

Major surgical resections  
England, 2004-2006

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## Introduction

### Background

Surgery is the treatment that has the greatest impact on long term survival in most types of cancer. It can also serve the purpose of significantly improving symptoms, even in situations where long term survival is unrealistic. A more detailed understanding of the patterns of surgical treatments in cancer is therefore vital to efforts to improve outcomes for cancer patients. The need to develop better knowledge and understanding of treatment was a central aim of the Cancer Reform Strategy. This project is the first attempt to look in more detail at surgical treatment for patients across a wide variety of cancer types in England. This report is best seen as the beginning of a process in which we aim, over time, to relate treatment rates to survival and other outcomes, to establish 'benchmarks' for good practice and to provide data both to health care providers and commissioners that we hope will help drive up standards of care.

The main source of routine data collection of surgical procedures within the NHS is the Hospital Episode Statistics (HES) dataset, collected through trusts submitting relevant data for their patients. These data are used for the reimbursement of trusts for their surgical activity. Recently, the National Cancer Intelligence Network (NCIN) facilitated the linkage between the national cancer registry data held by the English cancer registries, and an extract of all HES records relating to cancer patients. This has resulted in the National Cancer Data Repository (NCDR), enabling the analyses presented in this report.

The National Cancer Data Repository holds cancer registration data for the whole of England combined with over 10 million individual entries of hospital episodes. This provides an unparalleled resource for exploring hypotheses and evaluating quality of care. Further information about the National Cancer Data Repository is available from the NCIN website [www.ncin.org.uk](http://www.ncin.org.uk).

The proportion of patients who undergo surgical operations as part of their treatment is available nationally for bowel, head and neck, lung, oesophago-gastric cancers and mastectomy and breast reconstruction through national cancer audits. See <http://www.ic.nhs.uk> for more details. Analyses by cancer networks in these audit reports are either the network where the patient is first seen in secondary care (usually the Multi-Disciplinary Team) or in which patients receive their treatment. In the work presented here, we have used the area of residence of patients in the analyses, which will result in some apparent discrepancies at a local level if the results are compared directly with audit data. Their reports may also cover different time periods. In addition, the results presented in this report may differ because of the use of different surgical procedure codes from those used in the national audits. This is because, for the present analysis, we have chosen to focus on what the clinical experts in their respective fields have identified as the relevant 'Major Surgical Procedures', some of which may well be carried out with 'palliative' rather than 'curative' intent.

This report represents a significant step forward in providing national level analyses for the surgical treatment of a wide range of common cancer sites using routine information on surgical procedures derived from HES. This is the first report that brings together information of this nature using a common methodology and produces a common set of outputs specifically for major resections across such a wide range of cancer types.

By bringing together cancer registrations with information regarding operations and procedures undertaken within the NHS, we can present analyses of the data that is available and start to ask questions as to why any apparent differences are seen.

This is the first step in understanding variations in surgical treatment which we hope will provide the intelligence to raise standards of care and help improve outcomes for cancer patients.

In undertaking this analysis, we attempted to answer the following questions:

- Is it possible to use routine HES data to ascertain the proportion of patients who received a major resection as part of their treatment?
- Are there differences in surgical rates between the sexes, age groups and those in different deprivation quintiles?
- What is the variation across the country based on the cancer network to which patients are assigned using their postcode of residence?

## Methods

The primary aim of this report was to produce a first exploratory analysis using routine data from hospitals to determine the percentage of patients who have a record of a major resection in England and whether any variation between inequality groups exist. Major resections were classified as non-diagnostic surgical operations which would be carried out with intent to remove the tumour.

The HES database contains records for every in-patient and/or day case stay for each patient attending an NHS hospital in England and includes information regarding the procedures, operations and corresponding dates performed during each episode. Each episode can contain up to 12 different codes describing the procedure or operation that a patient underwent. Operations and procedures are recorded using a classification system called OPCS. All OPCS codes and their descriptions used for each site are included in the appendix of this report.

Clinicians from the NCIN's Site Specific Clinical Reference Groups (SSCRGs) and staff from cancer registries in England were involved in this work and helped to determine which relevant OPCS codes should be included as a major resection for each cancer site, given that a patient had a diagnosis of cancer.

For certain sites there are diagnostic procedures which may also remove the tumour, for example loop and cone biopsies for cervical cancer. However, without data such as stage of disease at diagnosis, it is not possible to say retrospectively whether the tumour would have been removed and therefore these operations were not included as "major resections". Patients with certain tumours may also undergo surgery that won't remove the tumour but will instead aim to debulk the tumour before radiotherapy or chemotherapy. Therefore, the percentage of patients who have received surgery as part of their care may well be higher for some sites than the percentage of patients who receive a major resection as presented in this initial report.

All patients diagnosed with a malignant neoplasm from 2004 to 2006 (inclusive) were extracted from the NCDR in January 2010 for cancer of the oesophagus (C15), stomach (C16), liver (C22), pancreas (C25), colorectal (C18-C20), lung (C33-C34), breast (C50), cervix (C53), uterus (C54-C55), ovary (C56), prostate (C61), kidney (C64-C66 & C68) and bladder (C67). All codes in brackets relate to the ICD-10 codes included for each site.

The National Cancer Data repository also holds data obtained from linking patients with the Hospital Episode Statistics Database (HES). All linked HES records from 2003 to 2007 were extracted for cancer patients from the national cancer data repository in October 2010.

All OPCS procedures from HES for a given patient were included in the analysis. A patient was either classified as having a record of a major resection or not. It is possible that patients had a record of more than one OPCS code that was assigned as a major resection for their treatment. These patients have been included once in the analyses as having received a major resection.

A timeframe of 30 days before diagnosis date and up to six months post diagnosis was used to restrict the surgery to the relevant cancer diagnosis and not a recurrence. For cancers of the breast, uterus, ovary and cervix, a period of up to one year post diagnosis was used. This is because, for these cancers, patients may undergo a course of chemotherapy, radiotherapy or both, before a major resection is performed. Any procedure outside the allocated timeframe was not attributed to that diagnosis and therefore excluded from these analyses.

Exclusions were also made where a patient was diagnosed as a result of being registered solely on the basis of a death certificate (Death Certificate Only registration – DCO). As DCO registrations are unlikely to have known about their tumour before their death, it would not be appropriate to include them within these analyses. The proportion of patients classified as a DCO varies with site. In addition, any records with missing information regarding date of diagnosis, place of residence at diagnosis or age of patient were also excluded from the analysis. The quality of our data has not made it possible for us to attempt to correct the findings for the stage of disease or for co-morbidity, although we have examined the effects of age and socio-economic deprivation

As data is only available for patients treated in NHS hospitals, any patients who could not be matched to at least one hospital episode were also excluded from the analysis as we did not know whether they may have received a major resection outside of the NHS. Data for patients who are treated privately are not currently available. The percentage of patients who did not have a linked HES record varies by cancer site from 27% for prostate cancer to 3% for oesophageal cancer. Table 1 shows the breakdown by site and Appendix 1 shows the percentage of matched patients by cancer site and by cancer network.

**Table 1: Percentage of Non-DCO cancer registrations linked to a HES record, by cancer site, patients diagnosed 2004-06, with HES up to 2007.**

Cancer Site	Number of Non-DCO patients	Non-DCO patients linked to HES	Percent of patients linked to HES
oesophagus	18,458	17,839	97%
stomach	18,771	17,830	95%
liver	6,732	6,056	90%
pancreas	17,490	16,074	92%
colorectal	85,513	80,690	94%
lung	87,703	80,522	92%
breast	110,808	97,690	88%
cervix	6,765	6,007	89%
ovary	15,852	14,444	91%
uterus	16,880	15,374	91%
prostate	87,874	63,940	73%
kidney	17,649	16,314	92%
bladder	24,508	23,562	96%

## Summary of results

For all cancer sites, there was a decrease in the proportion of patients undergoing a major resection for older patients, with less than 2% of patients aged 80+ having a record of a major resection for six of the thirteen cancer sites analysed. There was evidence of small but significant decreases in the proportion of patients receiving a major resection in the more deprived socio-economic groups and also of variation in surgical rates between cancer networks. However, further work is required in order to better understand the clinical significance of these observations since other factors such as late diagnosis (i.e. stage of disease) and co-morbidities could contribute to these differences.

For cancers of the oesophagus, stomach, bladder, prostate, lung, pancreas and liver, less than 16% had a record of a major resection as part of their treatment. For liver cancer, only 6% of all patients were recorded as having undergone a major resection within NHS hospitals. With the exception of stomach cancer, less than 2% of patients aged over 80 had a record of a major resection in any of these cancer sites.

Large falls in the percentage of patients with a record of a major resection by age were seen for ovarian, kidney and cervical cancer. For patients aged 40-49 compared to patients aged 80+, the proportion decreased from 82% to 26% for ovarian, from 78% to 29% for kidney and from 58% to 10% for cervical cancer.

The highest percentage of patients aged 80 and over with a record of a major resection was seen in uterine cancer where a resection rate of 65% of NHS treated patients was seen.

Variation by deprivation quintile was not adjusted for age or other case-mix factors. Further work is therefore required to examine whether there are particular sub-groups of patients where there are real differences related to deprivation that may be hidden by this high level analysis.

The largest difference by deprivation quintile was seen for cervical cancer, with a gap of 10 percentage points between the least deprived and the most deprived. This gap can be expressed as a change of 2.3 percentage points per deprivation quintile and was statistically significant. Further analyses are required to try and define the reasons underlying this observation.

Differences in major surgery rates by deprivation quintile were also seen for cancers of the breast, colorectal (males and females), liver (f), lung (m), oesophagus (m), pancreas (m) and prostate. The differences however were relatively small for these sites, with the largest deprivation gap seen for oesophageal cancer with a difference of 1.3 percentage points per deprivation quintile.

Not having access to data for patients treated in the private setting may also result in an underestimation of the “deprivation gap” in major resections since private cancer surgery will be most frequent in the least deprived socio-economic groups.

Results analysed by cancer network also show that variation exists between the areas of residence of patients which cannot be explained by differences in the age structure of the populations. These results are presented to encourage further local and national examination of the reasons behind these apparent geographical differences in surgical resection rates. Only three of the sites, breast, uterus and liver, had all cancer networks within limits of expected variation when differences in age structures have been taken into account. For lung cancer, six cancer networks fell below the lower confidence limit and four cancer networks were above the upper confidence limit. This first analysis simply shows that variations do exist and should not, at this stage, be interpreted as necessarily demonstrating good or bad practice.

## **Limitations**

There are various factors which limit our ability to interpret these data. The most important of which is that we have not been able to make case-mix adjustments of the surgical rates for the stage of disease since this is not universally recorded for all cancer sites at a national level. There are surgical procedures which it is not possible to assign as ‘major’ resections without knowing the stage of disease for that patient. For early stage cervical patients, for example, operations which are coded as biopsies would have been undertaken to remove the tumour, whereas for patients with later stage disease, this would be a diagnostic procedure.

There are also concerns over the quality of data within HES which was not established with the direct intention of analysing the details of surgical operations, rather as a tool for reimbursement. However, it is a large scale and routinely available data source which we can use to try and gain a better understanding of cancer patients’ treatment. It is possible that there is some systematic variation in the way different Trusts code their procedures which could also explain some of the apparent variation at Network level.

These analyses have also not taken into account co-morbidities of patients which will affect the decision to treat and which could vary in their impact at regional level. The NCIN is committed to further work on this topic which we hope will allow for the adjustment of such data for co-morbidity.

In order to use such data to understand differences in clinical outcomes for patients for the future, we need to ensure that surgical procedures are coded consistently. It has become clear during the course of this work that there is significant scope for the rationalisation of how surgical procedure codes are used in this context and clinicians need to take more responsibility for how their activity is recorded.

## Next steps

These data provide an overview of the available data that is held regarding major surgical resections in England. However, this is just a basis to instigate an exploration of which questions need answering, and how the data can be recorded and shared in order to allow further analyses to be made. The results provide further evidence for the need for high quality cancer stage, co-morbidity and treatment data in order to explore the reasons for any variation.

- 1) Derive Charlson Indices from IP HES to examine the impact of co-morbidity on the variation.
- 2) Work with the clinical community via the NCIN's SSCRGs to engage with the coding section of Connecting for Health to try and improve the way that surgical procedures in cancer are coded.
- 3) Carry out more in-depth analyses of the impact of deprivation on surgical rates.
- 4) Try and establish the relationship between surgical treatment rates and outcomes, especially survival.
- 5) Make more systematic and ongoing links with the National Cancer Audits.
- 6) Try and find ways of examining the whole 'treatment pathway' for cancer patients; in other words, examine the role of surgery in combination with other oncological treatments.
- 7) Use the data to help support module 5 of the International Cancer Benchmarking Project; working towards internationally agreed 'benchmarks' of good practice.

## Acknowledgements

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This project was conceived and initially led by David Forman (IARC, formerly of NYCRIS) and supported by Catherine Thomson (Cancer Research UK) both of whose involvement has been invaluable.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C15: Oesophagus

Of all newly diagnosed cases of oesophageal cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 97% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

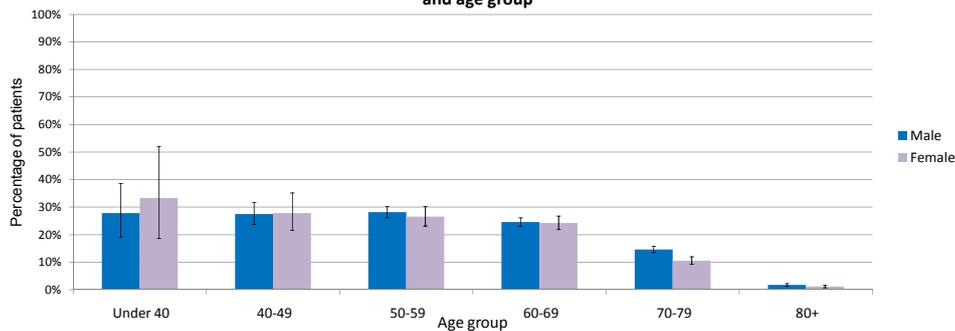
Using OPCS-4 codes, operations that have been defined as major resections include oesophagectomy, and partial excisions of the oesophagus. The full list of OPCS-4 codes used for oesophageal cancer are included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	79	28%	19% - 39%	27	33%	19% - 52%	106	29%	21% - 39%
40-49	472	28%	24% - 32%	165	28%	22% - 35%	637	28%	24% - 31%
50-59	1,893	28%	26% - 30%	606	27%	23% - 30%	2,499	28%	26% - 30%
60-69	3,140	25%	23% - 26%	1,154	24%	22% - 27%	4,294	25%	23% - 26%
70-79	3,675	15%	14% - 16%	1,942	11%	9% - 12%	5,617	13%	12% - 14%
80+	2,333	2%	1% - 2%	2,353	1%	1% - 2%	4,686	1%	1% - 2%
All ages	11,592	18%	17% - 18%	6,247	12%	11% - 12%	17,839	16%	15% - 16%

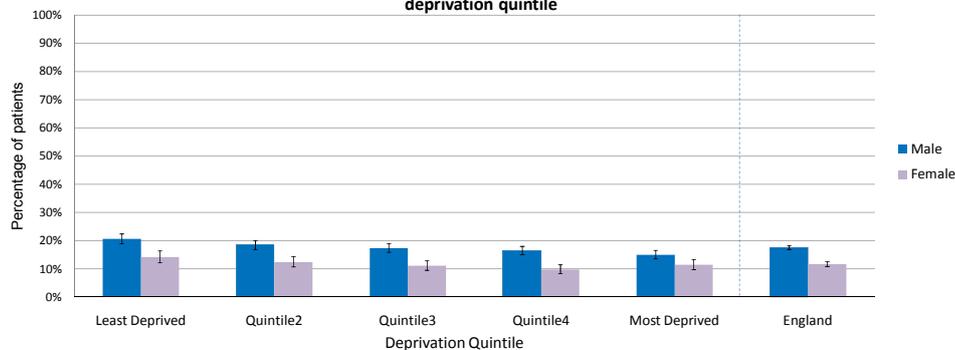
Percentage of NHS treated patients with a record of a major resection for oesophageal cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	2,064	21%	19% - 22%	1,058	14%	12% - 16%	3,122	18%	17% - 20%
Quintile 2	2,503	18%	17% - 20%	1,256	12%	11% - 14%	3,759	16%	15% - 18%
Quintile 3	2,465	17%	16% - 19%	1,351	11%	10% - 13%	3,816	15%	14% - 16%
Quintile 4	2,403	16%	15% - 18%	1,376	10%	8% - 11%	3,779	14%	13% - 15%
Quintile 5 - most deprived	2,157	15%	14% - 17%	1,206	11%	10% - 13%	3,363	14%	13% - 15%
All quintiles	11,592	18%	17% - 18%	6,247	12%	11% - 12%	17,839	16%	15% - 16%

Percentage of NHS treated patients with a record of a major resection for oesophageal cancer, by deprivation quintile



The percentage of patients with a record of a major resection is similar for males and females within each age band. However, there was a higher rate for males in the 70-79 age band compared to females.

There is a decrease in the older age groups in the percentage of oesophageal cancer patients with a record of a major resection. In patients aged 60-69, 25% had a record of a major resection compared to 13% of 70-79 year olds and 1% of patients aged 80 and over.

There was a decrease in the percentage of patients with a record of a major resection for males (-1.3% per quintile,  $p=0.002$ ) by deprivation quintile that was statistically significant. There was no statistically significant change for females. The percentages by deprivation quintile have not been adjusted for differences in the age structure within each quintile.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

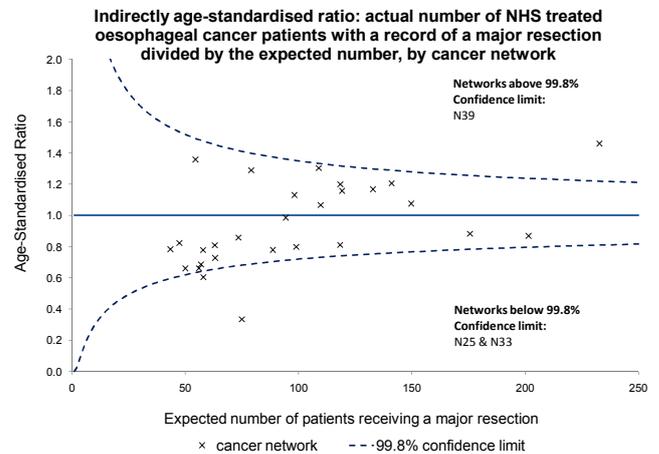
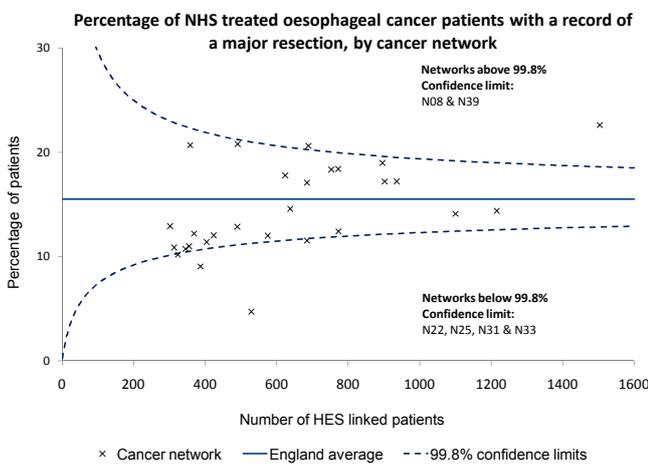
## C15: Oesophagus

The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	405	17%	13% - 21%	233	11%	7% - 15%	638	15%	12% - 18%
N02 Greater Manchester and Cheshire CN	796	16%	14% - 19%	420	10%	8% - 14%	1,216	14%	13% - 16%
N03 Merseyside and Cheshire CN	560	19%	16% - 23%	336	18%	15% - 23%	896	19%	17% - 22%
N06 Yorkshire CN	603	20%	17% - 23%	333	12%	9% - 16%	936	17%	15% - 20%
N07 Humber and Yorkshire Coast CN	326	23%	18% - 28%	165	17%	12% - 23%	491	21%	17% - 25%
N08 North Trent CN	450	23%	19% - 27%	239	16%	12% - 22%	689	21%	18% - 24%
N11 Pan Birmingham CN	403	18%	15% - 22%	221	17%	13% - 23%	624	18%	15% - 21%
N12 Arden CN	234	21%	16% - 26%	124	21%	15% - 29%	358	21%	17% - 25%
N20 Mount Vernon CN	178	14%	10% - 20%	124	11%	7% - 18%	302	13%	10% - 17%
N21 West London CN	222	14%	10% - 19%	133	6%	3% - 11%	355	11%	8% - 15%
N22 North London CN	231	12%	9% - 17%	93	5%	2% - 12%	324	10%	7% - 14%
N23 North East London CN	234	12%	8% - 16%	111	9%	5% - 16%	345	11%	8% - 14%
N24 South East London CN	267	14%	11% - 19%	137	6%	3% - 11%	404	11%	9% - 15%
N25 South West London CN	256	11%	8% - 16%	131	5%	2% - 10%	387	9%	7% - 12%
N26 Peninsula CN	506	23%	19% - 26%	266	11%	7% - 15%	772	18%	16% - 21%
N27 Dorset CN	197	13%	9% - 18%	116	8%	4% - 14%	313	11%	8% - 15%
N28 Avon, Somerset and Wiltshire CN	492	15%	13% - 19%	281	7%	5% - 11%	773	12%	10% - 15%
N29 3 Counties CN	268	16%	12% - 21%	156	6%	3% - 11%	424	12%	9% - 15%
N30 Thames Valley CN	515	20%	17% - 24%	238	14%	10% - 19%	753	18%	16% - 21%
N31 Central South Coast CN	454	13%	10% - 16%	231	9%	6% - 13%	685	12%	9% - 14%
N32 Surrey, West Sussex and Hampshire CN	252	15%	11% - 20%	117	7%	4% - 13%	369	12%	9% - 16%
N33 Sussex CN	338	6%	4% - 9%	191	2%	1% - 5%	529	5%	3% - 7%
N34 Kent and Medway CN	393	15%	11% - 18%	182	7%	4% - 11%	575	12%	10% - 15%
N35 Greater Midlands CN	445	21%	18% - 25%	240	10%	6% - 14%	685	17%	14% - 20%
N36 North of England CN	700	16%	13% - 19%	400	11%	8% - 14%	1,100	14%	12% - 16%
N37 Anglia CN	547	18%	15% - 22%	355	15%	12% - 20%	902	17%	15% - 20%
N38 Essex CN	341	14%	11% - 18%	149	10%	6% - 16%	490	13%	10% - 16%
N39 East Midlands CN	979	25%	22% - 28%	525	18%	15% - 22%	1,504	23%	21% - 25%
England	11,592	18%	17% - 18%	6,247	12%	11% - 12%	17,839	16%	15% - 16%



The funnel plot of percentages shows that six cancer networks fall outside the 99.8% confidence limits and therefore have a statistically significant difference from the average for England in the percentage of patients recorded as having a major resection. The funnel plot of age-standardised ratios shows that only three networks fall outside the 99.8% confidence limits. We cannot exclude the possibility that poor quality data flowing into HES may account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what factors other than age may underlie the apparent differences including coding quality within HES.

The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C16: Stomach

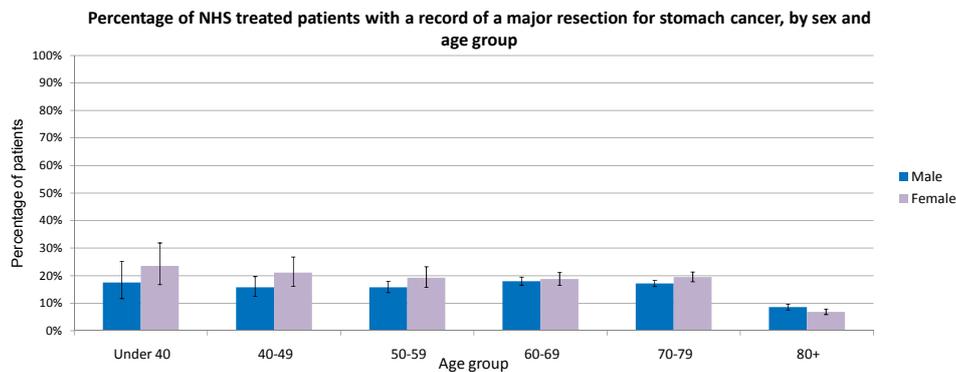
Of all newly diagnosed cases of stomach cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 95% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

Using OPCS-4 codes, operations that have been defined as major resections include total excision of stomach and partial excision of the stomach. The full list of OPCS-4 codes used for stomach cancer are included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

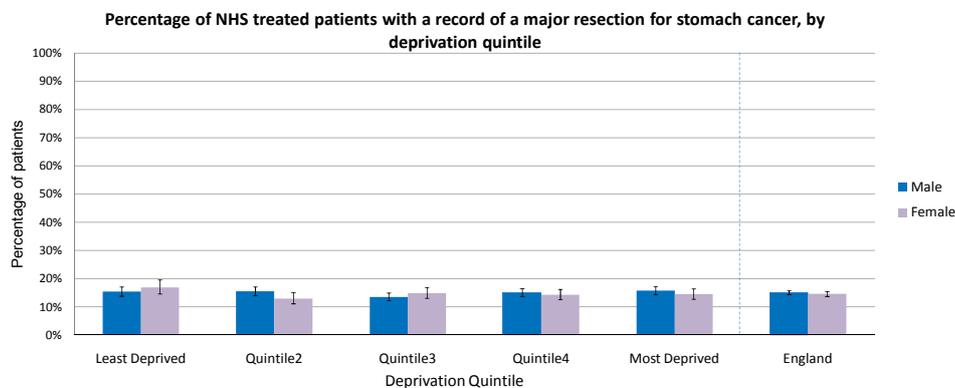
### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	120	18%	12% - 25%	119	24%	17% - 32%	239	21%	16% - 26%
40-49	398	16%	13% - 20%	223	21%	16% - 27%	621	18%	15% - 21%
50-59	1,204	16%	14% - 18%	431	19%	16% - 23%	1,635	17%	15% - 19%
60-69	2,681	18%	17% - 20%	1,076	19%	17% - 21%	3,757	18%	17% - 19%
70-79	4,380	17%	16% - 18%	1,878	20%	18% - 21%	6,258	18%	17% - 19%
80+	2,941	9%	8% - 10%	2,379	7%	6% - 8%	5,320	8%	7% - 9%
All ages	11,724	15%	14% - 16%	6,106	15%	14% - 15%	17,830	15%	14% - 15%



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	1,891	15%	14% - 17%	863	17%	15% - 20%	2,754	16%	15% - 17%
Quintile 2	2,259	15%	14% - 17%	1,143	13%	11% - 15%	3,402	15%	13% - 16%
Quintile 3	2,411	14%	12% - 15%	1,308	15%	13% - 17%	3,719	14%	13% - 15%
Quintile 4	2,592	15%	14% - 17%	1,382	14%	13% - 16%	3,974	15%	14% - 16%
Quintile 5 - most deprived	2,571	16%	14% - 17%	1,410	14%	13% - 16%	3,981	15%	14% - 16%
All quintiles	11,724	15%	14% - 16%	6,106	15%	14% - 15%	17,830	15%	14% - 15%



The difference in the percentage of patients with a record of a major resection between males and females within each age band is not statistically significant.

In patients aged under 80, around 18% had a record of a major resection. Across age bands for these patients, the difference in the percentage of patients with a record of a major resection was not statistically significant. The rate dropped for patients aged 80 and over to 8%.

Across deprivation quintiles, there was no statistically significant change in the percentage of patients with a record of a major resection for either males or females. The percentages by deprivation quintile have not been adjusted for differences in the age structure in each quintile.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

## C16: Stomach

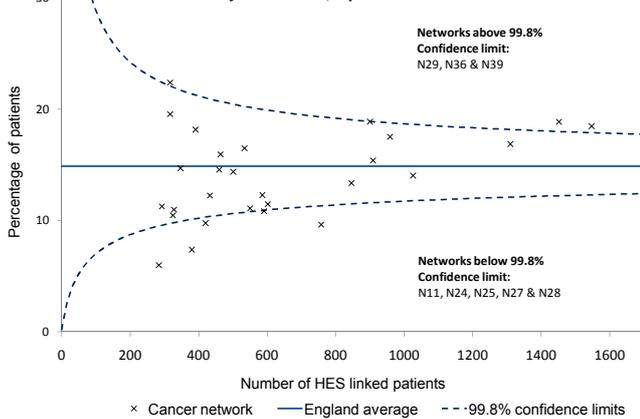
The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

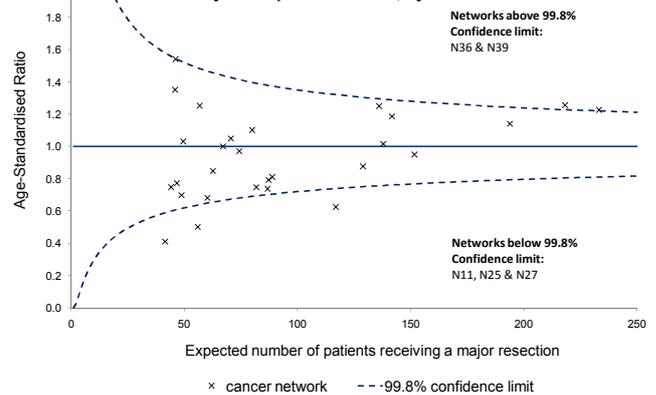
### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	344	14%	11% - 18%	190	21%	15% - 27%	534	16%	14% - 20%
N02 Greater Manchester and Cheshire CN	845	16%	14% - 19%	465	18%	15% - 22%	1,310	17%	15% - 19%
N03 Merseyside and Cheshire CN	600	16%	13% - 19%	309	15%	11% - 19%	909	15%	13% - 18%
N06 Yorkshire CN	599	19%	16% - 22%	360	16%	12% - 20%	959	18%	15% - 20%
N07 Humber and Yorkshire Coast CN	299	17%	13% - 22%	165	14%	9% - 20%	464	16%	13% - 20%
N08 North Trent CN	581	20%	17% - 23%	319	17%	13% - 22%	900	19%	16% - 22%
N11 Pan Birmingham CN	511	10%	7% - 12%	247	10%	7% - 14%	758	10%	8% - 12%
N12 Arden CN	215	12%	8% - 17%	110	8%	4% - 15%	325	10%	8% - 14%
N20 Mount Vernon CN	204	20%	15% - 26%	113	19%	13% - 28%	317	20%	16% - 24%
N21 West London CN	251	18%	14% - 23%	140	19%	13% - 26%	391	18%	15% - 22%
N22 North London CN	197	17%	12% - 23%	150	12%	8% - 18%	347	15%	11% - 19%
N23 North East London CN	298	16%	12% - 20%	162	12%	8% - 18%	460	15%	12% - 18%
N24 South East London CN	272	10%	7% - 14%	148	10%	6% - 16%	420	10%	7% - 13%
N25 South West London CN	254	6%	3% - 9%	126	11%	7% - 18%	380	7%	5% - 10%
N26 Peninsula CN	401	12%	9% - 15%	201	11%	7% - 16%	602	11%	9% - 14%
N27 Dorset CN	190	6%	4% - 11%	94	5%	2% - 12%	284	6%	4% - 9%
N28 Avon, Somerset and Wiltshire CN	365	11%	8% - 15%	226	10%	7% - 15%	591	11%	9% - 14%
N29 3 Counties CN	214	25%	19% - 31%	103	17%	11% - 26%	317	22%	18% - 27%
N30 Thames Valley CN	376	11%	9% - 15%	174	10%	7% - 16%	550	11%	9% - 14%
N31 Central South Coast CN	409	12%	9% - 15%	177	13%	9% - 19%	586	12%	10% - 15%
N32 Surrey, West Sussex and Hampshire CN	184	11%	7% - 16%	109	12%	7% - 19%	293	11%	8% - 15%
N33 Sussex CN	211	9%	6% - 14%	117	14%	9% - 21%	328	11%	8% - 15%
N34 Kent and Medway CN	338	15%	12% - 20%	163	12%	8% - 18%	501	14%	12% - 18%
N35 Greater Midlands CN	566	14%	11% - 17%	280	13%	9% - 17%	846	13%	11% - 16%
N36 North of England CN	979	19%	17% - 22%	568	17%	14% - 21%	1,547	18%	17% - 20%
N37 Anglia CN	736	13%	11% - 16%	290	16%	12% - 21%	1,026	14%	12% - 16%
N38 Essex CN	285	11%	8% - 15%	148	15%	10% - 21%	433	12%	9% - 16%
N39 East Midlands CN	1,000	20%	17% - 22%	452	17%	14% - 21%	1,452	19%	17% - 21%
England	11,724	15%	14% - 16%	6,106	15%	14% - 15%	17,830	15%	14% - 15%

Percentage of NHS treated stomach cancer patients with a record of a major resection, by cancer network



Indirectly age-standardised ratio: actual number of NHS treated stomach cancer patients with a record of a major resection divided by the expected number, by cancer network



The funnel plot of percentages shows that eight cancer networks fall outside the 99.8% confidence limits and therefore have a statistically significant difference from the average for England in the percentage of patients recorded with a major resection. The funnel plot of age-standardised ratios between observed and expected number of patients with a record of a major resection only shows that five cancer networks fall outside the 99.8% confidence limits. We cannot exclude the possibility that poor quality data flowing into HES may also account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what other factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C22: Liver

Of all newly diagnosed cases of liver cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 90% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

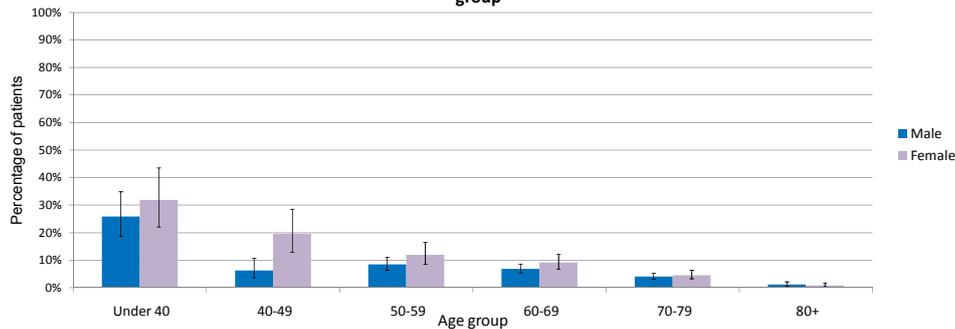
Using OPCS-4 codes, operations that have been defined as major resections are those classified under partial excisions of the liver. The full list of OPCS-4 codes used for liver cancer are included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	108	26%	19% - 35%	69	32%	22% - 44%	177	28%	22% - 35%
40-49	190	6%	4% - 11%	97	20%	13% - 29%	287	11%	8% - 15%
50-59	544	8%	6% - 11%	251	12%	9% - 17%	795	10%	8% - 12%
60-69	951	7%	5% - 9%	459	9%	7% - 12%	1,410	8%	6% - 9%
70-79	1,256	4%	3% - 5%	697	5%	3% - 6%	1,953	4%	3% - 5%
80+	707	1%	1% - 2%	727	1%	0% - 2%	1,434	1%	1% - 2%
All ages	3,756	6%	5% - 6%	2,300	7%	6% - 8%	6,056	6%	5% - 7%

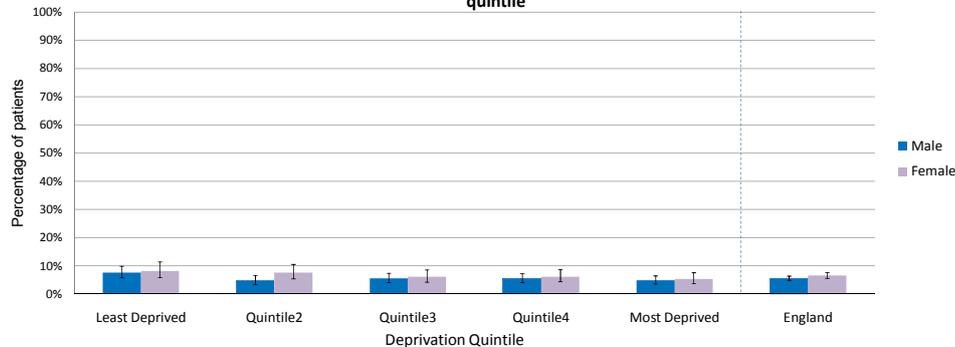
Percentage of NHS treated patients with a record of a major resection for liver cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	654	8%	6% - 10%	378	8%	6% - 11%	1,032	8%	6% - 10%
Quintile 2	703	5%	3% - 7%	420	8%	5% - 11%	1,123	6%	5% - 7%
Quintile 3	736	6%	4% - 7%	492	6%	4% - 9%	1,228	6%	5% - 7%
Quintile 4	777	5%	4% - 7%	501	6%	4% - 9%	1,278	6%	5% - 7%
Quintile 5 - most deprived	886	5%	4% - 6%	509	5%	4% - 8%	1,395	5%	4% - 6%
All quintiles	3,756	6%	5% - 6%	2,300	7%	6% - 8%	6,056	6%	5% - 7%

Percentage of NHS treated patients with a record of a major resection for liver cancer, by deprivation quintile



The percentage of patients aged 50 and over with a record of a major resection is similar for males and females within each age band. However, there was a higher rate for females in the 40-49 age band compared to males.

There is a decrease in the older age groups in the percentage of liver cancer patients with a record of a major resection. In patients aged 60-69, 8% have a record of a major resection compared to 4% of 70-79 year olds and 1% of patients aged 80 and over.

Across deprivation quintiles, there was no statistically significant change in the percentage of patients with a record of a major resection for males, however for females, there was a decrease which was statistically significant (-0.71% per quintile,  $p=0.011$ ). The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

## C22: Liver

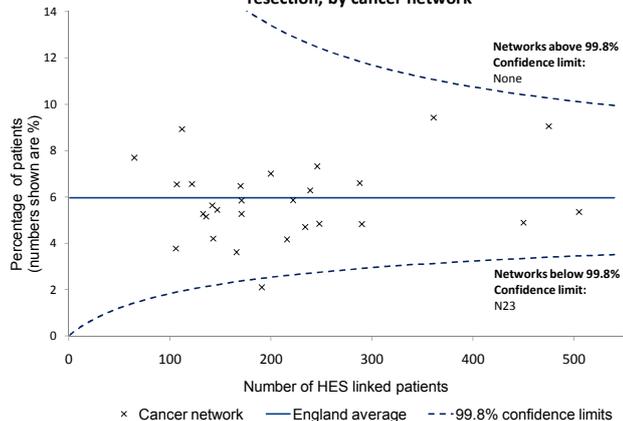
The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

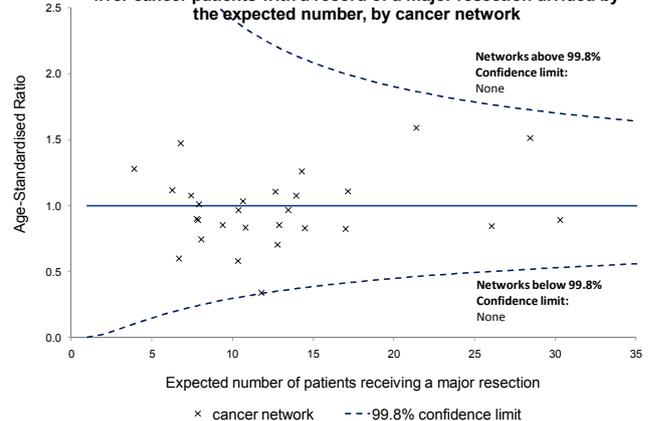
### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	132	6%	3% - 12%	90	6%	2% - 12%	222	6%	3% - 10%
N02 Greater Manchester and Cheshire CN	297	5%	3% - 9%	208	5%	3% - 9%	505	5%	4% - 8%
N03 Merseyside and Cheshire CN	172	4%	2% - 8%	118	6%	3% - 12%	290	5%	3% - 8%
N06 Yorkshire CN	225	11%	8% - 16%	136	7%	4% - 12%	361	9%	7% - 13%
N07 Humber and Yorkshire Coast CN	68	4%	2% - 12%	68	6%	2% - 14%	136	5%	3% - 10%
N08 North Trent CN	145	8%	5% - 14%	94	3%	1% - 9%	239	6%	4% - 10%
N11 Pan Birmingham CN	110	6%	3% - 13%	60	7%	3% - 16%	170	6%	4% - 11%
N12 Arden CN	34	9%	3% - 23%	31	6%	2% - 21%	65	8%	3% - 17%
N20 Mount Vernon CN	67	4%	2% - 12%	39	3%	0% - 13%	106	4%	1% - 9%
N21 West London CN	134	9%	5% - 15%	66	3%	1% - 10%	200	7%	4% - 11%
N22 North London CN	110	5%	3% - 11%	61	7%	3% - 16%	171	6%	3% - 10%
N23 North East London CN	117	3%	1% - 8%	74	0%	0% - 5%	191	2%	1% - 5%
N24 South East London CN	119	2%	0% - 6%	47	9%	3% - 20%	166	4%	2% - 8%
N25 South West London CN	96	5%	2% - 12%	51	6%	2% - 16%	147	5%	3% - 10%
N26 Peninsula CN	157	3%	1% - 7%	77	8%	4% - 16%	234	5%	3% - 8%
N27 Dorset CN	93	3%	1% - 9%	49	10%	4% - 22%	142	6%	3% - 11%
N28 Avon, Somerset and Wiltshire CN	144	4%	2% - 9%	104	6%	3% - 12%	248	5%	3% - 8%
N29 3 Counties CN	67	1%	0% - 8%	40	15%	7% - 29%	107	7%	3% - 13%
N30 Thames Valley CN	135	4%	2% - 9%	81	4%	1% - 10%	216	4%	2% - 8%
N31 Central South Coast CN	162	5%	3% - 9%	84	12%	7% - 21%	246	7%	5% - 11%
N32 Surrey, West Sussex and Hampshire CN	68	6%	2% - 14%	44	14%	6% - 27%	112	9%	5% - 16%
N33 Sussex CN	85	4%	1% - 10%	58	5%	2% - 14%	143	4%	2% - 9%
N34 Kent and Medway CN	82	5%	2% - 12%	51	6%	2% - 16%	133	5%	3% - 10%
N35 Greater Midlands CN	105	4%	1% - 9%	66	8%	3% - 17%	171	5%	3% - 10%
N36 North of England CN	280	4%	2% - 7%	170	6%	3% - 10%	450	5%	3% - 7%
N37 Anglia CN	189	6%	4% - 11%	99	7%	3% - 14%	288	7%	4% - 10%
N38 Essex CN	76	5%	2% - 13%	46	9%	3% - 20%	122	7%	3% - 12%
N39 East Midlands CN	287	9%	6% - 13%	188	10%	6% - 15%	475	9%	7% - 12%
England	3,756	6%	5% - 6%	2,300	7%	6% - 8%	6,056	6%	5% - 7%

Percentage of NHS treated liver cancer patients with a record of a major resection, by cancer network



Indirectly age-standardised ratio: actual number of NHS treated liver cancer patients with a record of a major resection divided by the expected number, by cancer network



The funnel plot of percentages show that the majority of cancer networks fall within the 99.8% confidence limits and therefore do not have a statistically significant difference from the average for England in the percentage of patients recorded as having a major resection. The funnel plot of age-standardised ratios shows that all cancer networks fall between the 99.8% confidence limits.

Note: The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C25: Pancreas

Of all newly diagnosed cases of pancreatic cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 92% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

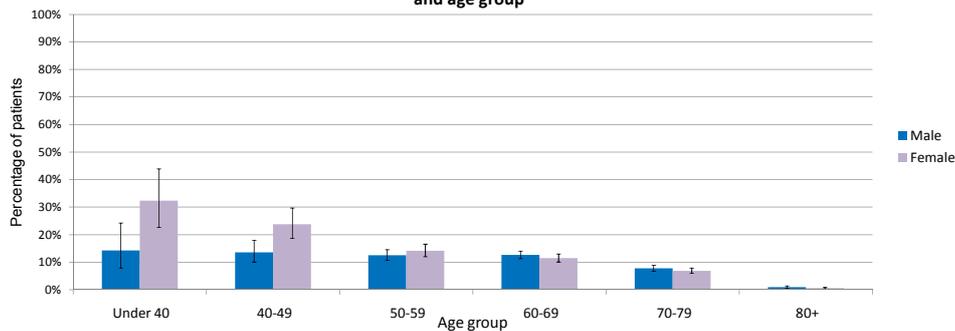
Using OPCS-4 codes, operations that have been defined as major resections include total excision of the pancreas, excision of head of pancreas and partial excision of the pancreas. The full list of OPCS-4 codes used for pancreatic cancer are included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	70	14%	8% - 24%	71	32%	23% - 44%	141	23%	17% - 31%
40-49	295	14%	10% - 18%	227	24%	19% - 30%	522	18%	15% - 22%
50-59	1,149	13%	11% - 15%	890	14%	12% - 17%	2,039	13%	12% - 15%
60-69	2,131	13%	11% - 14%	1,781	12%	10% - 13%	3,912	12%	11% - 13%
70-79	2,613	8%	7% - 9%	2,555	7%	6% - 8%	5,168	7%	7% - 8%
80+	1,660	1%	1% - 1%	2,632	1%	0% - 1%	4,292	1%	1% - 1%
All ages	7,918	9%	8% - 9%	8,156	7%	7% - 8%	16,074	8%	8% - 8%

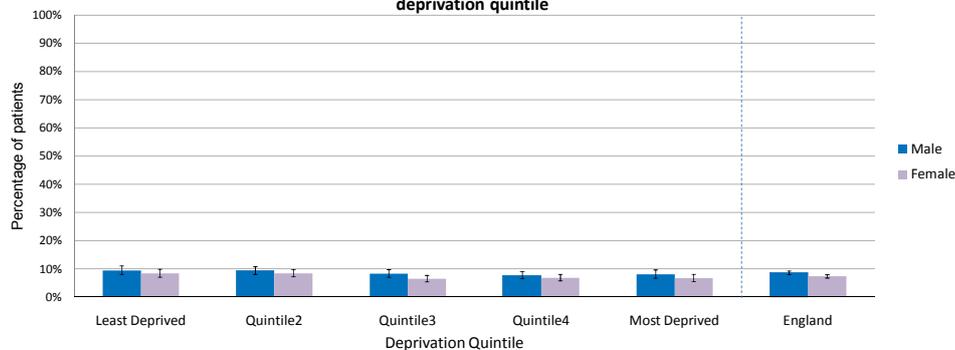
Percentage of NHS treated patients with a record of a major resection for pancreatic cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	1,562	9%	8% - 11%	1,465	8%	7% - 10%	3,027	9%	8% - 10%
Quintile 2	1,747	9%	8% - 11%	1,757	8%	7% - 10%	3,504	9%	8% - 10%
Quintile 3	1,691	8%	7% - 10%	1,745	6%	5% - 8%	3,436	7%	7% - 8%
Quintile 4	1,580	8%	7% - 9%	1,732	7%	6% - 8%	3,312	7%	6% - 8%
Quintile 5 - most deprived	1,338	8%	7% - 10%	1,457	7%	6% - 8%	2,795	7%	6% - 8%
All quintiles	7,918	9%	8% - 9%	8,156	7%	7% - 8%	16,074	8%	8% - 8%

Percentage of NHS treated patients with a record of a major resection for pancreatic cancer, by deprivation quintile



The difference in the percentage of patients with a record of a major resection between males and females within each age band is not statistically significant above the age of 50.

There is a decrease in the older age groups in the percentage of pancreatic cancer patients with a record of a major resection. In patients aged 60-69, 12% had a record of a major resection compared to 7% of 70-79 year olds and 1% of patients aged 80 and over.

There was a decrease in the percentage of patients with a record of a major resection for males (-0.5% per quintile,  $p=0.04$ ) by deprivation quintile that was statistically significant. There was no statistically significant change for females. The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

## C25: Pancreas

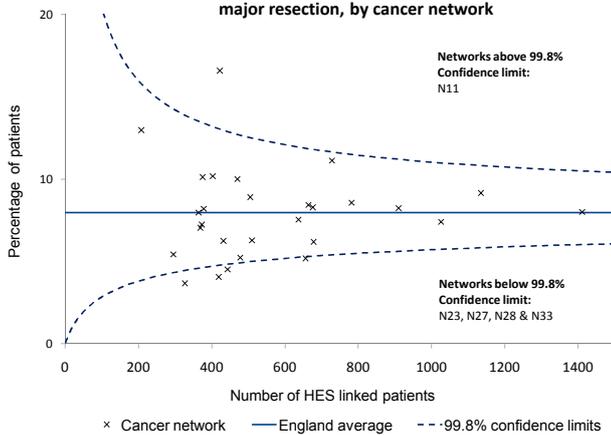
The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

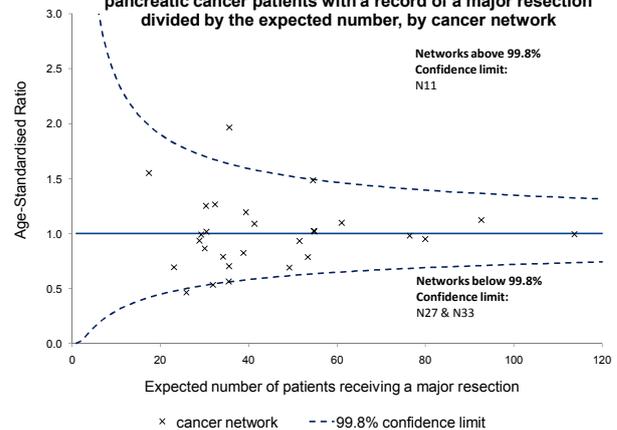
### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	250	10%	7% - 14%	255	8%	5% - 12%	505	9%	7% - 12%
N02 Greater Manchester and Cheshire CN	431	8%	6% - 11%	479	8%	6% - 11%	910	8%	7% - 10%
N03 Merseyside and Cheshire CN	310	10%	7% - 13%	354	7%	5% - 11%	664	8%	7% - 11%
N06 Yorkshire CN	394	10%	7% - 13%	388	7%	5% - 10%	782	9%	7% - 11%
N07 Humber and Yorkshire Coast CN	180	9%	6% - 14%	193	6%	3% - 10%	373	7%	5% - 10%
N08 North Trent CN	311	7%	4% - 10%	326	8%	6% - 12%	637	8%	6% - 10%
N11 Pan Birmingham CN	206	18%	13% - 24%	216	15%	11% - 21%	422	17%	13% - 20%
N12 Arden CN	102	10%	5% - 17%	106	16%	10% - 24%	208	13%	9% - 18%
N20 Mount Vernon CN	157	7%	4% - 12%	138	4%	2% - 8%	295	5%	3% - 9%
N21 West London CN	194	12%	8% - 18%	181	8%	5% - 13%	375	10%	7% - 14%
N22 North London CN	180	7%	4% - 12%	198	9%	6% - 14%	378	8%	6% - 11%
N23 North East London CN	219	4%	2% - 8%	224	5%	3% - 9%	443	5%	3% - 7%
N24 South East London CN	206	13%	9% - 18%	197	8%	5% - 12%	403	10%	8% - 14%
N25 South West London CN	217	7%	4% - 11%	215	6%	3% - 10%	432	6%	4% - 9%
N26 Peninsula CN	332	7%	5% - 11%	346	5%	3% - 8%	678	6%	5% - 8%
N27 Dorset CN	145	3%	1% - 8%	182	4%	2% - 8%	327	4%	2% - 6%
N28 Avon, Somerset and Wiltshire CN	300	4%	3% - 7%	356	6%	4% - 9%	656	5%	4% - 7%
N29 3 Counties CN	188	9%	5% - 13%	181	6%	3% - 10%	369	7%	5% - 10%
N30 Thames Valley CN	346	9%	6% - 12%	330	8%	5% - 11%	676	8%	6% - 11%
N31 Central South Coast CN	328	12%	9% - 16%	400	11%	8% - 14%	728	11%	9% - 14%
N32 Surrey, West Sussex and Hampshire CN	177	8%	5% - 14%	187	7%	5% - 12%	364	8%	6% - 11%
N33 Sussex CN	196	5%	2% - 8%	223	4%	2% - 7%	419	4%	3% - 6%
N34 Kent and Medway CN	259	8%	5% - 12%	251	5%	3% - 8%	510	6%	4% - 9%
N35 Greater Midlands CN	255	10%	7% - 14%	215	10%	7% - 15%	470	10%	8% - 13%
N36 North of England CN	547	11%	9% - 14%	588	7%	5% - 10%	1,135	9%	8% - 11%
N37 Anglia CN	506	8%	6% - 11%	520	7%	5% - 9%	1,026	7%	6% - 9%
N38 Essex CN	239	5%	3% - 8%	239	6%	4% - 10%	478	5%	4% - 8%
N39 East Midlands CN	743	8%	6% - 10%	668	8%	6% - 10%	1,411	8%	7% - 10%
England	7,918	9%	8% - 9%	8,156	7%	7% - 8%	16,074	8%	8% - 8%

Percentage of NHS treated pancreatic cancer patients with a record of a major resection, by cancer network



Indirectly age-standardised ratio: actual number of NHS treated pancreatic cancer patients with a record of a major resection divided by the expected number, by cancer network



The funnel plot of cancer network percentages shows that the majority of cancer networks fall within the 99.8% confidence limits and therefore do not have a statistically significant difference from the average for England in the percentage of patients recorded as having a major resection. However, the percentages for five cancer networks do fall outside the confidence limits. The funnel plot of age-standardised ratios between observed and expected number of patients with a record of a major resection shows that three cancer networks fall outside the 99.8% confidence limits. We cannot exclude the possibility that poor quality data flowing into HES may account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what other factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C18-20: Colorectal

Of all newly diagnosed cases of colorectal cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 94% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

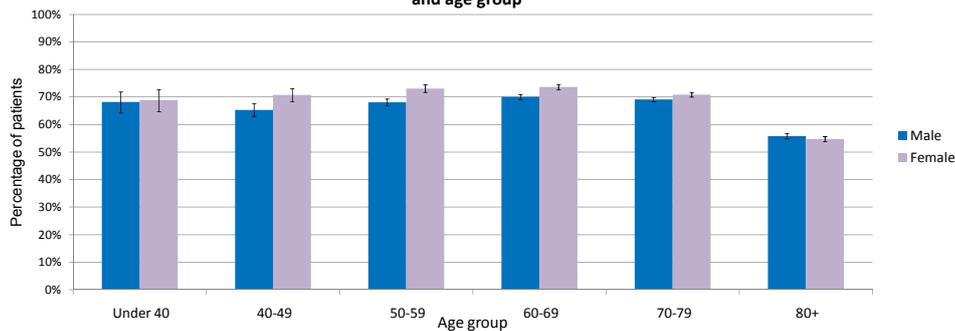
Using OPCS-4 codes, operations such as hemicolectomy, total colectomy and total excision of colon were included as major resections. The full list of OPCS-4 codes used for colorectal cancer are included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	565	68%	64% - 72%	514	69%	65% - 73%	1,079	68%	66% - 71%
40-49	1,640	65%	63% - 68%	1,407	71%	68% - 73%	3,047	68%	66% - 69%
50-59	5,684	68%	67% - 69%	3,933	73%	72% - 74%	9,617	70%	69% - 71%
60-69	11,572	70%	69% - 71%	7,250	74%	73% - 75%	18,822	71%	71% - 72%
70-79	15,772	69%	68% - 70%	11,505	71%	70% - 72%	27,277	70%	69% - 70%
80+	9,630	56%	55% - 57%	11,218	55%	54% - 56%	20,848	55%	55% - 56%
All ages	44,863	66%	66% - 67%	35,827	67%	66% - 67%	80,690	66%	66% - 67%

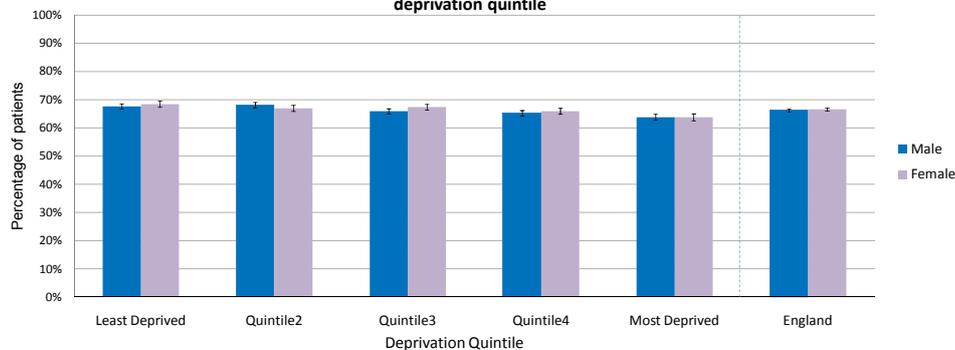
Percentage of NHS treated patients with a record of a major resection for colorectal cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	9,082	68%	67% - 69%	6,925	68%	67% - 69%	16,007	68%	67% - 69%
Quintile 2	9,829	68%	67% - 69%	7,809	67%	66% - 68%	17,638	68%	67% - 68%
Quintile 3	9,512	66%	65% - 67%	7,801	67%	66% - 68%	17,313	67%	66% - 67%
Quintile 4	8,778	65%	64% - 66%	7,360	66%	65% - 67%	16,138	66%	65% - 66%
Quintile 5 - most deprived	7,662	64%	63% - 65%	5,932	64%	63% - 65%	13,594	64%	63% - 65%
All quintiles	44,863	66%	66% - 67%	35,827	67%	66% - 67%	80,690	66%	66% - 67%

Percentage of NHS treated patients with a record of a major resection for colorectal cancer, by deprivation quintile



The percentage of patients with a record of a major resection is higher for females compared to males for patients in each ten year age group between 40 and 79. However, there was no difference in the percentage for patients aged 80 and over.

The percentage receiving a major resection is similar for all age groups. However, for patients aged 80 and over, the percentage falls to 55%, compared to around 70% for all other age groups.

Across the deprivation quintiles, there was a decrease in the percentage of patients with a record of a major resection for both males (-1.1% per quintile,  $p=0.02$ ) and females (-1.0% per quintile,  $p=0.029$ ) by deprivation quintile that was statistically significant. The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

## C18-20: Colorectal

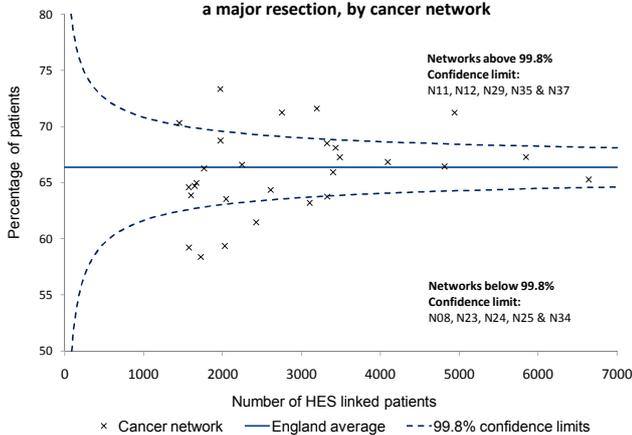
The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

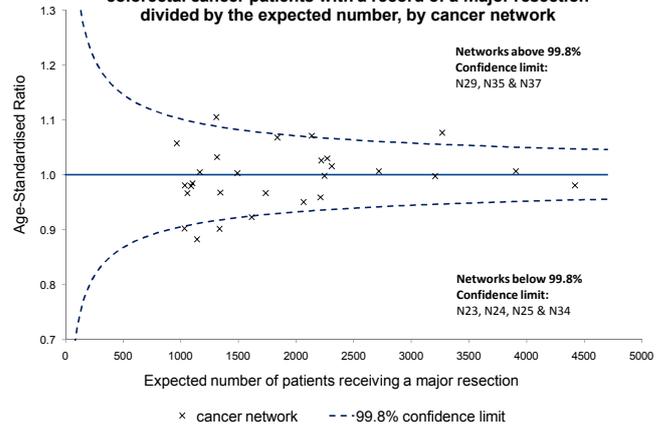
### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	1,476	66%	64% - 68%	1,135	62%	59% - 65%	2,611	64%	62% - 66%
N02 Greater Manchester and Cheshire CN	2,748	67%	65% - 69%	2,066	66%	64% - 68%	4,814	66%	65% - 68%
N03 Merseyside and Cheshire CN	1,958	69%	67% - 71%	1,366	67%	65% - 70%	3,324	69%	67% - 70%
N06 Yorkshire CN	2,293	66%	65% - 68%	1,802	67%	65% - 69%	4,095	67%	65% - 68%
N07 Humber and Yorkshire Coast CN	1,099	70%	67% - 73%	875	67%	64% - 70%	1,974	69%	67% - 71%
N08 North Trent CN	1,765	63%	61% - 65%	1,341	64%	61% - 66%	3,106	63%	61% - 65%
N11 Pan Birmingham CN	1,613	70%	68% - 72%	1,141	73%	70% - 75%	2,754	71%	70% - 73%
N12 Arden CN	836	68%	65% - 71%	616	74%	70% - 77%	1,452	70%	68% - 73%
N20 Mount Vernon CN	853	63%	60% - 66%	720	66%	63% - 70%	1,573	65%	62% - 67%
N21 West London CN	935	65%	62% - 68%	832	67%	64% - 70%	1,767	66%	64% - 68%
N22 North London CN	919	64%	61% - 67%	730	66%	62% - 69%	1,649	65%	62% - 67%
N23 North East London CN	848	59%	56% - 62%	726	59%	56% - 63%	1,574	59%	57% - 62%
N24 South East London CN	950	59%	56% - 62%	775	58%	54% - 61%	1,725	58%	56% - 61%
N25 South West London CN	1,052	60%	57% - 63%	978	59%	56% - 62%	2,030	59%	57% - 61%
N26 Peninsula CN	1,880	67%	65% - 69%	1,555	70%	67% - 72%	3,435	68%	67% - 70%
N27 Dorset CN	834	61%	58% - 64%	768	67%	64% - 70%	1,602	64%	61% - 66%
N28 Avon, Somerset and Wiltshire CN	1,851	66%	64% - 69%	1,550	65%	63% - 68%	3,401	66%	64% - 67%
N29 3 Counties CN	1,111	73%	70% - 75%	861	74%	71% - 77%	1,972	73%	71% - 75%
N30 Thames Valley CN	1,857	63%	61% - 65%	1,472	65%	62% - 67%	3,329	64%	62% - 65%
N31 Central South Coast CN	1,858	68%	66% - 70%	1,630	67%	64% - 69%	3,488	67%	66% - 69%
N32 Surrey, West Sussex and Hampshire CN	870	65%	62% - 68%	800	65%	61% - 68%	1,670	65%	63% - 67%
N33 Sussex CN	1,027	63%	60% - 66%	1,019	64%	61% - 67%	2,046	64%	61% - 66%
N34 Kent and Medway CN	1,323	60%	58% - 63%	1,103	63%	60% - 66%	2,426	61%	60% - 63%
N35 Greater Midlands CN	1,828	71%	69% - 73%	1,368	72%	70% - 75%	3,196	72%	70% - 73%
N36 North of England CN	3,342	67%	66% - 69%	2,504	67%	65% - 69%	5,846	67%	66% - 68%
N37 Anglia CN	2,728	71%	69% - 72%	2,214	72%	70% - 74%	4,942	71%	70% - 72%
N38 Essex CN	1,214	67%	64% - 69%	1,034	67%	64% - 69%	2,248	67%	65% - 69%
N39 East Midlands CN	3,795	65%	63% - 66%	2,846	66%	64% - 67%	6,641	65%	64% - 66%
England	44,863	66%	66% - 67%	35,827	67%	66% - 67%	80,690	66%	66% - 67%

Percentage of NHS treated colorectal cancer patients with a record of a major resection, by cancer network



Indirectly age-standardised ratio: actual number of NHS treated colorectal cancer patients with a record of a major resection divided by the expected number, by cancer network



The funnel plot of percentages shows that ten cancer networks fall outside the 99.8% confidence limits and therefore have a statistically significant difference from the average for England in the percentage of patients recorded as having a major resection. The funnel plot of age-standardised ratios between observed and expected number of patients with a record of a major resection shows that when age-standardised, seven cancer networks fall outside the 99.8% confidence limits. We cannot exclude the possibility that poor quality data flowing into HES may account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C33-34: Trachea, bronchus and lung

Of all newly diagnosed cases of lung cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 92% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

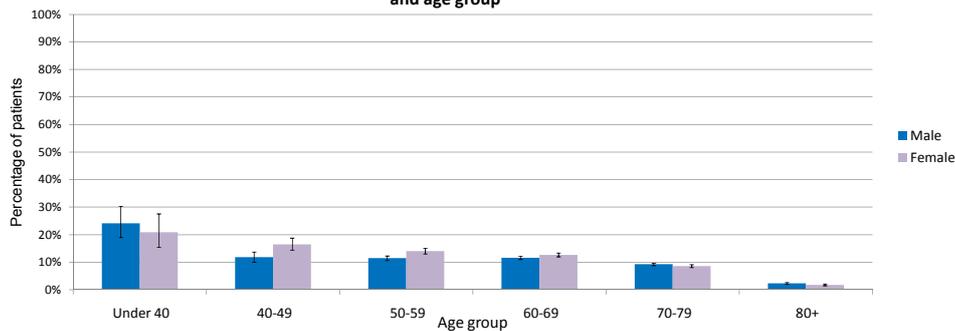
Using OPCS-4 codes, operations including pneumonectomy, bilobectomy and lobectomy as well as excisions of the trachea were included as major resections. The full list of OPCS-4 codes used for lung cancer are included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	215	24%	19% - 30%	172	21%	16% - 28%	387	23%	19% - 27%
40-49	1,177	12%	10% - 14%	1,115	17%	14% - 19%	2,292	14%	13% - 16%
50-59	5,655	11%	11% - 12%	4,401	14%	13% - 15%	10,056	13%	12% - 13%
60-69	13,081	12%	11% - 12%	8,421	13%	12% - 13%	21,502	12%	12% - 12%
70-79	17,352	9%	9% - 10%	11,621	9%	8% - 9%	28,973	9%	9% - 9%
80+	9,881	2%	2% - 3%	7,431	2%	2% - 2%	17,312	2%	2% - 2%
All ages	47,361	9%	9% - 9%	33,161	9%	9% - 9%	80,522	9%	9% - 9%

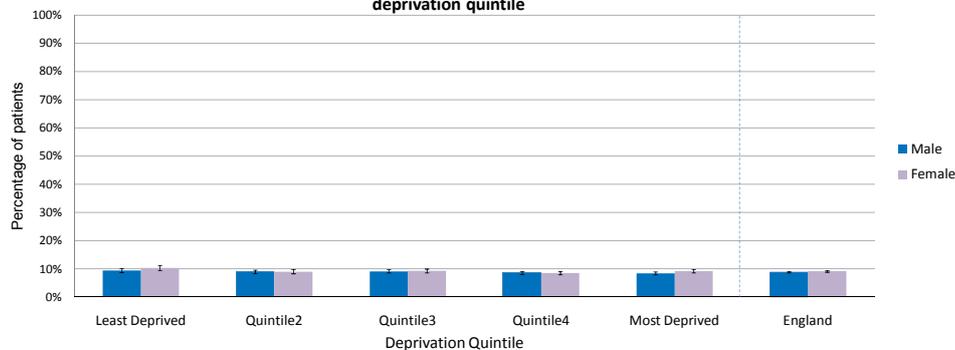
Percentage of NHS treated patients with a record of a major resection for lung cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	6,442	9%	9% - 10%	4,324	10%	9% - 11%	10,766	10%	9% - 10%
Quintile 2	8,336	9%	8% - 10%	5,515	9%	8% - 10%	13,851	9%	9% - 9%
Quintile 3	9,545	9%	9% - 10%	6,648	9%	9% - 10%	16,193	9%	9% - 10%
Quintile 4	10,870	9%	8% - 9%	7,842	8%	8% - 9%	18,712	9%	8% - 9%
Quintile 5 - most deprived	12,168	8%	8% - 9%	8,832	9%	9% - 10%	21,000	9%	8% - 9%
All quintiles	47,361	9%	9% - 9%	33,161	9%	9% - 9%	80,522	9%	9% - 9%

Percentage of NHS treated patients with a record of a major resection for lung cancer, by deprivation quintile



The percentage of patients with a record of a major resection is similar for males and females within each age band. However, there was a higher rate for females in the 40-49 age band compared to males.

There is a decrease in the percentage of patients with a record of a major resection across age groups. For patients aged 60-69, 12% of patients have a record of a major resection, compared to 2% of patients aged 80 and over.

For males, there was a difference (-0.24% per quintile) in the percentage of patients with a record of a major resection that was statistically significant ( $p=0.02$ ). There was no statistically significant difference in the percentages for females. The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

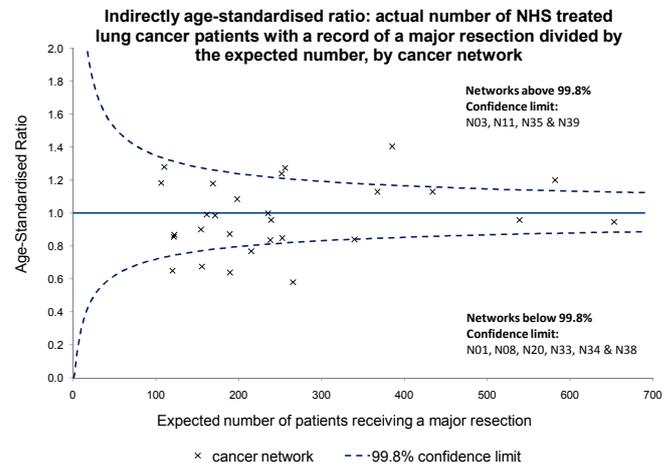
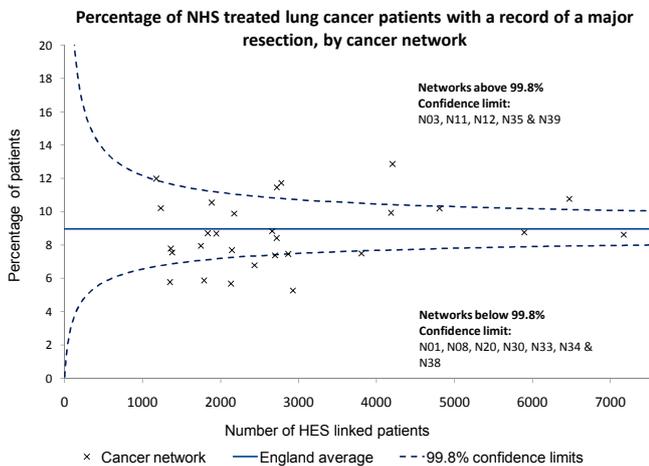
## C33-34: Trachea, bronchus and lung

The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	1,676	5%	4% - 6%	1,252	6%	4% - 7%	2,928	5%	5% - 6%
N02 Greater Manchester and Cheshire CN	3,385	9%	8% - 10%	2,509	9%	8% - 10%	5,894	9%	8% - 10%
N03 Merseyside and Cheshire CN	2,309	13%	12% - 15%	1,896	13%	11% - 14%	4,205	13%	12% - 14%
N06 Yorkshire CN	2,705	10%	9% - 11%	2,103	11%	9% - 12%	4,808	10%	9% - 11%
N07 Humber and Yorkshire Coast CN	1,290	10%	9% - 12%	885	9%	8% - 11%	2,175	10%	9% - 11%
N08 North Trent CN	2,217	7%	6% - 8%	1,590	8%	7% - 9%	3,807	7%	7% - 8%
N11 Pan Birmingham CN	1,725	12%	11% - 14%	1,055	11%	10% - 13%	2,780	12%	11% - 13%
N12 Arden CN	721	11%	9% - 13%	455	14%	11% - 17%	1,176	12%	10% - 14%
N20 Mount Vernon CN	776	6%	5% - 8%	576	5%	4% - 8%	1,352	6%	5% - 7%
N21 West London CN	1,090	10%	8% - 11%	797	12%	10% - 14%	1,887	11%	9% - 12%
N22 North London CN	1,019	7%	6% - 9%	729	9%	7% - 12%	1,748	8%	7% - 9%
N23 North East London CN	1,156	8%	7% - 10%	790	9%	7% - 11%	1,946	9%	8% - 10%
N24 South East London CN	1,250	8%	6% - 9%	897	8%	6% - 9%	2,147	8%	7% - 9%
N25 South West London CN	1,040	7%	6% - 9%	797	11%	9% - 13%	1,837	9%	8% - 10%
N26 Peninsula CN	1,620	9%	7% - 10%	1,042	9%	8% - 11%	2,662	9%	8% - 10%
N27 Dorset CN	709	10%	8% - 12%	525	11%	8% - 14%	1,234	10%	9% - 12%
N28 Avon, Somerset and Wiltshire CN	1,622	8%	7% - 9%	1,098	9%	8% - 11%	2,720	8%	7% - 10%
N29 3 Counties CN	836	8%	6% - 10%	526	8%	6% - 10%	1,362	8%	6% - 9%
N30 Thames Valley CN	1,613	7%	6% - 8%	1,085	8%	6% - 9%	2,698	7%	6% - 8%
N31 Central South Coast CN	1,707	8%	7% - 9%	1,161	7%	5% - 8%	2,868	7%	7% - 8%
N32 Surrey, West Sussex and Hampshire CN	800	7%	5% - 9%	579	8%	6% - 11%	1,379	8%	6% - 9%
N33 Sussex CN	1,066	6%	5% - 7%	723	6%	4% - 8%	1,789	6%	5% - 7%
N34 Kent and Medway CN	1,479	6%	5% - 8%	956	7%	6% - 9%	2,435	7%	6% - 8%
N35 Greater Midlands CN	1,708	10%	9% - 12%	1,014	13%	11% - 15%	2,722	11%	10% - 13%
N36 North of England CN	4,067	9%	8% - 10%	3,103	8%	8% - 10%	7,170	9%	8% - 9%
N37 Anglia CN	2,570	10%	9% - 11%	1,617	10%	8% - 11%	4,187	10%	9% - 11%
N38 Essex CN	1,259	6%	5% - 7%	875	6%	4% - 7%	2,134	6%	5% - 7%
N39 East Midlands CN	3,946	11%	10% - 12%	2,526	11%	9% - 12%	6,472	11%	10% - 12%
England	47,361	9%	9% - 9%	33,161	9%	9% - 9%	80,522	9%	9% - 9%



The funnel plots show that twelve cancer networks fall outside the 99.8% confidence limits and therefore the difference from the average for England in the percentage of patients recorded as having a major resection is statistically significant for these networks. The funnel plot of age-standardised ratios between observed and expected number of patients with a record of a major resection shows that ten cancer networks fall outside the 99.8% confidence limits. We cannot exclude the possibility that poor quality data flowing into HES may account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C50: Breast

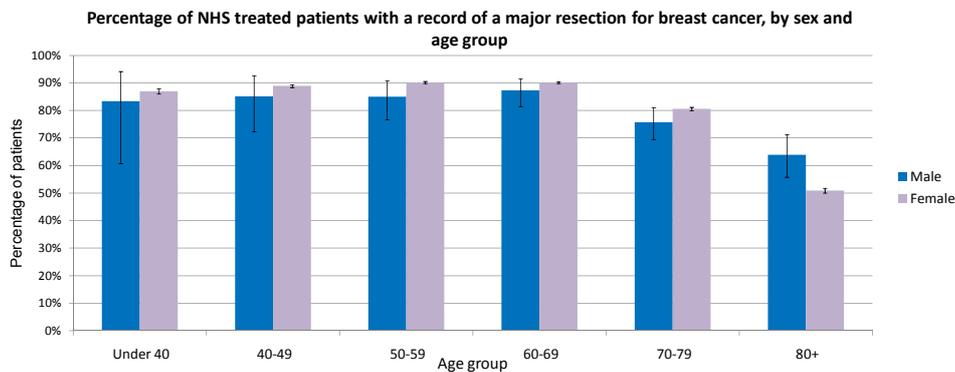
Of all newly diagnosed cases of breast cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 88% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

Using OPCS-4 codes, operations that have been defined as major resections include total excision of breast, partial excision and excision of lesion of breast and duct of breast. The full list of OPCS-4 codes used for breast cancer is included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

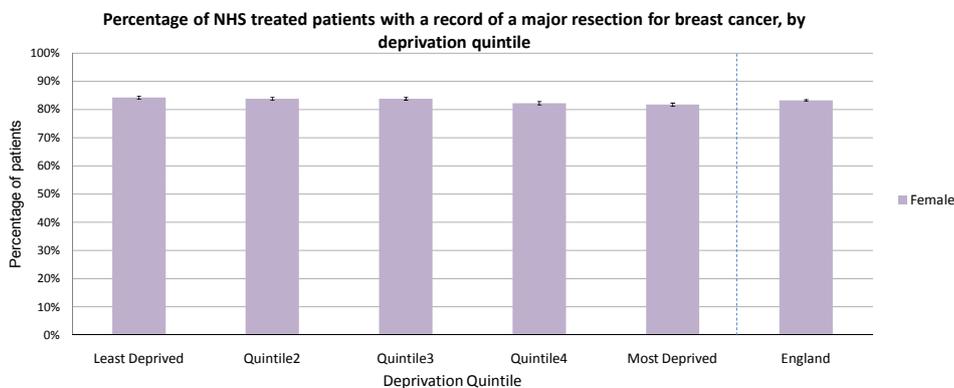
### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	18	83%	61% - 94%	4,870	87%	86% - 88%	4,888	87%	86% - 88%
40-49	47	85%	72% - 93%	14,651	89%	88% - 89%	14,698	89%	88% - 89%
50-59	100	85%	77% - 91%	23,849	90%	90% - 91%	23,949	90%	90% - 91%
60-69	173	87%	81% - 91%	24,598	90%	90% - 91%	24,771	90%	90% - 91%
70-79	214	76%	70% - 81%	17,093	81%	80% - 81%	17,307	81%	80% - 81%
80+	144	64%	56% - 71%	11,933	51%	50% - 52%	12,077	51%	50% - 52%
All ages	696	78%	75% - 81%	96,994	83%	83% - 84%	97,690	83%	83% - 84%



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived				20,413	84%	84% - 85%			
Quintile 2				21,464	84%	83% - 84%			
Quintile 3				20,988	84%	83% - 84%			
Quintile 4				18,983	82%	82% - 83%			
Quintile 5 - most deprived				15,146	82%	81% - 82%			
All quintiles				96,994	83%	83% - 84%			



Overall 83% of NHS treated breast cancer patients have a record of a major resection. There is a decrease with age in the percentage of female breast cancer patients with a record of a major resection aged 70 and over. In patients aged 60-69, 90% of females had a record of a major resection compared to 81% of 70-79 year olds and 51% of female patients aged 80 and over.

Across the deprivation quintiles, there was a slight decrease (-0.7%) in the percentage of patients with a record of a major resection for females by deprivation quintile that was statistically significant ( $p=0.022$ ). The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

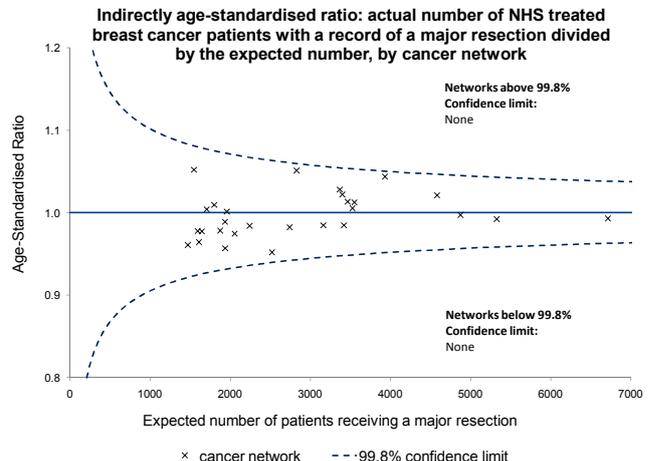
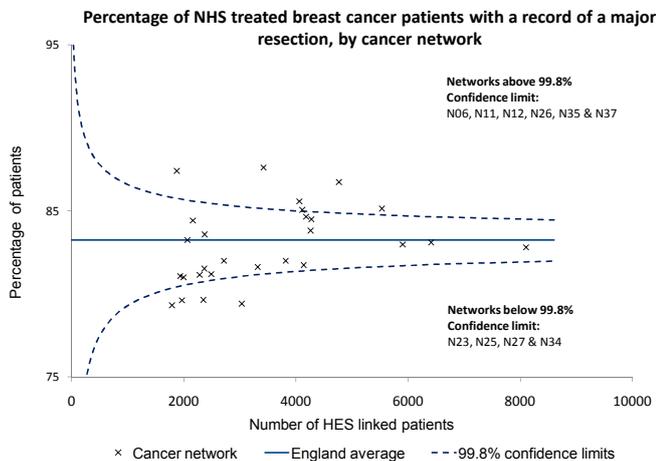
## C50: Breast

The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN				3,294	82%	80% - 83%			
N02 Greater Manchester and Cheshire CN				5,857	83%	82% - 84%			
N03 Merseyside and Cheshire CN				4,151	85%	84% - 86%			
N06 Yorkshire CN				4,729	87%	86% - 88%			
N07 Humber and Yorkshire Coast CN				2,149	85%	83% - 86%			
N08 North Trent CN				3,796	82%	81% - 83%			
N11 Pan Birmingham CN				3,397	88%	86% - 89%			
N12 Arden CN				1,863	87%	86% - 89%			
N20 Mount Vernon CN				1,917	81%	79% - 83%			
N21 West London CN				2,464	81%	80% - 83%			
N22 North London CN				1,981	81%	79% - 83%			
N23 North East London CN				1,950	80%	78% - 81%			
N24 South East London CN				2,261	81%	79% - 83%			
N25 South West London CN				2,332	80%	78% - 81%			
N26 Peninsula CN				4,082	85%	84% - 86%			
N27 Dorset CN				1,782	79%	77% - 81%			
N28 Avon, Somerset and Wiltshire CN				4,112	82%	81% - 83%			
N29 3 Counties CN				2,348	83%	82% - 85%			
N30 Thames Valley CN				4,252	85%	83% - 86%			
N31 Central South Coast CN				4,229	84%	83% - 85%			
N32 Surrey, West Sussex and Hampshire CN				2,056	83%	82% - 85%			
N33 Sussex CN				2,344	82%	80% - 83%			
N34 Kent and Medway CN				3,022	79%	78% - 81%			
N35 Greater Midlands CN				4,041	86%	85% - 87%			
N36 North of England CN				6,361	83%	82% - 84%			
N37 Anglia CN				5,489	85%	84% - 86%			
N38 Essex CN				2,691	82%	81% - 83%			
N39 East Midlands CN				8,044	83%	82% - 84%			
England				96,994	83%	83% - 84%			



The funnel plot of percentages shows that ten cancer networks fall outside the 99.8% confidence limits and therefore the difference from the average for England in the percentage of patients recorded as having a major resection is statistically significant for these cancer networks. However, the funnel plot for age-standardised ratios shows that all networks fall within the 99.8% confidence limits and therefore differences between networks are not statistically significant when age is taken into account.

Note: The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C53: Cervix

Of all newly diagnosed cases of cervical cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 89% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

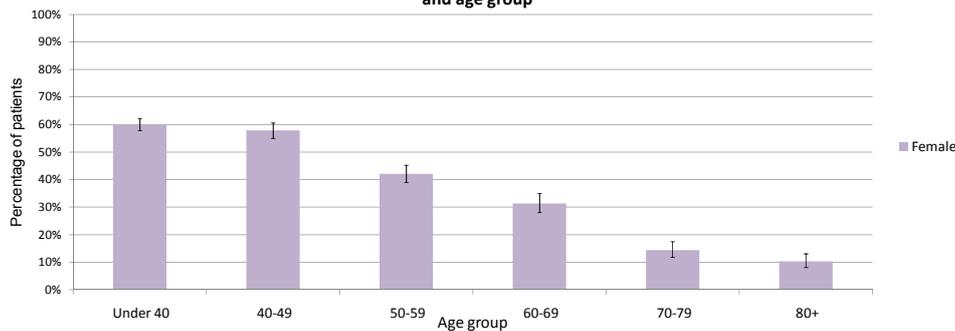
Using OPCS-4 codes, operations that have been defined as major resections include hysterectomy and hysterocolpomy. The full list of OPCS-4 codes used for cervical cancer is included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40				2,045	60%	58% - 62%			
40-49				1,217	58%	55% - 61%			
50-59				932	42%	39% - 45%			
60-69				676	31%	28% - 35%			
70-79				584	14%	12% - 17%			
80+				553	10%	8% - 13%			
All ages				6,007	45%	43% - 46%			

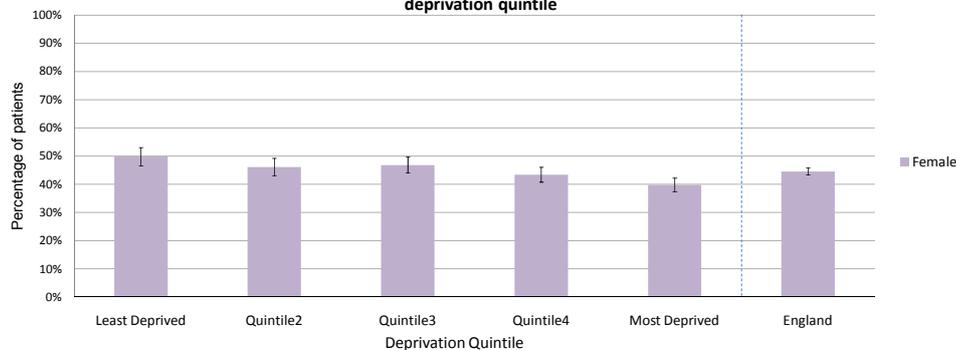
Percentage of NHS treated patients with a record of a major resection for cancer of the cervix, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived				901	50%	47% - 53%			
Quintile 2				1,006	46%	43% - 49%			
Quintile 3				1,175	47%	44% - 50%			
Quintile 4				1,357	43%	41% - 46%			
Quintile 5 - most deprived				1,568	40%	37% - 42%			
All quintiles				6,007	45%	43% - 46%			

Percentage of NHS treated patients with a record of a major resection for cancer of the cervix, by deprivation quintile



Overall, 45% of NHS treated cervical cancer patients have a record of a major resection.

There is a decrease with age in the percentage of patients with a record of a major resection. For patients aged under 40, around 60% have a record of a major resection. In patients aged 60-69, 31% have a record of a major resection and for patients aged 80 and over, 10% have a record of a major resection.

Across the deprivation quintiles, there was a decrease (-2.3% per quintile) in the percentage of patients with a record of a major resection for females by deprivation quintile that was statistically significant ( $p=0.01$ ). The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

## C53: Cervix

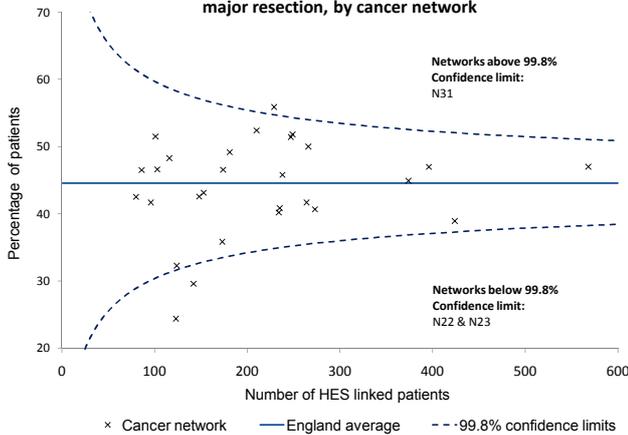
The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

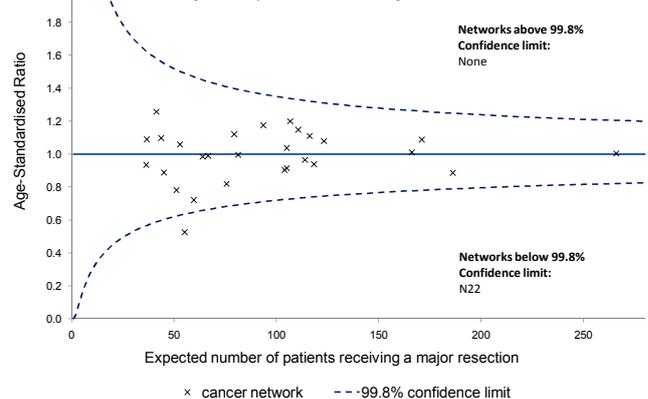
### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN				181	49%	42% - 56%			
N02 Greater Manchester and Cheshire CN				424	39%	34% - 44%			
N03 Merseyside and Cheshire CN				273	41%	35% - 47%			
N06 Yorkshire CN				374	45%	40% - 50%			
N07 Humber and Yorkshire Coast CN				210	52%	46% - 59%			
N08 North Trent CN				235	41%	35% - 47%			
N11 Pan Birmingham CN				264	42%	36% - 48%			
N12 Arden CN				116	48%	39% - 57%			
N20 Mount Vernon CN				96	42%	32% - 52%			
N21 West London CN				173	36%	29% - 43%			
N22 North London CN				123	24%	18% - 33%			
N23 North East London CN				142	30%	23% - 38%			
N24 South East London CN				174	47%	39% - 54%			
N25 South West London CN				148	43%	35% - 51%			
N26 Peninsula CN				238	46%	40% - 52%			
N27 Dorset CN				86	47%	36% - 57%			
N28 Avon, Somerset and Wiltshire CN				249	52%	46% - 58%			
N29 3 Counties CN				80	43%	32% - 53%			
N30 Thames Valley CN				247	51%	45% - 58%			
N31 Central South Coast CN				229	56%	49% - 62%			
N32 Surrey, West Sussex and Hampshire CN				101	51%	42% - 61%			
N33 Sussex CN				103	47%	37% - 56%			
N34 Kent and Medway CN				153	43%	36% - 51%			
N35 Greater Midlands CN				266	50%	44% - 56%			
N36 North of England CN				396	47%	42% - 52%			
N37 Anglia CN				234	40%	34% - 47%			
N38 Essex CN				124	32%	25% - 41%			
N39 East Midlands CN				568	47%	43% - 51%			
England				6,007	45%	43% - 46%			

Percentage of NHS treated cervical cancer patients with a record of a major resection, by cancer network



Indirectly age-standardised ratio: actual number of NHS treated cervical cancer patients with a record of a major resection divided by the expected number, by cancer network



The funnel plots show that the majority of cancer networks fall within the 99.8% confidence limits and therefore the difference from the average for England in the percentage of patients recorded as having a major resection is not statistically significant for these cancer networks. However, three cancer networks do fall outside the confidence limits. The funnel plot for age-standardised ratios shows that only one network falls below the 99.8% confidence limit when age is taken into account. We cannot exclude the possibility that poor quality data flowing into HES may account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C54-55: Uterus

Of all newly diagnosed cases of uterine cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 91% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

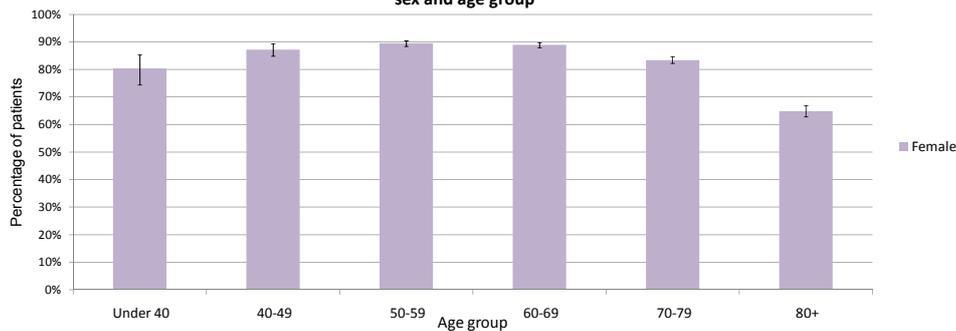
Using OPCS-4 codes, operations that have been defined as major resections include hysterectomy and hysterocolpomy. The full list of OPCS-4 codes used for uterine cancer is included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40				204	80%	74% - 85%			
40-49				837	87%	85% - 89%			
50-59				3,556	89%	88% - 90%			
60-69				4,731	89%	88% - 90%			
70-79				3,900	83%	82% - 85%			
80+				2,146	65%	63% - 67%			
All ages				15,374	84%	84% - 85%			

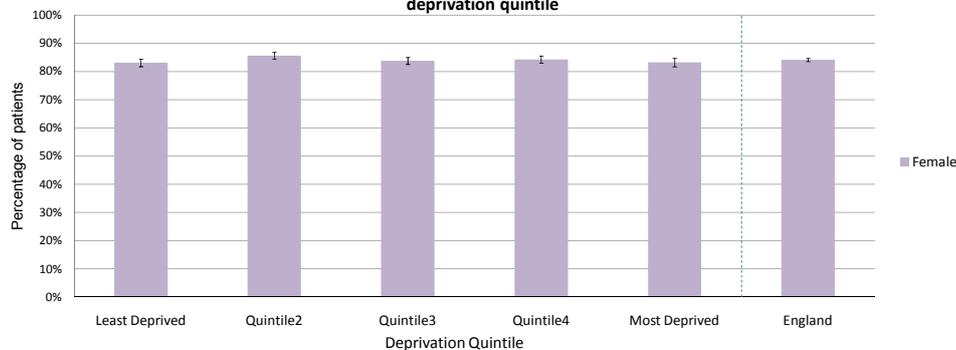
Percentage of NHS treated patients with a record of a major resection for cancer of the uterus, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived				2,943	83%	82% - 84%			
Quintile 2				3,427	86%	84% - 87%			
Quintile 3				3,402	84%	83% - 85%			
Quintile 4				3,033	84%	83% - 86%			
Quintile 5 - most deprived				2,569	83%	82% - 85%			
All quintiles				15,374	84%	84% - 85%			

Percentage of NHS treated patients with a record of a major resection for cancer of the uterus, by deprivation quintile



Overall, 84% of NHS treated uterine cancer patients have a record of a major resection. There is a decrease with age in the percentage of older uterine cancer patients with a record of a major resection. For patients aged 60-69, 89% have a record of a major resection. In patients aged 70-79, 83% had a record of a major resection and for patients aged 80 and over, 65% had a record of a major resection.

Across deprivation quintiles, there was no statistically significant change in the percentage of patients with a record of a major resection for females. The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

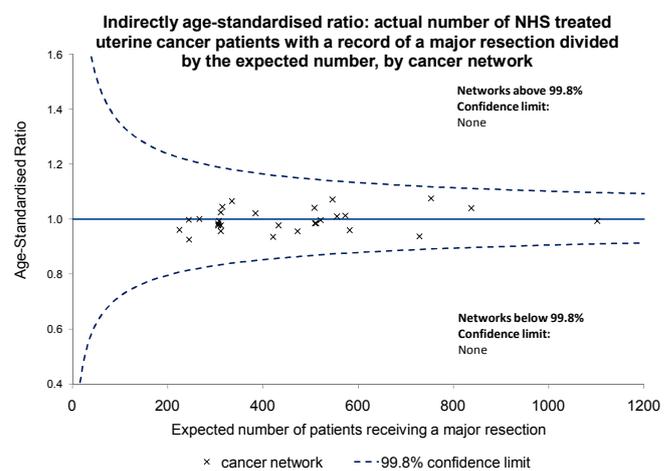
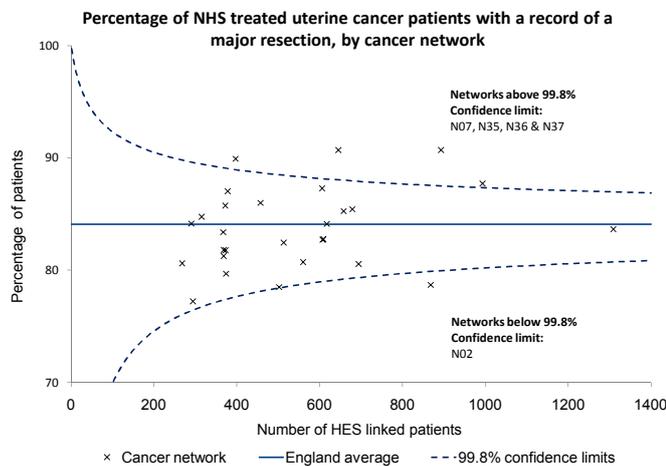
## C54-55: Uterus

The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN				513	82%	79% - 86%			
N02 Greater Manchester and Cheshire CN				868	79%	76% - 81%			
N03 Merseyside and Cheshire CN				560	81%	77% - 84%			
N06 Yorkshire CN				694	81%	77% - 83%			
N07 Humber and Yorkshire Coast CN				397	90%	87% - 93%			
N08 North Trent CN				617	84%	81% - 87%			
N11 Pan Birmingham CN				606	87%	84% - 90%			
N12 Arden CN				315	85%	80% - 88%			
N20 Mount Vernon CN				268	81%	75% - 85%			
N21 West London CN				367	83%	79% - 87%			
N22 North London CN				374	80%	75% - 83%			
N23 North East London CN				368	81%	77% - 85%			
N24 South East London CN				372	86%	82% - 89%			
N25 South West London CN				368	82%	78% - 85%			
N26 Peninsula CN				679	85%	83% - 88%			
N27 Dorset CN				294	77%	72% - 82%			
N28 Avon, Somerset and Wiltshire CN				658	85%	82% - 88%			
N29 3 Counties CN				373	82%	78% - 85%			
N30 Thames Valley CN				607	83%	79% - 86%			
N31 Central South Coast CN				609	83%	80% - 86%			
N32 Surrey, West Sussex and Hampshire CN				290	84%	79% - 88%			
N33 Sussex CN				378	87%	83% - 90%			
N34 Kent and Medway CN				502	78%	75% - 82%			
N35 Greater Midlands CN				645	91%	88% - 93%			
N36 North of England CN				893	91%	89% - 92%			
N37 Anglia CN				993	88%	86% - 90%			
N38 Essex CN				457	86%	83% - 89%			
N39 East Midlands CN				1,309	84%	82% - 86%			
England				15,374	84%	84% - 85%			



The funnel plot of percentages shows that five cancer networks fall outside the 99.8% confidence limits and therefore have a statistically significant difference from the average for England in the percentage of patients recorded as having a major resection. However, the funnel plot of age-standardised ratios shows that all networks fall within the 99.8% confidence limits.

Note: The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C56: Ovary

Of all newly diagnosed cases of ovarian cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 91% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

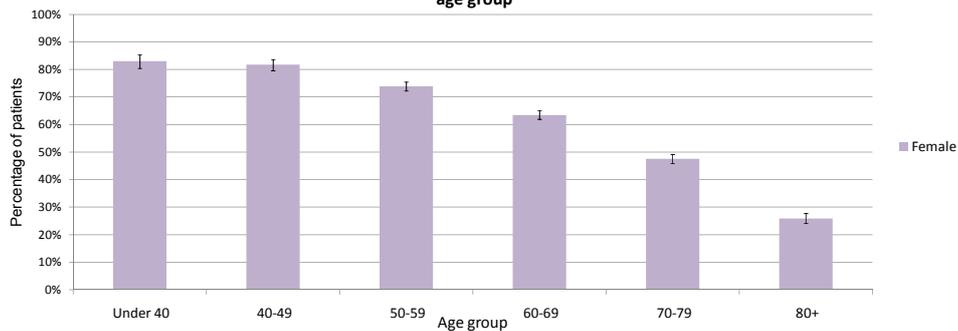
Using OPCS-4 codes, operations that have been defined as major resections include oophorectomies and salpingo-oophorectomy, and other excisions of ovary and uterus. The full list of OPCS-4 codes used for ovarian cancer is included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40				888	83%	80% - 85%			
40-49				1,324	82%	80% - 84%			
50-59				2,801	74%	72% - 75%			
60-69				3,687	63%	62% - 65%			
70-79				3,502	48%	46% - 49%			
80+				2,242	26%	24% - 28%			
All ages				14,444	59%	58% - 59%			

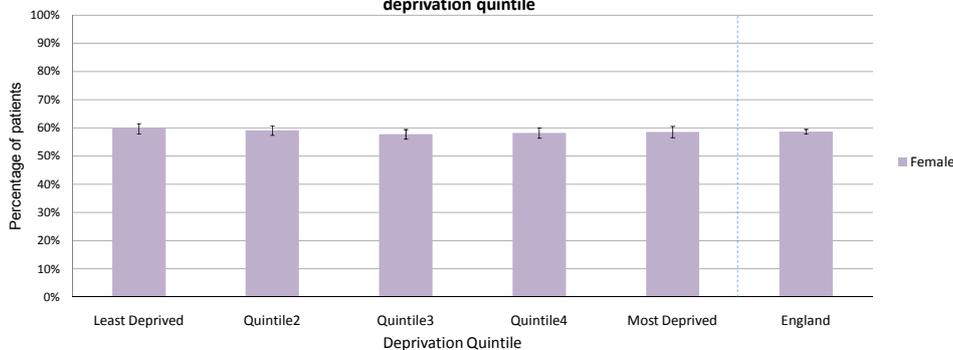
Percentage of NHS treated patients with a record of a major resection for ovarian cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived				2,883	60%	58% - 62%			
Quintile 2				3,132	59%	57% - 61%			
Quintile 3				3,210	58%	56% - 59%			
Quintile 4				2,887	58%	56% - 60%			
Quintile 5 - most deprived				2,332	59%	57% - 61%			
All quintiles				14,444	59%	58% - 59%			

Percentage of NHS treated patients with a record of a major resection for ovarian cancer, by deprivation quintile



Overall, 59% of NHS treated ovarian cancer patients have a record of a major resection. However, there is a decrease with age in the percentage of ovarian cancer patients with a record of a major resection. For patients aged under 40 and 40-49, around 83% have a record of a major resection. In patients aged 60-69, 63% have a record of a major resection and for patients aged 80 and over, 26% have a record of a major resection.

Across the deprivation quintiles, there was no statistically significant change in the percentage of patients with a record of a major resection for females. The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

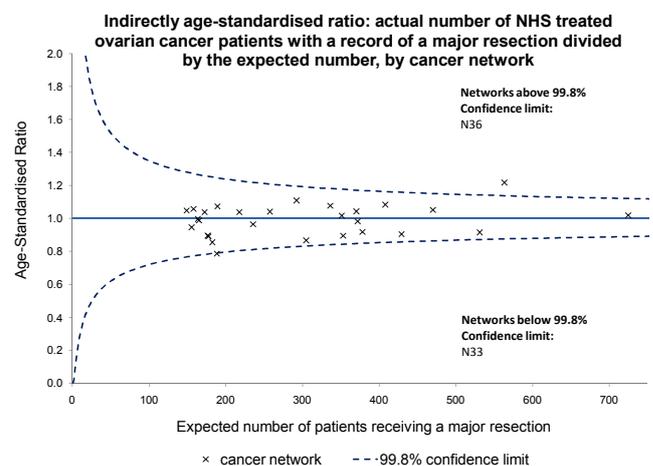
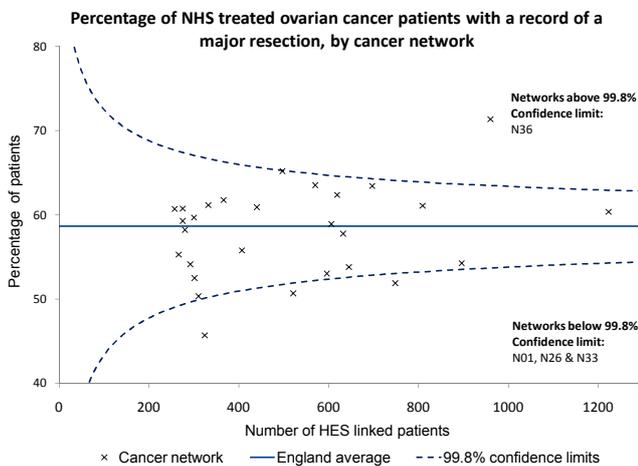
## C56: Ovary

The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN				521	51%	46% - 55%			
N02 Greater Manchester and Cheshire CN				896	54%	51% - 57%			
N03 Merseyside and Cheshire CN				596	53%	49% - 57%			
N06 Yorkshire CN				606	59%	55% - 63%			
N07 Humber and Yorkshire Coast CN				292	54%	48% - 60%			
N08 North Trent CN				570	64%	59% - 67%			
N11 Pan Birmingham CN				497	65%	61% - 69%			
N12 Arden CN				275	59%	53% - 65%			
N20 Mount Vernon CN				257	61%	55% - 66%			
N21 West London CN				310	50%	45% - 56%			
N22 North London CN				280	58%	52% - 64%			
N23 North East London CN				266	55%	49% - 61%			
N24 South East London CN				301	52%	47% - 58%			
N25 South West London CN				366	62%	57% - 67%			
N26 Peninsula CN				748	52%	48% - 55%			
N27 Dorset CN				300	60%	54% - 65%			
N28 Avon, Somerset and Wiltshire CN				697	63%	60% - 67%			
N29 3 Counties CN				332	61%	56% - 66%			
N30 Thames Valley CN				632	58%	54% - 62%			
N31 Central South Coast CN				645	54%	50% - 58%			
N32 Surrey, West Sussex and Hampshire CN				275	61%	55% - 66%			
N33 Sussex CN				324	46%	40% - 51%			
N34 Kent and Medway CN				407	56%	51% - 61%			
N35 Greater Midlands CN				619	62%	58% - 66%			
N36 North of England CN				960	71%	68% - 74%			
N37 Anglia CN				809	61%	58% - 64%			
N38 Essex CN				440	61%	56% - 65%			
N39 East Midlands CN				1,223	60%	58% - 63%			
England				14,444	59%	58% - 59%			



The funnel plot of percentages show that four cancer networks fall outside the 99.8% confidence limits and therefore the difference is statistically significant from the average for England in the percentage of patients recorded as having a major resection for these networks. The funnel plot of age-standardised ratios shows that only two networks falls outside the 99.8% confidence limits. We cannot exclude the possibility that poor quality data flowing into HES may account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C61: Prostate

Of all newly diagnosed cases of prostate cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 73% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

Using OPCS-4 codes, operations such as total/radical prostatectomy and perineal prostatectomy were included as major resections. The full list of OPCS-4 codes used for prostate cancer are included in the appendix.

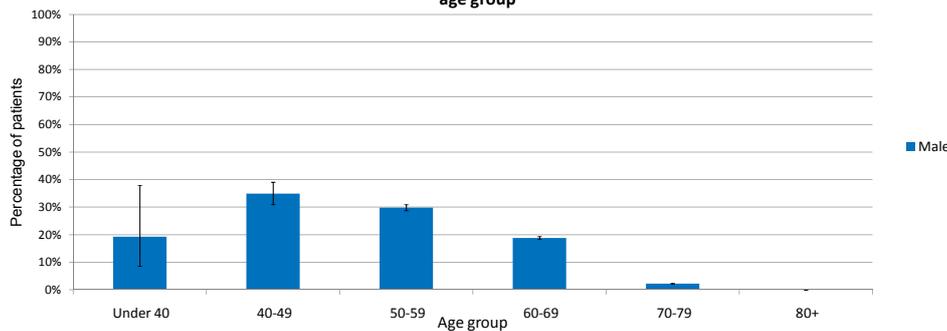
These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

For prostate cancer, a larger proportion of patients are not treated as inpatients or day cases (see appendix 2). Please note that only patients who have a record of being treated in an inpatient or day case setting are included in these analyses.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	26	19%	9% - 38%						
40-49	516	35%	31% - 39%						
50-59	6,743	30%	29% - 31%						
60-69	19,835	19%	18% - 19%						
70-79	23,172	2%	2% - 2%						
80+	13,648	0%	0% - 0%						
All ages	63,940	10%	10% - 10%						

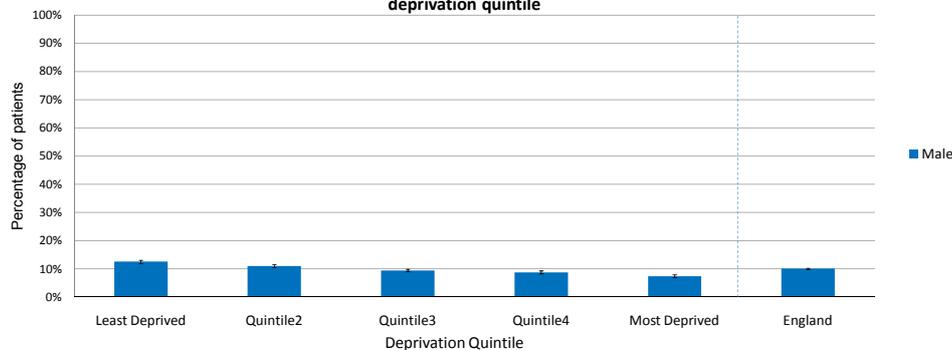
Percentage of NHS treated patients with a record of a major resection for prostate cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	14,111	13%	12% - 13%						
Quintile 2	14,869	11%	10% - 12%						
Quintile 3	13,734	9%	9% - 10%						
Quintile 4	11,671	9%	8% - 9%						
Quintile 5 - most deprived	9,555	7%	7% - 8%						
All quintiles	63,940	10%	10% - 10%						

Percentage of NHS treated patients with a record of a major resection for prostate cancer, by deprivation quintile



Overall, 10% of NHS treated prostate cancer patients had a record of a major resection for their cancer.

There is variation with age with 35% of patients aged 40-49 receiving a major resection, 19% of patients aged 60-69 and less than 0.1% of patients aged 80 and over.

There was a decrease in the percentage of patients with a record of a major resection for males by deprivation quintile that was statistically significant (-1.2%,  $p=0.001$ ). The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

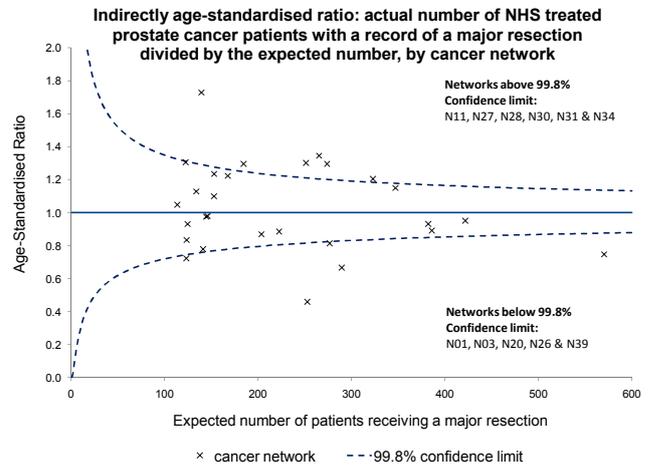
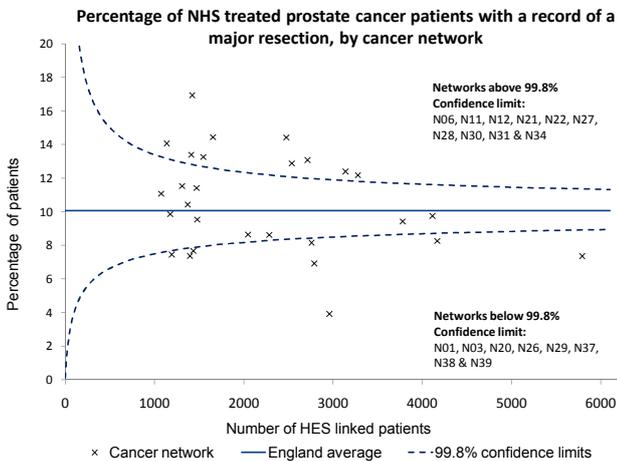
## C61: Prostate

The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	2,760	8%	7% - 9%						
N02 Greater Manchester and Cheshire CN	4,114	10%	9% - 11%						
N03 Merseyside and Cheshire CN	2,791	7%	6% - 8%						
N06 Yorkshire CN	3,279	12%	11% - 13%						
N07 Humber and Yorkshire Coast CN	1,480	10%	8% - 11%						
N08 North Trent CN	2,286	9%	8% - 10%						
N11 Pan Birmingham CN	2,715	13%	12% - 14%						
N12 Arden CN	1,138	14%	12% - 16%						
N20 Mount Vernon CN	1,195	7%	6% - 9%						
N21 West London CN	1,412	13%	12% - 15%						
N22 North London CN	1,547	13%	12% - 15%						
N23 North East London CN	1,310	12%	10% - 13%						
N24 South East London CN	1,177	10%	8% - 12%						
N25 South West London CN	1,372	10%	9% - 12%						
N26 Peninsula CN	2,961	4%	3% - 5%						
N27 Dorset CN	1,423	17%	15% - 19%						
N28 Avon, Somerset and Wiltshire CN	3,140	12%	11% - 14%						
N29 3 Counties CN	1,398	7%	6% - 9%						
N30 Thames Valley CN	2,477	14%	13% - 16%						
N31 Central South Coast CN	2,539	13%	12% - 14%						
N32 Surrey, West Sussex and Hampshire CN	1,075	11%	9% - 13%						
N33 Sussex CN	1,472	11%	10% - 13%						
N34 Kent and Medway CN	1,656	14%	13% - 16%						
N35 Greater Midlands CN	2,049	9%	7% - 10%						
N36 North of England CN	3,781	9%	9% - 10%						
N37 Anglia CN	4,167	8%	7% - 9%						
N38 Essex CN	1,435	8%	6% - 9%						
N39 East Midlands CN	5,791	7%	7% - 8%						
England	63,940	10%	10% - 10%						



The funnel plot on percentages shows that there is large variation between networks in the proportion of patients with a record of a major resection. The majority of cancer networks fall outside the 99.8% confidence limits and therefore have a statistically significant difference from the average for England in the percentage of patients with a record of a major resection. The funnel plot of age-standardised ratios shows less variation between cancer networks but eleven cancer networks do still fall outside the 99.8% confidence intervals. We cannot exclude the possibility that poor quality data flowing into HES may also account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C64-C66 & C68: Kidney

Of all newly diagnosed cases of kidney cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 92% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment.

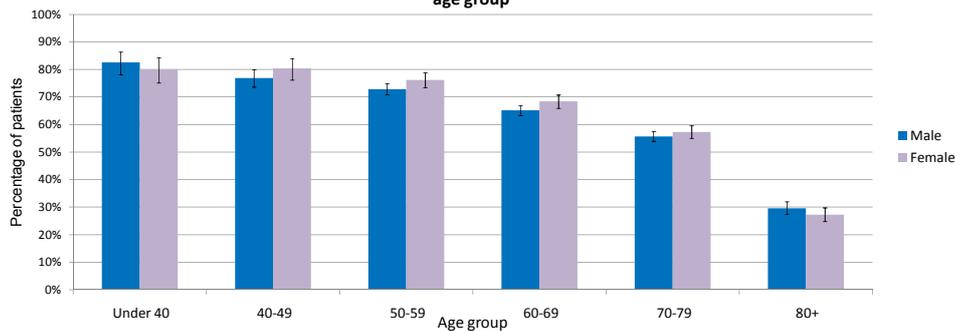
Using OPCS-4 codes, operations that have been defined as major resections include total and partial nephrectomy, and total and partial excisions of the kidney. The full list of OPCS-4 codes used for kidney cancer are included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	328	83%	78% - 86%	291	80%	75% - 84%	619	81%	78% - 84%
40-49	689	77%	74% - 80%	387	80%	76% - 84%	1,076	78%	76% - 81%
50-59	1,854	73%	71% - 75%	943	76%	73% - 79%	2,797	74%	72% - 76%
60-69	2,718	65%	63% - 67%	1,430	68%	66% - 71%	4,148	66%	65% - 68%
70-79	3,094	56%	54% - 57%	1,813	57%	55% - 60%	4,907	56%	55% - 58%
80+	1,552	30%	27% - 32%	1,215	27%	25% - 30%	2,767	29%	27% - 30%
All ages	10,235	60%	59% - 61%	6,079	59%	58% - 61%	16,314	60%	59% - 60%

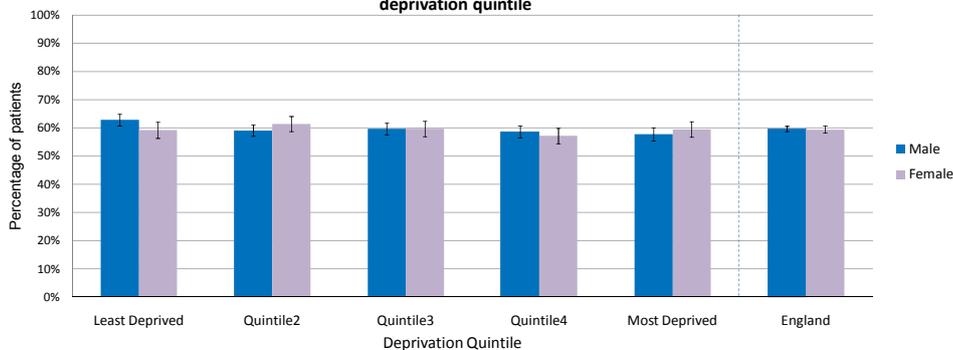
Percentage of NHS treated patients with a record of a major resection for kidney cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	2,060	63%	61% - 65%	1,132	59%	56% - 62%	3,192	62%	60% - 63%
Quintile 2	2,223	59%	57% - 61%	1,239	61%	59% - 64%	3,462	60%	58% - 62%
Quintile 3	2,240	60%	58% - 62%	1,279	60%	57% - 62%	3,519	60%	58% - 61%
Quintile 4	2,019	59%	56% - 61%	1,259	57%	54% - 60%	3,278	58%	56% - 60%
Quintile 5 - most deprived	1,693	58%	55% - 60%	1,170	59%	57% - 62%	2,863	58%	57% - 60%
All quintiles	10,235	60%	59% - 61%	6,079	59%	58% - 61%	16,314	60%	59% - 60%

Percentage of NHS treated patients with a record of a major resection for kidney cancer, by deprivation quintile



The difference between males and females within each age band in the percentage of patients with a record of a major resection is not statistically significant.

There is a decrease with age in the percentage of kidney cancer patients with a record of a major resection. In patients aged 50-59, 74% had a record of a major resection compared to 56% of 70-79 year olds and 29% of patients aged 80 and over.

Across the deprivation quintiles, there was no statistically significant change in the percentage of patients with a record of a major resection for either males or females. The percentages by deprivation quintile have not been adjusted for differences in the age structure within each quintile.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

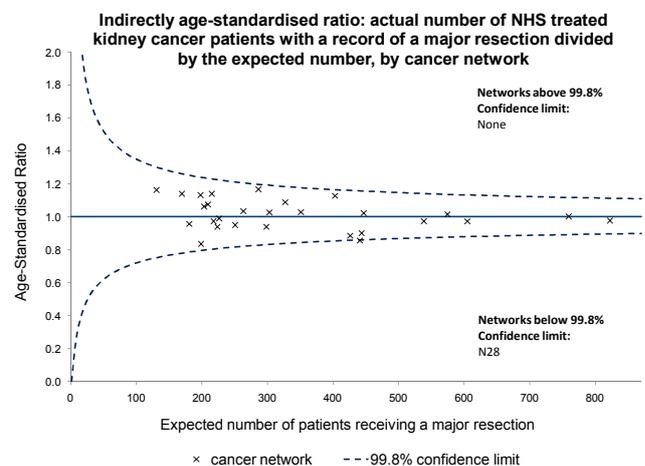
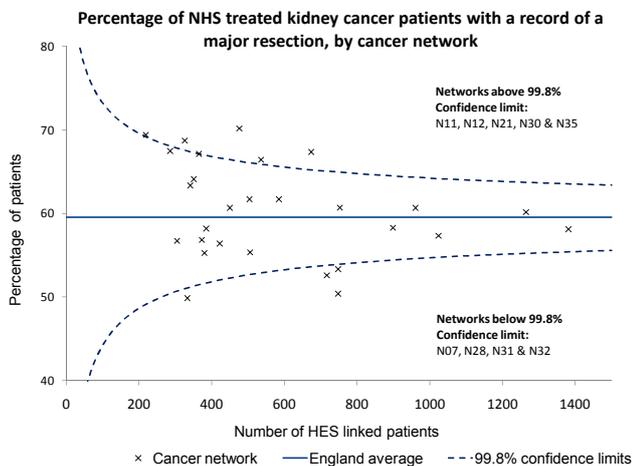
## C64-C66 & C68: Kidney

The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

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### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	324	63%	58% - 68%	180	59%	52% - 66%	504	62%	57% - 66%
N02 Greater Manchester and Cheshire CN	558	58%	54% - 62%	341	59%	53% - 64%	899	58%	55% - 61%
N03 Merseyside and Cheshire CN	370	62%	57% - 67%	215	60%	54% - 67%	585	62%	58% - 66%
N06 Yorkshire CN	586	60%	56% - 64%	375	61%	56% - 66%	961	61%	58% - 64%
N07 Humber and Yorkshire Coast CN	281	58%	52% - 64%	141	53%	45% - 61%	422	56%	52% - 61%
N08 North Trent CN	450	51%	47% - 56%	267	55%	49% - 61%	717	53%	49% - 56%
N11 Pan Birmingham CN	292	68%	62% - 73%	184	74%	67% - 80%	476	70%	66% - 74%
N12 Arden CN	126	66%	57% - 74%	93	74%	64% - 82%	219	69%	63% - 75%
N20 Mount Vernon CN	180	67%	59% - 73%	106	69%	60% - 77%	286	67%	62% - 73%
N21 West London CN	225	68%	62% - 74%	101	70%	61% - 78%	326	69%	63% - 74%
N22 North London CN	220	65%	58% - 71%	145	71%	63% - 78%	365	67%	62% - 72%
N23 North East London CN	199	55%	48% - 62%	106	59%	50% - 68%	305	57%	51% - 62%
N24 South East London CN	222	64%	58% - 70%	119	61%	52% - 70%	341	63%	58% - 68%
N25 South West London CN	240	58%	52% - 64%	133	54%	46% - 62%	373	57%	52% - 62%
N26 Peninsula CN	475	61%	57% - 66%	278	59%	53% - 65%	753	61%	57% - 64%
N27 Dorset CN	263	56%	49% - 61%	117	55%	46% - 63%	380	55%	50% - 60%
N28 Avon, Somerset and Wiltshire CN	467	52%	47% - 56%	281	48%	43% - 54%	748	50%	47% - 54%
N29 3 Counties CN	225	62%	56% - 68%	126	67%	59% - 75%	351	64%	59% - 69%
N30 Thames Valley CN	430	69%	65% - 73%	244	64%	58% - 70%	674	67%	64% - 71%
N31 Central South Coast CN	468	52%	48% - 57%	280	55%	49% - 61%	748	53%	50% - 57%
N32 Surrey, West Sussex and Hampshire CN	215	52%	45% - 59%	118	46%	37% - 55%	333	50%	45% - 55%
N33 Sussex CN	229	59%	53% - 66%	156	56%	49% - 64%	385	58%	53% - 63%
N34 Kent and Medway CN	306	56%	50% - 61%	200	55%	48% - 61%	506	55%	51% - 60%
N35 Greater Midlands CN	329	66%	61% - 71%	207	67%	60% - 73%	536	66%	62% - 70%
N36 North of England CN	749	61%	57% - 64%	516	59%	55% - 63%	1,265	60%	57% - 63%
N37 Anglia CN	652	57%	53% - 61%	372	58%	53% - 63%	1,024	57%	54% - 60%
N38 Essex CN	281	59%	53% - 65%	169	63%	56% - 70%	450	61%	56% - 65%
N39 East Midlands CN	873	60%	56% - 63%	509	56%	51% - 60%	1,382	58%	55% - 61%
England	10,235	60%	59% - 61%	6,079	59%	58% - 61%	16,314	60%	59% - 60%



The funnel plot of percentages shows that nine cancer networks fall outside the 99.8% confidence limits and therefore do not have a statistically significant difference from the average for England in the percentage of patients recorded as having a major resection. The funnel plot of age-standardised ratios between observed and expected number of patients with a record of a major resection shows that one network falls outside the 99.8% confidence limits. We cannot exclude the possibility that poor quality data flowing into HES may still account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what other factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

# NHS treated patients with a record of a major resection, by sex, age and deprivation quintile, 2004-2006, followed up to 2007

## C67: Bladder

Of all newly diagnosed cases of bladder cancer registered in England in 2004-2006 (excluding Death Certificate Only registrations), 96% were linked to at least one record within HES. The results presented on these pages show the percentage of these linked, non-DCO patients who had a record of a major resection as part of their treatment. For these analyses, only operations that would remove the whole tumour for bladder cancer have been included. A larger percentage of patients will undergo other treatment for their tumour.

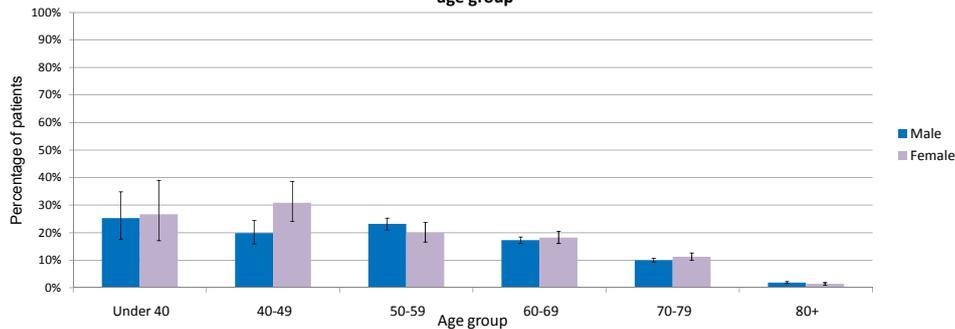
Using OPCS-4 codes, operations that have been defined as major resections include Cystoprostatectomy, Cystourethrectomy, Cystectomy NEC, Other specified total excision of bladder and Unspecified total excision of bladder. Other operations such as endoscopic operations, and operations of the Urethra (that are common for bladder cancer patients) have not been included. The full list of OPCS-4 codes used for bladder cancer are included in the appendix.

These results are intended to show any differences in the percentage of NHS treated patients with a record of a major resection by different equality groups; age, sex and deprivation. However, caution should be taken when interpreting these results due to limitations in using HES data. These results do not show the proportion of patients who are cured of their cancer through surgery, although it is believed that the large majority of these operations will have been carried out with curative intent. In addition, the treatment of private patients will not be captured.

### Major resections by age and sex

Age group	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Under 40	95	25%	18% - 35%	60	27%	17% - 39%	155	26%	20% - 33%
40-49	338	20%	16% - 24%	152	31%	24% - 39%	490	23%	20% - 27%
50-59	1,459	23%	21% - 25%	496	20%	17% - 24%	1,955	22%	21% - 24%
60-69	3,797	17%	16% - 19%	1,167	18%	16% - 21%	4,964	18%	16% - 19%
70-79	6,335	10%	9% - 11%	2,078	11%	10% - 13%	8,413	10%	10% - 11%
80+	4,946	2%	2% - 2%	2,639	1%	1% - 2%	7,585	2%	1% - 2%
All ages	16,970	11%	10% - 11%	6,592	10%	9% - 11%	23,562	10%	10% - 11%

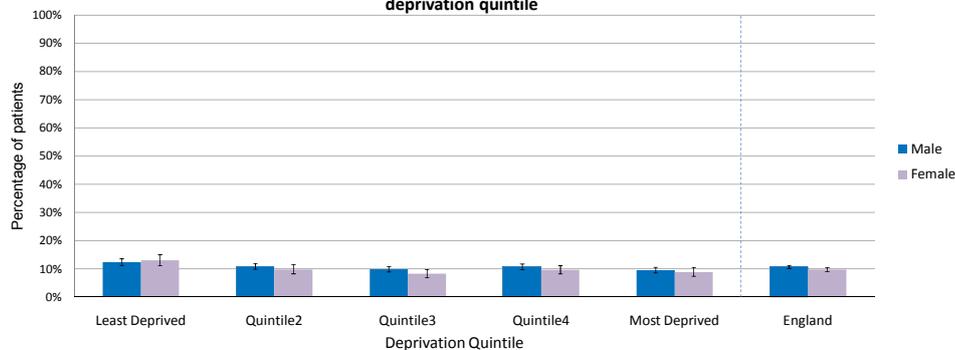
Percentage of NHS treated patients with a record of a major resection for bladder cancer, by sex and age group



### Major resections by deprivation quintile and sex

Deprivation quintile	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
Quintile 1 - least deprived	3,196	12%	11% - 14%	1,139	13%	11% - 15%	4,335	13%	12% - 14%
Quintile 2	3,601	11%	10% - 12%	1,296	10%	8% - 12%	4,897	11%	10% - 12%
Quintile 3	3,673	10%	9% - 11%	1,356	8%	7% - 10%	5,029	9%	9% - 10%
Quintile 4	3,522	11%	10% - 12%	1,467	10%	8% - 11%	4,989	10%	10% - 11%
Quintile 5 - most deprived	2,978	10%	9% - 11%	1,334	9%	7% - 10%	4,312	9%	8% - 10%
All quintiles	16,970	11%	10% - 11%	6,592	10%	9% - 11%	23,562	10%	10% - 11%

Percentage of NHS treated patients with a record of a major resection for bladder cancer, by deprivation quintile



The percentage of patients with a record of a major resection is very similar for males and females within each age band.

There is a decrease with age in the percentage of bladder cancer patients with a record of a major resection. In patients aged 50-59, 22% have a record of a major resection compared to 10% of 70-79 year olds and 2% patients aged 80 and over.

Across the deprivation quintiles, there was no statistically significant change in the percentage of patients with a record of a major resection for either males or females. The percentages by deprivation quintile have not been adjusted for differences in the age structure.

# NHS treated patients with a record of a major resection, by sex and cancer network, 2004-2006 followed up to 2007

## C67: Bladder

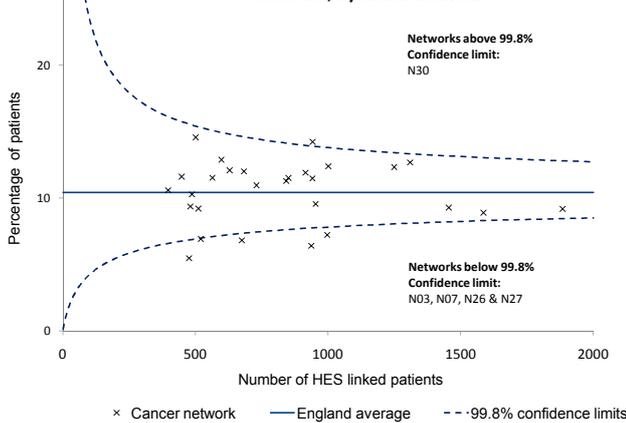
The results on this page are a reflection of the surgical treatment data currently available through HES, however, there are limitations in the data available and therefore these results are being presented in order to stimulate further discussions with the clinical community as to what factors affect surgery rates and how we can improve data collection. Differences between cancer networks maybe due to higher rates of private patients, later stage of disease at diagnosis, co-morbidities, miscoding or poor data flow. It is important to read the introduction to this report to understand the limitations of data currently available nationally.

These results are observational; there is no "good" or "bad" percentage from these results. Better quality data are required in order to understand how surgery rates can affect outcomes. The cancer network relates to the residence of the patient at diagnosis and not the hospital or trust where the patient was treated. Improved data quality and consistency of coding will allow further research into inequalities in cancer to be undertaken to create a better understanding of how patients are treated within the NHS and to target efforts to improve their outcomes.

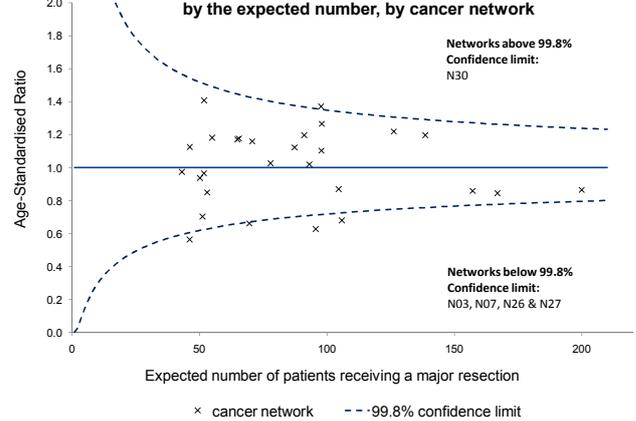
### Major resections by cancer network and sex

Cancer network	Male			Female			Persons		
	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval	HES linked patients	% major resections	95% Confidence Interval
N01 Lancashire and South Cumbria CN	696	10%	8% - 12%	257	9%	6% - 13%	953	10%	8% - 12%
N02 Greater Manchester and Cheshire CN	1,022	10%	9% - 12%	433	7%	5% - 9%	1,455	9%	8% - 11%
N03 Merseyside and Cheshire CN	700	8%	6% - 10%	297	6%	4% - 10%	997	7%	6% - 9%
N06 Yorkshire CN	900	12%	10% - 14%	409	14%	11% - 18%	1,309	13%	11% - 15%
N07 Humber and Yorkshire Coast CN	490	6%	4% - 9%	185	8%	5% - 13%	675	7%	5% - 9%
N08 North Trent CN	643	12%	10% - 15%	298	10%	7% - 14%	941	11%	10% - 14%
N11 Pan Birmingham CN	541	10%	8% - 13%	189	13%	9% - 19%	730	11%	9% - 13%
N12 Arden CN	294	10%	7% - 14%	103	12%	7% - 19%	397	11%	8% - 14%
N20 Mount Vernon CN	362	11%	8% - 14%	125	9%	5% - 15%	487	10%	8% - 13%
N21 West London CN	403	12%	10% - 16%	195	14%	10% - 19%	598	13%	10% - 16%
N22 North London CN	359	11%	8% - 15%	122	5%	2% - 10%	481	9%	7% - 12%
N23 North East London CN	369	7%	5% - 10%	151	7%	4% - 12%	520	7%	5% - 9%
N24 South East London CN	374	10%	7% - 13%	137	7%	4% - 13%	511	9%	7% - 12%
N25 South West London CN	448	12%	9% - 15%	181	13%	9% - 18%	629	12%	10% - 15%
N26 Peninsula CN	673	6%	4% - 8%	264	8%	6% - 12%	937	6%	5% - 8%
N27 Dorset CN	362	6%	4% - 9%	114	4%	1% - 9%	476	5%	4% - 8%
N28 Avon, Somerset and Wiltshire CN	682	12%	10% - 15%	233	10%	7% - 15%	915	12%	10% - 14%
N29 3 Counties CN	374	15%	12% - 19%	127	13%	9% - 20%	501	15%	12% - 18%
N30 Thames Valley CN	690	15%	13% - 18%	252	12%	8% - 16%	942	14%	12% - 17%
N31 Central South Coast CN	731	12%	10% - 15%	270	12%	9% - 17%	1,001	12%	10% - 15%
N32 Surrey, West Sussex and Hampshire CN	326	12%	9% - 16%	122	10%	6% - 16%	448	12%	9% - 15%
N33 Sussex CN	398	13%	10% - 16%	166	9%	6% - 14%	564	12%	9% - 14%
N34 Kent and Medway CN	639	13%	11% - 16%	212	7%	4% - 11%	851	12%	10% - 14%
N35 Greater Midlands CN	609	11%	9% - 14%	233	12%	9% - 17%	842	11%	9% - 14%
N36 North of England CN	1,109	9%	7% - 11%	477	9%	7% - 12%	1,586	9%	8% - 10%
N37 Anglia CN	927	12%	10% - 15%	322	12%	9% - 16%	1,249	12%	11% - 14%
N38 Essex CN	493	11%	9% - 14%	190	14%	10% - 20%	683	12%	10% - 15%
N39 East Midlands CN	1,356	10%	8% - 12%	528	8%	6% - 10%	1,884	9%	8% - 11%
England	16,970	11%	10% - 11%	6,592	10%	9% - 11%	23,562	10%	10% - 11%

Percentage of NHS treated bladder cancer patients with a record of a major resection, by cancer network



Indirectly age-standardised ratio: actual number of NHS treated bladder cancer patients with a record of a major resection divided by the expected number, by cancer network



The funnel plot of percentages shows that five cancer networks fall outside the 99.8% confidence limits and therefore the difference from the average for England in the percentage of patients recorded as having a major resection is statistically significant for these cancer networks. The plot for the age-standardised ratio shows that when taking into account differences in the age structures of the networks, the same five cancer networks do fall outside the 99.8% confidence limit. We cannot exclude the possibility that poor quality data flowing into HES may account for some of the differences seen.

Note: It is important to examine the data for these networks more carefully and investigate further as to what factors may underlie the apparent differences including coding quality within HES. The percentages shown in the table above do not take into account any factors such as differences in the age-distributions, co-morbidities or stage at diagnosis of patients between cancer networks.

## Glossary

### Death Certificate Only (DCO)

Patients whose diagnosis is solely on the basis of the existence of a death certificate with cancer as a cause of death.

### Denominator

Only patients with at least one linked record within HES were included as the denominator. The number of linked patients is less than the total number of patients diagnosed. As no information is known about patients without a linked HES record, it has been assumed that they were not treated within an NHS hospital for their cancer and therefore are not included in this analysis.

### 95% confidence intervals

For the percentages, 95% confidence intervals are given calculated using the Wilson Score Method. These are a measure of variability in the percentages calculated using the sample size. The upper and lower limits of the confidence interval show how big a contribution chance may have made to a particular statistic. The 95% confidence intervals quoted give the range in which the rate in question would fall 19 times out of 20, were it possible to repeat the analyses.

### Indirectly age-standardised ratios

Age-standardised ratios for cancer networks were calculated using the indirect method.<sup>1</sup> The number of patients recorded with a major resection is divided by the number of patients expected to have received a major resection, given the age distribution of the patients for each network. The expected number is calculated by using the percentages calculated for all patients in England, by age groups, for each site.

### Percentages by deprivation

Weighted ordinary least squares linear regression was used to model the trend across percentages for deprivation quintiles. The weight used for the linear regression was the corresponding number of patients for each quintile.

### Funnel plots and 99.8% limits

Non-age-standardised funnel plots are created to compare the percentage of patients with a record of a major resection for the 28 cancer networks with the overall percentage for England. They show how the networks compare by looking at whether the percentage is above, below or within the 99.8% control limits around the overall percentage for England.

The percentages for each cancer network are plotted against the number of HES linked patients within each network to take into account the varying number of patients in each of the cancer networks.

<sup>1</sup> Statistical Methods in Cancer Research, Volume IV – Descriptive Epidemiology, IARC Scientific Publications No.128, pp62

Only those networks whose percentage lie outside the control limits are highlighted because they appear to have a difference in the percentage with a record of a major resection that is statistically significant.

These differences warrant further investigation as the difference may well be affected by data quality issues in HES as well as the linking between cancer registrations and the HES database.

Funnel plots for indirectly age-standardised resection ratios show the ratios plotted against the expected number of patients with a record of a major resection (see *Indirectly age-standardised ratios*). These funnel plots show which networks fall outside the limits once differences in the age structure of the group of patients has been taken into account.

Excel sheet templates and explanations of funnel plots are available from the APHO website or from ERPHO<sup>2</sup>

It is important to note that the results for each cancer network relates to the postcode of residence of patients and not the cancer network where the patient is treated.

## **SSCRGs**

The Site Specific Clinical Reference Groups bring together clinical specialists, cancer registries, patient and charity representatives in order to advise, support and shape the work of the NCIN.

More information can be found on the NCIN website [www.ncin.org.uk](http://www.ncin.org.uk)

## **OPCS classification**

Operations and procedures within HES are recorded using the OPCS Classification of Interventions and Procedures. For more information please see [www.connectingforhealth.nhs.uk/clinicalcoding](http://www.connectingforhealth.nhs.uk/clinicalcoding)

## **Major resection**

A major resection has been defined with SSCRG lead clinicians as an operation which would be carried out for a cancer patient which would attempt to remove the entire tumour. A list of OPCS-4 codes assigned as major resections for each site are available in Appendix 2.

<sup>2</sup> <http://www.erpho.org.uk/ViewResource.aspx?id=16120>

## Appendix 1: Percentage of patients linked to at least one record within HES, by site and cancer network, 2004-2006

This table shows the percentage of non-DCO cancer registrations that were linked to HES. Percentages linked for prostate cancer are low due to the relatively high number of patients who are not treated as an inpatient or day case and therefore do not have a record in HES. This table is included to show the proportion of patients that a HES record was available for and included in the analyses for each network.

	Upper GI				Colorectal	Lung	Breast	Gynaecological			Urology		
	Oesophagus	Stomach	Liver	Pancreas				Cervix	Uterus	Ovary	Prostate	Kidney	Bladder
N01 Lancashire and South Cumbria CN	98%	95%	91%	91%	96%	95%	95%	93%	93%	93%	89%	95%	97%
N02 Greater Manchester and Cheshire CN	96%	96%	94%	94%	95%	93%	91%	94%	93%	93%	76%	94%	96%
N03 Merseyside and Cheshire CN	97%	94%	91%	92%	94%	91%	89%	92%	92%	88%	78%	91%	97%
N06 Yorkshire CN	96%	96%	86%	92%	95%	90%	88%	89%	88%	88%	70%	92%	95%
N07 Humber and Yorkshire Coast CN	99%	96%	89%	93%	96%	93%	88%	86%	93%	91%	74%	95%	99%
N08 North Trent CN	98%	98%	93%	97%	96%	96%	91%	90%	96%	93%	86%	94%	97%
N11 Pan Birmingham CN	98%	96%	92%	98%	95%	94%	90%	91%	91%	91%	80%	92%	97%
N12 Arden CN	97%	96%	94%	95%	95%	94%	89%	90%	91%	88%	66%	95%	98%
N20 Mount Vernon CN	97%	92%	84%	83%	92%	88%	79%	85%	81%	86%	68%	89%	95%
N21 West London CN	95%	91%	88%	92%	93%	91%	84%	91%	89%	89%	67%	91%	94%
N22 North West London CN	94%	93%	90%	87%	91%	88%	83%	90%	93%	88%	72%	88%	95%
N23 North East London CN	95%	93%	91%	92%	94%	91%	88%	90%	92%	92%	74%	93%	96%
N24 South East London CN	95%	93%	88%	88%	93%	90%	85%	90%	85%	86%	64%	91%	96%
N25 South West London CN	96%	92%	87%	88%	92%	88%	84%	86%	83%	91%	60%	87%	93%
N26 Peninsula CN	97%	94%	93%	93%	95%	93%	92%	95%	94%	94%	83%	95%	97%
N27 Dorset CN	99%	97%	93%	95%	95%	94%	89%	89%	92%	96%	63%	92%	96%
N28 Avon, Somerset and Wiltshire CN	97%	96%	90%	92%	96%	92%	88%	84%	95%	94%	83%	91%	97%
N29 3 Counties CN	95%	94%	96%	94%	95%	92%	90%	82%	90%	92%	65%	89%	95%
N30 Thames Valley CN	95%	92%	88%	89%	91%	88%	82%	89%	87%	87%	60%	87%	94%
N31 Central South Coast CN	95%	92%	88%	93%	94%	90%	89%	91%	92%	95%	65%	94%	96%
N32 Surrey, West Sussex and Hampshire CN	94%	93%	80%	87%	92%	88%	81%	92%	86%	85%	65%	94%	94%
N33 Sussex CN	96%	95%	89%	90%	92%	90%	86%	84%	90%	86%	72%	93%	93%
N34 Kent and Medway CN	93%	93%	83%	87%	90%	87%	83%	76%	88%	89%	60%	90%	95%
N35 Greater Midlands CN	95%	95%	88%	89%	94%	90%	90%	94%	92%	91%	61%	90%	95%
N36 North of England CN	98%	97%	90%	94%	97%	92%	93%	83%	93%	92%	78%	96%	97%
N37 Anglia CN	98%	94%	91%	92%	94%	92%	88%	83%	90%	91%	75%	93%	96%
N38 Essex CN	97%	96%	87%	91%	95%	93%	85%	94%	93%	94%	62%	93%	96%
N39 East Midlands CN	99%	97%	94%	96%	97%	96%	91%	90%	94%	93%	82%	94%	98%
<b>England</b>	<b>97%</b>	<b>95%</b>	<b>90%</b>	<b>92%</b>	<b>94%</b>	<b>92%</b>	<b>88%</b>	<b>89%</b>	<b>91%</b>	<b>91%</b>	<b>73%</b>	<b>92%</b>	<b>96%</b>

## Appendix 2: OPCS-4 codes assigned as a major resection by cancer site

### Oesophagus

<b>Code</b>	<b>Description</b>
G011	Oesophagogastrectomy and anastomosis of oesophagus to stomach
G018	Other specified excision of oesophagus and stomach
G019	Unspecified excision of oesophagus and stomach
G021	Total oesophagectomy and anastomosis of pharynx to stomach
G022	Total oesophagectomy and interposition of microvascularly attached jejunum
G023	Total oesophagectomy and interposition of jejunum NEC
G024	Total oesophagectomy and interposition of microvascularly attached colon
G025	Total oesophagectomy and interposition of colon NEC
G028	Other specified total excision of oesophagus
G029	Unspecified total excision of oesophagus
G031	Partial oesophagectomy and end to end anastomosis of oesophagus
G032	Partial oesophagectomy and interposition of microvascularly attached jejunum
G035	Partial oesophagectomy and interposition of microvascularly attached colon
G036	Partial oesophagectomy and interposition of colon NEC
G038	Other Specified partial excision
G039	Unspecified partial excision

### Stomach

<b>Code</b>	<b>Description</b>
G012	Oesophagogastrectomy and anastomosis of oesophagus to transposed jejunum
G013	Oesophagogastrectomy and anastomosis of oesophagus to jejunum NEC
G271	Total gastrectomy and excision of surrounding tissue
G272	Total gastrectomy and anastomosis of oesophagus to duodenum
G273	Total gastrectomy and interposition of jejunum
G274	Total gastrectomy and anastomosis of oesophagus to transposed jejunum
G275	Total gastrectomy and anastomosis of oesophagus to jejunum NEC
G278	Total excision of stomach, Other specified
G281	Partial gastrectomy and anastomosis of stomach to duodenum
G282	Partial gastrectomy and anastomosis of stomach to transposed jejunum
G283	Partial gastrectomy and anastomosis of stomach to jejunum NEC, Billroth II
G288	Partial excision of stomach, other specified

### Liver

<b>Code</b>	<b>Description</b>
J021	Right hemihepatectomy
J022	Left hemihepatectomy
J023	Resection of segment(s) of liver
J024	Wedge excision of liver
J026	Extended right hemihepatectomy
J027	Extended left hemihepatectomy
J028	Other specified partial excision of liver
J029	Partial excision of liver, Unspecified

## Pancreas

<b>Code</b>	<b>Description</b>
J551	Total pancreatectomy and excision of surrounding tissue
J552	Total pancreatectomy NEC
J558	Other specified total excision of pancreas
J559	Unspecified total excision of pancreas
J561	Pancreaticoduodenectomy and excision of surrounding tissue
J562	Pancreaticoduodenectomy and resection of antrum of stomach
J563	Pancreaticoduodenectomy NEC
J564	Subtotal excision of head of pancreas with preservation of duodenum and drainage HFQ
J568	Pylorus-preserving Pancreaticoduodenectomy. Excision of head of pancreas, other specified.
J569	Excision of head of pancreas, unspecified.
J571	Subtotal pancreatectomy
J572	Left pancreatectomy and drainage of pancreatic duct
J573	Left pancreatectomy NEC
J574	Excision of tail of pancreas and drainage of pancreatic duct
J575	Excision of tail of pancreas NEC
J578	Other specified other partial excision of pancreas
J579	Other partial excision of pancreas, unspecified. Pancreatectomy nos

## Colorectal

<b>Code</b>	<b>Description</b>
H041	Proctocolectomy NEC, Panproctocolectomy and Ileostomy
H042	Panproctocolectomy and anastomosis of ileum to anus and creation of pouch HFQ
H043	Panproctocolectomy and anastomosis of ileum to anus NEC
H048	Other specified total excision of colon and rectum
H049	Panproctocolectomy NEC, Total excision of colon and rectum, unspecified-
H051	Total colectomy and anastomosis of ileum to rectum
H052	Total colectomy and ileostomy and creation of rectal fistula HFQ
H053	Total colectomy and ileostomy NEC
H058	Total excision of colon, other specified
H059	Total excision of colon, Unspecified
H061	Extended right hemicolectomy and end to end anastomosis
H062	Extended right hemicolectomy and anastomosis of ileum to colon
H063	Extended right hemicolectomy and anastomosis NEC
H064	Extended right hemicolectomy and ileostomy HFQ
H068	Other specified extended excision of right hemicolon
H069	Extended excision of Right hemicolon, unspecified, excision of Right colon and surrounding tissue
H071	Right hemicolectomy and end to end anastomosis of ileum to colon, Ileocaecal resection
H072	Right hemicolectomy and side to side anastomosis of ileum to transverse colon,
H073	Right hemicolectomy and anastomosis NEC
H074	Right hemicolectomy and ileostomy HFQ
H078	Other specified other excision of right hemicolon
H079	Other excision of right hemicolon, unspecified; Right hemicolectomy NEC
H081	Transverse colectomy and end to end anastomosis
H082	Transverse colectomy and anastomosis of ileum to colon
H083	Transverse colectomy and anastomosis NEC
H084	Transverse colectomy and ileostomy HFQ
H085	Transverse colectomy and exteriorisation of bowel NEC
H088	Other specified excision of transverse colon
H089	Excision of transverse colon, unspecified
H091	Left hemicolectomy and end to end anastomosis of colon to rectum
H092	Left hemicolectomy and end to end anastomosis of colon to colon
H093	Left hemicolectomy and anastomosis NEC
H094	Left hemicolectomy and ileostomy HFQ
H095	Left hemicolectomy and exteriorisation of bowel NEC
H098	Excision of left hemicolon, Other specified

H099	Left hemicolectomy NEC, Excision of left hemicolon, Unspecified
H101	Sigmoid colectomy and end to end anastomosis of ileum to rectum
H102	Sigmoid colectomy and anastomosis of colon to rectum
H103	Sigmoid colectomy and anastomosis NEC
H104	Sigmoid colectomy and ileostomy HFQ
H105	Sigmoid colectomy and exteriorisation of bowel NEC
H108	Other specified excision of sigmoid colon
H109	Unspecified excision of sigmoid colon
H111	Colectomy and end to end anastomosis of colon to colon NEC
H112	Colectomy and side to side anastomosis of ileum to colon NEC
H113	Colectomy and anastomosis NEC
H114	Colectomy and ileostomy NEC
H115	Colectomy and exteriorisation of bowel
H118	Other excision of colon, other specified
H119	Hemicolectomy NEC; Colectomy NEC, Other excision of colon, unspecified;
H291	Subtotal excision of colon and rectum and creation of colonic pouch and anastomosis of colon to anus
H292	Subtotal excision of colon and rectum and creation of colonic pouch NEC
H293	Subtotal excision of colon and creation of colonic pouch and anastomosis of colon to rectum
H294	Subtotal excision of colon and creation of colonic pouch NEC
H298	Subtotal excision of colon, Other specified
H299	Subtotal excision of colon, Unspecified
H331	Abdominoperineal excision of rectum and end colostomy; APR; SCAPER
H332	Proctectomy and anastomosis of colon to anus
H333	Anterior resection of rectum and anastomosis of colon to rectum using staples
H334	Anterior resection of rectum and anastomosis NEC
H335	Hartmann procedure, Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel
H336	Anterior resection of rectum and exteriorisation
H337	Perineal resection of rectum HFQ
H338	Anterior Resection of Rectum NEC
H339	Rectosigmoidectomy NEC, Excision of rectum, unspecified
H404	Trans-sphincteric anastomosis of colon to anus
H408	Other specified operations on rectum through anal sphincter
H409	Unspecified operations on rectum through anal sphincter
X141	Total exenteration of pelvis
X142	Anterior exenteration of pelvis
X143	Posterior exenteration of pelvis
X148	Other specified clearance of pelvis
X149	Clearance of pelvis, unspecified

## Lung

Code	Description
E391	Open excision of lesion of trachea
E398	Other specified partial excision of trachea
E399	Unspecified partial excision of trachea
E441	Excision of carina
E461	Sleeve resection of bronchus and anastomosis HFQ
E541	Total pneumonectomy, total removal of lung, Pneumonectomy NEC
E542	Bilobectomy of lung
E543	Lobectomy of lung
E544	Excision of segment of lung
E545	Partial lobectomy of lung NEC
E548	Excision of lung, other specified
E549	Excision of lung, Unspecified
E552	Open excision of lesion of lung
E559	Open removal of lesion of lung, unspecified
T013	Excision of lesion of chest wall
T023	Insertion of prosthesis into chest wall NEC

## Breast

<b>Code</b>	<b>Description</b>
B271	Total mastectomy and excision of both pectoral muscles and part of chest wall
B272	Radical mastectomy/total mastectomy and excision of both pectoral muscles NEC.
B273	Total mastectomy and excision of pectoralis minor muscle
B274	Total mastectomy NEC, inc toilet and simple mastectomy, extended simple mastectomy.
B275	Subcutaneous mastectomy
B276	Skin sparing mastectomy
B278	Total excision of breast other specified.
B279	Unspecified, Mastectomy NEC.
B281	Quadrantectomy of breast
B282	Partial excision of breast, Partial mastectomy, WLE, includes wedge or segmental excision of breast NEC.
B283	Excision of lesion of breast, includes lumpectomy, excision biopsy.
B284	Re-excision of breast margins
B285	Wire guided partial excision of breast
B286	Excision of accessory breast tissue
B288	Other specified other excision of breast
B289	Unspecified other excision of breast
B341	Subareolar excision of mamillary duct
B342	Excision of mamillary duct NEC
B343	Excision of lesion of mamillary duct nec. Microdochectomy.
B352	Excision of nipple
B353	Extirpation/removal of lesion of nipple.
B374	Capsulectomy of breast
B401	Interstitial laser destruction of lesion of breast
B408	Destruction of lesion of breast, Other specified
B409	Destruction of lesion of breast, Unspecified

## Cervix

<b>Code</b>	<b>Description</b>
P172	Excision of Vagina
Q011	Amputation of Cervix, Radical Trachelectomy
Q013	Excision of cervix uteri, Lesion of
Q018	Excision of cervix uteri, Other specified
Q071	Radical Hysterectomy (removes uterus + cervix + vagina). Wertheims hysterectomy
Q072	Abdominal Hysterectomy and excision of periuterine tissue NEC.Radical Hysterectomy
Q073	Abdominal excision of Uterus
Q074	TAH, Panhysterectomy, hysterectomy NEC (removes uterus + cervix). Total abdominal hysterectomy NEC
Q078	Other specified abdominal excision of uterus
Q079	Abdominal excision of Uterus, unspecified
Q081	Vaginal hysterocolpectomy and excision of periuterine tissue
Q082	Vaginal hysterectomy and excision of periuterine tissue NEC
Q083	Vaginal hysterocolpectomy NEC
Q088	Vaginal excision of Uterus
Q089	Unspecified vaginal excision of uterus
X141	Clearance of Pelvis, total exenteration
X142	Clearance of Pelvis, anterior exenteration
X143	Clearance of Pelvis, posterior exenteration

## Ovary

<b>Code</b>	<b>Description</b>
Q071	Radical Hysterectomy (removes uterus + cervix + vagina). Wertheims hysterectomy
Q072	Abdominal Hysterectomy and excision of periuterine tissue NEC.Radical Hysterectomy
Q073	Abdominal excision of Uterus, abdominal hysterocolpectomy nec
Q074	TAH, Panhysterectomy, hysterectomy NEC (removes uterus + cervix). Total abdominal hysterectomy NEC
Q075	Abdominal excision of Uterus, subtotal abdominal hysterocolpectomy
Q078	Abdominal excision of uterus, other specified
Q079	Abdominal excision of uterus, Unspecified
Q081	Vaginal excision of uterus, vaginal hysterocolpectomy
Q082	Vaginal excision of uterus, vaginal hysterectomy
Q083	Vaginal excision of uterus, vaginal hysterocolpectomy NEC
Q088	Vaginal excision of uterus, other specified
Q089	Vaginal excision of Uterus, Unspecified
Q243	Oophorectomy NEC
Q223	Bilateral oophorectomy, excision of gonads
Q235	Unilateral oophorectomy NEC
Q491	Endoscopic extirpation of lesion of ovary NEC
Q236	Oophorectomy of remaining solitary ovary NEC
Q438	Other specified partial excision of ovary
Q439	Unspecified partial excision of ovary
Q232	Salpingoophorectomy of remaining solitary fallopian tube and ovary
Q241	Salpingoophorectomy NEC
Q221	Bilateral salpingoophorectomy
Q231	Unilateral salpingoophorectomy NEC
T361	Omentectomy
X141	Clearance of Pelvis, total exenteration
X142	Clearance of Pelvis, Anterior exenteration
X143	Clearance of Pelvis, Posterior exenteration

## Uterus

<b>Code</b>	<b>Description</b>
Q071	Radical Hysterectomy (removes uterus + cervix + vagina). Wertheims hysterectomy
Q072	Abdominal Hysterectomy and excision of periuterine tissue NEC.Radical Hysterectomy
Q073	Abdominal hysterocolpectomy NEC, Hysterocolpectomy NEC
Q074	TAH, Panhysterectomy, hysterectomy NEC (removes uterus + cervix). Total abdominal hysterectomy NEC
Q079	Abdonimal excision of uterus, unspecified
Q081	Vaginal hysterocolpectomy and excision of periuterine tissue
Q082	Vaginal hysterectomy and excision of periuterine tissue NEC
Q083	Vaginal hysterocolpectomy NEC
Q088	Vaginal Excision of Uterus, other specified
Q089	Unspecified vaginal excision of uterus
Q078	Other specified abdominal excision of uterus
Q075	Subtotal abdominal Hysterectomy (does not remove cervix)
Q093	Open excision of lesion of uterus NEC
Q161	Other vaginal operations on uterus, vaginal excision of lesion of uterus
Q229	Bilateral Excision of adnexa of uterus unspecified
Q239	Unspecified unilateral excision of adnexa of uterus
Q521	Excision of lesion of broad ligament of uterus
X141	Clearance of pelvis, Total exenteration
X142	Clearance of pelvis, Anterior exenteration
X143	Clearance of pelvis, Posterior exenteration

## Prostate

<b>Code</b>	<b>Description</b>
M611	Total / Radical prostatectomy, Total excision of prostate and capsule
M614	Perineal prostatectomy
M618	Open excision of prostate, other specified
M619	Prostatectomy NEC. Open excision of prostate, unspecified

## Bladder

<b>Code</b>	<b>Description</b>
M341	Cystoprostatectomy
M342	Cystourethrectomy
M343	Cystectomy NEC
M348	Other specified total excision of bladder
M349	Unspecified total excision of bladder

## Kidney

<b>Code</b>	<b>Description</b>
M021	Nephrectomy and excision of perirenal tissue, Nephroureterectomy and excision of perirenal tissue
M022	Nephroureterectomy NEC
M023	Bilateral nephrectomy
M024	Excision of half of horseshoe kidney
M025	Nephrectomy NEC
M028	Total excision of kidney, other specified
M029	Total excision of kidney, unspecified
M038	Other specified partial excision of kidney
M039	Partial nephrectomy NEC, Partial excision of kidney, Unspecified
M042	Open excision of lesion of kidney NEC
M104	Endoscopic cryoablation of lesion of kidney
M181	Total ureterectomy , Ureterectomy NEC
M182	Excision of segment of ureter
M183	Secondary ureterectomy
M252	Open excision of lesion of ureter NEC



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The National Cancer Intelligence Network is a UK-wide initiative, working to drive improvements in standards of cancer care and clinical outcomes by improving and using the information collected about cancer patients for analysis, publication and research.

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