NHS England

Diagnostic Imaging Dataset Annual Statistical Release 2016/17

Diagnostic Imaging Dataset

Annual Statistical Release 2016/17

Version number: 1.0

First published: 23rd November 2017

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This information can be made available in formats, such as easy read or large print, and may be available in alternative languages, upon request. Please contact:

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- **DID**
  Diagnostic Imaging Dataset
- **NHS Digital**
  Previously Health and Social Care Information Centre
- **RIS**
  Radiology Information System

1 Introduction

The Diagnostic Imaging Dataset (DID) is a monthly data collection covering data on diagnostic imaging tests on NHS patients in England. It provides estimates of GP usage of direct access to key diagnostics tests for cancer, for example chest imaging, non-obstetric ultrasound and Brain MRI.

The DID was introduced to monitor progress on *Improving Outcomes: A Strategy for Cancer*[1]. This strategy set out how the Government, NHS and public can help prevent cancer, improve the quality and efficiency of cancer services and move towards achieving outcomes that rival the best. One aspect of that is to ensure that GPs have access to the right diagnostic tests to help them to diagnose or exclude cancer earlier. The DID therefore reports on imaging activity, referral source and timeliness.

These data are collated from Radiology Information Systems (RISs), which are hospital administrative systems used to manage the workflow of radiology departments, and uploaded into a database maintained by NHS Digital.

This publication finalises estimates of imaging activity in 2016/17.

[1] *Improving Outcomes: A Strategy for Cancer*, first published 12 January 2011, see https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213785/dh_123394.pdf updated https://www.england.nhs.uk/wp-content/uploads/2016/05/cancer-strategy.pdf

2 Headline Messages

For all imaging activity:

- 42.1 million imaging tests were reported in England in the year to March 2017, compared with 40.7 million in the previous year, an increase of 3.6%.
- Plain Radiography (X-ray) was most common with 22.9 million procedures, followed by Diagnostic Ultrasonography (Ultrasound, 9.37 million), Computerized Axial Tomography (CT Scan, 4.82 million) and Magnetic Resonance Imaging (MRI, 3.36 million).
- The median period between the request being made and the test being performed varied from the same day for X-ray, Fluoroscopy and Medical Photography up to 22 days for MRI in 2016/17, the same as in 2015/16.
- Across all types of imaging, emergency admissions and inpatients have shorter waits than outpatients and referrals made under GP direct access arrangements.
- The median period from a test being performed to the report being issued varied from the same day for CT scan, Ultrasound, Fluoroscopy and Medical Photography up to 3 days for MRI in 2016/17, the same as in 2015/16.

For the key tests[2] Chest X-ray, Brain MRI and Non-Obstetric Ultrasound of the Abdomen and/or Pelvis:

- In 2016/17, GPs requested over a quarter (26.8%) of all tests that may have been used to diagnose or discount cancer, under direct access arrangements. This is compares to 26.1% in 2015/16.
- The test most commonly requested by GPs was Chest X-ray with 2.17 million tests (up 7.4% from 2015/16), whilst the test with the highest proportion of GP referrals was ultrasounds that may have been used to diagnose ovarian cancer (45%) of which were requested by GPs in 2016/17).
- The median period between the request being made and the test being performed varied between each of the key tests under GP direct access arrangements. This ranged from the same day for Chest X-ray to 27 days for both ultrasound procedures (kidney or bladder and abdomen and/or pelvis).

[2] Although these tests are used to diagnose cancer, many of the tests also have wider clinical uses. Within this dataset it is not possible to distinguish the different uses of these tests.

3 Annual Imaging Activity

3.1 Imaging Activity by modality

3.1.1. 42.1 million imaging tests were reported in England in the year to March 2017, compared with 40.7 million in the previous year, an increase of 3.6%[3].

3.1.2. Plain Radiography (X-ray) had the biggest share of all tests performed during the year, with 22.9 million X-rays reported in 2016/17, up 1.5% from 22.6 million in 2015/16. The next most common procedures were Ultrasound (9.37 million, up 5.1% from 2015/16), CT scans (4.82 million, up 7.9%) and MRI Scans (3.36 million, up 8.9%). Both SPECT scans and PET-CT scans had a large proportional increase (up 36.8% and 35.9% respectively). Medical Photography accounts for the smallest share of all tests (about 31.000 records) but continued to grow (by 30.4%). Table 1 shows the imaging counts and growth for each modality.

3.1.3. March was the month with the most reported activity, with over 3.8 million tests, although it was the only month with 23 working weekdays (the average was 21). December had the lowest number of reported tests, with under 3.3 million. Graph 1 shows this seasonal fluctuation overall and by modality. There are dips in reported imaging for most modalities in December and February, but a slight rising trend over the year for some of the reported imaging activities.

Further information on the tests included in these tables is given in the glossary at Section 6.3.

Monthly breakdowns of activity by modality, provider and referral source setting are given in Additional Tables 1a – 6l (separate excel files), available from http://www.england.nhs.uk/statistics/statistical-work-areas/diagnostic-imaging-dataset/

[3] There was little change in data completeness in this period: 99.6% in 2015/16 to 99.7% in 2016/17.

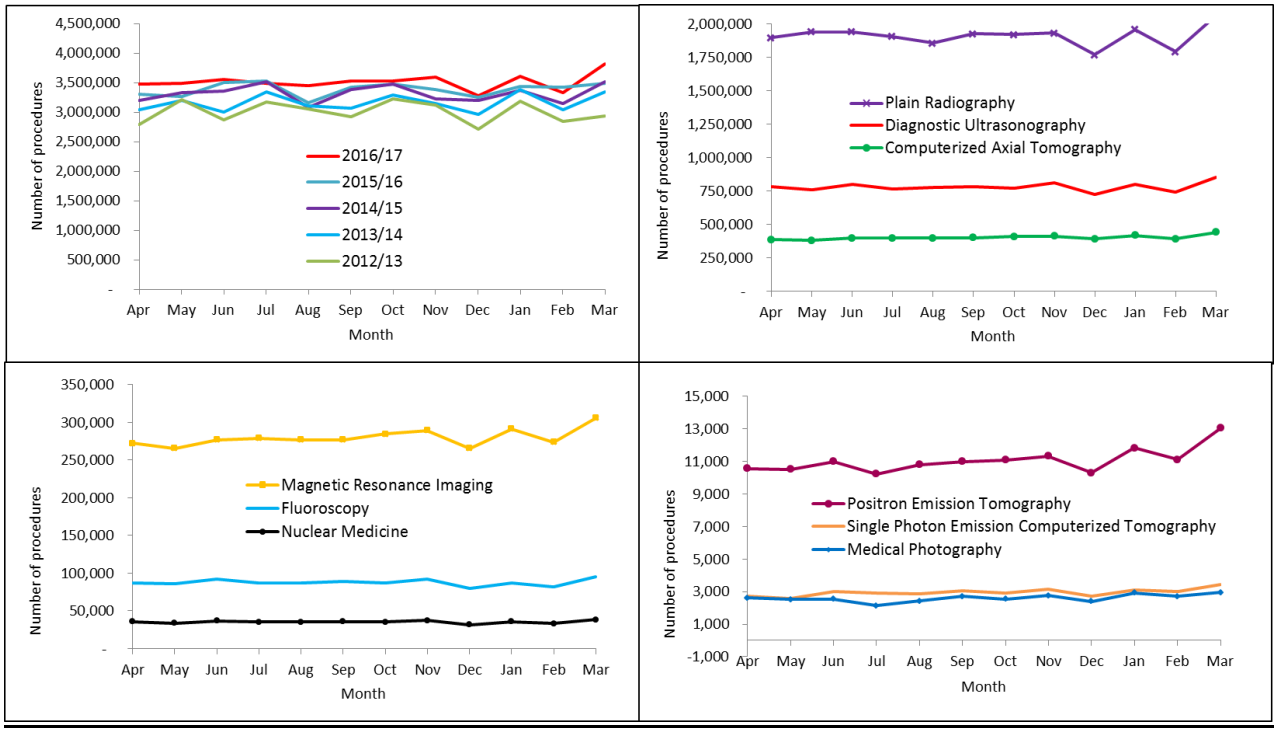
Table 1: Count of NHS imaging activity in England, 2012/13 to 2016/17

	X-ray	Ultrasound	CT Scan	MRI	Fluoro-scopy	Nuclear Medicine	PET-CT Scans	SPECT Scans	Medical Photography	% organisations included	Total[1]
2012/13[2]	21,174,005	7,687,850	3,346,840	2,349,160	1,018,620	437,155	71,080	11,390	6,085	93.6%	36,102,195
2013/14	21,832,985	8,140,175	3,780,405	2,614,865	1,028,735	446,365	75,255	16,350	10,530	97.8%	37,945,665
2014/15	22,576,785	8,566,470	4,199,515	2,890,310	1,018,100	439,655	89,165	21,850	16,180	99.2%	39,818,030
2015/16	22,570,870	8,916,225	4,461,650	3,084,815	1,040,560	432,755	97,990	25,900	23,945	99.6%	40,654,715
2016/17	22,913,795	9,368,335	4,815,200	3,358,515	1,052,750	423,860	132,760	35,420	31,225	99.7%	42,131,855
% Growth[3]	1.5%	5.1%	7.9%	8.9%	1.2%	-2.1%	35.9%	36.8%	30.4%	0.1%	3.6%
2016/17[4]											
Apr	1,898,420	780,105	385,305	272,155	87,175	35,500	10,570	2,730	2,620	98.9%	**3,474,580**
May	1,942,770	761,010	380,070	265,440	86,085	33,600	10,510	2,565	2,520	98.3%	**3,484,575**
Jun	1,940,630	800,860	395,635	277,185	91,900	36,775	10,990	3,000	2,535	98.9%	**3,559,505**
Jul	1,905,630	765,305	397,715	279,060	86,955	35,000	10,230	2,900	2,130	99.4%	**3,484,920**
Aug	1,856,310	775,250	397,960	276,820	86,925	35,390	10,790	2,870	2,430	99.4%	**3,444,745**
Sep	1,926,945	784,575	399,545	276,845	89,515	35,515	11,000	3,045	2,700	100.0%	**3,529,685**
Oct	1,921,450	772,245	408,335	284,825	86,695	35,385	11,090	2,900	2,545	100.0%	**3,525,470**
Nov	1,932,795	812,225	410,960	289,335	92,625	37,155	11,315	3,145	2,765	100.0%	**3,592,325**
Dec	1,770,250	722,085	391,575	265,505	80,030	31,730	10,295	2,710	2,395	99.4%	**3,276,575**
Jan	1,960,555	801,320	417,875	291,385	87,530	35,870	11,830	3,110	2,915	99.4%	**3,612,380**
Feb	1,793,425	742,730	389,935	273,915	81,720	33,400	11,105	3,000	2,715	98.9%	**3,331,940**
Mar	2,064,615	850,630	440,290	306,045	95,595	38,540	13,035	3,450	2,955	98.3%	**3,815,155**

Notes:

1. Totals do not always equal the sum of parts due to rounding.
2. 2012/13 was the first year of the DID collection and as such some of the changes since then may be due to improved coverage of the dataset.
3. % Growth is between 2015/16 and 2016/17.
4. Some months' data are missing for several organisations in 2016/17; see Section 6.1 for details.

Graph 1: NHS imaging activity in England, April 2016 to March 2017



3.2 Imaging Activity by Age and Gender

3.2.1. Almost 6.5 million more tests were performed on females than on males in 2016/17. The largest difference occurred for ultrasound procedures (4.2 million more on females) and for X-rays (2.0 million more). The majority of ultrasounds were on patients aged under 44 whilst the rate of X-rays increased markedly with age. Approximately half of the 2 million more X-rays for females than males was attributable to demographic differences, especially the higher number of older women compared to older men. Conversely there were more PET-CT scans on males than females, with the rate of CT scanning on males also slightly higher than for females. Table 2 shows the age and gender of patients who have received diagnostic tests in 2016/17.

Table 2: NHS Imaging activity in England by gender and age, 2016/17

	X-ray	Ultrasound	CT Scan	MRI	Fluoro-scopy	Nuclear Medicine	PET-CT Scan	SPECT Scan	Medical Photography	Total[1]
Female	12,387,055	6,774,120	2,393,760	1,796,810	513,425	229,560	59,145	19,970	16,555	24,190,400
Male	10,398,935	2,536,210	2,401,455	1,547,400	536,070	193,085	73,390	15,290	14,665	17,716,510
Not known / specified[2]	127,805	58,000	19,980	14,305	3,250	1,215	225	160	5	224,945
0-14	2,050,410	436,380	54,750	142,020	55,965	17,800	740	400	1,840	2,760,305
15-44	5,279,080	4,626,280	788,260	1,034,320	185,435	60,360	13,700	6,790	6,005	12,000,225
45-59	4,694,185	1,812,825	979,490	947,895	243,470	96,410	28,970	7,400	5,685	8,816,335
60-74	5,591,915	1,470,670	1,456,220	835,350	328,400	151,210	58,140	12,265	7,205	9,911,385
75+	5,255,880	1,006,135	1,528,615	395,685	238,315	97,880	31,135	8,555	10,345	8,572,555
Not Known	42,325	16,035	7,870	3,245	1,170	195	75	0	145	71,055

Notes:

1. Totals do not always equal the sum of parts due to rounding.
2. “Not Specified” means that the patient did not want to reveal their gender. “Not known” means that the patient’s gender was recorded as “Not known” or else was not reported.

4 Patient Test Times

4.1 Patient Test Times – Request to test

4.1.1. The DID collects data on four dates that are associated with each imaging event:

- Date of Test Request (by a health care professional).
- Date of Test Request Received (by the organisation that provides the imaging necessary for the test).
- Date of Test
- Date of Test Report Issued (by a health care professional interpreting the imaging output).

4.1.2. This publication is based on all imaging which had a Date of Test between April 2016 and March 2017.

4.1.3. There were big differences in the median period between the request being made and the test being performed for the different tests. The median ranged from the same day for X-ray, Fluoroscopy and Medical Photography to 22 days for MRI scans. There was also some variability within individual tests over the course of the year, with the median for MRI varying by up to a week, from 21 to 28 days, see Table 3.

Table 3: Median number of days between date of test request and date of test, by modality, April 2016 to March 2017

	X-ray	Ultra-sound	CT Scans	MRI	Fluoro-scopy	Nuclear Medicine	PET-CT Scans	SPECT Scans	Medical Photography
2012/13	0	13	2	23	0	15	8	14	0
2013/14	0	13	2	24	0	14	7	17	0
2014/15	0	13	2	24	0	15	8	15	0
2015/16	0	13	1	22	0	16	7	15	0
2016/17	0	13	1	22	0	16	7	17	0
Apr	0	14	1	22	0	16	8	15	0
May	0	13	1	21	0	16	7	16	0
Jun	0	13	1	21	0	16	7	16	0
Jul	0	13	1	21	0	16	6	16	0
Aug	0	13	1	22	0	16	6	17	0
Sep	0	13	1	21	0	17	7	17	0
Oct	0	13	1	21	0	16	7	16	0
Nov	0	13	2	22	0	16	7	18	0
Dec	0	13	1	22	0	15	7	18	0
Jan	0	14	1	28	0	20	8	21	0
Feb	0	13	2	21	0	16	7	16	0
Mar	0	13	2	21	0	17	7	17	0

Note: Median values of 0 occur where at least 50% of activity has a 'date of test request' and 'date of test' which is recorded as the same day. Records where either of these dates is missing are not used to calculate medians.

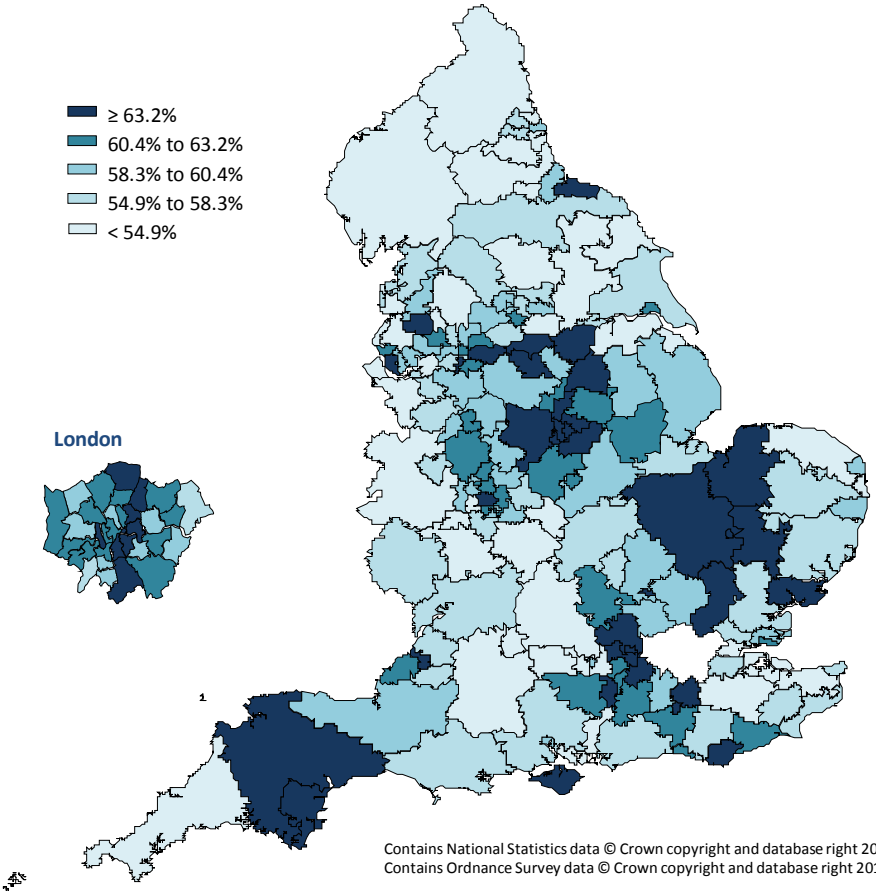
4.1.4. The median number of days between test request and date of test rose by two days for SPECT scans in 2016/17 compared to 2015/16. All other modalities remained the same as in 2015/16.

4.1.5. The figures in Table 3 should not be compared to “waiting time” statistics that measure how long patients are on a waiting list for a procedure, since these figures included both planned and unplanned imaging activity. In addition, these figures exclude any cancelled or missed appointments and they count the period for individual tests not each patient appointment.

4.1.6. There was some regional variation in the proportion of imaging which occurred within seven days of the test being requested for CT Scans and within fourteen days of the test being requested for Ultrasound and MRI Scans. Maps 1-3 illustrate this for each CCG in England (with a fifth of CCGs in each band shown). The underlying data for these charts are given in Table 7a-7h (separate Excel file[4]).

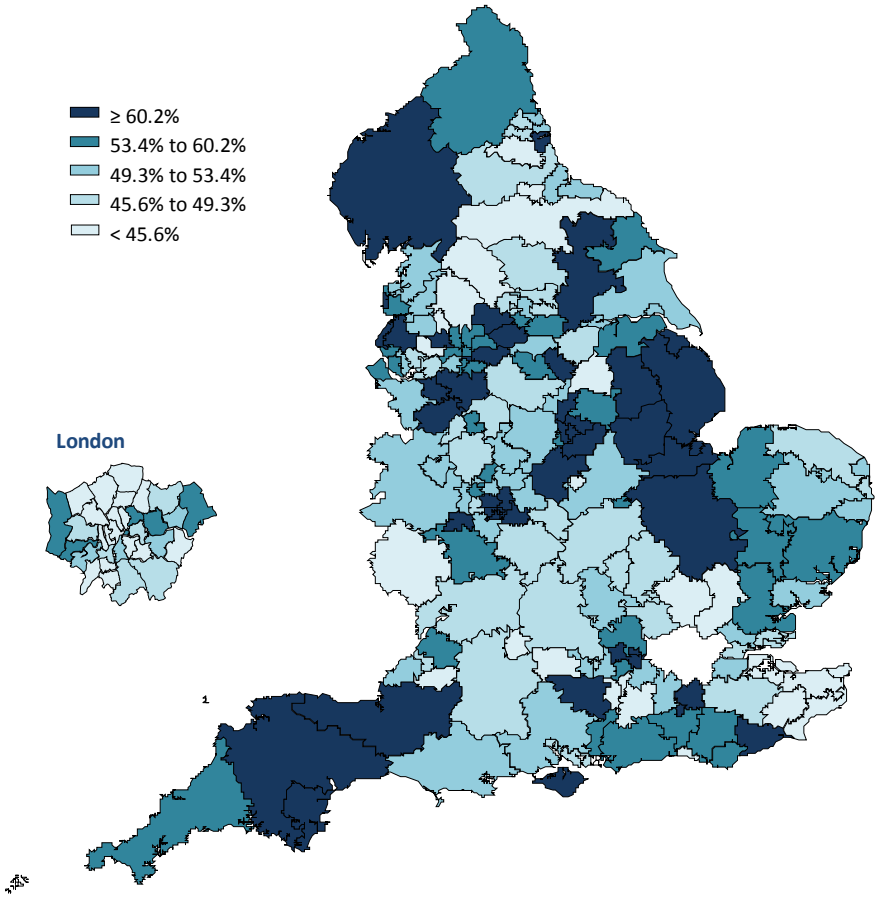
4.1.7. Patients from Accident & Emergency departments and admitted patients have shorter waits for their test than other sources of referral. GP direct access and outpatient referrals show a longer “waiting time” distribution. This affects the median number of days from request to test for those modalities with more outpatient and GP referrals. This is illustrated in Graph 2, which shows the distribution of periods from request to test for individual procedures, by patient source setting and modality. Table 9 (separate Excel file) gives the underlying figures for these charts.

Map 1: Proportion of CT scans where date of test is less than 7 days after date of referral, for each CCG, 2016/17

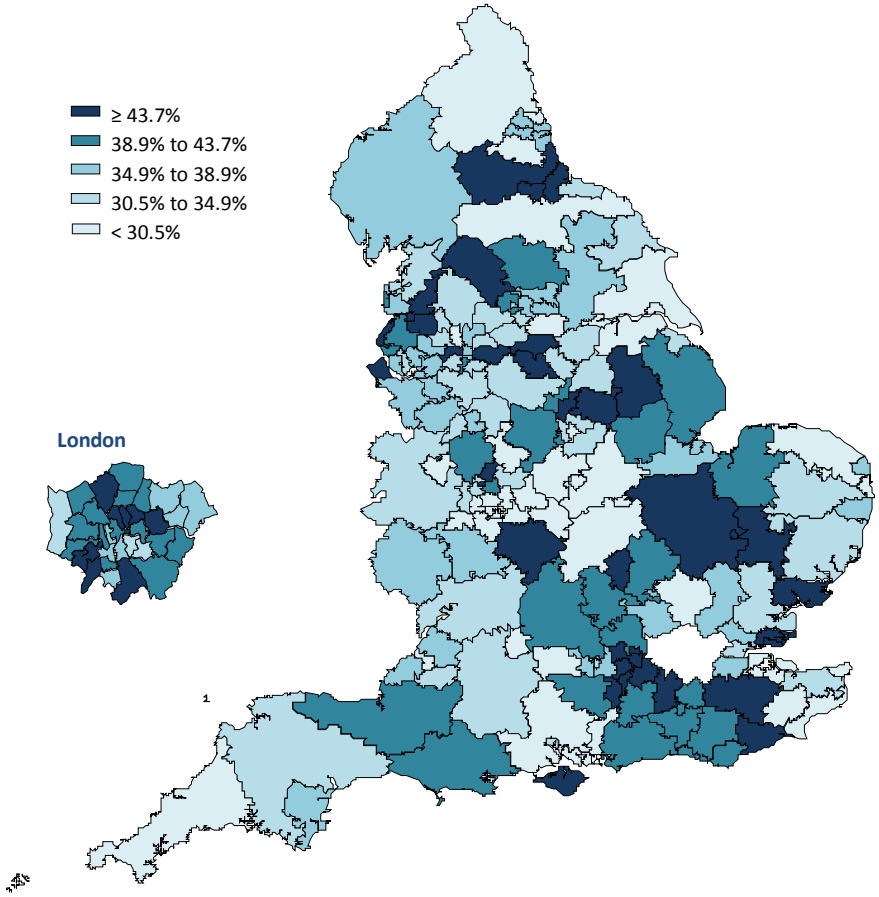


[4] Figures for some CCGs may be based on incomplete data due to missing GP practice information from which to attribute activity to CCGs. For further details see Annex 4 to the Technical Report.

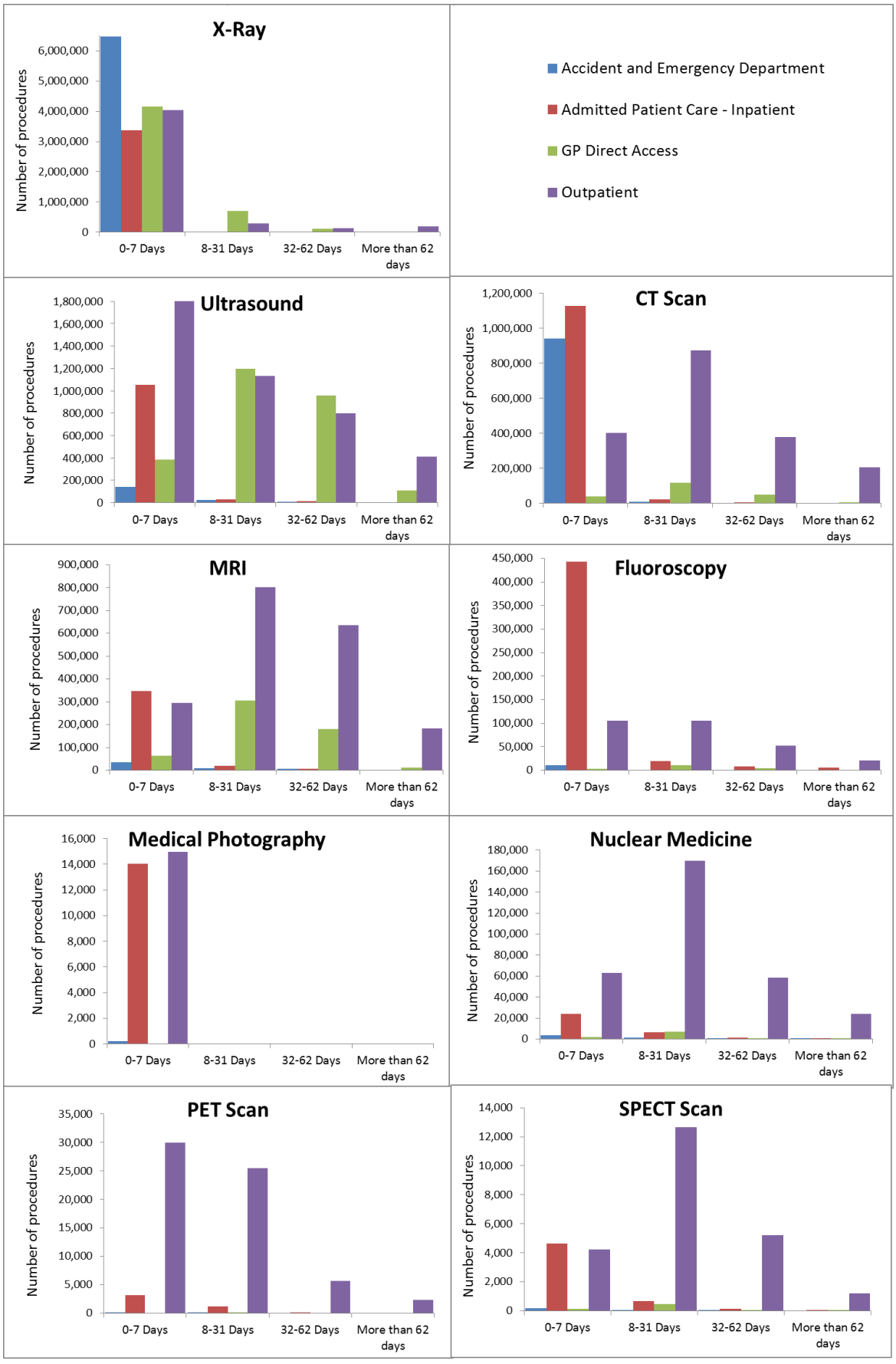
Map 2: Proportion of Ultrasounds where date of test is less than 14 days after date of request, for each CCG, 2016/17



Map 3: Proportion of MRI Scans where date of test is less than 14 days after date of request, for each CCG, 2016/17



Graph 2: Imaging activity by number of days from date of test request to date of test, by modality and source of referral, 2016/17



4.2 Patient Test Times – Test to report

4.2.1. The median number of days between the 'date of test' and the 'date of test report issued' varied between the different modalities, see Table 4. For Ultrasound, CT Scans, Fluoroscopy and Medical Photography, at least half the procedures (with a report issue date) were reported the same day as the test (that is, a median of 0). For MRI the median difference was 3 days, for PET-CT scans the median difference was 2 days, and for the other modalities the median difference was 1 day.

4.2.2. Within each modality, the elapsed period for a test report in 2016/17 was the same as the previous year and remained fairly consistent throughout the 12 months, with two modalities showing slight fluctuations of one day.

Table 4: Median number of days between date of test and date test report issued, by modality, April 2016 to March 2017

	X-ray	Ultra-sound	CT Scans	MRI	Fluoro-scopy	Nuclear Medicine	PET-CT Scans	SPECT Scans	Medical Photography
2012/13	1	0	0	2	0	2	2	1	1
2013/14	1	0	0	2	0	1	2	1	0
2014/15	1	0	0	3	0	1	2	1	0
2015/16	1	0	0	3	0	1	2	1	0
2016/17	1	0	0	3	0	1	2	1	0
Apr	1	0	0	3	0	1	2	1	0
May	1	0	0	3	0	1	2	1	0
Jun	1	0	0	3	0	1	2	1	0
Jul	1	0	0	3	0	1	2	1	0
Aug	1	0	0	3	0	1	2	1	0
Sep	1	0	0	3	0	1	2	1	1
Oct	1	0	0	3	0	1	2	1	1
Nov	1	0	0	3	0	1	2	1	1
Dec	1	0	0	3	0	1	2	1	1
Jan	1	0	0	3	0	1	2	1	0
Feb	1	0	0	3	0	1	2	2	0
Mar	1	0	0	3	0	1	2	2	0

4.2.3. The National Imaging Board guidance states that investigations will be seen and accurately reported within as short a time as possible and stresses the importance of reporting imaging activity in a timely manner. It suggested that Inpatient and Accident & Emergency referrals should be reported the same working day whilst all other referrals should be reported by the next working day. A tolerance of 90% for this was considered reasonable.

4.2.4. Most modalities show some progress towards this standard in 2016/17 compared with 2015/16, but fall short of achieving such rapid reporting. Table 5 shows the percentage of reports that were issued the same day as the test and those issued by the end of the next day separately for Admitted patient and A&E referred tests and for Outpatient and GP direct access tests, for each modality. Tables 10a-10d (separate Excel file) gives this breakdown by provider and type of referral.

Table 5: Proportion of imaging reports that were issued, either the same day as the test or by the end of the following day, by modality, April 2016 to March 2017.

Reported by:		X-ray		Ultrasound		CT Scans		MRI		Fluoroscopy		Nuclear Medicine		PET-CT Scans		SPECT Scans		Medical Photography	
		Same day	Next day	Same day	Next day	Same day	Next day	Same day	Next day	Same day	Next day	Same day	Next day	Same day	Next day	Same day	Next day	Same day	Next day
Inpatient and A&E	2012/13	25%	50%	91%	94%	81%	92%	64%	81%	70%	79%	58%	76%	23%	54%	75%	84%	20%	59%
	2013/14	25%	51%	92%	96%	84%	94%	65%	81%	71%	80%	59%	78%	28%	52%	73%	84%	48%	76%
	2014/15	26%	53%	93%	96%	85%	95%	66%	82%	72%	81%	60%	78%	29%	57%	67%	87%	49%	73%
	2015/16	28%	55%	94%	96%	88%	96%	67%	83%	72%	82%	62%	77%	35%	61%	72%	85%	52%	74%
	2016/17	29%	55%	94%	96%	88%	96%	65%	80%	73%	82%	64%	77%	39%	64%	76%	85%	48%	66%
	Apr	30%	55%	94%	97%	88%	96%	65%	80%	74%	83%	63%	77%	41%	65%	77%	87%	53%	71%
	May	29%	56%	95%	97%	89%	97%	66%	81%	75%	84%	65%	78%	30%	61%	64%	79%	53%	75%
	Jun	29%	54%	94%	96%	87%	96%	65%	80%	74%	83%	62%	75%	45%	62%	72%	83%	56%	77%
	Jul	28%	54%	94%	96%	88%	96%	65%	80%	73%	82%	61%	74%	42%	70%	77%	86%	51%	73%
	Aug	29%	55%	95%	97%	88%	96%	65%	80%	74%	82%	63%	76%	40%	66%	77%	86%	47%	65%
	Sep	28%	53%	94%	96%	88%	96%	65%	80%	73%	81%	63%	76%	37%	63%	76%	85%	44%	59%
	Oct	28%	54%	94%	96%	87%	95%	64%	79%	72%	81%	62%	77%	36%	69%	77%	85%	36%	48%
	Nov	31%	57%	93%	96%	87%	96%	64%	79%	73%	82%	63%	78%	38%	63%	80%	88%	39%	55%
	Dec	29%	53%	94%	96%	89%	96%	67%	81%	73%	81%	68%	80%	40%	64%	81%	88%	42%	55%
	Jan	29%	56%	95%	97%	89%	97%	66%	81%	74%	82%	65%	79%	39%	67%	78%	88%	54%	74%
	Feb	29%	55%	95%	97%	89%	97%	65%	80%	73%	82%	69%	80%	39%	62%	81%	88%	50%	68%
	Mar	28%	53%	93%	96%	88%	96%	65%	79%	74%	82%	64%	77%	35%	62%	70%	79%	57%	69%
Outpatients & GP Direct Access	2012/13	37%	53%	84%	90%	34%	50%	20%	35%	54%	68%	23%	45%	9%	39%	23%	46%	25%	70%
	2013/14	38%	53%	87%	91%	32%	47%	19%	34%	56%	70%	25%	46%	9%	35%	22%	43%	66%	90%
	2014/15	38%	54%	88%	93%	29%	45%	18%	33%	59%	72%	26%	47%	10%	38%	20%	44%	70%	86%
	2015/16	39%	54%	89%	93%	27%	42%	17%	32%	61%	73%	29%	50%	13%	38%	23%	44%	57%	76%
	2016/17	38%	54%	90%	94%	27%	40%	17%	31%	63%	74%	30%	50%	16%	41%	24%	44%	58%	72%
	Apr	37%	52%	91%	94%	28%	42%	18%	32%	64%	75%	30%	49%	17%	42%	24%	43%	53%	65%
	May	39%	55%	90%	94%	28%	43%	18%	32%	63%	75%	29%	50%	16%	44%	25%	45%	55%	76%
	Jun	38%	53%	90%	93%	27%	40%	17%	31%	63%	75%	30%	50%	13%	38%	23%	44%	57%	74%
	Jul	37%	52%	90%	94%	25%	37%	15%	28%	62%	74%	30%	48%	14%	39%	25%	44%	65%	82%
	Aug	38%	54%	91%	94%	26%	39%	16%	30%	61%	74%	30%	51%	15%	39%	23%	42%	54%	70%
	Sep	37%	51%	90%	93%	25%	38%	17%	30%	61%	73%	29%	49%	13%	39%	23%	45%	54%	63%
	Oct	38%	53%	90%	93%	26%	39%	17%	30%	62%	73%	29%	49%	16%	43%	21%	42%	47%	60%
	Nov	40%	57%	89%	93%	28%	42%	17%	32%	62%	74%	31%	52%	18%	45%	26%	47%	57%	73%
	Dec	41%	56%	90%	94%	28%	42%	17%	31%	65%	76%	33%	54%	16%	43%	27%	47%	48%	60%
	Jan	40%	56%	91%	94%	28%	42%	17%	32%	63%	75%	32%	52%	19%	45%	21%	44%	68%	83%
	Feb	39%	55%	91%	94%	26%	40%	16%	30%	64%	76%	31%	51%	18%	43%	23%	40%	68%	82%
	Mar	37%	51%	91%	94%	26%	39%	16%	30%	63%	75%	31%	51%	16%	38%	22%	41%	69%	77%

5 Imaging Tests that could contribute to Early Diagnosis of Cancer

5.1 Definition of the tests

5.1.1. One of the main drivers for establishing the DID was to assess the use of diagnostic imaging that could contribute to the early diagnosis of cancer and, in particular, General Practitioner (GP) direct access to these tests. To enable this analysis, a subset of procedures that are often used to diagnose or discount a diagnosis of cancer has been identified:

Brain (MRI)

- This may diagnose brain cancer, this includes – MRI of brain (often with contrast);

Kidney or bladder (Ultrasound)

- This may diagnose kidney or bladder cancer, this includes – ultrasound of kidney, ultrasound scan of bladder or ultrasound and Doppler scan of kidney;

Chest and/or abdomen (CT)

- CTs which may diagnose lung cancer, this includes – chest + abdominal CT, CT of chest (high resolution or other), CT thorax + abdomen with contrast, CT thorax with contrast or CT chest + abdomen;

Chest (X-ray)

- This may diagnose lung cancer, this includes – plain chest X-ray only;

Abdomen and/or pelvis (Ultrasound)

- This may diagnose ovarian cancer, this includes – ultrasonography of pelvis, ultrasonography of abdomen (upper, lower or other) or abdomen + pelvis.

5.1.2. Although these tests are used to diagnose cancer, many of them also have wider clinical uses. Within this data, it is not possible to distinguish between the different uses of these tests.

5.1.3. Brain MRI, chest X-ray, and ultrasounds of the abdomen and pelvis to diagnose Ovarian Cancer were three of the key tests outlined in *Improving Outcomes: a Strategy for Cancer*.

5.2 Imaging activity and GP referral

5.2.1. In 2016/17, 11.0 million of these tests that may have been used to diagnose or discount cancer were performed, up 2.3% from 10.7 million in 2015/16. There were sustained increases for Brain MRI and Chest and/or abdomen CT and proportionally smaller rises for Chest X-ray and Kidney or bladder ultrasound. The number of Ultrasounds showed least monthly variation across the year, as seen in graph 3.1.

5.2.2. The most common test requested through all source settings was Chest X-ray, with 8.3 million tests being requested in 2016/17 (up 2.3% from 2015/16). This was also the most common test requested by GPs (2.2 million, up 7.4% from 2015/16). Next most common were tests that may have been used to diagnose ovarian cancer (abdominal or pelvic ultrasound, roughly 1.3 million), with 45% of such tests being requested by a GP. Table 6 shows the total number of tests suitable for diagnosing cancer, with the subset of these that had a referral source of GP direct access.

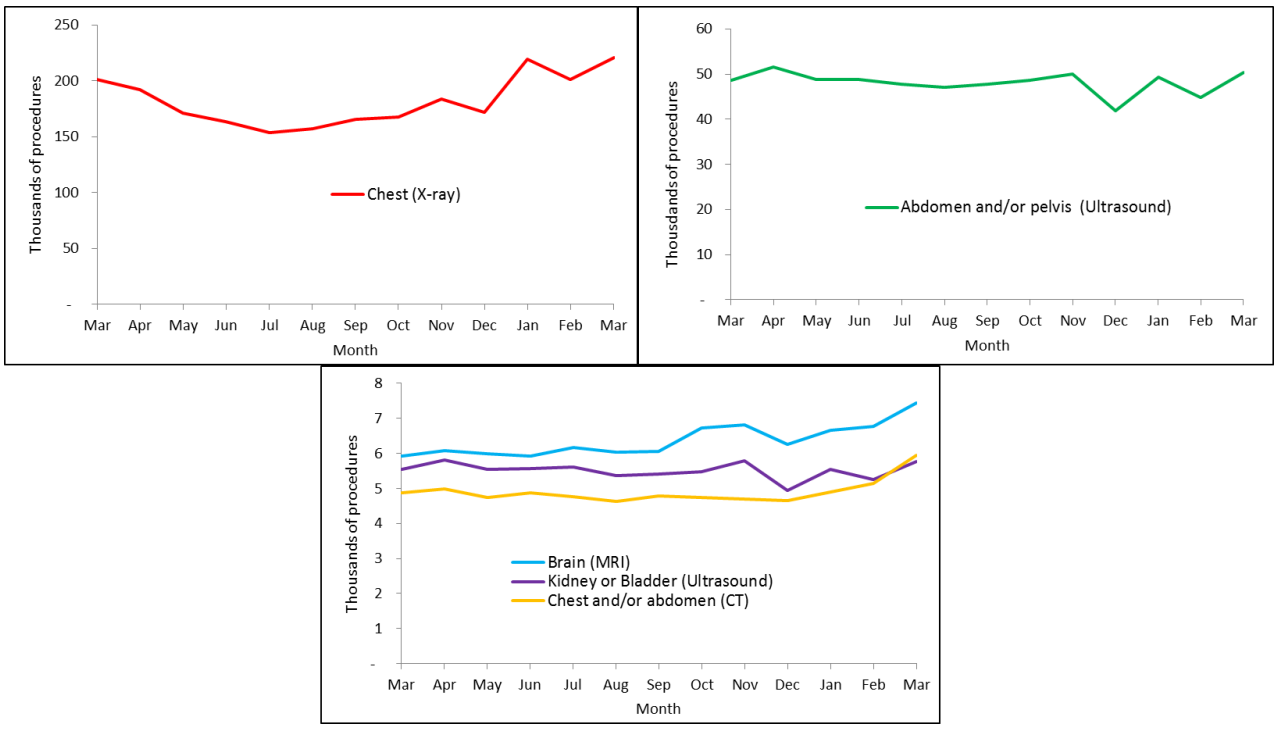
Table 6: Imaging activity for groups of tests suitable for diagnosing cancer, for all patients referred and for those directly referred by a GP, April 2016 to March 2017

	Brain (MRI)		Kidney or bladder (Ultrasound)		Chest and/or abdomen (CT)		Chest (X-ray)		Abdomen and/or pelvis (Ultrasound)	
	All	GP	All	GP	All	GP	All	GP	All	GP
2012/13	472,755	31,030	220,230	67,460	388,655	32,185	7,723,410	1,991,705	1,165,345	536,930
2013/14	528,870	39,540	220,075	65,450	438,245	39,180	7,691,055	1,931,250	1,246,225	570,235
2014/15	582,905	50,090	228,525	67,035	489,195	46,620	8,149,525	2,124,255	1,300,660	598,910
2015/16	629,095	68,330	222,765	65,925	512,865	50,995	8,070,460	2,019,315	1,312,745	600,435
2016/17	686,390	76,925	233,615	66,120	539,405	58,875	8,253,330	2,167,875	1,287,095	576,845
Growth	9.1%	12.6%	4.9%	0.3%	5.2%	15.5%	2.3%	7.4%	-2.0%	-3.9%
2016/17										
Apr	55,765	6,080	19,580	5,810	44,800	4,995	691,990	192,140	110,450	51,565
May	53,065	5,995	18,745	5,535	42,975	4,745	669,765	170,835	106,745	48,850
Jun	56,000	5,915	19,810	5,560	45,160	4,875	653,750	163,375	110,445	48,780
Jul	56,515	6,165	19,750	5,620	43,860	4,755	644,670	153,995	106,900	47,750
Aug	55,900	6,035	19,410	5,375	44,275	4,620	620,265	157,205	105,000	47,060
Sep	56,530	6,050	19,575	5,410	44,455	4,785	644,910	165,710	107,165	47,745
Oct	58,035	6,720	19,095	5,480	44,455	4,745	677,500	167,545	107,790	48,645
Nov	59,645	6,825	20,285	5,795	45,730	4,705	705,355	183,820	110,695	50,035
Dec	54,315	6,255	17,965	4,950	42,470	4,650	707,395	171,935	96,395	41,880
Jan	59,930	6,670	20,125	5,550	46,890	4,900	787,575	219,240	110,540	49,355
Feb	56,535	6,780	18,700	5,260	44,165	5,150	695,930	201,130	100,880	44,870
Mar	64,160	7,440	20,575	5,775	50,170	5,955	754,220	220,950	114,090	50,310

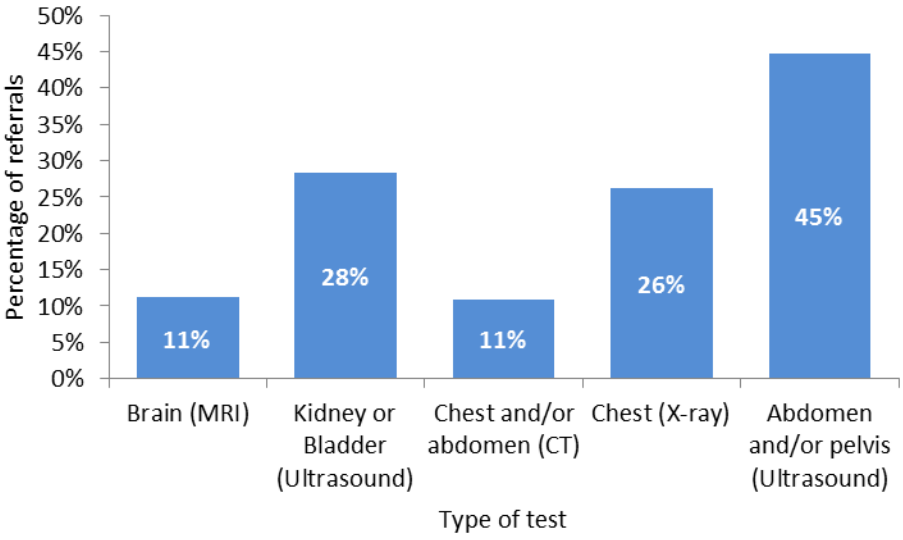
Totals do not always equal the sum of parts due to rounding
% Growth is between 2015/16 and 2016/17

5.2.3. Of the 11.0 million tests requested in 2016/17, 26.8% were requested by GPs under direct access arrangements, compared with 26.1% in 2015/16. Graph 3.2 shows the proportion of tests requested by GPs by test. The lowest proportions of GP direct access were for Brain MRI and Chest and/or abdomen CT (11%). But for the fourth year running, these were also the tests with most increase year on year and where the GP access source increased faster than the overall rise in the number of tests.

Graph 3.1: Imaging activity for patients directly referred by a GP, March 2016 to March 2017



Graph 3.2: Percentage of referrals made by GPs by type of test, 2016/17



5.3 Patient test times

Patient test times – Request to test

5.3.1. For the key tests that may be used to diagnose or discount cancer, the median period from a test being requested to being performed is longer for GP direct access than for all referrals, see Table 7. The exception is Chest X-ray, where the median is zero (same day) for GP and all referrals. The main reason for

this difference is that 'all referrals' includes tests on emergency admissions and inpatients, which have shorter waits.

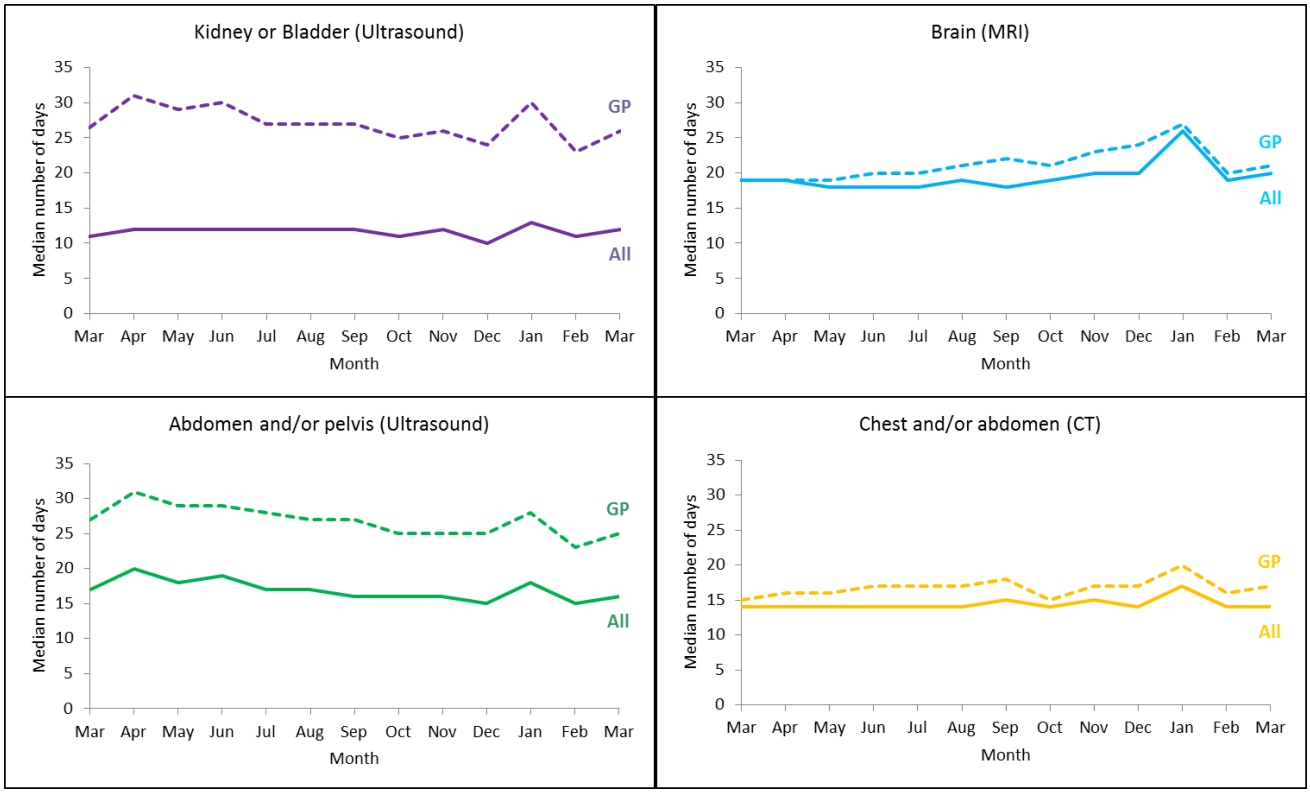
Table 7: Median number of days between date of test request and date of test for groups of tests suitable for diagnosing cancer, overall and for GP Direct Access, April 2016 to March 2017

	Brain (MRI)		Kidney or bladder (Ultrasound)		Chest and/or abdomen (CT)		Chest (X-ray)		Abdomen and/or pelvis (Ultrasound)	
	All	GP	All	GP	All	GP	All	GP	All	GP
2012/13	21	25	13	23	13	17	0	0	14	22
2013/14	21	25	13	23	13	16	0	0	15	24
2014/15	21	26	13	24	14	17	0	0	17	26
2015/16	19	21	11	26	14	16	0	0	17	27
2016/17	19	21	12	27	14	17	0	0	17	27
Apr	19	19	12	31	14	16	0	0	20	31
May	18	19	12	29	14	16	0	0	18	29
Jun	18	20	12	30	14	17	0	0	19	29
Jul	18	20	12	27	14	17	0	0	17	28
Aug	19	21	12	27	14	17	0	0	17	27
Sep	18	22	12	27	15	18	0	0	16	27
Oct	19	21	11	25	14	15	0	0	16	25
Nov	20	23	12	26	15	17	0	0	16	25
Dec	20	24	10	24	14	17	0	0	15	25
Jan	26	27	13	30	17	20	0	0	18	28
Feb	19	20	11	23	14	16	0	0	15	23
Mar	20	21	12	26	14	17	0	0	16	25

5.3.2. Two out of the five tests had an increase of one day in the median period from request to test for GP referrals in 2016/17: Ultrasound for kidney or bladder and CT-scan of chest and/or abdomen. However most medians were similar to in 2015/16.

5.3.3. The median number of days between date of request and date of test has shown some fluctuation throughout 2016/17 for tests that are suitable for diagnosing cancer, as shown in Graph 4. Brain MRI and both ultrasound procedures (kidney or bladder and abdomen and/or pelvis) for GP direct access have shown the largest variation across the months of 2016/17 with a range of about 8 days, but there is no consistent seasonality except a peak in January for all tests.

Graph 4: Median number of days between date of test request and date of test for groups of tests suitable for diagnosing cancer, overall and for GP Direct Access, March 2016 to March 2017



Patient test times – Test to report

5.3.4. There is generally little difference in the time taken for a test report to be issued for GP direct access and all referrals, as shown in Table 8. However, the median period between the date of test and the date the report was issued was 3 days for GP-referred brain MRI, compared with 2 days overall, and 3 days for GP-referred chest and/or abdomen CT, compared with 2 day overall.

5.3.5. The median time between test and report issued has remained the same for most modalities between 2015/16 and 2016/17. Only the median days for chest and abdomen CT increased by one day for both GP-referred and all patients in 2016/17 compared to 2015/16.

5.3.6. Throughout 2016/17 there has been some fluctuation of the median test to report period but no consistent pattern over the year for any referrals.

Table 8: Median number of days between date of test and date test report issued and Percentage of records where report issued on day of test, for groups of tests suitable for diagnosing cancer, for All referrals and GP Direct Access, April 2016 to March 2017

	Brain (MRI)				Kidney or bladder (Ultrasound)			
	All Median	All % Same day	GP Median	GP % Same day	All Median	All % Same day	GP Median	GP % Same day
2012/13	2	32%	3	17%	0	85%	0	80%
2013/14	2	34%	3	18%	0	89%	0	85%
2014/15	2	33%	3	18%	0	91%	0	88%
2015/16	2	35%	3	21%	0	92%	0	89%
2016/17	2	33%	3	19%	0	93%	0	89%
Apr	2	35%	3	22%	0	94%	0	90%
May	2	35%	2	24%	0	93%	0	89%
Jun	2	33%	3	21%	0	92%	0	88%
Jul	2	32%	3	16%	0	92%	0	88%
Aug	2	33%	3	15%	0	93%	0	90%
Sep	2	33%	3	18%	0	93%	0	90%
Oct	2	32%	3	21%	0	93%	0	89%
Nov	2	32%	2	19%	0	93%	0	90%
Dec	2	33%	3	17%	0	95%	0	92%
Jan	2	31%	2	20%	0	94%	0	91%
Feb	2	32%	2	16%	0	94%	0	90%
Mar	2	32%	3	17%	0	92%	0	89%

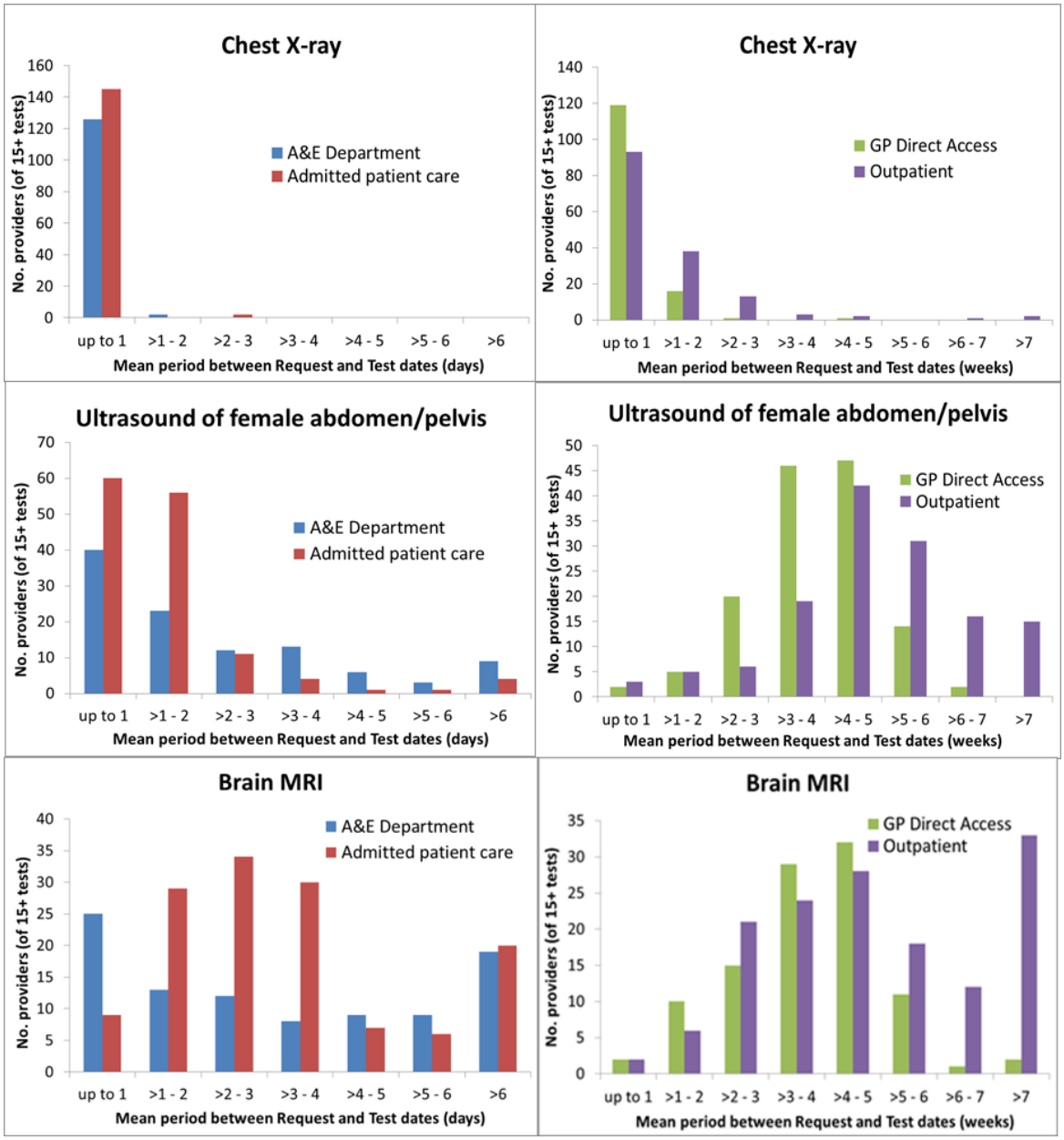
	Chest and/or abdomen (CT)				Chest (X-ray)				Abdomen and/or pelvis (Ultrasound)			
	All Median	All % Same day	GP Median	GP % Same day	All Median	All % Same day	GP Median	GP % Same day	All Median	All % Same day	GP Median	GP % Same day
2012/13	1	42%	2	32%	2	25%	2	29%	0	86%	0	84%
2013/14	1	40%	2	29%	2	25%	2	28%	0	89%	0	88%
2014/15	1	38%	2	27%	2	25%	2	28%	0	90%	0	89%
2015/16	1	36%	2	25%	2	26%	2	29%	0	92%	0	90%
2016/17	2	36%	3	23%	2	26%	2	27%	0	93%	0	91%
Apr	2	37%	3	24%	2	26%	2	26%	0	93%	0	92%
May	1	37%	2	26%	2	27%	1	29%	0	93%	0	91%
Jun	2	36%	3	23%	2	26%	2	26%	0	92%	0	91%
Jul	2	35%	4	21%	2	26%	2	26%	0	93%	0	91%
Aug	2	35%	4	22%	2	26%	2	27%	0	93%	0	91%
Sep	2	34%	4	20%	2	24%	2	25%	0	93%	0	91%
Oct	2	35%	3	22%	2	24%	2	26%	0	93%	0	91%
Nov	2	36%	3	25%	2	27%	1	30%	0	92%	0	91%
Dec	2	38%	3	22%	2	26%	1	31%	0	93%	0	92%
Jan	2	37%	3	24%	2	26%	1	28%	0	94%	0	92%
Feb	2	35%	3	22%	2	25%	2	27%	0	94%	0	92%
Mar	2	35%	3	22%	2	24%	2	25%	0	94%	0	92%

Variation by provider

5.3.7. The mean period between date of test request and date of test varies by provider as well as by referral source and modality; see Graph 5.1 for Chest X-ray, Ultrasound of the abdomen and/or pelvis in females and Brain MRI.

For chest X-ray, there is slightly more variation by provider for GP referrals and outpatients, where the averages from request to test range from less than one day to over a week[5], than for admitted patients and those referred by A&E, where most providers average less than one day[6] between request and test. For female ultrasound there is also more variation for GP referrals and outpatients, with providers differing in their mean request to test period by several weeks. For brain MRI, there is variation between providers for A&E and admitted patients (of several days) as well as for GP referrals and outpatients (of several weeks).

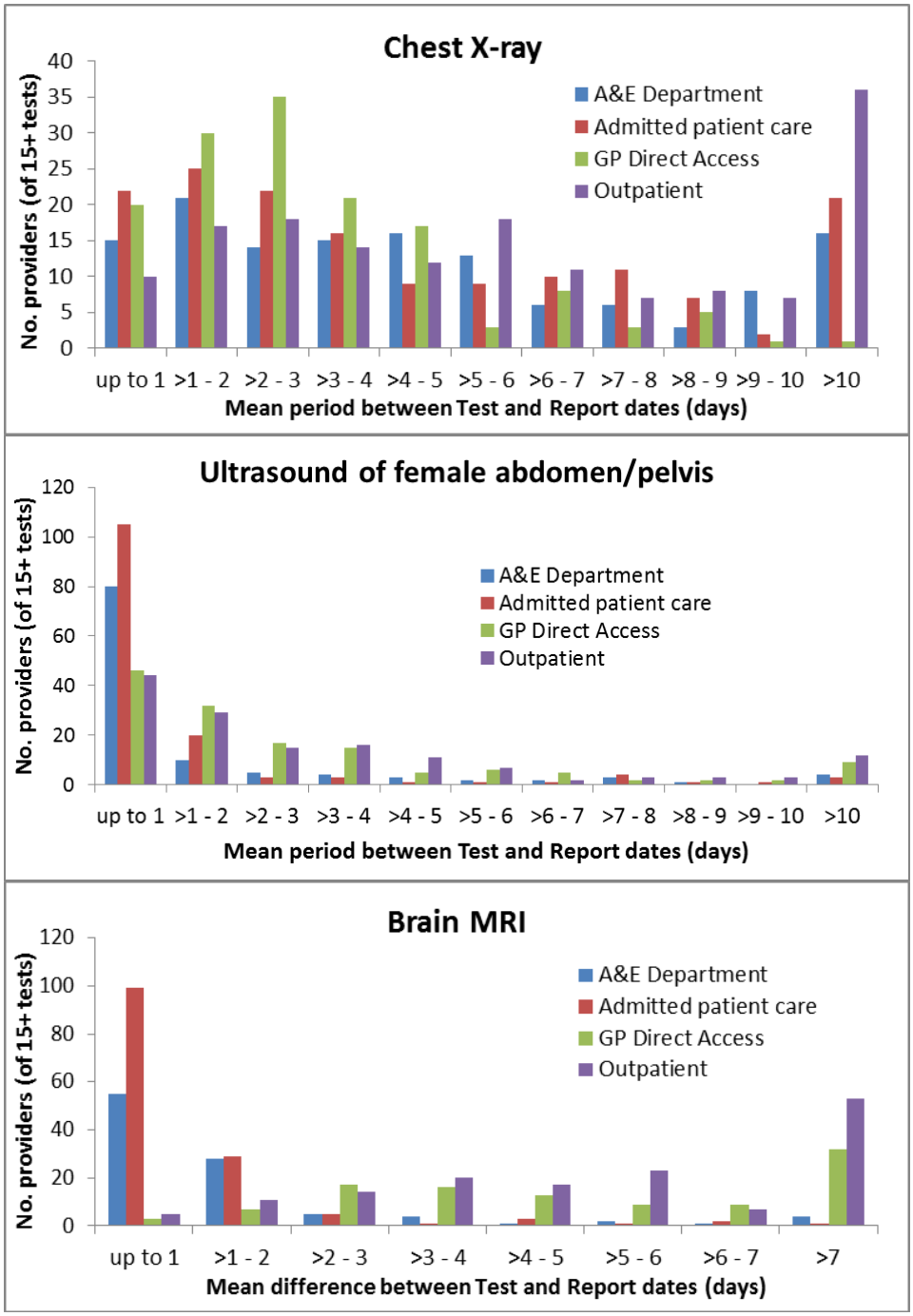
Graph 5.1 Average period from date of test request to date of test for procedures suitable for diagnosing cancer, by provider and referral source, 2016/17



[5] Very high values may reflect inaccurately reported dates.
[6] Period measured between dates and not times of day.

5.3.8. The mean period between date of test and date of test report also varies by provider for Chest X-ray, Ultrasound of the abdomen and/or pelvis in females and Brain MRI, see Graph 5.2. There is less variation in test to report periods by source of referral than for the period from test request to test, but there are still big differences between the diagnostic types. Female ultrasounds were generally reported the same day but chest X-ray and brain MRI were up to a week or so later. No significant correlation was observed between the mean request to test period and the mean test to report period at provider level, neither were the provider means for either period related to the volume of imaging tests performed for these three diagnostics.

Graph 5.2 Average period from date of test to date test report issued for procedures suitable for diagnosing cancer, by provider and referral source, 2016/17



6 Annex

6.1 Data Quality Statement

Although data from Radiology Information Systems (RISs) were not originally intended for statistical purposes and have some shortfalls, they do provide a rich resource with great potential for wider analysis. This data collection aligns with the code of practice for official statistics in making better use of administrative data and evaluating existing data sources to limit the burden on respondents. Some RIS systems cover additional test activity not reported in this publication.

There are a large number of validations built into the DID upload system, verifying that the data provided by organisations makes sense. Whilst validations and other checks have been made to ensure that the data are complete and accurately reflect activity, data issues may affect activity for some providers.

Final data for each month are extracted from the DID data warehouse around the 28th of the sixth month after the period. Any data submitted after this date may not be included in the publication but would be available in the iView tool. In 2016/17, some data for three provider organisations were missing in the final report:

- The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust (RCX) data for April to June 2016;
- East Sussex Healthcare NHS Trust (RXC) data for May 2016;
- The Rotherham NHS Foundation Trust (RFR) data for December 2016

Nevertheless, the coverage and quality has continued to improve in 2016/17, as data providers become more familiar and the information is further evaluated. Provider data completeness is now 99.7%. However within this, some data submissions may be incomplete. Known problems are:

- Aintree University Hospital NHS Foundation Trust (REM) had a shortfall in their data from June to August 2016, due to data extraction errors.
- Central Manchester University Hospitals NHS Foundation Trust (RW3) incorrectly apportioned activity in June 2016 between patient source settings, due to a file corruption. In particular, this understates the proportion of Chest X-ray and Ultrasound tests reported as GP-referred in the analysis of tests that could contribute to Early Diagnosis of Cancer.
- Circle Nottingham NHS Treatment Centre (NV313) started to submit activity from December 2016 which was previously missing.
- County Durham and Darlington NHS Foundation Trust (RXP) reported excessive MRI activity in August 2016 that did not reflect activity.
- East Sussex Healthcare NHS Trust (RXC) erroneously submitted some data for Sussex Community NHS Foundation Trust (RDR) for May 2016, instead of their own activity, and had a shortfall in their data for June 2016.
- Imperial College Healthcare NHS Trust (RYJ) had a shortfall in their data for May 2016, with missing activity for most days in that month.
- Kettering General Hospital NHS Foundation Trust (RNQ) had a shortfall in their data for June 2016, due to a bug in their system that could not be corrected in time.

- Luton and Dunstable University Hospital NHS Foundation Trust (RC9) had a shortfall in their data for October 2016, due to staffing difficulties for submission.
- Sheffield Teaching Hospitals NHS Foundation Trust (RHQ) submitted incomplete PET data for January to February 2017, due to a misunderstanding with a third party over who was submitting the data.
- St George's Healthcare NHS Trust (RJ7) has an inflated submission for March 2017 which is unexplained.
- The Royal Marsden NHS Foundation Trust (RPY) did not submit PET scan data for April to December 2016. Their PET scan activity ranged from around 380 to 450 scans per month, a total of 3,822 PET scans omitted from DID over the nine months.
- United Lincolnshire Hospitals NHS Trust (RWD) had a shortfall in their data for March 2017, due to a technical fault with the extract.
- University Hospitals of Leicester NHS Trust (RWE) had a shortfall for August 2016, due to an error arising from a system change.

The Technical Report gives more information on data completeness and quality in Section 4.

Reported times from test request to test should not be compared to diagnostic test waiting time statistics, as these are collected using different definitions. Unlike these statistics, the DM01 diagnostic test waiting times statistics exclude records where, for example:

- The patient is waiting for a planned (or surveillance) diagnostic test/procedure, that is a procedure or series of procedures as part of a treatment plan which is required for clinical reasons to be carried out at a specific time or repeated at a specific frequency, such as 6-month check cystoscopy;
- The patient is currently admitted to a hospital bed and is waiting for a diagnostic test/procedure as part of their inpatient treatment.

In addition, for the data published here, approximately 89% of tests had a date of test request included and 90% of tests had a date of test report issue included.

Some patient records have no known commissioner as this is derived from patient registered GP practice which is not a mandatory field. Data are submitted by provider, so data quality is better for providers than for commissioners.

Details of coverage, completeness, comparability with other data sources and a discussion on the types of data quality issues encountered are provided in the Technical Report which is available on the NHS England Statistics website.

6.2 Revisions

In the provisional publications, several Trusts did not provide data on time and their figures were either blank or "0" for all or selected fields. Most subsequently submitted data, with the exceptions listed above. Submissions made after the deadline may be available in iView, but these data are now finalised and revisions will only be made in exceptional circumstances. For more detail of the revisions policy, see the Technical Report.

6.3 Glossary

Computerised Axial Tomography (CT Scan)
Computed tomography (CT), sometimes called CAT scan, uses special X-ray equipment to obtain image data from different angles around the body, then uses computer processing of the information to show a cross-section of body tissues and organs. In the DID this means all codes mentioning CAT or computed tomography except those also mentioning PET.

Diagnostic Ultrasonography (Ultrasound)
The use of ultrasonic waves for diagnostic or therapeutic purposes, specifically to image an internal body structure, monitor a developing foetus or generate localised deep heat to the tissues. In the DID this means any code relating to ultrasound.

Fluoroscopy
Fluoroscopy is an imaging technique commonly used by physicians to obtain real-time images of the internal structures of a patient through the use of a fluoroscope. In its simplest form, a fluoroscope consists of an X-ray source and fluorescent screen between which a patient is placed. In the DID this is a collection of codes mentioning fluoroscopy or using fluoroscopic guidance, Barium enema or swallow. Interventional procedures are classified under imaging modalities which provide guidance. Almost all interventional procedures are under fluoroscopy procedure. A very small number of interventional procedures are under CT or MRI procedures.

Magnetic Resonance Imaging (MRI)
Magnetic resonance imaging (MRI) is a method of producing extremely detailed pictures of body tissues and organs without the need for X-rays. The electromagnetic energy that is released when exposing a patient to radio waves in a strong magnetic field is measured and analysed by a computer, which forms two- or three-dimensional images that may be viewed on a TV monitor. In the DID this means all codes mentioning MRI.

Plain Radiography (X-ray)
A Radiograph is an image produced on a radiosensitive surface, such as a detector, by radiation other than visible light, especially by X-rays passed through an object or by photographing a fluoroscopic image. In the DID this means any code referring to radiography or X-ray.

Medical Photography
A Photograph is an image recorded on sensitised material by energy from the light spectrum, which is then processed to create a print that can be viewed clearly. Medical Photography is used in order to document a variety of different medical conditions and their treatment.

Nuclear Medicine
Nuclear medicine (NM) is a branch of medicine and medical imaging that uses unsealed radioactive substances in diagnosis and therapy. These substances consist of radionuclides, or pharmaceuticals that have been labelled with radionuclides (radiopharmaceuticals). In diagnosis, radioactive substances are administered to patients and the radiation emitted is measured.

Nuclear medicine imaging tests differ from most other imaging modalities in that the tests primarily show the physiological function of the system being investigated, as opposed to the anatomy. It has both diagnostic and therapeutic uses, such as planning cancer treatments and evaluating how well a patient has responded to a treatment. It can be used with other diagnostic methods, including CT scans and MRI, where the images are superimposed to produce complex cross-sectional, three-dimensional scans.

Position Emission Tomography – Computer Tomography (PET-CT Scans)
Position Emission Tomography - Computed Tomography (PET-CT Scan) is an imaging technique used in the diagnosis and treatment of cancer which combines PET with CT. PET uses gamma-type cameras to produce crude three-dimensional images highlighting radionuclide concentration in the body. CT allows precise localisation of the radionuclide concentration. PET-CT scans can be used to show how far a cancer has spread and can determine if a patient is responding positively to a treatment. In the DID this means all codes mentioning PET, whether or not they also mention CT.

Single Photon Emission Computerised Tomography (SPECT scans)
Single Photon Emission Computerised Tomography (SPECT scans) is an imaging method that allows for analysis of internal organs. Gamma photon-emitting radionuclides are administered to a patient prior to being exposed to gamma cameras that rotate around a patient to produce cross-sectional slices that can then be reformatted into a true three-dimensional image of the patient.

Median
The median is the preferred measure of the average time between pairs of dates within records as it is less susceptible to extreme values than the mean. The median number of days between pairs of dates is calculated by ordering the values obtained by subtracting the dates for each record and selecting the middle value when all records are ranked by these numbers of days.

Modality
The broad procedure or method used for examination, for example MRI. This may include procedures assisted by the method, e.g. biopsy or injection. In the DID the modality of the examination is derived from SNOMED CT (Systematised Nomenclature of Medicine – Clinical Terms) or NICIP (National Interim Clinical Imaging Procedure) codes.

Referral source setting
This is a categorisation of the department or organisation making the referral for the imaging activity. It includes categories for admitted patient care, outpatients, GP Direct Access, A&E and health care providers other than the organisation providing the imaging activity.

6.4 Contact Us

6.4.1 Feedback

We welcome feedback on this publication. Please contact us at did@dh.gsi.gov.uk

6.4.2 iView

NHS Digital allow health sector colleagues to access DID information through their web-based reporting tool, iView. Registered users may access anonymised data at an aggregate level in a consistent and flexible format:

- **Access Information** – choose from a variety of data areas.
- **Build Reports** – select data to suit your needs.
- **Generate Charts** – customise report tables and graphs.
- **Export Data** – copy to Excel and manipulate data your way.
- **Save Reports** – store your favourite views for future use.

For more information, please visit the iView website http://content.digital.nhs.uk/iview. If you would like to register to use iView for DID, please email enquiries@nhsdigital.nhs.uk (subject: DID iView Access).

6.4.3 Websites

The DID information website can be found here: http://content.digital.nhs.uk/DID.

Those who submit data to DID do so via a secure submission portal here: https://did.hscic.gov.uk/

The DID Additional Tables and Technical Report can be found here: http://www.england.nhs.uk/statistics/diagnostic-imaging-dataset/

6.4.4 Additional Information

For press enquiries contact the NHS England Media team on 0113 825 0958 or 0113 825 0959. Email enquiries should be directed to nhsengland.media@nhs.net

The Government Statistical Service (GSS) statistician responsible for producing these data is:

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