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Enabling patients with respiratory symptoms to access chest X-rays on demand: the experience of the walk-in service in Corby, UK

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ABSTRACT

Background UK clinical guidance for lung cancer (NICE 141) includes pathways for chest X-rays (CXRs). Many patients fulfilling the criteria do not receive one, either because they do not consult their doctor or because their doctor does not refer them. The town of Corby, UK, has particularly high incidence and mortality rates for lung cancer and was chosen as a pilot site for a new, patient-requested X-ray service.

Methods The number of community-initiated CXRs were compared before and after the introduction of the service and between similar geographical areas. Clinical data and patient questionnaires were analysed for those attending the service.

Results There was a 63% increase in the total number of community-initiated CXRs in Corby for the year following the introduction of the service, compared with the year before. This was statistically greater than in surrounding geographical areas. Corby General Practitioners also requested 47% more CXRs than in the previous year.

Conclusions The implementation of the service was associated with a significant increase in the numbers of clinically indicated CXRs in an area of high lung cancer incidence and mortality. The service attracted a clinically appropriate population. The numbers of cancers detected were in line with statistical expectations.

Keywords cancer, primary care, public health

Introduction

In the UK, only 7.5% of patients with lung cancer are still alive 5 years after diagnosis and the median survival rate is only about 6 months.[1] This survival rate is amongst the worst in Western Europe, where rates are typically 12–14%.[2] This poorer survival rate has been related to a range of different factors, but previous studies comparing the UK to Scandinavia and Italy have suggested that late diagnosis of lung cancer in the UK is implicated.[3,4] Lung cancer is the second most common form of cancer in the UK, accounting for one in eight of new cancer cases. It is the most common cause of cancer death in the UK[5–7] and therefore the development of new initiatives that may lead to improved case detection are needed.

In the UK, most patients with suspected lung cancer are referred to specialist services by their General Practitioner (GP), following an abnormal chest X-ray (CXR). NICE clinical guidelines[8] recommend a CXR in all patients with respiratory symptoms that last 3 weeks or longer (breathlessness, hoarseness, cough, chest or shoulder pain). However, previous studies[9,10] have shown that many patients fulfilling these criteria do not get referred for a CXR, either because they do not consult their GP or because their GP does not refer them.

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Northamptonshire (a county in the East Midlands of England) as a whole has the same survival rate from lung cancer as the national average, and a slightly lower incidence than the England average (England incidence 45.6 per 100 000 (2008),[7] Northamptonshire incidence c. 40 per 100 000).[11] However, this county-wide average masks the fact that lung cancer is a serious problem in one of its towns: Corby. It is estimated that 33.5% of adults in Corby smoke, compared with 26% in Northamptonshire as a whole and 21% in South Northamptonshire.[11,12] There is a huge discrepancy in both incidence and mortality rates for lung cancer between Corby and other Northamptonshire local authorities, with Corby having an age-standardized lung cancer incidence and mortality rates of c. 70 and 60 per 100 000, respectively. This compares with rates of c.45 and 35 per 100 000 for the rest of the county.[11]

This study examined the implementation and impact of a new service whereby patients meeting the recommended clinical guidelines for a CXR could attend a community-based walk-in service without requiring a referral from their GP. This service was developed in partnership with local GPs and commissioners of clinical services in Corby. A social marketing campaign designed to increase awareness of the symptoms of lung cancer was associated with the service implementation. The aim of the research study was therefore to investigate the effect on community CXR rates of a new patient-requested, walk-in CXR service and linked social marketing campaign in Corby.

Methods

Intervention

The service was developed in partnership with local GPs and commissioners of clinical services in Corby. A community self-requested CXR service was provided to allow members of the public to self-present for a CXR without a GP referral or an appointment. Patients were made aware of the existence of these services and the criteria for undergoing a CXR by primary care health professionals and social marketing campaigns. The social marketing campaign was an integral part of the early detection of lung cancer initiative. The aim of the campaign was to make the public aware of the walk-in service, whilst increasing general awareness of cancer and its associated signs and symptoms and included promotional materials, media coverage and outreach events. Those presenting to the walk-in centre provided information relating to their symptoms, previous CXR history and other clinical data so that only those clinically eligible for CXR received one. These patient clinical data were routinely collected from patients as part of the intervention. The clinical information was reviewed by a radiographer and, if the patient fulfilled the following agreed criteria, a CXR was taken:

- aged over 50 years;
- persistent respiratory symptoms for longer than 3 weeks duration;
- no CXR on local hospital radiology system within the previous 3 months.

Patients were given an information leaflet, asking them to contact their GP 2 weeks later in order to discuss their results. Their X-ray report was sent to the patient's GP practice using the normal reporting protocol with an explanation of the self-requested service. Where the CXR suggested a diagnosis of lung cancer, a CT-Thorax was arranged by the local lung cancer team, and the patient was immediately referred to the fast-track lung cancer clinic (with a maximum 2 week wait from referral to appointment). The patient's GP practice was informed where this was the case.

Data collection

The study employed a mixed-methods approach, drawing on data from a range of sources. A range of routinely collected data sources were interrogated for anonymous data. These included centrally collected statistics from existing regional and national cancer registries, county-level CXR referral, reporting, investigation and subsequent intervention data, and routinely collected social marketing data. The source of the CXR referral (including differentiation between primary care, secondary care and self-requested referrals) were recorded on the county-level radiography databases.

In addition, all patients self-requesting a CXR were invited to complete a short questionnaire. This recorded demographic information, smoking status, motivation for attendance at the service, eligibility for a CXR and information relating to the social marketing campaign.

A sample size of 299 would be required in order to have a probability of 95% of detecting one case of lung cancer in those displaying clinical symptoms for whom a 1% prevalence might be expected.

Outcome measures

The primary clinical outcome measure was the total number of CXRs ordered from the community in Corby. This was obtained from the routinely collected data from the radiography departments of the two acute hospitals in the county who administer the X-ray services and only included those X-rays which originated from primary care (general practitioner) referrals. They do not include X-rays ordered by clinicians in secondary care, including those originating from referrals at

off-site secondary care outpatient clinics. Those data originating from the new walk-in service were separately identified as such and were also collected for this project. Other clinical outcomes included the number of cases of lung cancer diagnosed. Process outcomes for the service were also measured to judge its appropriateness and effectiveness.

Statistical analysis

Descriptive statistics were used to summarize the characteristics of those attending the new service. Chi-squared tests were used to investigate the differences between the observed CXR numbers across different geographical regions and between the lung cancer detection rates in Corby and Leeds.

Results

Service uptake and eligibility

There were 22 006 patients aged 50 years and over registered with Corby GPs in 2012.[12] In total, 463 people attended the Corby walk-in service from its inception (10 October 2011) until its closure on 31 September 2012. An equal number of men and women attended (228 men and 228 women, 7 not recorded). The mean age of those attending for a CXR was 64.5 years (SD = 10.3 years), with a range of 46–100 years. The ages of those accepted for an X-ray were similar (mean = 64.7 years, SD = 10.3 years) but with a range of 50–100 years, in line with the acceptance criteria.

Patients presented with a range of symptoms, the most common of which was cough (89%), with shortness of breath reported by 60% of those attending. Approximately a quarter of patients reported a change of voice (26%) and/or chest pain (26%). Thirty-seven percent of those attending were current smokers (this is similar to the adult smoking prevalence rate for Corby (33.5%)).[12]

Four hundred and seven of those attending for a self-requested CXR were recorded as having had CXRs performed by the service (24 did not have a CXR, and the outcome for the remaining 32 was not recorded). This indicates that a minimum of 86% of all who attended the walk-in service were clinically eligible for a CXR.

Effect on total number of CXRs

There was an initial large take-up of self-requested X-rays, and this coincided with intensive first quarter social marketing that was undertaken as part of the initiative. This initial large peak was followed by a decrease and then a partial recovery in May 2012. The social marketing campaign finished at the end of November 2011 and therefore the steady-state demand can be estimated from the January to September numbers (allowing time for the effect of the social marketing activities in November to dissipate), giving a mean of 20 self-requested CXRs a month (SD = 10.5). Figure 1 further examines this early large response, annotated with the direct marketing activities undertaken. An increase was observed in the numbers attending for X-ray after each marketing activity, although the effect of these steadily declines.

During the period in which the initiative was active, a 63% increase in total number of CXRs in Corby was observed, compared with the previous year. This was significantly greater than the 21% increase seen in the rest of the north of the county of Northamptonshire ($\chi^2 = 212.94$, $P < 0.001$). A national lung cancer campaign was implemented within this timeframe, which accounts for a widespread increase in CXR referrals.

In addition, there was a 47% increase in CXRs ordered by Corby GPs, excluding the self-requested X-rays, which was again statistically higher than those for the rest of the north of the county ($\chi^2 = 107.24$, $P < 0.001$). This is shown in Fig. 2.

Figure 3 shows the total number of community-initiated chest X-rays performed for patients from Corby and elsewhere in Northamptonshire for the 2 years prior to and 1 year following the introduction of the self-requested service in Corby. These are given as the number of CXRs per 100 smokers to take account of the different general practice populations and the confounding variables of smoking incidence. It can be seen that the CXR rates per 100 smokers for the three areas (Corby, other Northern Northamptonshire and Southern Northamptonshire) are very similar for the years preceding the introduction of the self-requested service for Corby. In the year when the service was running (October 2011–September 2012), there was a general increase in the number of CXRs performed, but the increase was much greater for Corby than for the rest of the County (see Fig. 3).

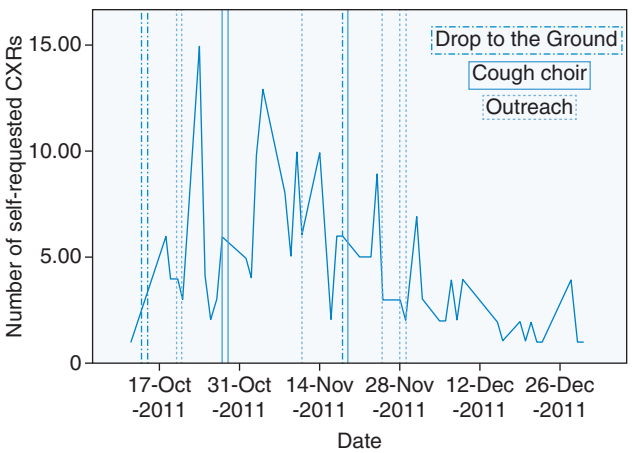

Fig. 1 Daily number of CXRs taken at the walk-in service 12 Oct–30 Dec 2011 with marketing campaigns.

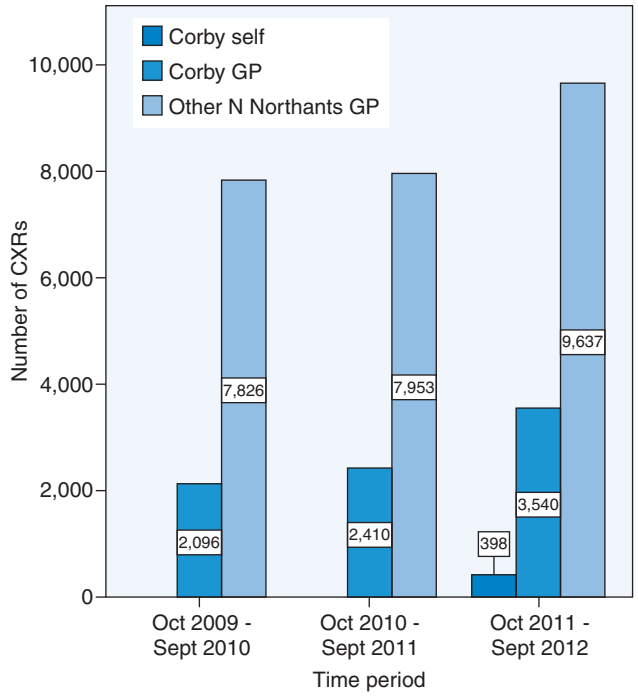

Fig. 2 Total numbers of CXRs by year.

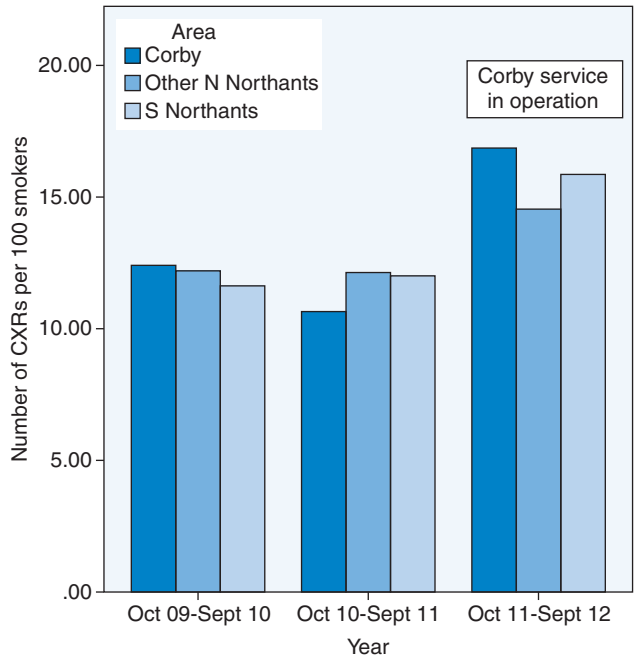

Fig. 3 Number of CXRs per 100 smokers in Corby, other Northern Northamptonshire and Southern Northamptonshire, by year.

Diagnosis of lung pathology

Two lung cancers were detected via the walk-in CXR service (0.5% of X-rays taken), both of which were at an advanced stage and were referred for palliative chemotherapy. This is not statistically significantly different from the experience of a larger study in Leeds using similar consecutively sampling (Callister *et al.*, personal communication),[13] which found 22 lung cancers from 2515 self-requested CXRs (0.9%) ($\chi^2 = 2.49$, $P = 0.618$). One case of renal cancer with lung metastases was also detected. Thirty-six patients displayed changes consistent with chronic obstructive lung disease which had not been detected previously and seven new cases of congestive cardiac failure were detected (see Table 1).

Table 1 Results of follow-up of abnormal X-rays

CXR follow-up	*Number*	*% of self-requested CXRs*
CT scan	24	5.5
Lung cancer (palliative chemo)	2	0.5
Other cancer with lung metastases	1	0.2
Interstitial lung disease	4	0.9
Congestive cardiac failure (new)	7	1.6
Chronic obstructive lung disease changes (new to radiology)	36	8.3

Discussion

Main findings of this study

The findings of this small pilot suggest that the introduction of this walk-in service, and its associated social marketing campaign, was associated with a dramatic increase in the numbers of clinically indicated CXRs for early diagnosis of lung cancer in an area of high lung cancer incidence and mortality. During the project, there was a 63% increase in community-initiated CXRs in Corby compared with the previous year and this was significantly greater than increases seen in the rest of the county. The service experienced an initial high peak of patients requesting X-rays. It is likely that these numbers would have included those who had had symptoms for some time and therefore once the service was well established those with more recent symptoms dominated. In line with this, the initial large peak experienced by the service was followed by a dip and then a partial recovery in May 2012. The social marketing activity was confined to the first 2 months of the initiative, which may have had an influence on the relatively low numbers attending for self-requested CXRs after this period.

One unexpected, but welcome, outcome of the initiative can be seen in a review of the data relating to the numbers of CXRs ordered by GPs in the geographical area covered by the pilot. Excluding the self-requested X-rays, there was a 47%

increase in CXRs ordered by Corby GPs, which is statistically higher than those for the rest of the north of the county. The initiative itself focussed on individual members of the public and raising their awareness: our findings suggest that there may have been a concurrent impact on the awareness and behaviour of clinicians.

Nearly 90% of people attending the Corby CXR service were clinically eligible for a CXR. This suggests that an initiative of this kind with its associated social marketing did not result in a large number of inappropriate requests and that the service and associated social marketing campaign were appropriately targeted. Only two lung cancers were detected through the self-requested CXR route and both of these were at an advanced stage (patients were referred for palliative chemotherapy). This level of detection was not statistically significantly different from expectations based on other studies. Other undiagnosed lung pathologies were also detected via the self-requested route.

What is already known on this topic

In the UK, a CXR is recommended for all patients presenting with respiratory symptoms lasting over 3 weeks. However, previous studies have found that referrals are not always made for a range of reasons.[9,10] A study of the effect of enabling patients to attend for a CXR without a GP referral in a major urban setting (Leeds) found that this could increase the number of clinically indicated CXRs and hence improve the likelihood of the early detection of lung cancer in that population (Callister *et al.*, personal communication).[13]

What this study adds

The findings of this project suggest that an initiative of this kind can increase the number of clinically eligible patients who attend for a CXR in an area of high lung cancer incidence and mortality, by enabling patients to circumvent the usual referral pathways. The findings confirm those of the Leeds study.[13] There was also an associated large increase in the CXR referrals from GPs during the time that the walk-in service was available, suggesting that primary care doctors may also have been made more aware of the referral guidelines.

Limitations of the study

This was a small pilot in one area of the UK and was only funded for a maximum of one year with active social marketing only in the first three months. Although the primary outcome measure for this study was the total number of community-initiated CXRs, the aim of such initiatives is to increase the early detection rate for lung cancers. Owing to the low expected incidence rates of lung cancer, this was not possible to adequately assess the impact in the time available. A longer study is recommended for follow-up work. Additionally, this study indicates that the behaviour of GPs may be affected by the introduction of a patient-requested pathway. This was an unexpected outcome and the study was not therefore designed to investigate the mechanisms for this finding, which again would benefit from further research.

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