The Impact of Alternative Routes to Diagnosis for Cancer on Utilisation of Care: Evidence from a Population-Based study

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Research Question

- What is the association between alternative Routes to Diagnosis (RtD) and following costs of care?
- What is the impact on costs of care of re-routing patients' diagnoses from Emergency Presentation to GP or Two Week Wait Referral?

Background & Motivations

- Cancer accounts for 6% of the NHS budget. Colorectal, breast, prostate, and lung cancer cost £1.5 billion annually in hospital care alone (Laudicella et al, 2016).
- Patients diagnosed through Emergency Presentation have lower survivals.
- Little is known about the cost implications of re-routing patients' diagnoses from Emergency Presentation to GP/Two Week Wait (TWW) Referral.
- Evidence on costs and health outcomes can support Clinical Commissioners in the efficient allocation of resources.

Methods

Data & Patients

- Patients age 18+ diagnosed in England in 2006-2009 with colorectal (108,551), breast (136,824), prostate (113,800) or lung (111,7836) cancer.
- Data on costs of inpatient and outpatient care from the National Schedules of Reference Costs were matched to data from the National Cancer Data Repository and Hospital Episodes Statistics.

Outcome measures

- Patients' risk adjusted costs one year before and five years after diagnosis
- Patients' risk adjusted survivals five years after diagnosis

Empirical Approach

- RtD were obtained from Elliss-Brookes et al (2012).
- Risk adjusted costs and survivals were estimated for patients diagnosed after a GP/TWW referral and patients diagnosed after an Emergency presentation.
- Total patients that can potentially be re-routed in every CCG were identified by comparing CCGs relative performance.
- Costs and Survivals were calculated for a simulated scenario where all CCGs achieved the same share of emergency diagnosis as the top 10% performing CCGs.

Estimation Strategy

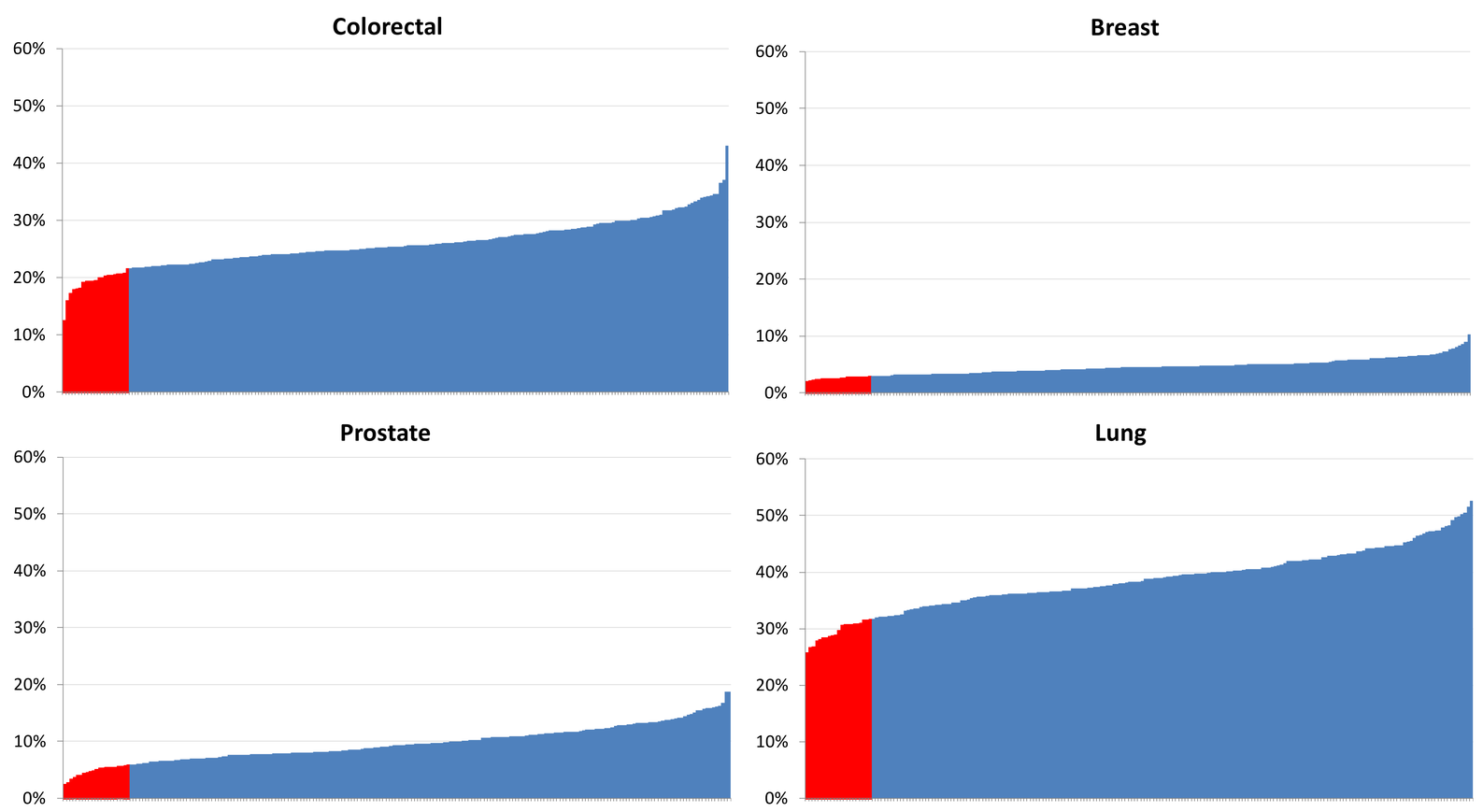
- Alternative RtD are likely to have an impact on costs through two distinct channels: by increasing the intensity of the treatment and by extending the life of the patients.
- Moreover, predicting patient-level costs is challenging due to skewness of the cost distribution, right censoring, and accelerated cost accumulation at the end of life.
- The Basu-Manning (BM) estimator was used (Basu & Manning, 2010) to measure the effect on costs of re-routing patients from Emergency to GP/TWW referrals.
- The BM estimator is a three part model that allows for the issues described above and for decomposing the overall effect on costs into the part due to variation in survivals and the part due to variation in intensity of treatment.
- Differences in Survivals at five years between Emergency and GP/TWW referral estimated using Wiebull Survival Models.

Cost Analysis: Re-routing Diagnoses from Emergency to GP/TWW Referrals

	Colorectal	Breast	Prostate	Lung†
Rerouted Patients	**1,535**	**580**	**1,166**	**2,370**
Conversion Rate (2014/15)	4.35%	7.76%	15.25%	18.56%
Number non Converted	33,784	6,894	6,475	10,399
Non Converted Costs	*£14,189,461*	*£1,091,669*	*£1,019,083*	*£1,325,085*
Pre Diagnosis Costs	*-£838,352*	*-£288,158*	*-£1,033,303*	*-£1,264,481*
Survival Costs	*£1,731,051*	*£412,871*	*£717,854*	*£2,150,354*
Intensity of Treatment Costs	*-£1,553,657*	*-£364,384*	*-£1,844,350*	*-£1,367,722*
Total Costs	**£13,528,503**	**£851,998**	**-£1,140,716**	**£843,237**
Additional patients surviving to 5 years	**551**	**297**	**476**	**354**
Cost per additional patient Surviving	**£24,549**	**£2,870**	**-£2,398***	**£2,381**

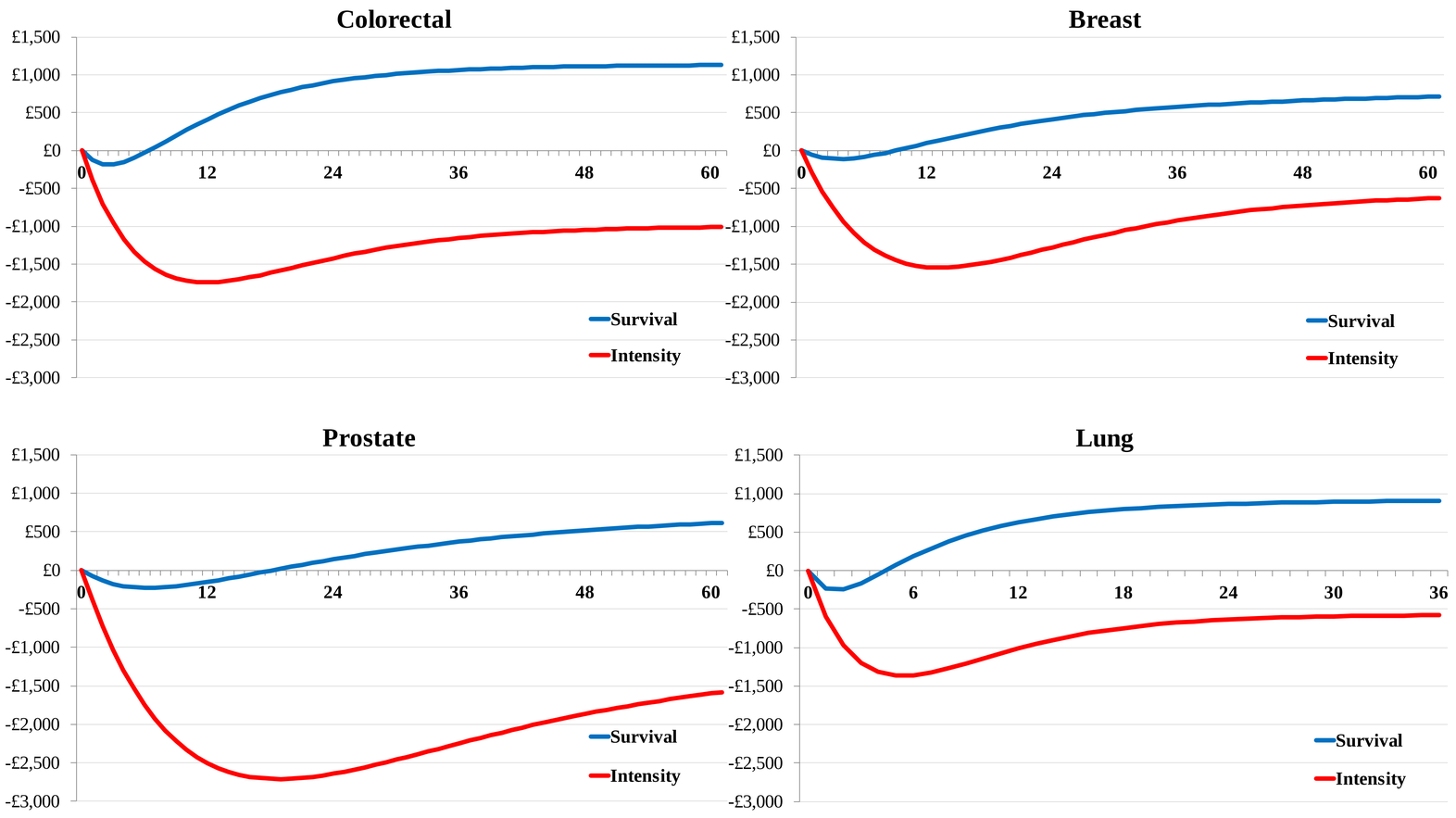
* Re-routing prostate cancer patients from Emergency Presentation to GP/TWW Referral is ***Cost Saving***.
† 3 Years Costs and Survivals for Lung Cancer.

Figure 1. Proportion of Cancers Diagnosed through an Emergency Presentation across CCGs



* 10% best performing CCGs shown in **RED** with average rate used to re-route patients in other CCGs.

Figure 2. Five-Year Average Cumulative Cost Differences between Emergency & GP/TWW Referral: Partitioned into Survival Costs and Intensity of Treatment Costs



* Negative costs indicate GP/TWW Referral diagnosis less expensive as compared to Emergency Presentation. *Months from diagnosis* on horizontal axis.

Conclusion

- This study provides evidence on the effect of costs and survivals of re-rerouting patients' diagnoses from Emergency Presentations to GP/TWW Referrals.
- Cancers diagnosed through Emergency Presentation have higher costs and poorer survivals rates than GP/TWW Referrals.
- If all CCGs reduced the share of Emergency Diagnoses as in the top 10% performing CCGs, annually 1,678 additional patients would survive to five years. Each life saved would cost £24,549, £2,870, and £2,381 for colorectal, breast, and lung cancer respectively. Re-routing patients is ***cost saving*** for prostate cancer (-£2,398 per patient).

References

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