

Improving diagnostic pathways for patients with suspected lung cancer

FINAL report

Accelerate, Coordinate, Evaluate (ACE) Programme

An early diagnosis of cancer initiative supported by:

NHS England, Cancer Research UK and Macmillan Cancer Support

ACE Lung Cancer Pathway Cluster

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About the ACE Programme

The Accelerate, Coordinate, Evaluate (ACE) Programme is an early diagnosis of cancer initiative focused on testing innovations that either identify individuals at high risk of cancer earlier or streamline diagnostic pathways. It was set-up to accelerate the pace of change in this area by adding to the knowledge base and is delivered with support from: NHS England, Cancer Research UK and Macmillan Cancer Support; with support on evaluation provided by the Department of Health's Policy Research Units (PRUs).

The first phase of the programme consisted of 60 projects split into various topic-based clusters to facilitate evidence generation and learning. The second phase (pilots live from January 2017) comprises five projects exploring multidisciplinary diagnostic centre (MDC) based pathways. The learning from ACE is intended to provide ideas and evidence to those seeking to improve local cancer services. The evaluations and findings are produced independently, and are therefore, not necessarily endorsed by the three supporting organisations.

Executive Summary

Introduction

The earlier diagnosis of lung cancer will save lives. Recent NICE Guidance (NG12) has lowered the threshold for suspected cancer referrals to ensure more people are investigated early. As well as improving clinical outcomes, this change will put additional pressure on diagnostic services. It is therefore important that lung cancer pathways are organised to be highly effective and efficient and to ensure patients are given their diagnosis as soon as possible.

The ACE Lung Cancer Pathway cluster has over the past two years sought to identify the practices that are likely to improve pathway performance and patient experience.

Purpose

The focus of this study is on *managed* lung cancer pathways from referral to diagnosis. The aim of this report and its supporting documentation is to share practical learning, relevant information and useful tools to a wider audience.

Six ACE projects have helped us learn about ways to achieve quicker access to CT (computed tomography), about using data to drive service improvement, and about ways of maximising radiology input and improving communications. In addition to the learning gained from ACE projects, emerging themes were also explored through a telephone survey, and national data was analysed to improve understanding of lung pathway configurations currently in place.

All of these activities have been progressed with the active involvement of national lung cancer experts and in close cooperation with the Lung Cancer Clinical Expert Group (LCCEG), NHS England. In parallel to ACE, the LCCEG developed a National Optimal Lung Cancer Pathway (NOLCP) and associated service guidance, both of which are due to be published in 2017 and are referenced in this report.

The structure of this report follows the stages of a lung cancer pathway up to diagnosis. It starts with sections on what happens following an abnormal or normal chest x-ray (CXR) report, explores whether CT should happen before or after the outpatient appointment (OPA) and how further diagnostic tests are organised. There are also separate sections on radiology and the role of data analysis in driving service improvement. Detailed information on each of the six ACE lung cancer pathway projects are included in the appendices and a variety of supporting documents are provided on the ACE website (www.cruk.org/ace-resources).

Context

Survival for lung cancer patients is intimately related to the stage at diagnosis. Data for lung cancer patients diagnosed in England in 2012 (McPhail et al, 2015)ⁱ reveals that 49% of lung cancers were diagnosed at stage 4, when survival rates are poor. One year survival rates for those diagnosed at stage 4 were only 14.6% for males and 19.3% for females, as opposed to 81.2% (males) and 85.1% (females) for those who are diagnosed with stage 1 lung cancer.

This relationship between earlier diagnosis and improved clinical outcomes is acknowledged by NHS England, and is a key aim of the current cancer strategy, *Achieving World-Class Cancer Outcomes. A Strategy for England 2015-2020* (July 2015).

Conclusions

This report shows that concerted effort by local teams can achieve significant positive change. Change is more likely to occur if primary and secondary care clinicians work together with the encouragement and support of senior management and local commissioners.

No one single lung cancer pathway configuration holds the answer to best performance but the trusts that manage to achieve tight, well-coordinated arrangements with same-day testing where appropriate, are achieving shorter pathways to diagnoses.

The trusts themselves identify the need to have good internal and external relationships along with a flexible approach and 'can do' attitude, as important characteristics of successful teams, which in turn achieves successful pathways.

This paper points the reader towards 'better practice' examples and shares expert views on key aspects of the pre-diagnostic lung cancer pathway. Each section of the report includes a set of specific topic-related conclusions. A set of general conclusions and recommendations have also been produced and are set out below.

- A.** There is a range of different pathway arrangements in place across lung cancer providers, a significant proportion of which are not in line with current best practice.
- B.** The implementation of straight-to-CT arrangements can achieve quicker access to CT, and therefore a quicker diagnosis for people that have had an abnormal CXR result.
- C.** Providing a timely – and possibly a GP direct access – route to CT for people who have had a normal CXR result, but continue to have clinical symptoms and/or concerns will pick up some cancers and will provide welcome reassurance to many others.
- D.** The analysis and use of comparative data within a constructive team environment can be a powerful tool in driving performance improvement.
- E.** Preparing patients fully (so they know what might happen) before referral will improve patient experience and reduce delays in the cancer pathway.
- F.** By providing all relevant clinical information on referral forms, GPs can reduce the potential for later delays and/or unnecessary procedures.
- G.** Radiology has a key role to play in the lung cancer pathway and significant benefits can be achieved by standardising communications between radiologists and GPs and by ensuring that anyone reporting CXRs reports a minimum of 2,000 CXRs per annum.
- H.** Clinical leadership, teamwork and having good relationships with colleagues across departments and organisations (secondary/tertiary) as well as flexible approaches and 'can do' attitudes are seen by trusts as key to better performance.
- I.** Enthusiastic clinicians can play a key role in driving service improvement and/or maintaining high quality services but they need to be part of a supportive management structure and to have appropriate levels of admin/project management support.
- J.** The telephone survey analysis did not identify many pathway features that were more prominent in trusts that perform well on 62/31 day median performance, but better performing trusts had more same-day testing arrangements in place and were smaller than those who performed less well on those standards.

Recommendations

Cancer Alliances and Clinical Commissioning Groups (CCGs) will want to ensure local providers have read this report and are given time and support to produce a plan of action to improve their lung cancer services.

These recommendations should be considered alongside the topic-based conclusions at the end of each section of this report.

1. Primary and secondary care clinicians should review the range of lung cancer pathways available locally as a set, and in particular:
 - Identify what route GPs should use if concerns remain following a normal CXR result.
 - Review what actions are taken by whom when an abnormal CXR result is detected.
 - Consider patient communications to ensure they are prepared fully before referral.
2. Local cancer teams should monitor the order and timing of key events including:
 - The proportion of 2WW and consultant upgrades that have CT prior to the OPA
 - Request-to-report turnaround times for CXR, CT, PET CT, EBUS – and check whether they are in line with the National Optimal Lung Cancer Pathway (NOLCP).
3. Local trusts should review their lung cancer workforce in relation to:
 - The number of radiologists/radiographers that report GP requested CXRs and consider whether rationalising this task to fewer people could be advantageous.
 - The proportion of 2WW and consultant upgrade patients first seen by a lung cancer specialist (as opposed to a respiratory physician without a lung cancer specialty).
4. Local services should consider whether there is further opportunity for coordinating tests so they occur on the same day, to reduce hospital visits and unnecessary delay.
5. Lung cancer teams should review their arrangements for deciding on post-CT diagnostics, taking into account the benefits that can be achieved by having a diagnostic multi-disciplinary team (MDT) approach, with the aim of ensuring that only the right tests are undertaken and in the right order.
6. Services should review local patient tracking arrangements within the cancer team and in radiology to ensure the system is robust, efficient, and fully operational.
7. Lung cancer services should organise regular team ‘time outs’ to review data reports, local intelligence and patient feedback on how the pathway is working. When areas of weakness are identified, consider options and develop plans to address.

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1. Introduction

This final report of the ACE Lung Cancer Pathways work stream follows the publication of an interim Report in October 2015. The interim report, [Lung Cancer Pathways: Variation in Performance and Practice](#) showed the wide variation that exists in Lung Cancer management and performance across English CCGs and trusts. For example, in 2014 the case mix adjusted median survival by NHS trust ranged from 91 days to 332 days post diagnosis and the median referral to treatment interval was between 35 and 63 days.

The interim report also described a range of differences in local lung cancer pathways and posed the question whether differences in performance could be explained – at least in part – by differences in the lung cancer pathways in place across NHS trusts.

This final report explores that topic in more detail incorporating the learning gathered from a number of different processes and sources during the past 2 years.

1.1 The ACE Programme

The ACE Programme concept was to learn by monitoring and evaluating local projects as they implemented changes to their pathways or piloted new interventions. 12 lung cancer projects were chosen to be part of ACE; all aiming to achieve earlier diagnosis of lung cancers and improved patient experience, but in different ways.

ACE clustered the projects around two key themes, one theme identified projects aiming to take [proactive approaches](#) to people at high risk of lung cancer, mostly aimed at people who are asymptomatic, and the other theme was about improving and streamlining [lung cancer pathways](#) for people who present to their GP with concerning symptoms. This report, along with a number of associated documents, is the outcome of the lung cancer pathway cluster and a brief description of the 'proactive lung' cluster is provided below.

1.2 'Proactive Approaches' lung cluster

In this cluster five ACE projects are exploring the benefits of taking various proactive approaches to finding and then testing people at high risk of lung cancer. Of the five ACE projects in that cluster, four are offering CT scans to people who have been risk assessed as being at high risk. The other project within that cluster has established a self-referral CXR service and has been exploring the benefits of that approach. The final report of that cluster will be available in summer 2017 but a short update report was produced in November 2016 and is available [here](#).

2. National context

2.1 Lung cancer – facts and figures

It is well documented that survival for lung cancer patients is closely related to the stage at diagnosis. Data for lung cancer patients diagnosed in England in 2012ⁱ reveals that 49% of lung cancers were diagnosed at stage 4, when survival rates are poor. In fact, one year survival rates for those that present at stage 4 were only 14.6% for males and 19.3% for females, as opposed to 81.2% (males) and 85.1% (females) for those who are diagnosed with stage 1 lung cancer.

The same study (McPhail et al, 2015) however, showed a recent improvement in the proportion of all patients alive at one year, increasing by an absolute level of around 11% between 2004-7 and 2012. They further examined stage-specific survival and showed that these survival improvements were limited to patients with earlier stage disease, there being no change in survival rates in patients with stage 4 lung cancer. Another study (Walters et al, 2015)ⁱⁱ showed that survival rates for six commoner cancers in England, including lung cancer, had increased between 1995 and 2013. The proportion of patients (all stages) alive at one year had increased from 23% to 39%.

Although the proportion of lung cancers diagnosed following an emergency presentation is going down (from 39% in 2006 to 35% in 2013) and the proportion of those diagnosed via 2WW referrals is going up (22% in 2006 and 28% in 2013)ⁱⁱⁱ there is still huge scope to save lives by bringing patients into the system earlier, through a managed route which will in turn, improve clinical outcomes.

The relationship between earlier diagnosis and improved clinical outcomes is acknowledged by NHS England and the current cancer strategy has therefore identified earlier diagnosis as one of its key aims.

2.2 Policy framework

Following the publication of the Five Year Forward View the Independent Cancer Taskforce was established to develop a five year strategy for cancer. The Cancer Taskforce report, *Achieving World-Class Cancer Outcomes. A Strategy for England 2015-2020* was published in July 2015. It sets the framework and confirms that the need to achieve earlier diagnosis of cancers is a very high priority.

The National Cancer Programme was established to lead the delivery of the Cancer Taskforce report. It published an implementation plan in May 2016^{iv} and a progress update in October 2016^v.

Key initiatives that are impacting (or will soon impact) lung cancer pathways include:

New NICE Referral Guidelines NG12, published in 2015. This guidance lowers the threshold for urgent cancer referrals and will put extra pressure on services if cancer pathways are not working efficiently.

Faster Diagnosis Standard will require a diagnosis of cancer/no cancer within 28 days. This is currently being piloted for lung cancer in East Lancashire and Bournemouth and is due to be evaluated and rolled out from April 2018.

National Diagnostic Capacity Fund and Transformation Fund, provides an opportunity for CCGs and/or Cancer Alliances to submit bids which will help them to build their local diagnostic capacity. Both to keep up with growing demand and to ensure their lung pathways are functioning at optimal levels.

Lung Cancer Clinical Expert Group (LCCEG), this group, formerly referred to as the Lung Cancer Clinical Reference Group, sits within the NHS England structures reporting up to a

Cancer Clinical Steering Group (CCSG) which is chaired by the Clinical Director for Cancer, Chris Harrison. A key role of the CCSG will be to support the work of the Cancer Alliances as they implement the cancer strategy.

Lung Service Guidance and the Optimal Pathway

The LCCEG has produced Lung Service Guidance and an Optimal Lung Cancer Pathway (NOLCP). Both documents have had wide consultation and are likely to be published in early 2017 via NHS Gateway. The Optimal Pathway will have the status of supporting guidance.

ACE has been working closely with the LCCEG and this lung report should be seen as associated documentation. The NOLCP has drawn on some of the interim findings of the ACE Programme whilst at the same time the LCCEG has influenced the shape of some of the ACE projects. The work of ACE should be seen as complementary to that of the LCCEG.

A copy of the NOLCP is available [here](#).

3. Sources of learning

Although the focus of this cluster has been on the 6 ACE Lung Pathway projects, information gathering and learning has taken place in a variety of ways and these are described below.

3.1 ACE Lung Cancer Pathway projects

The 6 projects that formed the core of this cluster have been progressing their projects over the past two years. Four of the six projects were aiming to create a shorter and more direct route to CT for patients that received an abnormal CXR result – either as the focus or as one element of a wider project. One project implemented a new GP direct access to CT pathway for patients that had received a normal CXR result, but continued to have worrying symptoms. The focus of the sixth project has been the use of data analysis and clinical engagement at sector level to drive service improvement.

All of these projects were evaluated locally with ACE maintaining a monitoring and oversight role. Many of the projects developed new documentation as a result of their projects and these documents are included on the website as supporting resources. Other tools and resources were developed at cluster level including an automated [Days to Diagnosis Chart](#) and a '[Straight-to-CT Quick Reference Guide](#)' which readers may find useful.

A more detailed description of each of the 6 projects is provided in the appendix, and the results and key learning from the projects is described in the relevant topic based sections below.

3.2 Telephone survey

In order to gain a better understanding of pathways in place at trusts outside of ACE, a telephone survey was carried out during October/November 2016 in 20 trusts; 10 of whom had performed well on 62 and 31 day pathways during 2014 and 10 who struggled with those pathways during that particular year.

The purpose of the survey was both to 1) get a sense of the range of pathway configurations in place across the country and 2) to see whether the lung cancer pathways in place in 'top' performers were significantly different to the pathways in place in 'bottom' performers.

A variety of indicators can be used to assess performance but since this study focusses on pathway performance, median day performance of 62 and 31 day standards were identified as being the most relevant indicators to use. Throughout this paper references to 'top' and 'bottom' performers only relates to trusts in terms of their lung cancer pathway performance in 2014 in relation to 62 and 31 days so the reader should bear in mind this narrow definition of performance.

Telephone interviews were chosen as the information gathering method since preliminary discussions showed that some terminology e.g. 'straight-to-CT' meant different things to different people/organisations. The telephone interviews were carried out by the ACE lung programme lead and in most cases the interview was with the lead lung cancer physician at the trusts, although in some cases the interview was with the cancer services manager or lead

clinical nurse specialist (CNS). All participating trusts were assured that their responses would be presented anonymously.

Some results of the telephone interviews are presented in the relevant topic-based sections below, and a copy of the full report is available [here](#).

3.3 National Data Analysis

ACE has also analysed national datasets to gain a wider picture of variation in lung cancer pathways. In order to achieve this, lung cancer data from the National Cancer Registry were linked with the Diagnostic Imaging Dataset (DID) and Cancer Waiting Times (CWT) data. All these national datasets were accessed via the National Cancer Registration and Analysis Service (NCRAS).

The overall aim of this national data analysis was to investigate pre-diagnostic pathways for lung cancer patients diagnosed in 2013. Objectives were to 1) describe and examine variation of different pre-diagnostic scenarios and 2) examine the variation in CT timings by trust.

Some analysis also focussed on top/bottom performers to mirror the telephone interview process. Specific aspects of this analysis are presented in section 6.1 below and further information is available in section 8.

3.4 Expert input

All of the ACE lung pathway meetings benefited from the active participation of lung cancer experts with national roles. The lung experts played a key role in shaping and providing context to the discussions. In particular, substantial expertise was provided from the LCCEG through its Chair, **David Baldwin**.

There has also been substantial input from NCRAS from its Clinical Lead for Early Diagnosis, **Mick Peake**. In particular the national data analysis presented within this report was overseen by NCRAS.

The Royal College of Radiologists (RCR) provided a representative to ACE, **Anand Devaraj**, and the programme has benefited significantly from his input in a variety of ways.

Each of the experts listed above have seen and contributed to this report.

4. CXR results – what happens after abnormal results

4.1 ACE Project learning

The three ACE projects that have been able to design and implement new straight-to-CT pathways and monitor the results of those changes are Crawley CCG, Horsham & Mid Sussex CCG and University Hospitals of North Midlands (UHNM). Their results are presented below but more information on each of these projects is in the appendices.

Crawley CCG

A new straight-to-CT pathway for patients with an abnormal CXR result was introduced in October 2015 at Sussex and Surrey Healthcare NHS Trust and was monitored for 12 months.

The team devised a new [CXR referral form](#) and integrated patient information leaflet, to enable a patient to be referred directly to CT; when the CXR result warrants this.

An electronic automatic alert (code Z5) is used when a CXR result indicates a potential cancer. The code then triggers the new pathway, which moves the patient more quickly to a CT scan.

- During the 12-month pilot, 110 patients received a Z5 code and 56 (51%) of those later received a confirmed cancer diagnosis.
- Prior to implementation, CXR to CT interval was **27 days**, post implementation **14 days**
- Before implementation only **16%** of 2WW referrals had CT prior to OPA, rate is now **50%**
- Before implementation 62 day performance was as low as **59%**, now it is **94%**
- For more information about this project and a copy of the referral form see **appendix 1A**.

Horsham and Mid Sussex CCG

Brighton and Sussex University Hospitals NHS Trust established a new diagnostic MDT in December 2015. They rationalised CXR reporting from 30 to 7 radiologists/reporting radiographers then developed and put in place a new radiology decision support/coding system and introduced new CXR referral forms. These were all precursors to the introduction of their new straight-to-CT pathway, which started in April 2016. The pilot finished on 30/09/16 providing six months of data.

Since the use of the new pathway was dependent on GPs referring on the new CXR referral form and this has taken time for local GPs to get used to using, the old and new pathways ran alongside each other during the pilot period.

- Data relating to activity between April and September 2016 has been analysed.
- 7,918 GP requested CXR referrals were made during the pilot period and 39% (3,102) of those were referred on ACE forms.
- 111 of the 3,102 (**3.7%**) referred on the new form resulted in an ACE code 1 or 2 being given, which then triggered a CT scan being arranged directly by the radiology department.

- Prior to the pilot, the CXR to CT interval time was **19 days**. During the pilot the total lapsed time achieved was **7 days**.
- Prior to the pilot, the CXR to chest OPA interval was **27 days**, during the pilot it was **18 days** and included a diagnostic MDT discussion which had not happened previously.
- Of the 103 patients that went on to have a CT scan, 30 patients (29%) were referred to the lung diagnostic MDT with probable cancer, 44 patients (43%) had a CT abnormality requiring a routine Chest OPD referral and 28 patients (21%) had a normal CT scan and were discharged back to the GP.

The Trust regards their new pathway as a success and is recommending that it continues, subject to being appropriately commissioned.

For more information about this project and a copy of the radiology decision support tool they created, see section 10.1, **appendix 1B**, and the supporting resources [here](#).

University Hospitals of North Midlands

At University Hospitals of North Midlands straight-to-CT was implemented in the north of their patch (North Staffordshire and Stoke-on-Trent) prior to ACE, but then rolled out to south Staffordshire as part of ACE. The project was hampered by organisational change which then affected patient flows, but the new pathway was eventually implemented in south Staffordshire from January 2016.

Local data analysis has identified that the new pathway achieved considerable positive improvement with the most striking change being a reduction from a peak of **37 days** from referral to MDT before the pathway was introduced to **17 days** after 9 months of using the new pathway. As in the case of Horsham and Mid Sussex project, the UHNM project began with measures taken by radiology to rationalise and improve CXR reporting. They had also introduced patient tracking within radiology, which they regarded as particularly beneficial. For more detail about their project achievements and key learning please see **Appendix 1E**.

4.2 Telephone survey results

A key question included within the telephone survey conducted by ACE was about local arrangements in place for action following identification of a CXR result which indicates the possibility of cancer. For ease of reference this will be referred to simply as an ‘abnormal’ result in this report.

The 20 survey responses revealed a range of pathways in place **from** the more traditional i.e. CXR report sent to GP and the GP then decides what action to take next, **to** what could be described as a straight-to-CT arrangement where secondary care assumes responsibility when an abnormal CXR result is identified and decides what needs to happen next, which generally is for the patient to have a CT scan as quickly as possible.

Table 1 below displays the responses received grouped into broad categories, relating to both the mechanism that is used (2WW or consultant upgrade) and *who* is responsible for deciding on the next step and making sure it happens. It shows that:

- The majority of trusts use the 2WW mechanism to trigger the start of the cancer pathway at this stage, although some use the consultant upgrade mechanism.
- The most common arrangement is that the trust initiates action immediately, but requests and chases (where necessary) a 2WW referral form, the receipt of which 'starts the clock'.
- There were no significant differences in the processes used between top and bottom performers in terms of this stage of the pathway.

Table 1: Action taken as a result of abnormal CXR

	TWW	TWW	Cons Upgrade
	GP responsible for making things happen after CXR report received	Trust starts action and chases GP if 2WW form not submitted promptly	Secondary care assumes responsibility and informs GP of actions taken
TOP Trusts	T1, T2, T4	T3, T5, T8, T10, T11, T13	T7
BOTTOM Trusts	B8	B2, B4, B6, B10, B13, B14	B7, B9, B12

Please see third paragraph of section 3.2 for an explanation of 'top' and 'bottom' trusts. The full telephone survey report can be found [here](#).

4.3 National Guidance and Expert Views

Regarding CT stopping 2WW clock

NICE referral guidance states that if a CXR result suggests cancer then a 2WW referral should be made. *Cancer Waiting Times Guidance (V9)*^{vi} indicates that the 2WW standard is met when a patient is seen by a consultant or has gone 'straight-to-test'. In the case of lung cancer the CT scan is sufficient to 'stop the 2WW clock'.

CWT V9 Section 3.2 Ending a pathway

The 2WW end point is either when:

- *The patient is seen for the first time by a consultant (or member of their team) or in a diagnostic clinic following the referral receipt. This is recorded as DATE FIRST SEEN*
- *The patient is seen at a diagnostic clinic or goes 'straight to test' (unless that test is a blood test).*^{vii}

Regarding consultant upgrade vs 2WW

"4.7.1 CWT Guidance V9, Who can upgrade a patient?"

A consultant or an authorised member of the consultant team (as defined by local policy) can upgrade a patient if cancer is suspected. The ultimate responsibility for upgrades rests with the consultant responsible for the care of the patient who will have delegated their authority by local agreement. The upgrades could come from any part of the health service not just from consultants and

teams that most commonly see cancer patients. It is therefore important that local policies are agreed and processes are in place to publicise and operate the upgrade system locally."

"This suggests to me that, so long as both sets of consultants are obeying local guidance regarding the requirements for them to start patients on a cancer pathway, both groups are obeying the CWT guidance, and either practice can be acceptable."

CWT analyst response to query from B. Gill

Regarding Straight to CT

NICE Clinical Guidelines 121 Section 1.1.6

Where a chest x-ray has been requested in primary or secondary care and is incidentally suggestive of lung cancer, a second copy of the radiologist's report should be sent to a designated member of the lung cancer MDT, usually the chest physician. The MDT should have a mechanism in place to follow up these reports to enable the patient's GP to have a management plan in place. [2005]^{viii}

NICE Quality Statement 3:

"People with a chest x-ray result suggesting lung cancer have a copy of the radiologists report sent to and followed up by the lung cancer MDT"

Lung CRG's Optimal Pathway

The National Optimal Lung Cancer Pathway (NOLCP) stipulates that GP-requested CXRs for a potential cancer should ideally be reported immediately (hot reporting) and where the result is suggestive of cancer, a CT scan should take place on the same day or within 72 hours. A copy of the NOLCP is available [here](#).

4.4 Conclusions: abnormal CXR results

- Significant improvement can be achieved by putting in place a 'straight-to-CT' arrangement as demonstrated by ACE projects. Benefits include:
 - Quicker access to CT for those at higher risk
 - Having a secondary care safety net in place to ensure patients are followed up, even if a GP referral is not made.
 - Fewer outpatient appointments taking place without CT results being available – i.e. higher percent of CT prior to OPA
- Expert views and national guidance recommends that straight-to-CT arrangements are available, but they are not currently in place in a significant number of trusts.

- Since both 2WW and consultant upgrade mechanisms are being used to start the cancer pathway following an abnormal CXR, data analysis that focusses only on 2WW data (e.g. conversion rates) will not be giving a complete picture of activity.
- Where GPs are able to prepare patients for the possibility that a CT will be needed following the CXR, this reduces potential delay and is likely to improve patient experience. It also ensures the GPs are geared up to provide up-to-date renal function, should CT be required.
- Where GPs have submitted adequate clinical information on their CXR referral form, this enables secondary care to decide best course of action more quickly i.e. without needing to get further information from the GP or needing to conduct an OPA prior to the CT.

Please also see ACE's *straight-to-CT* [Quick Reference Guide](#) available as a supporting document.

5. What happens after a normal CXR result

5.1 ACE Project Learning

The CXR is usually the first diagnostic test undertaken in a patient with lung symptoms, but it is a poor indicator of early stage lung cancer. Studies indicate that as many as 20–25% of lung cancers are missed on the initial CXR^{ix}, and this figure may be higher for early stage lung cancers. CXRs may not detect lung cancer either because i) it was visible but was misinterpreted, or ii) because it was not visible due to the position of the tumour within the lung or its small size or had an atypical morphology (e.g. looked like an infective or inflammatory process rather than a malignancy).

Because of the unreliability of the CXR in identifying lung cancers, particularly at their early stages, it is important that there is access to a second and more definitive diagnostic test – the CT scan – for appropriate circumstances.

One ACE project based in Nottingham (A16), established a GP direct access pathway to CT as a way of providing direct access to this second diagnostic test to GPs.

Their aim was to improve access to CT for people who met the following criteria:

- Normal CXR result
- Persistent cough (>3 weeks)
- Resolved minor haemoptysis
- High risk of lung cancer
- Unexplained change in symptoms in patients with COPD

They hoped to reduce the use of the 2WW referral route by providing this alternative with a key aim being to reduce unnecessary outpatient appointments.

Their new pathway began in January 2015 as a pilot in a small locality but then was rolled out across all Nottingham CCGs from June 2015. An analysis of the data from that period reveals that:

- Over 150 direct access CT scans were performed via the new pathway
- **2.4%** were found to have lung cancer
- One other incidental cancer was also found
- **4%** of patients had non-malignant abnormalities that required treatment
- A large proportion of patients were reassured that they did not have cancer
- CT turnaround time for routine patients was **42 days** during this period, and only **15.5 days** for patients on the GP direct access pathway
- GP satisfaction with the new pathway was high and rated 8.1 out of 10

Although this pathway offered quicker access to CT than the normal CT referral route, it did not provide quicker access than those referred via a 2WW referral. This however, may be appropriate given the lower levels of risk that they would have had. The impact that this additional pathway had on the quantity of 2WW referrals made during that period has not

yet been analysed. More information about the Nottingham project is in **appendix 1C** and the direct access CT request form used by the project is available [here](#).

5.2 Telephone survey results

The table below shows the responses given by top and bottom trusts to the question: What happens after a normal CXR result, when the GP still has concerns? Most trusts responded that *'The GP can/should make a 2WW referral'*. Some trusts added that the GP could also seek advice. Other trusts had direct access to CT pathways and indicated that this would be an option. The full list of responses is provided in table 2 below, which shows that:

- ❖ The 2WW referral is seen as the route available for this situation in most cases
- ❖ There are no marked differences between top and bottom performers in relation to this aspect.

Table 2: Normal CXR result but continuing concerns

	Top Trusts	Bottom Trusts
2WW referral	3	7
2WW referral or phone for advice	3	-
2WW or Direct Access to CT	2	2
Direct Access to CT	1	-
Urgent referral to Respiratory OPA		1

Do local GPs have direct access to CT?

Of the 20 trusts asked, most said 'no' (13) and 7 said 'yes' to this question. When trusts were asked about the criteria for using this pathway, answers were fairly vague and it seemed to be mostly up to the GP's discretion.

One of the physicians interviewed felt that the Lung Risk Assessment Tool (RAT), could be used at this stage of the pathway (with some adaptation), when patients have had a normal CXR result but have continuing symptoms.

In terms of the split between top/bottom performers, five top performers answered 'yes' to having direct access pathways in place as opposed to two of the bottom performers (table 3).

Table 3: GP direct access pathway to CT

Top trusts	Bottom trusts
5 said Yes	2 said Yes
5 said No	8 said No

5.3 National Guidance and expert views

The NOLCP stipulates that if a CXR result is normal but that clinical suspicions remain, a CT scan should be provided either on the same day or within 72 hours of the CXR result.

This perhaps raises the question of whether or not the CXR is required if a CT is to happen no matter what the result; expert views are that the CXR result is still valuable as part of the

diagnostic process, even if the result is normal. It may provide an alternative diagnosis to explain the patient's clinical presentation that is sufficient to reassure both patient and GP or might suggest that a course of antibiotics should be given prior to considering a CT. Additionally if a definite lung cancer is shown on CXR, it can ensure that the patient has the appropriate staging CT as the next step (e.g. chest and abdominal CT with contrast).

However, if a patient has sufficiently concerning systems/risk profile to warrant a CT scan whether or not the CXR is normal, then it may make sense for this to be ordered at the same time as the CXR. This would also mean that patients could be prepared for having both tests at the same time. A key issue though is which risk algorithm is the most appropriate one to use to assess the risk level and there is not yet a definitive answer to this question.

5.4 Conclusions: normal CXR result

- The Nottingham ACE project has demonstrated that GP direct access to CT pathways can provide a helpful alternative route for GPs who feel that further investigation is required following a normal CXR result, but where the risk level does not justify a 2WW.
- If a key reason for establishing a GP direct access pathway is to reduce 2WW outpatient appointments, a 2WW pathway which includes CT prior to OPA, with discharge by phone or letter following normal CT results, could achieve the same aim.
- Any pathway needs to be seen in the context of what purpose it serves and what the alternative routes would be if it did not exist. A direct access to CT route can offer a longer pathway to CT than a 2WW referral route, but that may be appropriate if the access criteria reflect a lower level of risk than the patients that would normally be referred via the 2WW route.
- The range of pathways available to GPs and the access criteria to each should be reviewed as a set to ensure that appropriate and speedy access is available for all those who require the extra reassurance that a CT scan can offer, even if the CXR result is normal.

6. OPAs and CT scans – which comes first?

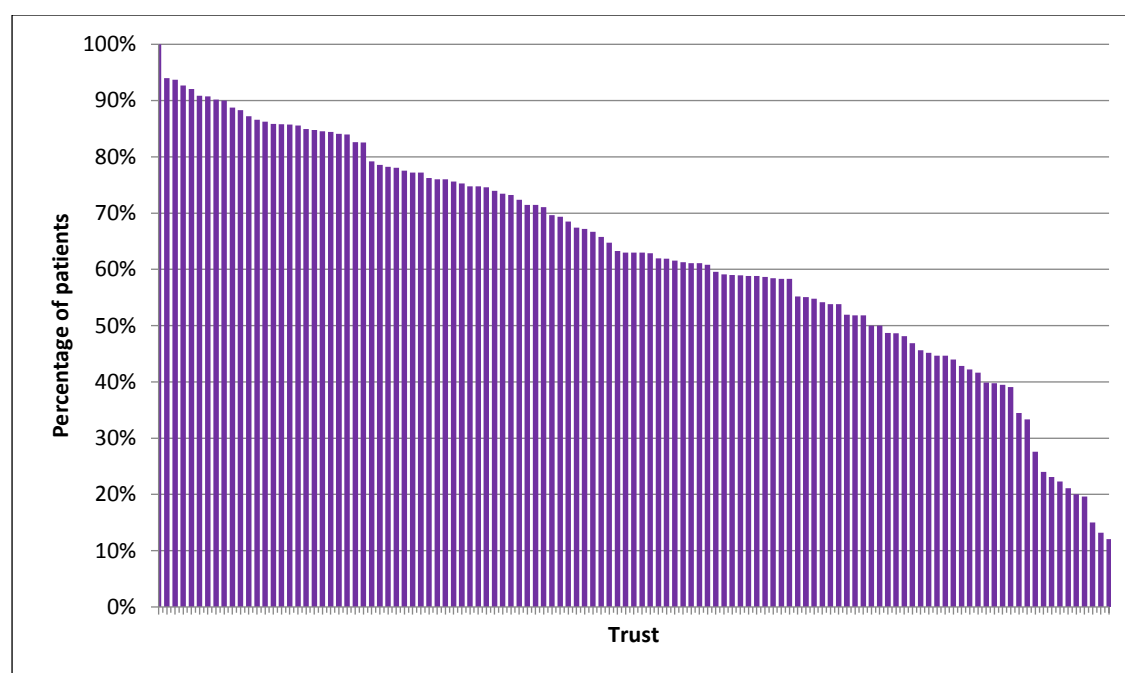
The focus of this section is on the order and nature of the arrangements surrounding the first diagnostic tests; in particular, whether the CT happens before or after the initial OPA. One-stop clinics will be explored and the concept of filtering or triaging referrals.

6.1 National data analysis results

Linked imaging data, cancer waiting times and cancer registrations across England in 2013 was analysed to try and identify current practice in relation to the ordering of consultant activity in secondary care and the CT scan.

For non-emergency patients, the timing of the CT scan in relation to whether it occurred before or after they had their first consultant OPA in secondary care was explored. Figure 7 below shows wide variation in the proportions of patients receiving CT scans prior to or on the same day as their first consultant activity across 116 trusts - range from 12% to 100%.

Figure 7: Proportion of non-emergency patients by trust who had CT scan before or on same day as first consultant activity in secondary care, 2013 (NCRAS- NCR, DID and CWT)



A limitation of this analysis is that the first consultant activity in secondary care may actually be the CT scan itself or that both occurred on the same day.

These data are consistent with the information gathered from the ACE telephone survey which shows that CT prior to, or on the same day as the first consultant appointment (OPA) in secondary care, is not the standard pathway in a significant number of trusts.

6.2 Telephone survey results

Trust responses to the question, 'which comes first, CT or outpatient appointment (OPA)?' ranged from one end of the scale to the other (Table 4). In some trusts the OPA is always done first and in others the CT is always done first. Five trusts have 'one-stop shop' arrangements

in place for at least some of their patients, which means that the two events generally happen on the same day.

Interestingly, two trusts explained that the order varied depending on whether the patient was on a 2WW pathway or a consultant upgrade pathway. Even more interestingly, one of those trusts does CT before OPA for 2WWs but OPA before CT for consultant upgrades and the other trust does it the other way around i.e. the OPA before CT for 2WWs and CT before OPA for consultant upgrades.

When questioned further about these arrangements, the logic generally related to the patient communication arrangements. Where the pathways included arrangements for the patients to be told that a CT might be needed after the CXR, the CT was arranged without the need for a prior OPA. Where patients were unprepared for this possibility, it was felt that an OPA was needed first to prepare them.

Table 4: What happens first: CT or OPA

	OPA always or mostly first	Same day (one-stop shop)	CT always or mostly first (60%, 90%, 100%)
TOP Trusts	T4, T5, T7	T2, T8, T10	T1, T3, T11, T13
BOTTOM Trusts	B6 (2WW), B7(2WW) B9(CU), B10	B7(CU), B8	B2, B4, B6(CU), B9(2WW), B12, B13, B14

One lung physician interviewed said that *‘before subjecting anyone to radiological exposure physicians should do a full clinical assessment taking into account co-morbidities...’* and at that trust the OPA always happens first for 2WW referrals. **Physician A**

In contrast, another lung physician said that no OPA should happen unless the CT had taken place and the results were available. **Physician B**

Yet another lung physician commented that a third of patients would not need to come in for an OPA if their CT had been done and reported ahead of time. **Physician C**

Physician A quoted above, explained that the initial OPA was necessary because 2WW referrals did not normally include sufficient clinical information to enable a decision to be made about the appropriateness of a CT scan. He felt that new ‘tick box’ referral forms provided less information than GP letters had provided in the past.

Patient communications

This is a topic that a number of people felt strongly about. If patients know what to expect when they are referred into secondary care – either as a 2WW or for a particular diagnostic test - they will have a better patient experience and it will be a less stressful experience. However, despite the importance of the preparation process, it is not always happening.

Inadequate preparatory communications can lead to a patient requiring an extra outpatient appointment which may be inconvenient to the patient, require extra resource from the cancer team and add delay in the pathway.

One-stop clinics

Several of the trusts interviewed offered CT and OPA appointments on the same day within a 'one-stop shop' arrangement. As well as being more convenient for patients to make a single journey, clinicians felt that it made their pathway more efficient. The concept of a one-stop clinic is explored further in section 7.2 below and a case study of a top performing trust's one-stop clinic is included [here](#).

Discharge from the cancer pathway

The telephone survey revealed that in 2 of the 20 trusts, they were unaware that a CT scan could stop the 2WW clock. A number of other trusts were unaware that CWT guidance would allow them to discharge a 2WW patient from the cancer pathway by letter if the test results and review of notes warranted this. See **section 6.3** for relevant CWT references.

Pathways vary in how good news is communicated to patients. Some choose to discharge patients by letter if the CT scan is normal. But discharging a patient from the cancer pathway may still involve re-routing patients to a routine respiratory appointment or back to the GP. Some trusts feel they need to see all 2WW patients since the patient may still have symptoms that need to be addressed, although one could argue that this should not be happening within a cancer clinic where extra resources are available. However, views are mixed and re-routing patients to a less urgent respiratory clinic will also require some effort.

When trusts were asked what percentage of patients in their cancer clinics did NOT have cancer, the responses varied from 20% to 95% and there did not appear to be a significant difference between top trusts and bottom trusts in this respect. Top trust responses ranged from 20% - 95% and bottom trust responses ranged from 25% to 80%. Where cancer clinics contain high percentages of non-cancer patients, trusts may want to consider whether this is the best use of lung cancer clinician time.

6.3 National guidance and expert views

Regarding the order of CT and OPA

Although not explicitly mandated in national guidance, the consensus from experts is that in the majority of cases the CT scan should be undertaken prior to the OPA. This is also the configuration described within the NOLCP which has been approved in principle by NHS England.

The NOLCP stipulates that a vetting process should take place to check that a CT is appropriate before patients are booked but that this should be done promptly so that the pathway is not delayed. The key information clinicians will want to review during this vetting process includes the age of the patient (to ensure they are ≥ 40), CXR results, symptoms, risk factors and any clinical information related to the patient's fitness to attend for a CT. But experts believe that very few will be unsuitable for a CT.

Regarding discharge from cancer pathway

When CT results are normal and this is sufficient to reassure the physician that the patient can be discharged from the cancer pathway, it is up to the local team to decide how patients are discharged. There is nothing in the guidance that prevents this being done by letter and means that a 2WW patient may not ever have a consultant outpatient appointment. They will, however, have had a CT scan within the two week time limit.

Cancer Waiting Times guidance V9 says:

"3.2.2 What about cases which are given a negative diagnosis for cancer, a diagnosis of cancer not included in the CWT cohort or those which end their pathway before a diagnosis/treatment is given? For patients who have no diagnosis of cancer recorded and no subsequent 62 day period data is entered (ie after DATE FIRST SEEN) it will be taken that there was a non-cancer diagnosis. The activity up to the date first seen would still be counted and needs to be uploaded.

It is understood that you would want to close this record down locally. The data item CANCER.... supports local tracking. You could, for example, select Code 03 - 'no new cancer diagnosis identified by healthcare provider'. You can upload this data to the CWT-Db for completeness if you wish but if you do not the system will take it that the pathway ended at DATE FIRST SEEN ie the patients were not diagnosed with cancer and therefore did not continue on the 62 day pathway."

"This suggests to me that if a diagnostic test produces a result that would convince a practitioner to give the patient a negative diagnosis, the patient can be discharged in the appropriate manner according to local guidance, and no further input would be required to the CWT database for that pathway. It should be noted that it is expected that a 28 day faster diagnosis standard will be nationally implemented within the next few years. When this occurs, there may be a requirement to record the date patients are removed from their cancer pathways; the process for this will be clarified closer to the date the standard is put in place."

CWT analyst response to query from B.Gill

6.4 Conclusions: CTs and OPAs

- Expert views are that the CT scan should take place prior to the OPA unless there are particular reasons why this is inappropriate.
- Two week wait referral forms should contain all relevant clinical information to enable physicians to review the referrals quickly and identify next steps.
- A vetting system should be in place to enable a fast review of referral information to determine whether or not a CT scan is appropriate. Experts believe that in the vast majority of cases, it will be appropriate and should be organised to take place quickly.

- In order to achieve better patient experience AND faster pathways, good preparatory communication with patients is crucial. If patients understand what might happen next, they can move to a CT post-CXR more quickly and will find the process less stressful.
- The CT report should be available to the physician for the OPA, to prevent the physician having to give an initial tentative diagnosis, which could be later contradicted by the radiology report, adding potential delay and stress.
- The introduction of one-stop clinic arrangements to enable the CT and OPA to occur on the same day should be considered – to reduce patient attendances, improve communications and reduce potential delay in the pathway.
- Local services should consider whether some patients could be discharged from the cancer pathway (possibly re-routed to a routine clinic or back to the GP) by letter/phone if the CT scan is clear, rather than using a cancer clinic OPA slot to provide this function.

7. Further diagnostics – post-CT

7.1 Telephone survey results

Table 5 shows the results of a question asked regarding who decides on further diagnostic tests. Seven of the 20 trusts interviewed had diagnostic MDTs in place to discuss and agree what further tests are needed beyond the CT to achieve a full staged diagnosis. However, a number of trusts interviewed still rely on the respiratory physician alone to decide which tests should be ordered and those physicians may or may not be lung cancer specialists. In other trusts the diagnostic discussion happens between the physician and radiologist – formally or informally.

Table 5: Decision regarding further diagnostic tests

	Top trusts	Bottom trusts
Diagnostic MDT	4	3 (1 of these is clinician only and held out of hours)
Done as part of Tx MDT	1	-
Phys/Rad together	1	2
Physician mostly on own, but will seek advice for complex pts.	4	4
Mixture of above	-	1

A small review of consultant level activity was undertaken in one of the trusts interviewed, which revealed that the consultants who had more lung cancer experience were able to achieve more direct diagnostic pathways for their patients than other respiratory consultants who saw fewer cancer patients.

This suggests that greater use of lung cancer expertise/experience will lead to better use of resources and a more streamlined diagnostic process. Where it is not possible to restrict cancer activity to lung cancer physicians, then a diagnostic MDT is a way of at least bringing this expertise into the process.

Same day diagnostics

There was a marked difference between the top and bottom trusts when asked whether post-CT tests were coordinated to happen on the same day. None of the bottom trusts answered this in a definitively positive way, six trusts said firmly ‘no’ and the other responses were in the realm of ‘*we try but rarely achieve*’. In contrast, six top trusts said firmly ‘yes’ and were able to describe the various tests that happen on the same day.

Expert views about what can happen on the same day are set out in section 7.2 below and an example of how one trust organises their services into a one-stop clinic is described [here](#).

Patient tracking arrangements

When those interviewed were asked what they think is likely to be the difference between top and bottom performers, having robust patient tracking arrangements in place came up a

number of times as likely to be a feature of good performers. They usually described this along with the importance of having good performance monitoring structures at all levels within the trust, and access to quick escalation procedures when required.

One lung physician at a bottom performing trust explained that:

‘Patient tracking arrangements don’t happen in practice because they can’t keep the staff that perform this function so it’s mostly left to the clinicians.’

In this same trust it was estimated that in only 10% of cases will a CT have been performed prior to the OPA and in only 2% of cases will the CT report be available for the OPA.

In contrast, a top performing trust described meticulous patient monitoring arrangements including weekly meetings with the trust chief executive to provide updates on performance.

28 Day Faster Diagnosis Standard

Since the cancer strategy is aiming to implement a new 28 day standard from referral to diagnosis, a number of trusts were asked their views about the achievability of this standard with regard to lung cancer. Many said that it depended on the definitions used and whether it required a histological confirmation or just radiological. One not untypical response was that it would be a ‘massive challenge’. When pressed many said that it would be possible for the more straightforward patients, but not the complex ones and estimates of percentages that it would be achievable for, ranged from 30% to 75%.

A cancer/no cancer decision can usually be made following the initial CT, but if communication to the patient at that stage is what stops the clock, there are risks. It could mean that trusts prioritise that discussion rather than the further testing needed to confirm the type and stage of cancer, which would then enable a more meaningful conversation about treatment options.

7.2 National guidance and expert views

NICE Clinical Guidelines are explicit regarding the principle to be used when organising diagnostic tests:

“Choose investigations that give the most information about diagnosis and staging with least risk to the patient. Think carefully before performing a test that gives only diagnostic pathology when information on staging is also needed to guide treatment.” CG121, 1.3.12

The diagnostic MDT

A regular and formal diagnostic MDT is seen by experts as being best practice at this stage of the pathway. It provides a forum for discussion about which next tests are most appropriate for each patient, ensures multiple perspectives are taken into account and can allow professionals to agree and schedule investigations. The precise composition of this MDT is debated but at least a respiratory physician and radiologist is required. In one trust interviewed, the diagnostic MDT takes place out of hours and without management support but the clinicians still feel it is a good use of their time. An example of how one diagnostic MDT (Leicester Glenfield) works is available [here](#).

One-stop clinics

There is less expert agreement around one-stop clinics. Investigations that can be carried out as part of a one-stop clinic include CT scan, plain bronchoscopy, US guided diagnostic pleural tap, US guided neck and supraclavicular node needle biopsy, US biopsy of some chest wall lesions and CT guided biopsy of the lung.

Other tests such as EBUS/EUS, thoracoscopy, PET-CT scan and mediastinoscopy almost always require booking for a separate day. Given that a large proportion of patients will need one of these staging tests, there are limitations as to what can be achieved in a one-stop setting. Also there is the risk of carrying out an inappropriate test simply because it can be done in a one-stop setting. For example carrying out a plain bronchoscopy or CT guided needle biopsy when mediastinal sampling with EBUS or mediastinoscopy will be required later – resulting in patients having to undergo two or more investigations before being amenable to optimal treatment. If some form of ‘one stop’ clinic is being established, it is important that included in its structure is a diagnostic MDT, to identify those patients who are likely to require an invasive diagnostic procedure unavailable on that day (most often mediastinal node sampling) to avoid multiple invasive investigations.

Pathology perspective

Pathological specimens are often obtained via CT guided biopsy of a lung lesion, bronchial biopsy or EBUS/EUS sampling of enlarged mediastinal nodes, the latter enabling diagnosis and staging of a tumour in one procedure. In view of this, histology samples for lung cancer diagnosis are relatively small and often require additional immunohistochemical staining for accurate subtyping of tumours, especially when dealing with EBUS/EUS specimens, in order to plan the appropriate therapeutic pathway.

In an adequately staffed routine histology laboratory the minimum time required for the initial diagnostic report, including the immune profile of the tumour, is 48 hours (two working days). Additional molecular testing to guide targeted therapies may take a further 5-10 working days, especially if samples have to be sent to a molecular laboratory at another site.

The time required for diagnostic tests needs to be factored into the pathway target and also relies on adequate laboratory staffing and pathologists' time. Good communication between the clinical and the pathology teams and efficient sample transport is important.

Some pathology departments reflex test for molecular markers; i.e. if it is known that a sample is from a patient with advanced stage disease, the sample is sent immediately for molecular analysis prior to MDT review. In other centres the decision whether to assess the sample for molecular markers is an MDT decision based on the patient's clinical status and the oncological treatment plan.

There also needs to be a balance between tissue utilisation for diagnostic work up and preservation of tissue for molecular testing, which has to be borne in mind by the reporting pathologist.

Small cell lung cancer (SCLC)

Patients with SCLC should be considered as oncological emergencies since their performance status and therefore fitness for treatment can deteriorate very rapidly. The NICE lung cancer guideline update of 2011 recommends: 'Arrange for patients with small-cell lung cancer to have an assessment by a thoracic oncologist within one week of deciding to recommend treatment.'^x The radiological appearances of SCLCs are often typical and expert opinion suggests that such patients should be prioritised for urgent biopsy (many such patients can be diagnosed using US guided biopsy of neck nodes on the same day as their first clinic visit). Pathology laboratories should also be alerted to their urgent nature. In some centres the MDTs have agreed a policy of the pathologist contacting the oncologist directly and immediately a diagnosis of SCLC is confirmed. The patient is still discussed at the MDT but the clinic appointment is made very much more rapidly.

7.3 Conclusions: further diagnostics

- Greater use of lung cancer physicians (as opposed to respiratory physicians without a particular interest/expertise in lung cancer) is likely to achieve a better use of diagnostic resources as well as provide a higher quality of service.
- The diagnostic MDT, whilst variable in composition and implementation, is regarded as best practice by experts and is a useful way of ensuring that the right experience and expertise is involved in decisions about the most appropriate diagnostic tests for each patient.
- Robust patient tracking and good performance monitoring arrangements can be important ways of ensuring that patients move quickly through their pathway and that Trust management can keep track of performance levels.
- Top performers offer significantly more same-day diagnostic testing, which is likely to account at least in part, for their shorter pathways.
- Fast track arrangements should be in place to ensure that small cell lung cancers are expedited between pathology and oncology and that clinic time is prioritised.
- Pathology departments should consider the use of reflex testing for molecular markers to avoid unnecessary delay.

8. Role of data in service improvement

A number of the trusts interviewed expressed frustration at having insufficient information to identify and then rectify where their pathway performance was going wrong. One frustrated physician said that it was like *'getting on a train that leaves on time but arrives an hour late, without knowing where the delay has occurred'*.

This section of the report shares the experience of an ACE project that focussed their efforts on using data along with a sector approach to improve local services. The second part of this section shares more information about the national data analysis process that has supported this ACE lung work stream.

8.1 ACE project learning

The Greater Manchester Cancer ACE project (A71) explored and delivered local change as a result of a data driven performance improvement programme. Their ACE project was part of a larger Manchester-wide programme which included the development of four sector MDTs in place of the previous nine separate lung MDT arrangements.

Their work began with the development of locally owned quality standards for lung cancer. In addition to standard data items, they began to collect and monitor the percentage of 2WW patients first seen by a specialist respiratory physician and the extent to which CT happens prior to OPAs.

The project involved extending a Clinical Web Portal (CWP) electronic system, which had already been in place at the Christie, to the trusts in each sector. As part of their ACE project, the CWP was rolled out and put into practice across the NW sector MDT, which was the first sector to be formally established.

A fundamental part of the CWP was that local clinicians had to take personal responsibility for data input. When the first three months of data was available from the CWP, it was analysed and presented back to the three trusts within that sector. The data showed considerable variation between the trusts, particularly:

- Significant variation in 62 day breach standards, ranging from 4% to 28%.
- Variation in percentage of CT scans done prior to 2WW clinics from 48% to 89%.
- Percentage of patients seen by a respiratory physician at their first appointment varied from 62% to 98% across the three trusts.
- Referral to surgery rates following specialist MDT varied from 18% to 31%.

Over the next six months, significant improvements were made, particularly at the trust which had not been performing well – their breach rate improved from 28% to 4%, the percentage of CT scans done before the 2WW clinic rose from 48% to 66% and patients first seen by a respiratory physician improved from 62% to 73%.

In addition to achieving improvement at the outlier trusts, the three trusts then agreed to work together to develop a single sector optimal pathway. From July to December 2016, a pathway mapping exercise was carried out and workshops were held to agree one optimal pathway. A single pathway has now been agreed and resource gaps and commissioning implications will be explored and addressed in early 2017.

Key Learning from this project

Overall the project has been successful in achieving performance improvement. The use of data as part of a collaborative process has led to changes in how services are delivered. The focussed engagement of the three clinical teams with the oversight of the Manchester Cancer Pathway Board has led to some initial organisational changes and a commitment for more to follow.

However, it has also been recognised that the roll-out of the CWP tool across the different organisations was time-consuming and resource intensive. Similar benefits could probably have been achieved without the CWP tool, but the following elements are seen as key and were central to the project's success:

- Robust 'lung network' approach
- Locally agreed aims and quality standards
- Presentation of comparative data in supportive environment
- Strong clinical leadership within robust city wide structure
- Dedicated management support
- High local and national expectations

8.2 National data analysis

8.2.1 Pathways identified in national datasets

Data on Lung cancer patients diagnosed in 2013 were extracted from the National Cancer Registry and linked with the DID and CWT data. This was done using NHS number and date of birth. Those with multiple primaries were excluded. Images of interest were CXR and CT scans and the time frame of interest was six or three months prior to diagnosis.

35,780 patients records were analysed, there were >800,000 imaging records. 34,776 patients (97.2%) had a DID record and 26,978 (75.4%) had a CWT record.

A number of pathways scenarios were identified during the analysis but variation by trust and route to diagnosis was discovered. A report containing details of common scenarios and variation is being prepared and will be published later in 2017.

8.2.2 Top/bottom performance data analysis

In addition to the analysis undertaken across the full datasets, some further analysis was undertaken on the trusts that were interviewed as part of the telephone survey to see whether or not it was possible to see a difference in trust characteristics between top and bottom performers across national datasets.

A similar analysis has also been undertaken within NHS England's Analytical Insight Resource Unit, where they analysed three years of lung cancer data (Q2 2012/13 – Q1 2015/16) covering 1.7m DID records and 0.6m CWT records.

Both analyses came up with similar results. It has not been possible to find areas of significant difference between top and bottom performers, although both processes identified that top

performance was more associated with smaller services and bottom performance with larger lung cancer services. The average number of lung cancer patients in bottom trusts was almost double the number of patients in top trusts in 2013 – 186 and 97.

It was also apparent that bottom trusts had longer intervals between CXR test to diagnosis (25 days, average of median days) than top trusts (20 days). Bottom trusts also had longer time intervals between CT request and diagnosis date – 25.3 days compared with 20.2 in top trusts.

When examining the routes to diagnosis, top trusts had a higher proportion of patients diagnosed via 2WWs (29%) than bottom trusts (23%) and a lower percentage diagnosed via 'other outpatient' (9.5%) than bottom trusts (14%).

The limitations of national dataset analyses are that the DID dataset is a relatively new dataset, established in 2012 and there are data quality issues in the recording of imaging data. Private imaging is also not included in these data. This analysis is limited to 2013 data and changes in practice will have occurred since these data were collated.

8.3 Conclusions: data analysis

- The analysis and use of comparative data within a constructive team environment can be a powerful tool in driving real performance improvement
- A high level structure and accountability framework will provide useful context and profile to ensure follow through on service improvement and wider linkages.
- The combination of robust clinical leadership and strong management support is the ideal combination for achieving and sustaining change.
- Reaching agreement on key local indicators and overall aims at the outset helps to create the framework needed achieve change in later stages.
- Clinical responsibility for data input helps achieve local ownership of the results
- The agreement of common aims and the clinical engagement process is more important than the data capture tool.

9. Radiology-related topics

Since such a large part of the lung cancer diagnostic pathway involves radiology, it featured regularly in ACE cluster and project discussions. Discussions focussed particularly on:

- CXR referral forms, what information should be included
- CXR reporting, in terms of who (and how many) report CXRs
- How reports are written/communicated
- Role of the radiologist, particularly in 'straight-to-CT' arrangements

9.1 ACE project learning

Brighton and Sussex University Hospitals, as part of the Horsham and Mid Sussex Project (A14), started their pathway improvement process by reviewing their radiology processes.

As a result of this review they:

- Reduced the number of people reporting CXRs from 31 to 7 to improve quality
- Established a diagnostic MDT to ensure radiology input into all diagnostic discussions
- Changed their CXR referral form to support their new 'straight-to-CT' pathway
- Created a Radiology Decision Support Tool, to guide decision making and improve communications with primary care.

All of these measures had positive impacts on their service, and enabled them to further develop their service by implementing a new 'straight-to-CT' pathway. More details of this service along with relevant documentation is attached as **Appendix 1 B**.

North Staffordshire (A77) began their pathway improvement process by reviewing their CXR demand, their current capacity and their reporting backlog. They identified the need to both reduce the numbers of radiologists reporting CXRs and change the skill mix of their team – particularly by adding reporting radiographers. This strategy required an interim arrangement of outsourcing some of their reporting in order to address their backlog and to support the service while newly recruited radiographers completed their academic and clinical training. They also established a radiology patient tracking arrangement to ensure no CXRs were ever delayed or missed.

As a result of putting their strategy into practice they managed to:

- Address their backlog
- Start reporting all In-patient CXRs
- Reduce their CXR reporting turnaround time to less than 24 hours
- Provide a more cost effective service (by using radiographers for activities previously undertaken by radiologists).
- Increase GP satisfaction
- Reduce their reliance on outsourcing

A more detailed description of their project is included as **Appendix 1 E**.

As a result of the experiences of ACE projects and expert input, please see a summary of the information gathered regarding each of the 4 topics listed in above.

9.1.1 CXR referral forms

A sample CXR referral form (developed by the Crawley CCG project) is available to view [here](#).

A list of the information that a radiologist would ideally like to see on a CXR referral form includes the following:

- Presenting complaint and duration *e.g. cough for six weeks*
- Red flag symptoms present or absent – *e.g. some haemoptysis but no weight loss*
- Has the patient had antibiotics? - *e.g. no improvement despite two courses of antibiotics*
- History of smoking? At least Y/N but preferably by 'pack year' - *e.g. heavy smoker, 60PY*
- Previous medical history: especially respiratory and malignancy *e.g. known COPD, previous bowel cancer*
- Clinical suspicion – *e.g. I think this is a chest infection or I suspect this is cancer*

9.1.2 CXR reporting

Studies have shown that there is variation in the pickup rate of cancers from CXRs linked to the level of expertise/experience of the reporter. Experts and ACE radiologists agree that it is better to have a small number of people reporting CXRs, ensuring that each person reports a minimum of 2,000 CXRs per annum, to maintain quality and expertise.

9.1.3 Structured Reporting

ACE has heard from a number of GPs that they do not always understand what CXR reports are saying and/or what action they should take as a result of the CXR report.

A remedy for this is to ensure there is standardised or structured reporting in place, which may include a coding system or at least standardised wording to communicate results clearly and the action that the GP should take, if any.

A radiology decision support/coding system developed and used at BSUH is available to view [here](#) and another radiology decision support tool developed by the Somerset project (A60) and making use of coding to improve communications is available [here](#).

9.1.4 Role of radiologist in 'straight-to-CT'

The radiologist has a key role to play in the diagnostic process for lung cancer. They should be central to the diagnostic decision making process – ideally by attending a diagnostic MDT (as well as the treatment MDT) but there may be other robust local arrangements too.

They will also play a key role in reporting CXRs and in deciding which patients may then require a CT scan – either because of the CXR result or because of the clinical information presented on the CXR referral form. Radiologists can act under delegated authority on behalf of GPs and/or physicians as per local agreement, but these arrangements should be clear to

all and documented. Please see 9.2 below for more information on this topic. A straight to CT reference guide is available [here](#).

9.2 National guidance/expert views

Role of radiologist in 'straight-to-CT' arrangements

Ionising Radiation (Medical Exposure) Regulations IRMER) require that there is an appropriate process in place for referral and justification. In a 'straight-to-CT following abnormal CXR' pathway, the referrer is the GP who is requesting a CXR +/- CT thorax.

RCR guidance states that *"...many radiology departments will accept referrals from outside their own organisation for example a general practitioner. In this situation, the employer's procedures must state from whom they will accept referrals and how the referrer will be provided with referral criteria"*.

The radiologist reporting the CXR is (in this scenario) also justifying and authorising the CT, although it does not have to be the same radiologist. RCR IRMER states *"it is not always feasible for a radiologist to review every imaging request and therefore the regulations allow for an appropriately entitled operator to authorise an exposure using guidelines that a practitioner has written."*^{xi}

Local protocols should therefore be in place to describe arrangements for this type of pathway, but they do not need to be complex or lengthy documents.

CWT guidance on consultant upgrades

Radiologists can play a key role in consultant upgrades. The telephone survey results showed that they are playing a role in consultant upgrades in practice and Section 4.7.1 of the CWT guidance V9 states that:

*"The ultimate responsibility for upgrades rests with the consultant responsible for the care of the patient who will have delegated their authority by local agreement. **The upgrades could come from any part of the health service not just from consultants and teams that most commonly see cancer patients.** It is therefore important that local policies are agreed and processes are in place to publicise and operate the upgrade system locally."*

National Optimal Lung Cancer Pathway

The NOLCP pathway sets out tight turnaround times for radiology tests to be carried out and reported. In fact, it suggests that 'Hot Reporting' should be put in place for both CXRs and CTs and that a CT scan should take place within 72 hours of an abnormal CXR result being identified.

9.3 Conclusions: radiology

- CXR reporting is a specialised skill and should be limited to a relatively small number of appropriately trained/experienced people to ensure high quality, consistent reporting.
- Appropriately trained radiographers can play a key role in reporting CXR results and being part of the lung cancer diagnostic team.

- Trusts acting as ‘training hubs’ could play a useful role in developing and supporting several reporting radiographers during their training period, on the basis that they will then move to work in networked hospitals once their training has been completed.
- The use of a standardised reporting tool for CXR reports can be helpful for decision making and for communicating results with primary care. See example [here](#).
- CXR referral forms should be designed to ensure that sufficient clinical information is provided to enable radiology to assess referrals appropriately and identify next actions.
- Radiologists can play a key role in enabling ‘straight-to-CT’ arrangements, with the use of local protocols and delegated authority from GPs and/or lung physicians.
- Radiologists can provide a valuable role as members of a diagnostic MDT meeting, in helping to identify what additional tests may be required.

10. Report conclusions

This report has shown that concerted effort by local teams can achieve significant positive change. Change is more likely to occur if primary and secondary care clinicians work together with encouragement and support of senior management and local commissioners.

No one single lung cancer pathway configuration holds the answer to best performance but the trusts that manage to achieve tight well-coordinated arrangements with same-day testing where appropriate, are achieving shorter pathways to diagnoses.

The trusts themselves identify the need to have good internal and external relationships along with a flexible approach and 'can do' attitude, as important characteristics of successful teams, which in turn achieves successful pathways.

This paper provides 'better practice' examples and expert views on key aspects of the pre-diagnostic lung cancer pathway. In addition to the topic-based conclusions at the end of each section, a set of general conclusions are set out below.

- A.** There is a range of different pathway arrangements in place across lung cancer providers, a significant proportion of which are not in line with current best practice.
- B.** The implementation of straight-to-CT arrangements can achieve quicker access to CT, and therefore a quicker diagnosis for people that have had an abnormal CXR result.
- C.** Providing a timely – and possibly a GP direct access - route to CT for people who have had a normal CXR result, but continue to have clinical symptoms and/or concerns will pick up some cancers and will provide welcome reassurance to many others.
- D.** The analysis and use of comparative data within a constructive team environment can be a powerful tool in driving performance improvement
- E.** Preparing patients fully (so they know what might happen) before referral will improve patient experience and reduce delays in the cancer pathway.
- F.** By providing all relevant clinical information on CXR referral forms, GPs can reduce the potential for later delays and/or unnecessary procedures.
- G.** Radiology has a key role to play in the lung cancer pathway and significant benefits can be achieved by rationalising CXR reporting and standardising communications between radiologists and GPs.
- H.** Clinical leadership, teamwork and having good relationships with colleagues across departments and organisations (secondary/tertiary) as well as flexible approaches and 'can do' attitudes are seen by trusts as key to better performance.
- I.** Enthusiastic clinicians can play a key role in driving service improvement and/or maintaining high quality services but they need to be part of a supportive management structure and to have appropriate levels of admin/project management support.
- J.** The telephone survey analysis did not identify many pathway features that were more prominent in trusts that perform well on 62/31 day median performance, but better performing trusts had more same-day testing arrangements in place and were smaller than those who performed less well on those standards.

11. Recommendations

Local Cancer Alliances and CCGs will want to ensure local providers have read this report and are given time and support to produce a plan of action to improve their lung cancer services.

These recommendations should be considered alongside the topic based conclusions at the end of each section of this report.

1. Primary and secondary care clinicians should review the range of lung cancer pathways available locally as a set, and in particular:
 - Identify what route GPs should use if concerns remain following a normal CXR result.
 - Review what actions are taken by whom when an abnormal CXR result is detected.
 - Consider patient communications to ensure they are prepared fully before referral.
2. Local cancer teams should monitor the order and timing of key events including:
 - The proportion of 2WW and consultant upgrades that have CT prior to the OPA
 - Request-to-report turnaround times for CXR, CT, PET CT, EBUS – and check whether they are in line with the NOLCP
3. Local trusts should review their lung cancer workforce in relation to:
 - The number of radiologists/radiographers that report GP requested CXRs and consider whether rationalising this task to fewer people could be advantageous.
 - The proportion of 2WW and consultant upgrade patients first seen by a lung cancer specialist (as opposed to a respiratory physician without a lung cancer specialty).
4. Local services should consider whether there is further opportunity for coordinating tests so they occur on the same day, to reduce hospital visits and unnecessary delay.
5. Lung cancer teams should review their arrangements for deciding on post-CT diagnostics, taking into account the benefits that can be achieved by having a MDT approach, with the aim of ensuring that only the right tests are undertaken and in the right order.
6. Services should review local patient tracking arrangements within the cancer team and in radiology to ensure the system is robust, efficient, and fully operational.
7. Lung cancer services should organise regular team ‘time outs’ to review data reports, local intelligence and patient feedback on how the pathway is working. When areas of weakness are identified, consider options and develop plans to address.

Abbreviations and Terminology

Abbreviations	
2WW	Two week wait
CCG	Clinical commissioning group
CNS	Clinical nurse specialist
COPD	Chronic obstructive pulmonary disease
CT	Computerised tomography
CWP	Clinical web portal
CWT	Cancer waiting times
CXR	Chest x-ray
DID	Diagnostic imaging dataset
EBUS	Endobronchial ultrasound
eGFR	Estimated glomerular filtration rate – (used to assess kidney function prior to contrast CT)
EUS	Endoscopic ultrasound
GP	General practitioner
IRMER	Ionising Radiation (Medical Exposure) Regulations 2000
LCCEG	Lung cancer clinical expert group
MDT	Multi-disciplinary team
NCRAS	National Cancer Registration and Analysis Service
NHSE	NHS England
NICE	National institute for clinical excellence
NOLCP	National optimal lung cancer pathway
OPA	Outpatient appointment
OPD	Outpatient department
PET CT	Positron emission tomography and computed tomography
RAT	Risk assessment tool
RCR	Royal College of Radiology
SCLC	Small cell lung cancer
SMDT	Specialist multidisciplinary team
Terminology	
Direct Access to CT	When GPs refer directly for a CT scan
Straight-to-CT	When radiologists move patients directly to CT following an abnormal CXR result.

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- ⁱ McPhail S, Johnson S, Greenberg D, Peake M, Rous B. Stage at diagnosis and early mortality from cancer in England. Br J Cancer. 2015; 112, S108-115.
- ⁱⁱ Sara Walters, Sara Benitez-Majano, Patrick Muller, Michel P Coleman, Claudia Allemani, John Butler, Mick Peake, Marianne Guren, Bengt Glimelius, Stefan Bergstrom, Lars Pahlman, Bernard Rachet. Is England closing the international gap in cancer survival? Br J Cancer, 2015;113(5):848-60
- ⁱⁱⁱ Routes to diagnosis 2006-2013 workbook - http://www.ncin.org.uk/publications/routes_to_diagnosis
- ^{iv} Achieving World Class Cancer Outcomes: Taking the strategy forward, May 2016
- ^v Taking the Strategy Forward: programme update, October 2016
- ^{vi} Cancer Waiting Times Guidance V9
- ^{vii} Cancer Waiting Times Guidance V9 Section 3.2
- ^{viii} NICE Guidance CG121
- ^{ix} <http://www.nejm.org/doi/full/10.1056/NEJMoa1102873>
- ^x NICE: The diagnosis and treatment of lung cancer (update) 2011, recommendation 7.2.
- ^{xi} Royal College of Radiology, Ionising Radiation (Medical Exposure) Regulations 2000

Contact ACE

If you have any queries about ACE, please contact the team at: ACEteam@cancer.org.uk
In addition, you can visit our webpage: www.cruk.org/ace where we will publish news and reports.

The ACE Programme
Accelerate, Coordinate, Evaluate

1. ACE project descriptions

A) A87 - Crawley CCG

Background/Context:

NHS Crawley CCG is made up of 12 GP practices and is responsible for the health and wellbeing of more than 120,000 people. This project also involved Horsham and Mid Sussex (HMS) CCG, East Surrey (ES) CCG, primary care services/GP practices and secondary care, and the NHS Surrey and Sussex Healthcare Trust (SaSH).

The SaSH local health economy encompasses four CCGs with approximately 40 GP practices and 240 GPs and it was agreed that the new pathway would be implemented across the full catchment area. The trust performed around 9,000 GP requested chest x-rays (CXR) in 2014/15 and sees on average 35 2 week wait (2WW) referrals a month.

The CCGs identified that in their area cancer was the top cause of 'potential years of life lost' for all-cause mortality in 2010-2012 and that lung cancer accounted for most potential years of life lost in men. Emergency presentation rates for lung cancer were also higher locally than the England average.

Aims & Objectives:

Key objectives for the project were:

- To avoid unnecessary delays in the diagnostic pathway for lung cancer patients – by shortening CXR to CT times.
- To reduce the anxiety and burden on patients who do not have a completely normal chest x-ray (CXR). Previously, patients had often been asked to have a repeat CXR in 6-8 weeks.
- To promote joined-up working between primary and secondary care which will lead to a smoother and more seamless patient experience of the lung cancer diagnostic pathway.
- To ensure more patients have CT scan results available at their 2WW appointment, supporting respiratory physicians at that early consultation.
- To improve lung cancer survival rates through earlier detection of tumours when more treatment options (including surgical resections) may be available.

Project Description:

An evaluation for this project can be found [here](#).

Traditionally, patients who had suspicious findings following a GP requested CXR had these results flagged as a code Z5. This would trigger a fax to be sent to the GP

in addition to the electronic report. The GP would then refer the patient under a 2WW lung referral and an OPA would be made with the respiratory consultant. Often this consultation would provide little more than the ordering of a CT scan. The project team redesigned the pathway to enable, where suitable, the CT scan to be performed earlier and therefore the result would be available at the first appointment.

A new chest x-ray (CXR) request form was designed

The CXR request form that had been in use was a small A5 size form which had little space for clinical details and required to be handwritten. It was agreed that a new form was needed and that it should contain space for clinical indications for relevant risk factors, creatinine and eGFR blood test results, with patient details/latest blood results auto-populated. The new CXR request form was agreed in September 2015 and is available [here](#).

Patient information sheet

The new CXR request form is now given to the patient to take to the radiology department. To support the information the GPs provide to the patients a patient information sheet is now included, which informs patients that a CT scan might also be needed.

The Commissioning Patient Reference group was involved in the project and assisted with the development of the patient information sheet. The final version of the patient information sheet is the second page of the CXR Form available [here](#).

“Z5” codes for suspicion of cancer

The trust had already implemented coding functionality for suspicious radiological findings, known as “Z5”. For lung cancer, abnormal findings on CXRs are coded as “Z5 – chest” which then triggers the result to be emailed automatically to the chest physicians.

Respiratory review

One of the two respiratory consultants reviews the Z5 CXRs and either telephones or writes to both the GP and the patient informing them of the next steps and requesting a 2WW referral from the GP. At the same time the respiratory consultant requests the CT scan, bloods and an outpatient appointment (OPA) as required.

There was much discussion during the design phase with both the GPs and the trust regarding the necessity of the 2WW referral and it was agreed that with current national standards this extra step was still required to start the “cancer clock” but this will be kept under review.

Results:

Previously only **16% of 2WW referrals** had a CT performed prior to their first outpatient appointment which increased to 35% after 6 months and to **50% after 12 months**. During the 12 month pilot a total of 110 GP CXR requests were coded Z5, of which 56 patients received a cancer diagnosis.

The average time from an abnormal CXR to CT being performed is now **14 days**, the previous average time was **27 days**, showing a **12 day improvement**.

A review of the data shows that CXR to diagnosis went from an average of 40 days to 33 days and CXR to first treatment from an average of 69 days to 68 days.

- Before implementation 62 day performance was as low as 59%, now it is 94%.
- For a copy of the new CXR Referral form please click [here](#).

Commentary:

Considerable local discussion took place regarding the current 2WW pathway rules and whether or not a 2WW referral was required to start the 2WW pathway.

Key Learning:

- Putting in place an expedited route to CT for patients with a suspicious CXR result can achieve significant benefits including a quicker time to diagnosis.
- The new CXR referral form was key to enabling the straight-to-CT arrangement to happen.
- The integrated alert system was important in preventing anyone being missed and ensuring fast communications between radiology and physicians.

B) A14 – Horsham & Mid-Sussex CCG and Brighton and Sussex University Hospitals NHS Trust

Background/Context:

NHS Horsham and Mid Sussex Clinical Commissioning Group (CCG) is made up of 23 GP practices and is responsible for the health and wellbeing of more than 225,000 people. This project involved other organisations that work closely with Horsham and Mid Sussex (HMS) CCG including Brighton and Hove (B&H) CCG, High Weald, Lewes and Havens (HWLH) CCG, and Coastal West Sussex (CWS) CCG and in particular, Brighton and Sussex University Hospitals NHS Trust (BSUH).

The BSUH catchment encompasses four CCGs with over 60 GP practices and 400 GPs. The trust performed around 18,000 GP requested chest x-rays (CXR) in a year (2015) and on average receives 58 2WW referrals a month.

The CCG identified that in their area cancer was the top cause of 'potential years of life lost' for all-cause mortality in 2010-2012 and that lung cancer accounted for most potential years of life lost in men. Emergency presentations rates for lung cancer were also higher locally than the England average.

Aims & Objectives:

The aim of this project was to speed up the lung cancer pathway by reducing any unnecessary steps and improving coordination and communications. The main reason for this was to achieve earlier diagnosis of lung cancers in order to achieve improved survival. A more specific aim was to implement a quicker route to CT for patients who had abnormal CXR results.

Other expected benefits were to:

- Improve patient experience.
- Improve efficiency of pathway.
- Improve quality of pathway.

Project Description:

An evaluation of this project can be found [here](#).

The early stages of this project involved reviewing the current lung cancer pathway to identify areas where the pathway could be improved. Primary and secondary care clinicians met together with the lead CCG and project support over a number of months to first review the existing pathway and then to design a new and improved pathway. The new pathway that emerged from these discussions can be found [here](#) but key elements include:

- The establishment of a diagnostic MDT.
- The development of a new CXR referral form/patient information leaflet.
- The rationalisation of CXR reporting to fewer reporters.
- The development and use of a new radiology decision support/coding tool.

CXR referral Form

The first step of the process requires the use of a new updated CXR request form being completed by the GP which the patient then takes to the radiology department. The new form includes a patient information leaflet explaining that a CT might also be required. A copy of the basic referral form used is available [here](#).

Rationalising CXR reporting

Prior to the ACE project 31 radiologists/radiographers had been reporting GP requested CXRs which meant there was variation in reporting. As part of the project, this task was restricted to a much smaller cohort of 7 reporters.

Radiology decision support

In addition to the rationalisation of reporting, an in-depth piece of work was undertaken by the lead radiologist (Dr Nigel Marchbank) and colleagues to map out and describe the radiology decision pathway. They identified 4 different potential outcomes following a CXR and 4 potential outcomes following a CT scan and then coded them together with standard text that would be added at the end of the radiology report. The Radiology Decision Support Tool can be found [here](#).

The radiology administrative team leader has the task of following up patients coded ACE 1 or 2, and organising the CT scans. The MDT coordinator would also chase up 2WW referral forms from GPs where required.

eGFR arrangements

Prior to a CT scan with contrast the patient's kidney function needs to have been checked within 4 weeks and GPs are requested to provide a recent eGFR result where available. For those that were not provided/did not have a recent result the respiratory consultant reviewing the 2WW referral would complete pathology request forms and their secretary would liaise with the patient to ensure it was completed before the CT scan. Arranging this was very time intensive for the respiratory department.

It was agreed to purchase eGFR Point of Care machines at all CT sites to enable testing to occur immediately prior to the CT scan. Funding was secured from the South East Coast Cancer Clinical Network and the machines purchased in March 2016.

Diagnostic MDT

A formal diagnostic MDT was established in October 2015 to allow discussion of all patients on a diagnostic pathway with possible cancer. It was felt this was a vital requirement if patients were to be managed appropriately and decisions made BEFORE the first respiratory consultant OPA (subject to patient fitness and wishes).

Results:

- 3102 GP requested CXRs on new form (39% of total), reported by cohort of 7 CXR reporters compared with 31 previously.
- 111 (3.6%) received an ACE 1 or 2 code and went onto new pathway, straight-to-CT. 30 of these received an ACE 6 code, likely cancer.
- Time from CXR attendance to reported CT now 7 days compared to 19 days previously.
- Time from CXR attendance to OPA with respiratory specialist (following diagnostic MDM with agreement on next steps) now 18 days, compared to 27 days previously

(but without the diagnostic MDT before clinic appointment so no agreement on next steps when patient seen in clinic).

- More timely and higher quality of CXR reporting (time taken to report CXR three days pre-pilot, 1.4 days during pilot).
- Achieves quicker access to CT (12 days before pilot, 5 days during pilot).
- Very positive feedback from GPs.

Commentary:

There was much discussion during the design phase with both the GPs and the trust regarding the necessity of the 2WW referral. It was eventually agreed that with current national standards this was required to start the “cancer clock” and safety net the patient. It will be reviewed in light of the pending changes expected with the implementation of the 28 day national cancer standard.

Key Learning:

- Putting in place a radiology pathway with standardised reporting can achieve significant benefits in quality, time and patient experience.
- Key benefits include shorter pathways, more GP satisfaction and patient satisfaction.
- Time and change management is required to work through each step of the new pathway in detail to ensure success of project and safety netting of patients.
- It is important to start by understanding how the current pathway works before making changes to it.

C) A16 – Nottingham

Background/Context:

This project was submitted to ACE by Nottingham CCG, who were keen to ensure their local 2WW pathway was being used appropriately and that local GPs had direct access to CT testing when this was appropriate for their patients. In particular they were keen to ensure that the 2WW pathway was used for patients that met NICE referral guidance, but that there was also a route to CT for those with lower risk but not 'no risk' of lung cancer. Nottingham University Hospitals was experiencing capacity constraints and it was important that the new pathway was not creating additional demand, but that it would ensure appropriate and timely access to CT depending on the risk level of the patient.

Aims & Objectives:

To provide GPs with a direct route to a CT scan for patients that have had a normal CXR result, but where clinical symptoms persist.

The project expected to see:

- Reduced 2WW referrals, with reduced number of associated OPAs
- Quicker access to CT for those with low risk but not 'no risk'
- Some early stage cancers detected
- GP satisfaction with pathway
- More patients reassured definitively that they did not have cancer

Project Description:

The project team created and then put in place a GP 'direct access to CT' pathway for patients that had a normal or 'no apparent cancer' CXR result but who still had worrying clinical symptoms. It was decided that GP direct access to CT referrals could be made when the patient met the following criteria:

- Normal CXR result received
- Aged over 40 with any/all of the following
 - Unexplained, persistent cough (≥ 3 weeks)
 - Resolved minor haemoptysis
 - High risk of lung cancer

The pathway was first piloted in one cluster of GP practices and then later rolled out across the whole CCG.

A new referral form was created for these referrals and is available [here](#).

Results:

The new pathway is seen as successful locally and will continue to be in place post- ACE. More specific results from the activity generated are set out below:

- Over 150 direct access CT scans were performed via the new pathway
- **2.4%** were found to have lung cancer
- One other incidental cancer was also found
- 4% had non cancer abnormalities that required treatment
- CT turnaround time (TAT) for routine patients had been **42 days** and with new pathway achieved **15.5 days**

- GP satisfaction of the new pathway was high (rated 8.1 out of 10)
- Impact on 2WW and 62 day pathway was not identified
- Additional benefits include: New referral form, new reporting template and better relationships between radiology and CCGs.

Commentary:

The project was not able to establish what action would have been taken by the GP if the new pathway was not available, so it is hard to assess whether or not the new pathway has reduced pressure on the 2WW pathway or whether it generated additional demand.

If a local 2WW pathway starts with a straight-to-CT arrangement and includes an option to discharge a patient without an OPA if the scan is clear, then this could have a similar impact as the direct access pathway, but achieve quicker access to CT. The additional speed though could then have an adverse impact on the genuine 2WW referrals.

Key Learning:

- It is important to provide an access route to CT for patients with a normal CXR but where concerns persist. It can -
 - pick up significant findings
 - provide reassurance
 - be cost effective by avoiding unnecessary OPAs
- Direct communications between radiology and CCGs had a number of benefits including the development of a new referral form and reporting template.
- It is important not to over-refer on this system and to adhere to the protocol. The two week wait referral route is still the best route for patients where risk levels warrant.

D) A60 – Somerset

Background/Context:

Somerset CCG has a population of 535,000 and has nine federations of local GP practices. The age profile is weighted slightly towards people of older age and is set to rise. There are 345 new cases of lung cancer in Somerset each year. In 2012 only 21% of these are diagnosed at stages 1 or 2, which is less than the national average of 23%. In addition, Somerset has a larger proportion of unstaged lung cancers than the national average and a larger percent presenting as emergencies.

In order to understand the reasons for these circumstances, the CCG organised an Audit to take place and integrated the audit activity into their local Quality Scheme to provide additional incentive for GPs to take part.

A multi professional stakeholder event was also organised to consider the results of the audit and the data analysis undertaken. As a result of that event a plan of action was determined and a high level of engagement achieved.

Aims & Objectives:

To identify the reasons for late diagnosis of lung cancer in Somerset and then address the problems by improving the lung cancer pathway.

Phase 1: Carry out an audit to help diagnose the problem

Phase 2: Design and implement a new pathway which addresses the problems identified.

Project Description:

A project evaluation document for this project can be found [here](#).

The Audit:

17 GP practices in Somerset participated in a lung cancer audit, which identified 69 cases. Of the 69 identified:

- 75% had been on a chronic disease register at the time of their diagnosis
- 85% had attended their surgery in the 6 months leading up to the diagnosis
- 50% had had their symptoms for 3 weeks or less when they sought medical attention.

The results of this audit, along with a public health assessment of lung cancer in Somerset, were then discussed in a stakeholder workshop which included a wide range of clinicians and public/patient involvement. An ambitious action plan resulted from these discussions, which is described below.

1. To develop a risk stratification methodology

Since the audit showed that most lung cancers were diagnosed in patients who were already known to primary care, the clinical lead considered various ways of undertaking risk assessments on patients who were already in the primary care system. IT risk assessment tools such as QCancer, were considered as well as more informal methods of flagging repeat attenders. The establishment of more formal advice lines for GPs to use was also considered.

2. Patient education programme for those with low risk:

Produce a patient information leaflet to be given to patients with a relatively low risk score, to educate them on the signs and symptoms of cancer and benefits of early diagnosis.

3. New, more direct pathway to CT for those with higher risk:

Develop a new pathway that would involve use of a new CXR referral form providing broad clinical information and confirming patient choice for straight-to-CT, should that be required. Radiologists to report CXRs back to GPs in a standardised format, setting out clearly the recommended next actions.

Results:

A new straight-to-CT pathway was designed and agreement to pilot the pathway was achieved after considerable local discussion. The new pathway was then established as an optional addition to the existing lung cancer pathway and required:

- GPs to:
 - complete a risk assessment,
 - spend 20 minutes with patients explaining the new pathway prior to referral
 - complete the new referral form with extra clinical information
- Radiologists to use the decision support tool to code CXR results

To support the new pathway, the project team produced:

- A new CXR referral form
- A radiology decision support coding system

Although important groundwork was achieved and new documentation was produced and approved, the new pathway was only used by 6 patients during the six month pilot period and has now been withdrawn as an additional optional pathway. The reasons why this pathway was not embedded and used by local GPs are likely to include the following:

- It is difficult to 'double run' two pathways at once
- Expectations of time available to busy GPs were perhaps unrealistic
- The scope of the project was too wide, with too many aspects to address at once

Nonetheless, the Somerset ACE project has:

- Created local interest and local momentum
- Produced new tools, including a new referral form and radiology decision support tool
- Spawned further lung cancer projects and STP support.

Commentary/key learning:

- Local projects need a robust local structure and sufficient project support to ensure there is follow-through on all aspects of the project, particularly during implementation phases.
- Project teams should be careful about expecting GPs to take on too many extra tasks as part of any new arrangements, particularly when the arrangements are optional.
- While it may be tempting to create an additional pathway instead of changing existing pathways, it can then be hard to manage 2 different pathways.

E) A77 – University Hospitals of North Midlands

Background/Context:

The University Hospitals of North Midlands covers a population of 500,000 and has 360 lung cancers per annum. Prior to ACE they had made progress in implementing a 'straight-to-CT' pathway in the north of their catchment area and could see the benefits of the new arrangement. They applied to the ACE Programme on the basis that they would like to implement this arrangement within the southern part of their patch (South Staffordshire), where there were additional complexities to overcome, including considerable organisational change, which then impacted on patient flows.

In addition to their roll out of straight-to-CT in the south, North Staffordshire had previously focussed their efforts on rationalising and improving their radiology service. Although much of this was completed prior to ACE, their experiences were shared as part of ACE and have also informed the radiology section of this report.

Aims/Objectives:

To improve the 62 day lung cancer pathway and reduce the time to diagnosis

- By rolling out 'straight-to-CT' in South Staffordshire
- Increasing the proportion of patients who have CT prior to OPA
- By reducing the number of days between referral and diagnosis
- Maintaining and improving GP satisfaction with the service

Project Description:

Roll out of straight-to-CT at County Hospital (South Staffordshire)

The project started with discussions with the CCG to agree arrangements and then GP engagement events to discuss the benefits of the new arrangements. The new pathway then went live in South Staffordshire (County Hospital) from January 2016.

The new arrangements mean that an abnormal CXR result triggers a CT scan.

- The radiologist initiates the CT scan request after an abnormal CXR is identified
- The GP is informed but not required to do anything except to organise an urgent eGFR

If the CT scan confirms likely lung cancer

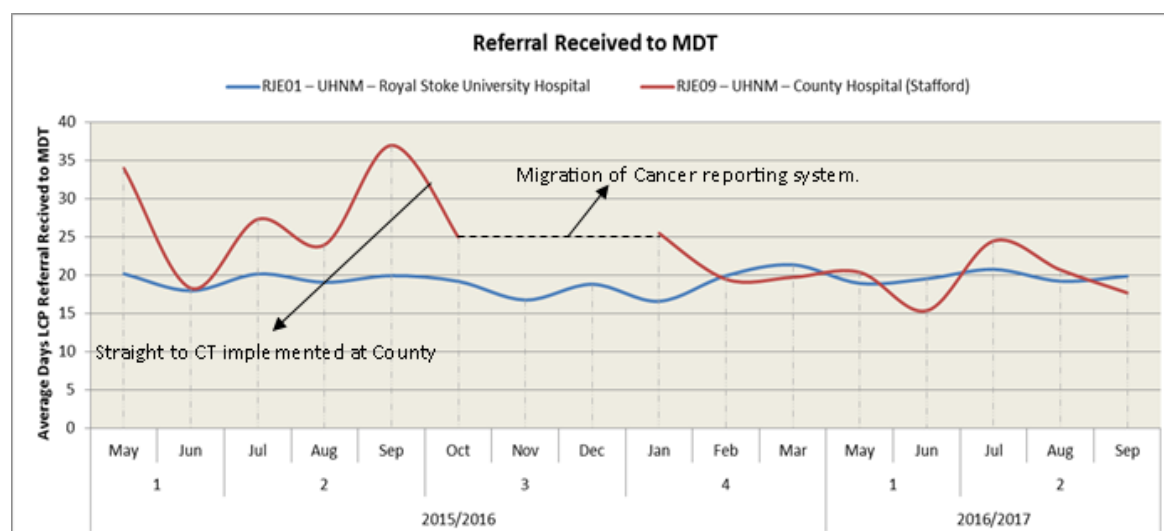
- The GP is informed and asked to submit a 2WW referral at that stage
- The lung MDT is notified by the radiologist
- The lung cancer physician and radiologist meet pre-clinic to determine likely further diagnostics – EBUS, bronchoscopy, CT Bx, PET

If the CT scan shows that the patient does NOT have cancer, a referral to the cancer pathway is not initiated, however a recommendation for a respiratory outpatient is made if other pathology is identified.

Results:

1) Straight-to-CT roll out in South Staffordshire (County Hospital)

This new pathway reduced the number of days from referral to MDT from a peak of **37 days** in September 2015 (prior to pathway implementation) to **17 days** in September 2016. See graph below.



In addition to shortening the diagnostic process the other benefits achieved include:

- A significant reduction in non-cancer 2WW referrals, with no difference in access times
- Faster determination of cancer/non-cancer, which is appreciated by the patients
- Fewer non-cancer patients in cancer clinics

Rationalisation of Radiology within the Lung Cancer Pathway

North Staffordshire began their pathway improvement process by reviewing their CXR demand, their current capacity and their reporting backlog. They identified the need to both reduce the numbers of radiologists reporting CXRs and change the skill mix of their team – particularly by adding reporting radiographers. This strategy required an interim arrangement of outsourcing some of their reporting in order to address their backlog and to support the service while newly recruited radiographers completed their academic and clinical training. They also established a radiology patient tracking arrangement to ensure no CXRs were ever delayed or missed.

As a result of putting their strategy into practice they managed to:

- Address their backlog
- Start reporting all In-patient CXRs
- Reduce their CXR reporting Turnaround time to under 24 hours
- Provide a more cost effective service (by using radiographers for activities previously undertaken by Radiologists).

- Increase GP satisfaction
- Reduce their reliance on outsourcing

Commentary:

There are still some challenges within the system including:

- The system is tied into radiology reporting and if there are pressures in this system, this leads to potential delays in CT reporting. However patients that are part of this pathway are reported out of turn by the thoracic radiologists.
- The ability to see non-cancer urgent referrals is important, but it has taken time to be able to deliver this
- Obtaining up-to-date renal function remains problematic
- Was plan for contrast CT scan in all cases the correct decision? (As we know other ACE participants have implemented CXR to plain CT rather than contrast CT pathways.)

The configuration of the new pathway means that the 2WW clock starts at a later point (after abnormal CT rather than abnormal CXR) than it does in many other trusts which may mean that it will be more challenging to implement the 28 day standard.

Key Learning:

The implementation of straight-to-CT across the University Hospitals of north Midlands alongside improvements within radiology, has achieved positive sustainable benefits including:

- A significant reduction in referral to MDT days.
- Rapid reporting turnaround and quicker pathways from referral to MDT.
- Uniform reporting to GPs – clarity of reports and imaging planning.
- Reduced number of non-cancer patients in cancer clinics.
- Second line diagnostics (EBUS, CTBx, PET etc) discussed prior to first clinic visit.

The implementation of ‘straight-to-CT’ across North Staffordshire was achieved more quickly and embedded more fully than it has been in the south to date because:

- The CCG and trust worked closely together to achieve the implementation.
- The CCG’s planning structures were used to achieve formal agreement to the changes prior to roll out.
- Macmillan GP/Primary Care facilitators led engagement events with GPs and acted as the point of contact for queries/teething problems between GPs and the trust.
- The process in the south had a less formal roll out.
- The committed Trust clinicians leading the project had limited management support until the later stages of the project.

F) A71 – Manchester

Background/Context:

The Greater Manchester Cancer ACE Project (A71) was part of a wider Greater Manchester (GM) programme of lung cancer service improvement strategies to improve outcomes for lung cancer patients in GM. The overall programme was coordinated and driven by the lung cancer pathway board which includes all Greater Manchester trusts.

This project was brought about due to identified variations in lung cancer service provision across GM and it was recognised that this variation was having significant impact on outcomes and patient experience.

Despite a significant development of reducing the number of sector MDTs from 9 to 4 in 2015, this variation still existed. The need therefore to have robust data to challenge service providers was identified as essential. The ACE project supported the development of a Clinical Web Portal (CWP), an electronic system of collected data, and it was piloted in the sector MDT in the north west sector (Bolton/Wigan/Salford).

Aims & Objectives:

The Greater Manchester lung pathway board aimed to develop a truly integrated lung cancer pathway, from referral, through diagnostics, treatment, and supportive/palliative care. The 3 objectives to achieve this were:

- i) Having a centralised lung cancer pathway aiming to deliver referral with suspected cancer to treatment within 14-days
- ii) Ensuring a sector-based lung cancer pathway was in place, with organisations working together within the sector across traditional boundaries to deliver faster and better care.
- iii) To deliver lung cancer pathway improvement through collection and analysis of clinically owned real time data (supported by CWP). This would enable the team to compare data across a sector to identify and address variation.

The driving force to achieve all the above objectives was to ensure the data collected was robust enough to be presented to the clinical teams. A fundamental part of the CWP was that local clinicians had to take personal responsibility for data input. When the first 3 months of data was available from the CWP, it was analysed and presented back to the 3 trusts within that sector.

Project Description:

Traditionally, data is collected for sector MDTs via the Somerset cancer system, however this did not produce real time data, was often not comparable between trusts and several Cancer centres did not use this system. The CWP system was rolled out across the NW sector of GM due to this being the first well established sector MDT. The significant

advantage of CWP was it included new data fields reflecting locally agreed quality standards (i.e. time to CT scan).

The lung cancer pathway board and the pathway director ensure that NW sector meetings were organised quarterly to review performance and agree action plan to deliver change.

Results:

CWP project has been successful in achieving performance improvement. The use of data as part of a collaborative process has led to changes in how services are delivered. The focussed engagement of the 3 clinical teams has generated a commitment from all 3 trusts to make sustainable organisational changes to improve how they deliver their services.

The data showed considerable variation between the trusts, particularly:

- Significant variation in 62 day breach standards, ranging from 4% to 28%.
- Variation in percentage of CT scans done prior to 2WW clinics from 48% to 89%.
- Percentage of patients seen by a respiratory physician at their first appointment varied from 62% to 98% across the 3 trusts.
- Referral to surgery rates following specialist MDT varied from 18% to 31%.

When this data was presented to the clinical teams in the NW sector, over the next 6 months the 3 trusts worked together to decide the best way of reducing variation and creating a more unified service, supported and monitored by the pathway board. Significant improvements were made, particularly at the Trust which had not been performing well – their breach rate improved from 28% to 8%, the percentage of CT scans done before the 2WW clinic rose from 48% to 66% and patients first seen by a respiratory physician improved from 62% to 73%.

Commentary:

The importance of the CWP project highlighted that the clinical teams could be shown real time data, which was comparable, to enact key service changes. The next important step will be the roll out of the new optimal lung pathway across NW sector. This will require the NW sector to continually improve and this is being driven by the newly agreed Greater Manchester Cancer plan, which has emerged as a result of the devolution of services across GM. There is a greater focus on lung cancer services as a result, due to high morbidity rates and poor outcomes in the region.

It is important to recognise that strong clinical leadership and facilitated sector team building is likely to have played large part in progress to date.

Key Learning:

The CWP pilot project involved extensive data collection across the different organisations, this was often time-consuming and resource intensive for clinical teams. Information governance issues were a particular challenge to overcome. Similar benefits could probably have been achieved without the CWP tool, but the following elements are seen as key and were central to the project's success:

- Robust 'Lung network' approach.
- Locally agreed aims and quality standards.
- Presentation of comparative data in supportive environment.
- Strong clinical leadership within robust GM wide structure.
- Dedicated management support.
- High local and national expectations.

2. List of Supporting Resources

Cluster Outputs

Executive summary of final lung cancer pathways report

Final lung cancer pathways report

Interim lung cancer pathways report

Qualitative research – telephone survey results

Straight to CT quick reference guide

Automated Days to diagnosis chart

Days to diagnosis chart instruction sheet

Project documents

A14 Horsham and Mid-Sussex project evaluation

A60 Somerset project evaluation

A87 Crawley project evaluation

A71 Manchester cancer project evaluation

Crawley (A87) referral form

Nottingham (A16) direct access CT requesting template

BSUH (A14) radiology decision pathway and support tool

Somerset (A60) radiology decision support tool

Manchester Cancer (A71) Poster

Case studies

Rapid access lung cancer service – Kettering

Diagnostic MDT – Leicester

One-stop clinic - South Tyneside

National documents

National Optimal Lung Cancer Pathway