

1 **Impact of radiographer immediate reporting of chest X-rays from general practice on the lung**
2 **cancer pathway (radioX): study protocol for a randomised control trial**

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24 **Abstract**

25 Background: Diagnostic capacity and suboptimal logistics are consistently identified as barriers to
26 timely diagnosis of cancer, especially lung cancer. Immediate chest X-ray (CXR) reporting for patients
27 referred from general practice is advocated in the National Optimal Lung Cancer Pathway to improve
28 time to diagnosis of lung cancer and to reduce inappropriate 2WW referrals. The aim of radioX is to
29 examine the impact of immediate reporting by radiographers of CXRs requested by general practice,
30 on lung cancer patient pathways.

31 Methods: A two-way comparative study that will compare the time to diagnosis of lung cancer for
32 patients. Internal comparison will be made between those who receive an immediate radiographer
33 report of a GP CXR compared to standard radiographer GP CXR reporting over a 12 month period.
34 External comparison will be made with a similar, neighbouring Trust that does not have radiographer
35 CXR reporting. Primary outcome is the effect on the speed of the lung cancer pathway (diagnosis of
36 cancer or discharge). Secondary outcomes include the effect of the pathway on efficiency including
37 the number of repeat CXRs performed in a timely fashion for suspected infection and the effect of
38 immediate reporting of GP CXRs on patient satisfaction.

39 Discussion: The radioX trial will examine the hypothesis that immediate reporting of CXRs referred
40 from general practice reduces the time to diagnosis of lung cancer or discharge from the lung cancer
41 pathway.

42 Trial registration: International Standard Randomised Controlled Trial Number [ISRCTN21818068](https://www.isrctn.com/ISRCTN21818068).

43 Registered 20th June 2017

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47 **Background**

48 Lung cancer is the leading cause of cancer death worldwide.¹ When compared to other common
49 cancers, prognosis for lung cancer is worse.² In the United Kingdom (UK) there has been a recent
50 modest increase in survival, with 12.6% of patients with lung cancer surviving five years,³ although
51 30% of patients die within 90 days of diagnosis.⁴ Diagnosis of lung cancer is often made at a late
52 stage, when prognosis is poor,⁵ and several factors are thought to influence this. Symptoms
53 suggesting lung cancer are often non-specific until late in the disease, which results in diagnostic
54 difficulties in primary care.^{6 47} In an attempt to address this, recent guidance by the National
55 Institute for Health and Care Excellence (NICE) has lowered the threshold for investigation and
56 referral to specialist care for cases of possible malignancy, including lung cancer (NG12).⁸

57 Imaging has become embedded into an increasing range of patient pathways, with the number of
58 investigations performed in England doubling in nine years.⁹ Service challenges for radiology in the
59 UK are threefold; sustained increases in activity,^{9 10} a chronic shortage of consultant radiologists^{11 12}
60 and unprecedented economic restrictions.¹³ Recognising the need to improve patient outcomes for
61 cancer, especially lung cancer which has shown minimal improvement in survival rates,^{2 5} renewed
62 focus is being given to rapid referral and diagnosis in cases of suspected cancer.^{6 8 14} These initiatives
63 will undoubtedly increase the volume of imaging investigations performed, at a time when
64 diagnostic capacity is failing to meet current demand.¹⁵

65 A clinical report of imaging examinations is essential to guide diagnostic and treatment decisions.
66 Time to a clinical report can be a serious factor in diagnostic delays¹⁶⁻¹⁸ with recognition that small
67 delays for lung cancer diagnosis may contribute to higher stage at diagnosis¹⁹ and also a
68 deterioration in performance status that may influence suitability for treatment. In the setting of the
69 lung cancer pathway, delays are often multifactorial, but may be contributed to by the time taken to
70 report a CXR. This is because the very first step in the lung cancer pathway is often the identification
71 and reporting of a lung mass on a CXR, which should then trigger a staging computed tomogram

72 (CT). The use of appropriately trained radiographers to undertake clinical reporting is not new.
73 Skeletal radiograph reporting, for example, has become widespread across the UK,^{12 20} and in many
74 departments provides a significant contribution to reporting capacity.^{21 22} More recently, reporting
75 radiographers have been trained to report CXRs^{23 24} and this has been proposed as a method of
76 minimising CXR reporting times in patients with suspected lung cancer.²⁵ There is some limited
77 evidence to date that has evaluated CXR accuracy rates of trained reporting radiographers in
78 comparison with radiologists. Reporting radiographers (n=40) were found to have high sensitivity
79 (95.4%; 95% CI 94.4% - 96.3%) and specificity (95.9%; 95% CI 94.9% - 96.7%) at an objective
80 structured examination of 100 CXRs at the completion of an accredited training programme.²³

81

82 Recent work found poor compliance with suggested optimal diagnostic investigations for lung
83 cancer, with 23% of patients in England receiving investigation and results within the recommended
84 timeframes with significant variation between regions.²⁶ This study aims to evaluate the impact of
85 radiographer reporting on the timeliness, accuracy and quality of CXR reports, as well as the impact
86 on the overall lung cancer pathway in comparison with radiologists. These parameters have not
87 previously been studied in lung cancer patients. The current study could act as a pilot study for a
88 larger, multisite evaluation if results are positive.

89

90 **Methods**

91 The aim of the current study is to investigate the impact of radiographer immediate chest X-ray
92 reporting on the lung cancer pathway.

93 Trial Design

94 A two-way comparative study that will compare the time to diagnosis of lung cancer for patients.
95 Internal comparison will be made between those who receive an immediate radiographer report of
96 a GP CXR compared to standard radiographer GP CXR reporting (Figure 1). The intervention group

97 will receive an immediate CXR report and be offered a CT for CXRs suspicious for cancer. The control
98 group will have the CXR reported no later than next working day in line with current protocols. Key
99 protocol elements are summarised in the SPIRIT (Standard Protocol Items: Recommendations for
100 Interventional trials) 2013 checklist²⁷ (Additional File 1) and Figure 2.

101

102 The diagnostic aspect of the lung cancer pathway at Homerton University Hospital is relatively
103 streamlined. To enable comparison with radiology service delivery at other institutions time to
104 diagnosis (immediate and standard CXR reporting) will be compared with Newham University
105 Hospital (Figure 2). This adjacent hospital has comparable patient demographics, a similar number of
106 lung cancer patients per year and is of comparable size. Newham does not currently have CXR
107 reporting radiographers and does not offer straight to CT for CXRs suspicious for lung cancer.

108 Study Setting

109 Research ethics committee and health research authority approval was granted 6 June 2017 (REC
110 17/LO/0870; HRA 221968). This study will not directly recruit patients; it is an evaluation of health
111 service delivery and as such no patient consent is required. Intervention is at an institutional level
112 and institutional approval has been gained. No additional or different tests will be performed, and all
113 the reporting practitioners (reporting radiographers and consultant radiologists) currently report
114 CXRs in clinical practice. The comparative aspect of the study is the timing, accuracy and usefulness
115 of the CXR report; immediate compared to standard care. Patient identifiable data will not be
116 available outside of the direct clinical care team, only anonymised data will be used. Patients will be
117 assigned a unique study identifier at time of CXR by the clinical care team. Block randomisation,
118 institutional rather than patient enrolment and the use of de-identified data is in line with previous
119 research that has examined the order of interpretation between readers.²⁸ The intervention is
120 considered to be an alternative non inferior form of standard practice since radiographer reporting
121 of CXRs has already been implemented in some NHS Trusts in the UK. Radiographer reporting,

122 including CXRs, has been shown to create additional diagnostic capacity at centres that have
123 embedded this into the imaging department.^{21 22 29} However, the published evidence on
124 radiographer reporting of CXRs is limited. Furthermore robust methods of evaluating diagnostic
125 reports (including actionability and usefulness) of radiographers and radiologists using independent
126 experts has not previously been attempted.

127

128 Clinical assessment will be made by a general practitioner and a referral made to Homerton
129 University Hospital for a CXR examination following standard and established referral procedures.
130 The referral for CXR will be checked by the performing radiographer or supervised assistant
131 practitioner to ensure that the referral meets Ionizing Radiation (Medical Exposure) Regulations
132 (IRMER) (2000) requirements and adheres to departmental protocols for a justified referral. Chest X-
133 rays will be obtained using digital radiography equipment, and radiation doses will be as low as
134 possible whilst maintaining good image quality. Existing departmental imaging protocols will be
135 followed. The standard X-ray projection for a chest examination is a single posterior-anterior (PA) X-
136 ray. The radiographer or assistant practitioner will check all images for diagnostic quality and record
137 the radiation dose on the radiology information system (RIS) in line with department standard
138 operating procedures. If the radiographer or assistant practitioner performing the CXR identifies a
139 potentially significant abnormality, for example lung cancer or pneumothorax, this will be triaged for
140 an immediate report according to current protocol.

141 Inclusion and exclusion criteria are presented in Table 1.

142

	Criteria
Inclusion	<ul style="list-style-type: none">• Referred for a chest X-ray from general practice• Aged over 16
Exclusion	<ul style="list-style-type: none">• Active diagnosis of lung cancer

143 Table 1. Inclusion and exclusion criteria

144 Randomisation

145 Intervention is at an institutional level; individual patients will not be randomised. Half-day sessions
146 will be randomised to intervention or standard practice, using a randomisation list provided by the
147 study statistician. This is in line with previous studies that have examined the timing or order of X-ray
148 reading but where all examinations are requested as part of routine clinical care and receive reports
149 from the same practitioners.³⁰

150 Intervention

151 The intervention reporting strategy is modelled on the national optimal lung cancer pathway
152 developed in 2016.³¹ The intervention strategy aims to streamline the patient journey through the
153 lung cancer pathway by providing prompt interpretation of CXRs referred by general practice and
154 offering immediate CT when appropriate.

155 Chest X-rays included in the intervention arm will be reported at the time of image acquisition while
156 the patient is still in the radiology department. Patients who have a CXR suspicious for cancer will be
157 offered an immediate CT of the chest and upper abdomen.

158 Control

159 Current practice in most radiology departments is for general practitioner examinations to be
160 reported once the patient has left the department. Considerable variability exists across England in
161 the time taken to report X-ray examinations (report turnaround time; RTAT). At Homerton University
162 Hospital, all GP X-rays are reported during the next reporting session following examination, with a
163 maximum RTAT of 1 working day. Patients who have a CXR suspicious for cancer are offered an
164 appointment for a CT of the chest and upper abdomen via the radiology department secretary team,
165 with the results sent to the referring GP and the cancer referrals office. Current practice is that if a
166 suspected abnormality is identified by the radiographer that performs the CXR an urgent report
167 (reporting radiographer or consultant radiologist) is arranged while the patient is still in the

168 department. If the findings are suspicious for lung cancer the patient is offered a CT of the chest and
169 abdomen. This protocol will continue throughout the study for the control reporting sessions.

170 Outcome measures

171 The primary outcome is to test the impact of radiographer immediate reporting of GP CXRs, with
172 immediate CT where appropriate, on time from performance of the CXR to treatment (with
173 intermediate time points)/discharge for lung cancer.

174 Secondary outcome measures include:

- 175 • Measurement of the effect on the speed of the lung cancer pathway:
 - 176 i. 6 and 12 month survival (lung cancer and all-cause)
 - 177 ii. Number of emergency admissions for lung cancer
 - 178 iii. Performance status at time of decision to treat
 - 179 iv. Stage at diagnosis of lung cancer
- 180 • Measurement of the effect of the pathway on efficiency including:
 - 181 i. The impact of immediate GP CXR reporting on the number of urgent respiratory
182 cancer (2WW) referrals
 - 183 ii. The accuracy and usefulness of radiographer CXR reporting in clinical practice
 - 184 iii. The cost effectiveness of radiographer reporting
 - 185 iv. The influence of immediate GP CXR reporting, with immediate CT where
186 appropriate, on the number of first 2WW appointments with all radiology results
187 available
- 188 • Measurement of the number of repeat CXRs performed in a timely fashion for suspected
189 infection
- 190 • The effect of immediate reporting of GP CXRs on patient satisfaction

191 In addition to comparison as per randomisation within Homerton University Hospital, primary
192 outcomes will be compared with a neighbouring hospital, Newham University Hospital.

193 **Components of the chest X-ray reporting pathway**

194 Reporting radiographer chest X-ray report

195 All reporting radiographers participating in the study have completed an accredited postgraduate
196 certificate in adult CXR reporting (experience 1 – 8 years) and currently provide CXR reports in
197 clinical practice. All CXRs referred by general practice on eligible patients (>16 years, no active
198 history of lung cancer) will receive a reporting radiographer report. In line with current practice, a
199 narrated report will be provided rather than a structured report. Image interpretation will occur on
200 Picture Archiving and Communication System (PACS) workstations and the report entered into PACS
201 and transferred to the patient electronic record. If the reporting radiographer requires additional
202 investigations (repeat X-ray due to inadequate initial X-ray, additional X-ray view, CT of the chest and
203 abdomen), these will be arranged by the reporting radiographer at time of the CXR report.

204 Off protocol radiographer reporting

205 Where the radiographer performing the CXR is concerned about the appearance of the X-ray or by
206 the clinical condition of the patient, current practice at Homerton University Hospital is for the CXR
207 to be reviewed by a reporting radiographer or consultant radiologist prior to the patient leaving the
208 department. This includes, for example, where the radiographer suspects a pneumothorax,
209 tuberculosis or cancer. If a radiographer has concerns that the appearances of the CXR is abnormal
210 and a significant pathology may be present, these patients will receive an immediate report,
211 regardless of the reporting session allocation (immediate/standard) so as not to negatively impact
212 on patient management. All such occurrences will be identified, included in the intention to treat
213 principle but we will also carry out sensitivity analysis excluding them. In view of randomisation, we
214 expect the same rates of such cases in intervention and control sessions.

215 Equivocal reporting radiographer reports

216 For cases where the reporting radiographer is unsure with the findings and/or clinical significance of
217 the CXR they will be free to review the case with another reporting radiographer and/or consultant
218 radiologist. This is in line with current best practice. This will include for example, instances where
219 previous cross sectional imaging is available for the patient, or where there may be unfamiliar
220 medical terminology on the CXR request form. All occurrences will be recorded.

221 Consultant radiologist chest X-ray report

222 All CXRs will receive a consultant radiologist report (general radiologists; experience range 2 – 21
223 years post FRCR), blinded to the reporting radiographer CXR report. Consultant radiologist reporting
224 will occur at the next session following the reporting radiographer report. Interpretation will occur
225 using PACS workstations and the report will be entered into a secure database.

226 Comparison of radiographer and radiologist reports

227 The CXR reports generated by the reporting radiographers and consultant radiologists will be
228 extracted, anonymised for source of report (radiographer/radiologist) and entered into a secure
229 database using the unique study identifier. A respiratory physician will compare the reports for
230 discrepancies, using a proforma with predefined criteria for clinically significant abnormalities.
231 Discrepancies in observations, interpretations and recommendations will be highlighted. These
232 criteria have been previously validated.³² Report comparison will occur within 3 working days of the
233 CXR examination.

234 Additional radiology investigations

235 All additional radiology investigations will be organised by the radiology department following
236 established departmental operating procedures. These additional investigations would be
237 performed as part of routine clinical practice and will not require any additional radiation exposure.

238 The reporting radiographers, after appropriate training, have been designated 'Non-Medical
239 Referrers' according to IRMER 2000 legislation.

240 Repeat chest X-ray for suspected infection

241 According to British Thoracic Society (BTS) guidance,³³ patients who have a CXR that is suspicious for
242 infection require a follow up CXR six weeks later following antibiotics to ensure resolution. The
243 reporting radiographer will arrange the follow up CXR at the time of the initial CXR report for the
244 immediate reporting arm, and the patient will be asked to re-attend the radiology department in six
245 weeks. This will be communicated in the CXR report.

246 For patients who have a CXR suspicious for infection in the standard care arm the recommendation
247 for a follow up CXR in six weeks will be included in the report conclusion. This will be requested by
248 the general practitioner, as is current practice.

249 CT of the chest

250 Patients that have an abnormal CXR suspicious for cancer will have a CT of the chest performed. The
251 reporting practitioner (reporting radiographer or consultant radiologist) will arrange this following
252 standard department procedure. The CT scan forms part of routine clinical management and
253 therefore does not require any additional radiation exposure. A consultant radiologist will interpret
254 all CTs.

255 The CT performed will be stratified based on the CXR appearances and the likelihood of cancer. This
256 will minimize radiation exposure, in line with best practice. For patients with a CXR that is suspicious
257 but not categorical for lung cancer a low dose unenhanced CT of the chest will be performed. For
258 patients who have a CXR that shows a high likelihood of cancer, a CT of the chest and abdomen with
259 intravenous contrast will be offered

260 Index diagnosis by thoracic radiologist

261 Chest X-rays that are found to have discordant reporting radiographer and consultant radiologist
262 reports at peer review will have an index diagnosis. For cases that have undergone a subsequent CT
263 scan of the chest and abdomen, the CT report will constitute the index diagnosis. CXR reports, either
264 reporting radiographer or consultant radiologist, will be deemed a true positive if CT confirms the
265 CXR diagnosis and a false positive if the CT is normal or another pathology is demonstrated. True
266 positive and true negative will be a consensus decision and corroboration between the CT and
267 clinical history between a respiratory physician and a thoracic radiologist. Assessment of report
268 accuracy will be made blinded to the origin (reporting radiographer/consultant radiologist) of the
269 CXR report.

270 For cases that have not had a CT performed, an independent expert thoracic consultant radiologist
271 will constitute the index diagnosis. The index radiologist will feed back the diagnosis via a
272 standardised proforma. All available thoracic imaging (X-ray, CT) for the patient will be sent via the
273 Image Exchange Portal (IEP) to the Royal Brompton Hospital. IEP is an established, secure method of
274 transferring radiology cases for external review within the NHS. A thoracic consultant radiologist will
275 review the available imaging and provide the definite diagnosis. CXR reports, both reporting
276 radiographer and consultant radiologist, will be deemed a true positive if the thoracic radiologist
277 confirms the CXR diagnosis and a false positive if the thoracic radiologist interpretation is normal or
278 another pathology is demonstrated.

279 Statistical Considerations

280 Sample size

281 For the primary endpoint in this pilot study, time to treatment decision for lung cancers, if we expect
282 an eleven day advance in time to first treatment decision, with a standard deviation of 14 (previous
283 audit data suggest this degree of variation), 26 cancers in each group will confer 80% power (2-sided
284 testing, 5% significance level), for the internal randomized comparison. We expect around 50

285 cancers per year in HUH, so we will have adequate power for this difference. A reduction in time to
286 diagnosis of two weeks was found to improve mortality of lung cancer patients so this difference
287 could be clinically significant in the current pilot study.³⁴ If we anticipate a 12-day instead of 11-day
288 advance in diagnosis, we would only need 22 in each arm, 44 cancers in all, for 80% power. For the
289 external comparison, assuming Newham University Hospital has a similar number of lung cancers
290 per year, therefore we would have close to 90% power for the same difference and standard
291 deviation. If we also compare times to diagnosis for all persons referred to the pathway (lung cancer
292 and non-lung cancer diagnoses), previous data suggest an average of 18 days and a standard
293 deviation of 14. If the intervention improves this by 7 days on average, with a standard deviation of
294 15, we would need 73 subjects in each group referred to the pathway to achieve 80% power (2-sided
295 testing, 5% significance level). Thus, both the internal and external comparisons will be adequately
296 powered.

297 Data analysis

298 Times to diagnosis, treatment and other continuous outcomes will be compared using simple t-tests.
299 Categorical outcomes, such as proportions of emergency admissions, will be compared using Poisson
300 regression. Survival will be compared using proportional hazards regression. Patient satisfaction will
301 be recorded in categorical outcomes, and will be compared using non-parametric tests.

302 Patient satisfaction

303 Patients referred for a CXR from general practice will be identified by the radiology administration
304 team, as is current practice. Eligible patients will have a patient satisfaction survey posted to their
305 home address, with a stamped self-addressed return envelope. No patient identifiable data will be
306 collected. Comparison will be made between patients who received an immediate and routine CXR
307 report. The patient satisfaction survey to be used has been included as Appendix 1.

308 Health Economic Assessment

309 Adaptation of a health economic model that examined the impact of radiographer CXR reporting on
310 the lung cancer pathway will be performed.³⁵ The model for this project will map out the care
311 pathways following standard reporting and immediate reporting. It is assumed that differences in
312 time to treatment will affect severity and hence costs and quality of life. Costs will be calculated
313 from an NHS perspective, covering a one-year period, and include X-ray reporting time, CXR cancer
314 and non-cancer diagnostic accuracy, subsequent care costs, as well as reading and supervision costs .
315 The cost per case detected will be reported. Quality of life scores will be obtained from the literature
316 for different cancer stages and these will be used to generate quality-adjusted life years (QALYs).
317 One way and probabilistic sensitivity analyses will be conducted to assess the impact on costs and
318 cost-effectiveness of changing parameters in the model. Due to the timing of the intervention in
319 relation to the lung cancer pathway there may be no meaningful difference in QALYs for the internal
320 comparison. The reduction in time to a non-lung cancer diagnosis may be a worthwhile
321 improvement in quality of life.

322 **Discussion**

323 The current study will determine the effect of immediate reporting of CXRs referred from general
324 practice, with immediate CT where appropriate, on the time to diagnosis of lung cancer. Although
325 only one part of the patient pathway, immediate GP CXR reporting could positively impact lung
326 cancer diagnosis and outcomes in at least three ways: Firstly, by providing an immediate CXR report
327 and initiating earlier further investigation including CT, the time to diagnosis will be shortened.
328 There is debate within the literature as to the significance of this in terms of improvements in early
329 survival times, performance status and reducing emergency admissions.³⁴ The current study will
330 examine this, both with internal and external comparison. Secondly, the efficiency of the service
331 may be improved by reducing the number of lung cancer pathway referrals through early provision
332 of an alternative diagnosis, which in turn means less time for patient anxiety and distress. Thirdly,
333 the proposal may release consultant radiologist time that can instead be used to interpret more

334 complex cross sectional imaging and support interventional procedures including lung biopsy. A
335 reduction in average time to diagnosis for lung cancer will help centres meet the ambitious target of
336 90% of lung cancer patients definitively diagnosed within 28 days by 2020.¹⁴

337 Diagnostic capacity is a significant barrier to improved outcomes for cancer patients,^{14 36} with
338 prompt radiology reports a particular issue across England.^{15 18}

339 The limitations of the current study include the fact that the intervention occurs only at a single
340 clinical site at which the diagnostic aspect of the lung cancer pathway is already relatively
341 streamlined. This is addressed by external comparison with a neighboring hospital with similar
342 patient characteristics and a comparable number of lung cancers diagnosed annually.

343

344 **Trial Status**

345 Study protocol version 1.5 2nd May 2017. Study will commence 1st July 2017 and close 30th June
346 2018. Trial registered [ISRCTN21818068](https://www.isrctn.com/ISRCTN21818068) 20th June 2017.

347 **List of Abbreviations**

348 2WW Urgent respiratory medicine referral for suspected cancer

349 BTS British Thoracic Society

350 CXR Chest X-ray

351 CT Computed Tomography

352 GP General Practice

353 IEP Image Exchange Portal

354 IRMER 2000 Ionizing Radiation (Medical Exposure) Regulations

355 NHS National Health Service

356 NICE National Institute for Health and Care Excellence

357 PACS Picture Archive and Communication System

358 QALY Quality Adjusted Life Year

359 RIS Radiology Information System

360 RTAT Report turnaround time

361

362 **Declarations**

363 Ethics approval and consent to participate

364 Ethical approval was granted by the London – Brent Research Ethics committee (17/LO/0870) on 5th

365 June 2017. Health Research Authority permission (IRAS Project ID 221968) was granted on 6th June

366 2017.

367 Consent for publication

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369 Availability of data and material

370 Not applicable

371 Competing interests

372 None to declare

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381 the data or in writing the manuscript.

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383 Authors' contributions

384 NW Conception and design of the work, drafting the protocol

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387 AB Conception and design of the work, drafting the protocol

388 SWD Statistical aspects.

389 KP Conception and design of the work, drafting the protocol

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392 DRB Conception and design of the work, drafting the protocol

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483

484

485 **Figure list and legend**

486 Figure 1. Intervention and standard patient pathway at Homerton University Hospital and Newham
487 General Hospital (external comparator)

488 GP = general practitioner; CXR = chest X-ray; CT = computed tomography; RR = reporting
489 radiographer; CR = consultant radiologist; Other Resp = other respiratory disease; sus CA =
490 suspicious for cancer; 2WW = urgent respiratory referral for suspected cancer; Routine Resp =
491 routine referral to respirator medicine

492

493 Figure 2. Schedule of enrolment, interventions, and assessments.

494 CXR = chest X-ray; CT = CT scan; * = when required

495 Appendix 1 – Patient Satisfaction Survey

496

497 Homerton University Hospital strives to offer effective, patient focused healthcare. In order to
498 improve services we would value your feedback on your experiences when you recently attended
499 the Radiology department for a chest X-ray. Please indicate your response to each question by
500 circling the appropriate answer.

501 All answers are anonymous and confidential. If you have any questions please contact Dr Nick
502 Woznitza, radiographer, on 0208 510 7848.

503 Please return the completed survey in the stamped, self-addressed envelope provided.

504

505 **Q1 What is your gender?**

506 Male

507 Female

508 Prefer not to answer

509

510 **Q2 Which age group do you belong to?**

511 16-24

512 25-34

513 35-44

514 45-54

515 55-64

516 65-74

517 75-84

518 85+

519

520

521 **Q3 To which of these ethnic groups do you consider you belong?**

522 White

523 1. English / Welsh / Scottish / Northern Irish / British

524 2. Irish

525 3. Gypsy or Irish Traveller

526 4. Any other White background, please describe

527 Mixed / Multiple ethnic groups

528 5. White and Black Caribbean

529 6. White and Black African

530 7. White and Asian

531 8. Any other Mixed / Multiple ethnic background, please describe

532 Asian / Asian British

533 9. Indian

534 10. Pakistani

535 11. Bangladeshi

536 12. Chinese

537 13. Any other Asian background, please describe

538 Black / African / Caribbean / Black British

539 14. African

540 15. Caribbean

541 16. Any other Black / African / Caribbean background, please describe

542 Other ethnic group

543 17. Arab

544 18. Any other ethnic group, please describe

545 Prefer not to answer

546

547

548 **Q4 When were you told that the results of your chest X-ray would be available?**

549 Immediately – given by a radiographer

550 Immediately – to contact my GP

551 Next day – to contact my GP

552

553 **Q5 Did you require any further tests?**

554 Yes – done at the same time as the chest X-ray

555 Yes – done on another day after the chest X-ray

556 No

557

558 **Q6 How do you feel about how you were told that you needed further tests?**

559 I did not need any further tests

560 It was done sensitively

561 It could have been done a bit more sensitively

562 It could have been done a lot more sensitively

563

564 **Q7 How did you feel about needing further tests?**

565 Frightened

566 Angry

567 Upset

568 Pleased that something was happening

569 Prefer not to say

570 Any comments?

571

572

573

574

575

576

577

578 **Q8** Would you have liked to be contacted by your own GP (Doctor) before the CT scan – even
579 if this meant a delay to your scan?

580 Yes

581 No

582 Not sure

583 Prefer not to say

584

585 **Q9** How long did you wait for your results after you had your CT scan?

586 Less than a week

587 1 – 2 weeks

588 More than 2 weeks

589 Can't remember

590

591 **Q10** If you had an appointment, was the booking system flexible enough for you?

592 My scan was performed immediately

593 Yes

594 No

595 Don't know/Can't remember

596

597 **Q11** If you have any suggestions or comments about the service you would like to make, please
598 use the space below

599

600

601