stage at diagnosis, despite SEP being independently associated with receipt of treatment and survival. They say there is no indication for targeted campaigns based on SEP. However, as discussed here, attempts to isolate factors that may be important in health interventions such as early presentation may fail to recognise them as independent factors because they are associated with other more powerful factors that relate to SEP, and may apply only to a minority of patients where biological factors are a major determinant of outcome in the majority. Furthermore, the evidence for barriers to healthcare in deprived groups is overwhelming. Thus, people at risk of lung cancer should continue to be made aware of their risk and encouraged to present early irrespective of their SEP, but barriers affecting the more deprived groups, resulting in inequalities, should be identified and addressed in targeted interventions and policy.²⁸

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REFERENCES

- 1 O’Dowd EL, McKeever TM, Baldwin DR, *et al*. What characteristics of primary care and patients are associated with early death in patients with lung cancer in the UK? *Thorax* 2015;**70**:161–8.
- 2 Riaz SP, Horton M, Kang J, *et al*. Lung cancer incidence and survival in England: an analysis by socioeconomic deprivation and urbanization. *J Thorac Oncol* 2011;**6**:2005–10.
- 3 Forrest LF, Adams J, Rubin G, *et al*. The role of receipt and timeliness of treatment in socioeconomic inequalities in lung cancer survival: population-based, data-linkage study. *Thorax* 2015;**70**:138–45.
- 4 Forrest LF, Sowden S, Rubin G, *et al*. Socio-economic inequalities in stage at diagnosis, and in time intervals on the lung cancer pathway from first symptom to treatment: systematic review and meta-analysis. *Thorax* 2017;**72**:430–436.
- 5 Khakwani A, Rich AL, Powell HA, *et al*. Lung cancer survival in England: trends in non-small-cell lung cancer survival over the duration of The

- National Lung Cancer Audit. *Br J Cancer* 2013;**109**:2058–65.
- 6 Powell HA, Tata LJ, Baldwin DR, *et al*. Early mortality after surgical resection for lung cancer: an analysis of the English National Lung cancer audit. *Thorax* 2013;**68**:826–34.
- 7 Khakwani A, Rich AL, Tata LJ, *et al*. Small-cell lung cancer in England: trends in survival and chemotherapy using The National Lung Cancer Audit. *PLoS ONE* 2014;**9**:e89426.
- 8 Walters S, Maringe C, Coleman MP, *et al*. Lung cancer survival and stage at diagnosis in Australia, Canada, Denmark, Norway, Sweden and the UK: a population-based study, 2004–2007. *Thorax* 2013;**68**:551–64.
- 9 Wallington M, Saxon EB, Bomb M, *et al*. 30-day mortality after systemic anticancer treatment for breast and lung cancer in England: a population-based, observational study. *Lancet Oncol* 2016;**17**:1203–16.
- 10 Murray RL, Bauld L, Hackshaw LE, *et al*. Improving access to smoking cessation services for disadvantaged groups: a systematic review. *J Public Health (Oxf)* 2009;**31**:258–77.
- 11 Bryan L, Westmaas L, Alcaraz K, *et al*. Cigarette smoking and cancer screening underutilization by state: BRFS 2010. *Nicotine Tob Res* 2014;**16**:1183–9.
- 12 Sutton S, Wardle J, Taylor T, *et al*. Predictors of attendance in the United Kingdom flexible sigmoidoscopy screening trial. *J Med Screen* 2000;**7**:99–104.
- 13 Biswas M, Ades AE, Hamilton W. Symptom lead times in lung and colorectal cancers: what are the benefits of symptom-based approaches to early diagnosis? *Br J Cancer* 2015;**112**:271–7.
- 14 Neal RD, Tharmanathan P, France B, *et al*. Is increased time to diagnosis and treatment in symptomatic cancer associated with poorer outcomes? Systematic review. *Br J Cancer* 2015;**112** (Suppl 1):S92–107.
- 15 Navani N, Nankivell M, Lawrence DR, *et al*. Lung cancer diagnosis and staging with endobronchial ultrasound-guided transbronchial needle aspiration compared with conventional approaches: an open-label, pragmatic, randomised controlled trial. *Lancet Respir Med* 2015;**3**:282–9.
- 16 McDonald FE, Yadegarfar G, Baldwin DR, *et al*. The UK Lung Screen (UKLS): demographic profile of first 88,897 approaches provides recommendations for population screening. *Cancer Prev Res (Phila)* 2014;**7**:362–71.
- 17 Brewster DH, Thomson CS, Hole DJ, *et al*. Relation between socioeconomic status and tumour stage in patients with breast, colorectal, ovarian, and lung cancer: results from four national, population based studies. *BMJ* 2001;**322**:830–1.
- 18 Been coughing for 3 weeks or getting out of breath easily? Tell your doctor. <https://www.nhs.uk/be-clear-on-cancer—P1lyZ1UizKMeMOiC.97>
- 19 Experian: using a targeted approach to finding the ‘missing millions’ suffering from COPD—South Tyneside ‘Love your lungs’ campaign. 2010. <http://www.experian.nl/assets/overheid/case-study-copd-british-lung-foundation.pdf>
- 20 Suspected cancer: recognition and referral. nice.org.uk/guidance/ng12.
- 21 Moseholm E, Rydahl-Hansen S, Overgaard D, *et al*. Health-related quality of life, anxiety and depression in the diagnostic phase of suspected cancer, and the influence of diagnosis. *Health Qual Life Outcomes* 2016;**14**:80.
- 22 Iyen-Omofoman B, Tata LJ, Baldwin DR, *et al*. Using socio-demographic and early clinical features in general practice to identify people with lung cancer earlier. *Thorax* 2013;**68**:451–9.
- 23 Hippisley-Cox J, Coupland C. Identifying patients with suspected lung cancer in primary care:

- derivation and validation of an algorithm. *Br J Gen Pract* 2011;61:e715–723.
- 24 Tracey E, McCaughan B, Badgery-Parker T, *et al.* Survival of Australian lung cancer patients and the impact of distance from and attendance at a thoracic specialist centre: a data linkage study. *Thorax* 2015;70:152–60.
- 25 Jones AP, Haynes R, Sauerzapf V, *et al.* Travel time to hospital and treatment for breast, colon, rectum, lung, ovary and prostate cancer. *Eur J Cancer* 2008;44:992–9.
- 26 Ali N, Lifford KJ, Carter B, *et al.* Barriers to uptake among high-risk individuals declining participation in lung cancer screening: a mixed methods analysis of the UK Lung Cancer Screening (UKLS) trial. *BMJ Open* 2015;5:e008254.
- 27 Khakwani A, Rich AL, Powell HA, *et al.* The impact of the 'hub and spoke' model of care for lung cancer and equitable access to surgery. *Thorax* 2015;70:146–51.
- 28 Commissioning Guidance for the Whole Lung Cancer Pathway. <https://www.roycastle.org/how-we-help/lung-cancer-information/information-for-healthcare-professionals/commissioning-guidance>