NY CRIS

CANCER OUTCOMES MONITORING

CANCER TREATMENT POLICIES & THEIR EFFECTS ON SURVIVAL

Ovary

KEY SITES STUDY 8

CANCER TREATMENT POLICIES & THEIR EFFECTS ON SURVIVAL

Ovary

Report Produced by

NY *Northern & Yorkshire* CRIS **Cancer Registry & Information Service**

The Leeds Teaching Hospitals NHS Trust

CANCER OUTCOMES MONITORING

in collaboration with the

Research School of Medicine

University of Leeds

Key Sites Study Funded by the NHS R&D Program for Cancer

KEY SITES STUDY

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2 INTRODUCTION

2.1. FOREWORD

2.1.1. Ovarian Cancer

Ovarian cancer results in more deaths than all the other gynaecological malignancies together and is the fourth most common cause of cancer death in women (NHS Executive, 1999). Incidence is generally higher in older women and in women of more deprived socio-economic groups. Symptoms are often non-specific, resulting in advanced disease at diagnosis (FIGO, 1998). Prognosis is poor compared with other gynaecological malignancies, with 5 year relative survival figures quoted at around 31% for England and 33% for Europe (Berrino *et al.*, 1999).

Good practice guidance currently states that management decisions for women with ovarian cancer should be made at cancer centres (NHS Executive, 1999). The first line treatment for ovary cancer is surgical; surgery is currently recommended to be carried out by gynaecological oncologists in the cancer centres. The National Institute for Clinical Excellence (NICE, 2000) published its recommendations on the use of Taxanes for ovarian cancer in May 2000. Their guidance states that "Paclitaxel in combination with a platinum therapy (cisplatin or carboplatin) should be the standard initial therapy for patients with ovarian cancer following surgery". NICE also give guidance on the use of Paclitaxel containing combination chemotherapy in the treatment of recurrent or resistent ovarian cancer. The NICE guidance will be reviewed in due course, when results from a large UK based trial (The ICON Group, 2002) are likely to be taken into account together with other relevant recent studies.

Within the time period studied in this particular report, Paclitaxel would have been used rarely and single agent carboplatin would have been the most common form of therapy used. Guidance also recommends that chemotherapy should be the responsibility of the specialist gynaecological oncology team at the cancer centre although agents may be actually administered in cancer units.

Palliative treatment and care of women with advanced disease is important in maintaining quality of life, relief of symptoms and psychological wellbeing. Palliative therapy may include palliative surgical procedures, radiotherapy or medical treatment.

2.1.2. Key Sites Study

This report contains the results of a retrospective study of population-based data collected by the Northern and Yorkshire Cancer Registry. The aim of this work was to investigate, as far as possible, the degree of variation in the management of patients with ovarian cancers in the former Yorkshire Region between the years 1986 and 1994 and to determine the impact of any variation on survival whilst allowing for casemix factors. The Northern and Yorkshire Cancer Registries integrated in 1997 but only data collected by the former Yorkshire Cancer Registry have been analysed in this report. This ovarian study forms part of a larger project, funded by the NHS R&D programme for cancer, which investigates variation in the management of a number of common cancers managed between 1986 and 1994. Long term follow up (survival up to 5 years from diagnosis) was an important component of the analysis,

and retrospective methodologies were essential. However, the results in this report should not necessarily be viewed as a reflection of current practices.

The Calman-Hine report recommended a uniformly high standard of management for all patients with cancer together with the establishment of cancer centres and units. The report also emphasised the importance of evidence-based decision making in relation to the optimal structuring and provision of cancer services. The results of a study such as this, may provide both a valuable starting point for establishing standards to be achieved in a cancer centre, and may also provide important evidence in the decision making surrounding the structuring of the provision of cancer services.

2.2. EXECUTIVE SUMMARY

2.2.1. Incidence

There were 3197 cases of ovarian cancer registered between 1986-94, approximately 355 new cases per year. The age-standardised incidence was about 17 cases per 100,000 population. There was little correlation between socio-economic status and incidence. There was some variation between districts but none reached significant levels.

2.2.2. Study population

Exclusions - 301 patients were excluded from the analysis because management data was routinely absent from certain groups of patients such as those managed privately, by GP, extra-regionally or were registered by death certificate only. There were 2896 cases in the analyses.

Age - Frequency increased steadily by age rising from 13% cases in the 40-49 age group to 35% cases in the over 70 age group. Only 4% of cases occurred in those under 40. The median age for ovarian cancer was 64 varying from 61 to 68 between districts.

Stage - Accurate staging information was only available for 18% of cases. However 59% were recorded with metastases at the time of presentation and treatment while a further 0.5% were recorded with positive nodes without metastatic spread. This information was used as a proxy for stage in the multivariate analyses. The proportions do not represent the full extent of nodal involvement or metastatic spread in this group of patients.

Histology - 91% of these cases had their disease confirmed histologically. There were 42 different histological diagnoses overall but 94% were classed as epithelial in type, with 85% of these some type of adenocarcinoma.

2.2.3. Management & Treatment

Histological Confirmation Rates

Variation in histological confirmation rates in districts varied from 95% to 88%, with an average of 91% across Yorkshire.

Treatment

18% of cases had no treatment apart from supportive care. 66% had some form surgery (more than a biopsy), 5% radiotherapy and 56% had chemotherapy. Surgery and chemotherapy was less common in patients over 70 years. There was no variation in treatment by socio-economic group. Districts varied in their surgery rate from 52% to 78%. Chemotherapy rates varied from 36% to 69% across districts.

There were some changes in treatment over time. There were more surgical cases having a full surgery (usually hysterectomy with bilateral salpingo-oophorectomy) and more cases having chemotherapy in later time periods.

Specialist Management

75% of cases were managed by a gynaecologist and 35% were managed by either a medical or clinical oncologist. 11% of cases were managed by a general surgeon alone, but these cases may have received a gynaecological opinion. 22% had input from both a gynaecologist and an oncologist.

Nearly 11% were managed by what we might now term a specialist gynaecologist oncologist. There were only 4 of these specialists in Yorkshire during this period. Three of these specialists dealt with 10 or more cases per year. Only 23% of cases were managed by a gynaecologist who treated more than 5 cases a year. This proportion went from 17% in 1986-88 to 31% from 1992-94.

Treatment varied between general surgeons and gynaecologists with the patients of general surgeons receiving less surgical treatment and less chemotherapy. Both full surgery rates and chemotherapy rates were higher in those gynaecologists dealing with more than 5 cases a year.

Hospital workload

58 hospitals managed ovarian cancer patients. 38% of patients were managed in low workload hospitals seeing less than one patient with ovarian cancer per month. One third of patients were managed in the 5 hospitals seeing more than 18 patients per year. Cases treated in hospitals with higher workload had both more full surgery and chemotherapy.

2.2.4. Referral

There was a wide range of time intervals between first symptom and first hospital visit in those cases where date of first symptom was recorded (n=1080). 2% of patients noticed symptoms one year before their first hospital visit. 50% of cases were seen within 9 weeks of their first symptom. 75% of cases treated by surgery (n=1835) were operated on within 26 days of their first hospital visit. In cases who were treated by surgery and then chemotherapy (n=992), 75% of cases received chemotherapy within 44 days of operation.

2.2.5. Survival

Survival in all cases was 55% at one year and 29% at five years. Median survival was about 14 months. Survival varied with different types of tumour with some rarer types of tumour having better or worse prognosis than the more common epithelial cancers.

Surgery

Those cases who received no surgical treatment had a median survival of about 10 weeks, with only 10% alive at one year. About 70% of cases treated by surgery were alive at one year, and at 5 years 47% of those treated with surgery alone were alive. Survival also varied with type of surgery. Those receiving full surgery (usually hysterectomy with salpingo-oophorectomy) had 50% 5 year survival compared to 30% 5 year survival in those who received less than full surgery (defined as surgery less than full, but more than a biopsy). Due to the limited case mix information available, it is not possible to say whether the latter cases received less surgery because of the advanced state of their disease or because they were under treated.

Chemotherapy and radiotherapy

Cases treated by chemotherapy in addition to surgery had higher survival rates over the first year but this advantage seemed to reverse after 18 months. At 5 years only 35% treated with chemotherapy are alive. This difference remains in those who have full surgery or less than full surgery, with better survival in the first year and about 10% poorer survival than those treated with surgery only at 5 years. Those cases who received chemotherapy but either no surgery or only a biopsy had a median survival of about 6-8 months compared to less than 2 months for those with no treatment at all.

Only 5% of cases received radiotherapy. Few cases were treated with radiotherapy and surgery but survival was improved over the first year in those who received it, but was about 2% worse at 5 years compared to those who received surgery alone. Those cases who had a biopsy and radiotherapy had much better survival at 1 year (55%) than those with a biopsy only (25%), but numbers of cases receiving radiotherapy were very small.

It is difficult to say whether differences in treatment gave different outcomes or that differences in case mix dictated different treatment modalities. It is likely that many cases who received no active treatment were too ill or died before any treatment could be given. Treatment with more than one modality may have improved survival over the first year, but those who survived one year with only surgery may have had a better prognosis and thus have a better long term survival.

Hospital workload

Hospitals treating more than 18 patients a year had a higher rate of survival over the first year but outcomes were no different from hospitals treating 12 –18 patients per year by about 15 months. At 5 years there was a 5% improved survival in hospitals treating over 12 patients compared to those treating less than 12 (about 30% to 25%).

Gynaecologist

At one year those treated by gynaecologists were twice as likely to be alive compared to those not treated by gynaecologists (62% to 32%). There was little survival difference in relation to gynaecologist workload at one year but at 5 years those treating more than 5 patients per year had 5 year survival rates of 32% compared to 37% in those treating 1-5 cases per year. When comparisons are made between those recognised as gynaecology oncologists and other gynaecologists similar differences were found. It is very likely that these differences in survival were mainly a result of differential case mix. That is stage at presentation was likely to be the main prognostic factor for survival, with patients not treated by gynaecologists being less likely to receive surgery because of their advanced disease and gynaecologist oncologists receiving more difficult cases on average than their colleagues. The lack of relationship between increased workload and improved outcome is at variance with observations from Scotland (Junor et al, 1999).

Post operative mortality

There was variation in 30 day post operative mortality between hospitals (range 0-7%). This suggests that this is a suitable subject for audit by teams and across cancer networks to establish avoidable causes of such mortality. Post operative mortality was lowest in patients treated in hospitals treating 12-18 patients a year. Post operative mortality was higher in patients treated by non gynaecologists (5%) and by gynaecology oncologists (5%) and lowest in those gynaecologists treating 4-5 cases per year (2%). These variations might be explained by differences in casemix.

2.2.6. Multivariate Relative Risk Analysis

Relative risk was examined by individual factors using univariate analyses, then after adjustment for casemix and finally after adjustment for all factors including management, as far as is possible with these data. Risk of death increased with both age and with metastases even when casemix and all factors were analysed. Risk of death remained constant over the period of the study.

Risk of death was highest in those cases who received no treatment, then those treated with chemotherapy only, then those treated with surgery and chemotherapy, and lowest in those cases treated with surgery only. When adjustment was made for casemix and for all factors there was no difference between the surgical groups, the differential was less in the other two groups. This suggests that much of the difference was due to more advanced disease in some of the treatment groups, but that there may also have been differences that were due to management.

Risk of death decreased significantly with increased hospital workload. This difference remained when casemix was considered but disappeared when all the management factors were taken into account. This suggests that management factors associated with treatment and workload can improve outcomes.

Risk of death was increased significantly with non-gynaecological management. Significant differences remained but decreased when casemix and other factors were taken into account. There were no significant differences in risk of death between gynaecologists with lower and higher workloads.

2.2.7. Recommendations for Future Work

The analyses show many variations in management and survival across Yorkshire over this period. It is often difficult to say whether these variations are due to differences in casemix or in management. The continuing improvement in staging data may clarify these issues in later time periods.

This work gives a baseline for observing the changes in treatment patterns and service organisation that arise from the national guidance and from medical progress.

30 day post operative mortality should be compared across cancer networks and audited if there are still large variations between hospitals.

2.3. ACKNOWLEDGEMENTS

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POPULATION DESCRIPTION

3

3.1. ALL OVARIAN CANCERS

3.1.1. New Registrations

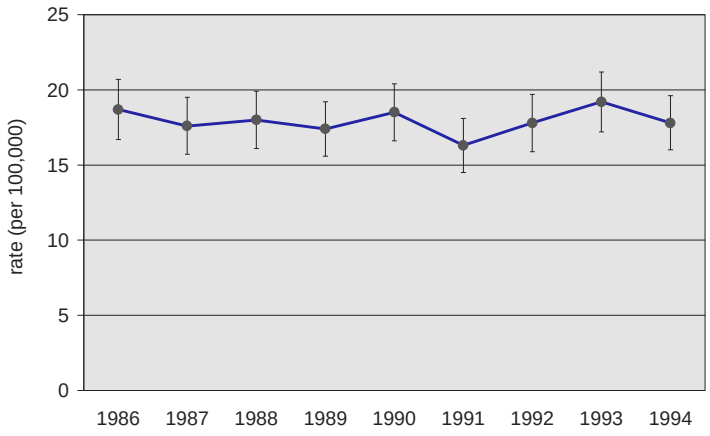
▼ **New Registrations of Ovarian Cancer by Age Group**

Age Group	Registrations	
<40	140	***4.4%***
40to 49	405	***12.7%***
50 to 59	629	***19.7%***
60 to 69	884	***27.7%***
70 to 79	750	***23.5%***
80+	389	***12.2%***
Total	3197	***100%***

During the study period, 1986-1994, a total of 3197 patients were registered with ovarian cancer (ICD9 code: 183) in the former Yorkshire region, averaging approximately 355 new cases per annum.

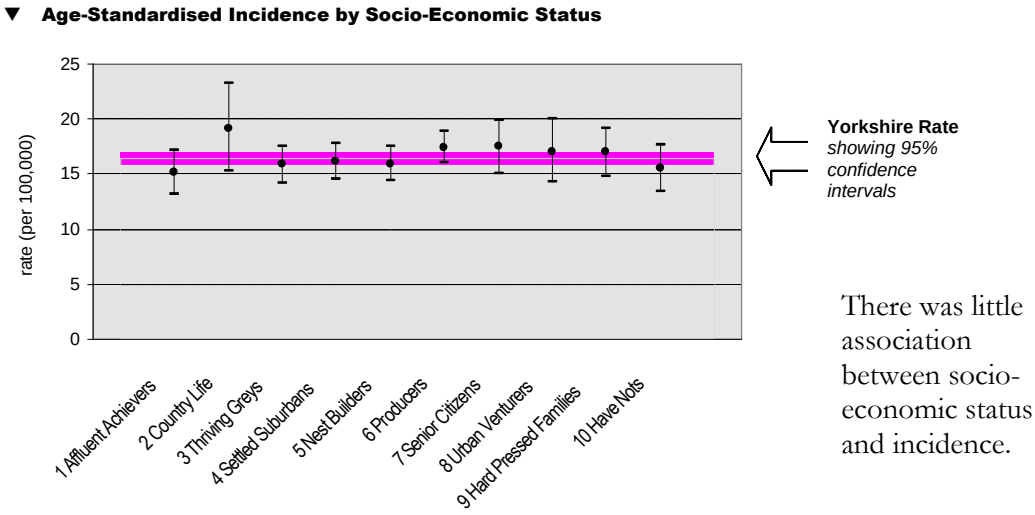
3.1.2. Incidence in Yorkshire Over the Time Period 1986-94

▼ **Age-Standardised Incidence by Year**



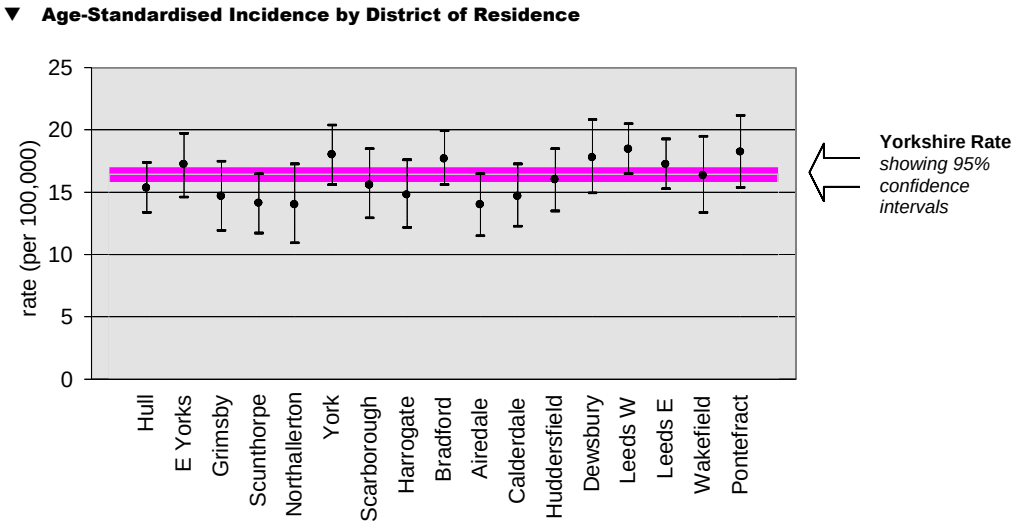
Between 1989 to 1994, the incidence of ovarian cancer was relatively stable at about 17 cases per 100,000 women.

3.1.3. Incidence by Socio-economic Status



There was little association between socio-economic status and incidence.

3.1.4. Incidence by District of Residence



The highest ovarian cancer incidence rates were found in Western Leeds and Pontefract and rates lower than the regional average were seen in the districts of Airedale, Northallerton and Scunthorpe. None of these District variations were, however, statistically significant in their difference from the regional average.

3.2. STUDY POPULATION

3.2.1. Exclusions

A total of 3197 ovarian cancer patients were registered in the former Yorkshire region, over the period 1986-94. However, as one of the primary aims of this study

was to assess variation in management, all groups for which management data were known to be routinely absent or incomplete were excluded from the data set. A total of 301 patients were excluded. These included patients managed outside of the region, patients who were managed by their GP or at GP-run hospitals, private patients and death certificate only (DCO) registrations:

Death Certificate Only Registrations

These are patients for whom, the only information registered, was that given on their death certificate. No other details were available for these patients and they were therefore excluded from study. Of the three gynaecological sites, ovary had the highest DCO rate: 3.6%, compared with 1.0% for cervix and 1.6% for uterus.

Private Patients

No management details were available for privately treated patients, and these patients were excluded from the study. 83.7% of the 301 excluded cases were private patients. Of these 105 (42.0%) qualified as being registered by death certificate only.

Extra-regionally Managed Patients

In districts such as Northallerton, which are on the border of the study region, some patients would have been diagnosed, referred and managed outside the region. These Yorkshire residents would still have their disease registered in Yorkshire and could therefore be included in the analysis of incidence in Section 3.1. However, since the cancer registration staff only extracted management and treatment information from the case notes of Yorkshire hospitals at that time, the management details of these particular patients were not available for study, if management was at a non-Yorkshire hospital. Instead, management was often recorded by the cancer registry simply as "extra-regional". These cases were excluded from study.

GP Managed Patients

A very small proportion of patients may remain solely under the management of their GP or are managed at a GP-run hospital. No further management details were available for these patients and they were therefore excluded from study.

▼ **Summary of all the exclusions made from the data set**

Exclusion Type	n	DCO Rate
Cases registered by death certificate only (DCO's)	115	***3.6%***
Extra regionally managed	23	***0.7%***
Privately treated	252	***7.9%***
GP managed	14	***0.4%***
GP only	11	***0.3%***
Histological type: small cell	3	***0.1%***
Total Excluded	301	***9.4%***

There were 301 exclusions with several cases being excluded for more than one reason.

Total Eligible for study (following exclusions) = 2896

3.2.2. Age

▼ **Frequency by Age Groups**

Age Group	n	%
0 to 9	2	***0.1%***
10 to 19	14	***0.5%***
20 to 29	37	***1.3%***
30 to 39	71	***2.5%***
40 to 49	362	***12.5%***
50 to 59	571	***19.7%***
60 to 69	815	***28.1%***
70 +	1024	***35.4%***
Total	2896	***100%***

The number of cases increased with increasing age, with over 60% of patients being over the age of 60 years.

3.2.3. Age Distribution by District of Residence

▼ **Median Age by District**

		Percentile		Range
District	Median	25th	75th	25th-75th
Grimsby	**61**	54	70	16
Pontefract	**62**	53	72	19
York	**62**	52	71	19
Scunthorpe	**62**	50	71	21
Wakefield	**63**	52	71	19
Calderdale	**63**	51	73	22
Scarborough	**64**	57	73	16
Huddersfield	**64**	54	75	21
Northallerton	**64**	53	74	21
Hull	**65**	55	73	18
East Yorkshire	**65**	54	75	21
Leeds West	**65**	55	76	21
Bradford	**66**	55	74	19
Dewsbury	**66**	55	74	19
Leeds East	**66**	55	74	19
Airedale	**66**	55	75	20
Harrogate	**68**	59	78	19
Yorkshire	**64**	54	74	20

The median age of ovarian cancer patients varied by district of residence from 61 years in Grimsby to 68 years in Harrogate.

3.2.4. Staging Information

▼ **Presence of involved Lymph Nodes and/or Metastases**

Stage	n	%
no known nodes or mets	1169	***40.4%***
nodal involvement	15	***0.5%***
metastases	1712	***59.1%***

The majority of Ovarian Cancer patients present with advanced disease, and accurate staging information is important for both treatment decisions, outcome, and as a case mix factor when comparing outcomes for different groups of patients.

Staging data were only available for 17.7% of patients, which is not a sufficient proportion to allow adequate adjustment in the multivariate relative risk analyses presented in Chapter 8. However, a high proportion of patients had positive nodes and metastases recorded and these data were used as a proxy for stage in the multivariate analysis. It is important to note that patients recorded without positive nodes or metastases are not necessarily node negative or metastasis free as appropriate diagnostic examinations may not have occurred. There were, therefore, more patients in this category than expected from the usual incidence of local disease (FIGO stage I).

4 MANAGEMENT & TREATMENT

4.1. MANAGEMENT OF OVARIAN CANCER

The following notes on the management of ovarian cancer are based upon current recommendations in the NHS Executive Cancer Guidance documentation published in 1999, and may not reflect practices during the time period 1986 to 1994.

The primary curative treatment for ovarian cancer is surgery. However, where disease is advanced it is very often impossible to completely remove all of the tumour. It is currently recommended that surgery be carried out by specialist gynaecological oncologists in Cancer Centres although, in the past, surgery may have been performed by gynaecologists at a number of different hospitals.

For the majority of women, chemotherapy is usually appropriate after surgery (but not generally recommended for patients with stage 1 disease). The standard therapy recommended by the National Institute for Clinical Excellence is Paclitaxel plus carboplatin (or cisplatin). It is now recommended that chemotherapy be the responsibility of the specialist gynaecological oncological oncology team at a Cancer Centre, but may be administered in Cancer Units under direction of the Centre.

4.1.1. NYCRIS Ovarian Cancer Management Data

To facilitate understanding of the following analysis of management, the reader should consider the notes given below regarding the NYCRIS data set.

Presentation

We cannot distinguish between those patients who presented acutely and those who had their disease diagnosed at operation, or who were referred with symptoms by their GP.

Managing Hospitals and Consultants

During the study period, up to three managing hospitals could be recorded. The hospital of primary management (which for ovarian cancer patients is defined as the place of surgery, otherwise the hospital where the primary treatment decision was made) was available for all patients. The Trust analyses in Section 4.5 were based upon the hospital of primary management. Hospitals were not recorded if a patient was referred for example, for an assessment only, without formal transfer of management. This was also true of the recorded managing consultants. A consultant would only be recorded by NYCRIS if management of a patient was formally transferred to that consultant. Consultants giving an opinion only, with no transfer of management would not be recorded. Up to three managing consultants could be recorded by NYCRIS, but the actual order of referral between specialties was unclear from the available data. The first consultant is defined as the primary managing consultant and not the consultant to whom the patient was first referred. For patients who received surgery, the consultant who perfomed surgery would be classed as the primary managing consultant.

Histological Confirmation

Whenever a histological diagnosis of cancer is made for a resident of the former Yorkshire region, a copy of the pathology report is sent to NYCRIS, and the histological details recorded for that patient and the patients disease is recorded as having been histologically confirmed.

Treatment

With respect to treatment, it should be noted that, until 1994, only treatment administered within nine weeks from diagnosis would have been routinely recorded. All definitive surgery is recorded by NYCRIS and whether or not a patient received chemotherapy. Details of the agents used for chemotherapy are not available however, nor can we ascertain whether single agent or combination therapy was employed. During the study period the treatment given was not formally connected to any particular consultant or hospital, within the routine dataset.

All radiotherapy, regardless of its intent, was recorded. Details of investigations such as CA125 and ultrasound, and information regarding other supportive care was not recorded.

Treatment of Patients Residing on the Border of the Region

In districts such as Northallerton, which is on the border of the study region, it is acknowledged that some patients may have been diagnosed, referred or managed outside the region. These Yorkshire residents would have their disease registered in Yorkshire, but their management/treatment details were not available for study. This group of patients would have been excluded from study.

A summary of the relevant data items available can be found in Section 8.2.2

4.2. HISTOLOGICAL CONFIRMATION

4.2.1. Histological Confirmation Rates Overall

▼ **Histological Confirmation**

Histological Confirmation	n	%
Diagnosis Confirmed	2635	***91%***
Not Confirmed	261	***9.0%***
Total	2896	***100%***

The majority of ovarian cancer patients (91.0%) had their disease confirmed histologically. There were a large number of different tumour types recorded and these are listed below.

4.2.2. Histological Groups

▼ **Frequency by Histological Group**

Histological Group	N	%	Histological Type	n	%
Epithelial	**2720**	***93.9%***	Cystadenocarcinoma	970	***33.5%***
			Adenocarcinoma	773	***26.7%***
			Carcinoma nos	358	***12.4%***
			(Cyst) Adeno/carcinoma endometroid	304	***10.5%***
			Adenocarcinoma papillary	212	***7.3%***
			Clinical primary	34	***1.2%***
			Carcinoma papillary	28	***1.0%***
			Carcinoma Undifferentiated	12	***0.4%***
			Carcinoma serous surface papillary	9	***0.3%***
			Brenner tumour malignant	7	***0.2%***
			Mesonephroma malignant	6	***0.2%***
			Carcinoma transitional cell	3	***0.1%***
			Adenofibroma endometroid malignant	2	***0.1%***
			Carcinoma large cell	1	***0.0%***
			Carcinoma solid	1	***0.0%***
MMMT & sarcoma	**62**	***2.1%***	Tumour mullerian mixed	26	***0.9%***
			Carcinosarcoma	15	***0.5%***
			Tumour mesodermal mixed	11	***0.4%***
			Leiomysarcoma	6	***0.2%***
			Fibrosarcoma	2	***0.1%***
			Sarcoma NOS	1	***0.0%***
			Sarcoma spindle cell	1	***0.0%***
OTHER GROUP					
Sex Cord Stromal	**28**	***1.0%***	Granulosa cell tumour malignant	22	***0.8%***
			Carcinoma sertoli cell	2	***0.1%***
			Carcinoma theca cell	2	***0.1%***
			Androblastoma malignant	1	***0.0%***
			Leydig cell tumour malignant	1	***0.0%***
Germ Cell	**40**	***1.4%***	Dysgerminoma	16	***0.6%***
			Teratoma malignant	12	***0.4%***
			Tumour endodermal sinus	9	***0.3%***
			Carcinoid tumour malignant	3	***0.1%***
			Teratocarcinoma	1	***0.0%***
Other rare	**46**	***1.6%***	Carcinoma squamous cell	12	***0.4%***
			Carcinoma anaplastic type	11	***0.4%***
			Neoplasm malignant	9	***0.3%***
			Mixed adenocarcinoma & squamous cell	5	***0.2%***
			Choriocarcinoma	2	***0.1%***
			Tumour cells malignant	2	***0.1%***
			Unknown	1	***0.0%***
			Haemangioendothelioma malignant	1	***0.0%***
			Malignant neoplasm	1	***0.0%***
			Melanoma malignant uncertain primary	1	***0.0%***
Total	**2896**	***100%***			

Ovarian cancers comprise a heterogeneous group of tumours of varying prognosis and lesions were grouped on this basis. Adjustments were made for differences in tumour type in the multivariate survival analysis in Section 7.

Epithelial: This group mainly comprised adenocarcinomas. Other less well defined carcinomas, including those defined as "clinical primary" were included in this group.

Mixed Mullerian Tumours and sarcomas were grouped together as these types are known to be aggressive cancers.

Sex Cord Stromal: These are cancers arising from the sex cord stroma (embryonic gonadal tissue).

Germ Cell: These are cancers arising from germ cell lines (early embryonic tissue). They are more aggressive than epithelial tumours but respond well to treatment (usually with chemotherapy) and are potentially curable.

Other rare: This group included some rare tumours and those not previously classified.

In the survival table the "Others" group includes **Sex Cord Stromal, Germ cell and Other rare cases.**

4.2.3. Histological Confirmation Rates by District of Residence

▼ **Histological Confirmation Rate by District of Residence**

District	N	Confirmed	
Scunthorpe	**135**	128	***94.8%***
Wakefield	**113**	107	***94.7%***
Scarborough	**130**	123	***94.6%***
Dewsbury	**142**	134	***94.4%***
York	**225**	211	***93.8%***
Northallerton	**64**	60	***93.8%***
Hull	**232**	212	***91.4%***
Pontefract	**150**	137	***91.3%***
Huddersfield	**160**	146	***91.3%***
Leeds East	**288**	262	***91.0%***
Airedale	**125**	113	***90.4%***
Harrogate	**114**	102	***89.5%***
East Yorkshire	**171**	152	***88.9%***
Calderdale	**133**	118	***88.7%***
Leeds West	**351**	310	***88.3%***
Bradford	**263**	232	***88.2%***
Grimsby	**100**	88	***88.0%***
Yorkshire	**2896**	2635	***91.0%***

Rates of histological verification for ovarian tumours were relatively high, with nearly a 7% difference between the districts with the highest and lowest confirmation rates.

4.3. TREATMENT

▼ **Treatment Options Overview usually Recommended**

Stage	Treatment Options	Recorded by NYCRIS as:
I	Surgery	S
II III	Surgery with combination chemotherapy	S + Ch
IV	Chemotherapy + / - surgery (some may just have biopsy)	S + Ch

▼ **Overall Treatment Rates**

Type of Treatment		n	%
Surgery	No surgery	311	***10.7%***
	Biopsy	676	***23.3%***
	Other surgery	895	***30.9%***
	Full surgery *	1014	***35.0%***
Any Radiotherapy		148	***5.1%***
Any Chemotherapy		1580	***54.6%***
No Treatment	(excluding biopsy)	519	***17.9%***

For the purposes of this study, "Full Surgery" most commonly refers to total abdominal hysterectomy with bilateral salpingo-oophorectomy. A small number of cases given pelvic exenteration were also included in this category. All other surgical procedures performed were classed as "Other Surgery", and cases where no surgical procedure was recorded but a histological diagnosis had been made were allocated to the "Biopsy" group. Patients having had a biopsy and another surgical procedure were grouped according to the main procedure performed.

Overall 82% of cases had either surgery (65.9% either full or other), radiotherapy or chemotherapy treatment. 38.8% had both surgery and chemotherapy. 24.2% had surgery alone, 15.2% had chemotherapy alone and only 9 cases had radiotherapy alone.

4.3.1. Treatment by Age Group

Treatment rates may vary according to a patients age. In more elderly groups, for example treatment rates may decline due to the presence of co-morbidity. However, it is possible that some patients may not receive therapy on the basis of their age alone.

▼ **Surgery by Age Group**

Age	N	No Surgery		Biopsy		Other Surgery		Full Surgery	
0 - 9	**2**	-	**-**	-	**-**	2	***100.0%***	-	**-**
10-19	**14**	-	**-**	3	***21.4%***	11	***78.6%***	-	**-**
20-29	**37**	-	**-**	3	***8.1%***	24	***64.9%***	10	***27.0%***
30-39	**71**	-	**-**	8	***11.3%***	28	***39.4%***	35	***49.3%***
40-49	**362**	6	***1.7%***	43	***11.9%***	116	***32.0%***	197	***54.4%***
50-59	**571**	14	***2.5%***	109	***19.1%***	180	***31.5%***	268	***46.9%***
60-69	**815**	61	***7.5%***	210	***25.8%***	242	***29.7%***	302	***37.1%***
70+	**1024**	230	***22.5%***	300	***29.3%***	292	***28.5%***	202	***19.7%***
Total	**2896**	311	***10.7%***	676	***23.3%***	895	***30.9%***	1014	***35.0%***

Full surgery was commonest in those age 40-49. The percentage of cases who received no surgery increased with age, rising to 22.5% of over 70s. This age group had a higher rate of biopsies only and less full or other surgery than younger age groups.

▼ **Chemotherapy by Age Group**

Age	N	Receiving Chemotherapy	
0 - 9	**2**	1	***50.0%***
10-19	**14**	7	***50.0%***
20-29	**37**	21	***56.8%***
30-39	**71**	34	***47.9%***
40-49	**362**	231	***63.8%***
50-59	**571**	394	***69.0%***
60-69	**815**	491	***60.2%***
70+	**1024**	401	***39.2%***
Total	**2896**	1580	***54.6%***

Chemotherapy use increased with age up to 50-59 years, then decreased. Only 39.2% of those over 70 received chemotherapy compared to rates of 47.9-69.0% in other age groups.

4.3.2. Treatment by Socio-Economic Group

▼ **Surgery by Socio-economic group**

Superprofile	N	No surgery		Biopsy		<Full Surgery		Full Surgery	
1 to 3	**603**	61	***10.1%***	132	***21.9%***	186	***30.8%***	224	***37.1%***
4 to 7	**1669**	185	***11.1%***	390	***23.4%***	517	***31.0%***	577	***34.6%***
8 to 10	**618**	63	***10.2%***	154	***24.9%***	191	***30.9%***	210	***34.0%***
Total	**2890**	309	***10.7%***	676	***23.4%***	894	***30.9%***	1011	***35.0%***

▼ **Chemotherapy by Socio-economic group**

SuperProfile	N	Receiving chemotherapy	
1 to 3	**603**	349	***57.9%***
4 to 7	**1669**	892	***53.4%***
8 to 10	**618**	336	***54.4%***
Total	**2890**	1577	***54.6%***

There were six cases that were not classifiable into socio-economic groups.

There were very few differences in surgery and chemotherapy rates between the socio-economic groups.

4.3.3. Treatment by District of Residence

▼ **Surgery by District of Residence**

District	None		Biopsy		Other Surgery		Full Surgery	
Wakefield	5	***4.4%***	29	***25.7%***	41	***36.3%***	38	***33.6%***
Scunthorpe	8	***5.9%***	41	***30.4%***	49	***36.3%***	37	***27.4%***
Scarborough	8	***6.2%***	34	***26.2%***	34	***26.2%***	54	***41.5%***
Dewsbury	9	***6.3%***	39	***27.5%***	39	***27.5%***	55	***38.7%***
York	18	***8.0%***	59	***26.2%***	62	***27.6%***	86	***38.2%***
Huddersfield	15	***9.4%***	37	***23.1%***	66	***41.3%***	42	***26.3%***
Hull	23	***9.9%***	56	***24.1%***	69	***29.7%***	84	***36.2%***
Pontefract	15	***10.0%***	23	***15.3%***	41	***27.3%***	71	***47.3%***
Leeds East	32	***11.1%***	51	***17.7%***	76	***26.4%***	129	***44.8%***
Airedale	14	***11.2%***	14	***11.2%***	60	***48.0%***	37	***29.6%***
East Yorkshire	20	***11.7%***	41	***24.0%***	49	***28.7%***	61	***35.7%***
Harrogate	14	***12.3%***	41	***36.0%***	39	***34.2%***	20	***17.5%***
Northallerton	8	***12.5%***	13	***20.3%***	16	***25.0%***	27	***42.2%***
Bradford	36	***13.7%***	86	***32.7%***	80	***30.4%***	61	***23.2%***
Calderdale	19	***14.3%***	25	***18.8%***	48	***36.1%***	41	***30.8%***
Leeds West	51	***14.5%***	69	***19.7%***	89	***25.4%***	142	***40.5%***
Grimsby	16	***16.0%***	18	***18.0%***	37	***37.0%***	29	***29.0%***
Yorkshire	311	***10.7%***	676	***23.3%***	895	***30.9%***	1014	***35.0%***

Surgical treatment rates varied between districts. No treatment rates varied between 4.4% and 16.0%. Full surgery varied between 17.5% and 47.3%. Other surgery varied between 25.0% and 48.0%. Biopsy only rates varied between 11.2% and 36.0%.

▼ **Chemotherapy by District of Residence**

District	N	Receiving chemotherapy	
Huddersfield	**160**	111	***69.4%***
Dewsbury	**142**	93	***65.5%***
Hull	**232**	148	***63.8%***
Scunthorpe	**135**	85	***63.0%***
Northallerton	**64**	40	***62.5%***
Pontefract	**150**	89	***59.3%***
East Yorkshire	**171**	100	***58.5%***
Harrogate	**114**	62	***54.4%***
Leeds East	**288**	156	***54.2%***
Calderdale	**133**	72	***54.1%***
Wakefield	**113**	61	***54.0%***
Leeds West	**351**	186	***53.0%***
York	**225**	119	***52.9%***
Bradford	**263**	119	***45.2%***
Airedale	**125**	53	***42.4%***
Grimsby	**100**	39	***39.0%***
Scarborough	**130**	47	***36.2%***
Yorkshire	**2896**	1580	***54.6%***

Chemotherapy varied from 69.4% in Huddersfield to 36.2% in Scarborough.

4.3.4. Treatment by Time Period

▼ **Surgery by time period**

Surgery	None		Biopsy		Other Surgery		Full Surgery	
1986-88	99	***10.3%***	224	***23.3%***	336	***34.9%***	304	***31.6%***
1989-91	92	***9.7%***	261	***27.5%***	289	***30.5%***	307	***32.3%***
1992-94	120	***12.2%***	191	***19.4%***	270	***27.4%***	403	***41.0%***
1986 - 1994	311	***10.7%***	676	***23.3%***	895	***30.9%***	1014	***35.0%***

Later time periods showed an increase in full surgery compared to a decrease in other surgery.

▼ **Chemotherapy by time period**

Overall		1986-88		1989-91		1992-94	
1580	***54.6%***	440	***45.7%***	533	***56.2%***	607	***61.7%***

Use of chemotherapy increased substantially over the time period.

4.4. SPECIALIST MANAGEMENT

One of the underlying assumptions of the Calman Hine reforms is that cancer patients are best treated by specialists working in multi-disciplinary teams. An analysis was made of which patients were treated by which specialists, either alone or in combination with others.

Some ovarian cancer is discovered at operations being carried out by a general surgeon, who may then ask for support from a gynaecologist. Patients under the management of a general surgeon can be operated upon by a gynaecologist, without transfer of management. In this instance, the gynaecologist would not have been recorded by the registry.

4.4.1. Combination of Specialties

▼ **Combination of specialities**

	Specialty	n	%
Any	Gynaecologist	2172	***75.0%***
	General Surgeon	577	***19.9%***
	Medical Oncologist	208	***7.2%***
	Clinical Oncologist	817	***28.2%***
	General Physician	144	***5.0%***
	Care of the elderly	104	***3.6%***
Combination	Gynaecologist & Clinical Oncologist	640	***22.1%***
	Gynaecologist & General Medicine	47	***1.6%***
	Gynaecologist & Medical Oncologist	187	***6.5%***
Only	General Surgeon Only	322	***11.1%***
	Gynaecologist Only	1244	***43.0%***

75.0% of cases were managed by a gynaecologist and 35.4% of cases were managed by an oncologist at some stage. 11.1% had only surgical management. 30.2% of cases were managed by two consultants and only 3% by three consultants (latter data not shown).

▼ **Recognised specialist gynaecological oncologists**

Degree of specialism	n	%
Non gynaecologist	724	***25.0%***
Other gynaecologist	1869	***64.5%***
Specialist gynaecological oncologist	303	***10.5%***
Total	2896	***100.0%***

Approximately 10% of patients were seen by a gynaecological oncologist. A specialist gynaecological oncologist was defined as accepted gynaecological oncologists and directors of training for the Royal College of Obstetricians and Gynaecologists who have a recognised tertiary practice. Over this period of time in Yorkshire only four specialist gynaecological oncologists as defined above were identified.

▼ **Additional Non-surgical therapy for patients managed by gynaecologists and general surgeons***

Specialty	Chemotherapy		Radiotherapy		Hormone Therapy	
Gynaecologist alone	1257	***59.9%***	127	***6.0%***	67	***3.2%***
General Surgeon alone	223	***44.2%***	15	***3.0%***	14	***2.8%***

(* This excludes patients managed by a combination of gynaecologists and general surgeons)

Treatment by gynaecologists was associated with a substantially greater use of chemotherapy in management than treatment by general surgeons.

▼ **Specialties over time**

Time Period	86 - 88		89 - 91		92 - 94	
Any Medical Oncologist	0	***0.0%***	23	***2.4%***	185	***18.8%***
Any Clinical Oncologist	306	***31.8%***	277	***29.2%***	234	***23.8%***
Any General Physician	41	***4.3%***	45	***4.7%***	58	***5.9%***
Any Gynaecologist	690	***71.7%***	693	***73.0%***	789	***80.2%***
Any General Surgeon	232	***24.1%***	187	***19.7%***	158	***16.1%***

▼ **Patients seen by a combination of gynaecologist and other non surgical (clinical or medical) oncologists, over time**

Seen	Overall		86 - 88		89 - 91		92 - 94	
Yes	802	**27.7%**	234	**24.3%**	231	***24.3%***	337	**34.2%**
No	2094	**72.3%**	729	**75.7%**	718	***75.7%***	647	**65.8%**

During the period of the study, the proportion of patients managed by gynaecologists increased by about 8% (from 71.7% to 80.2%), there was a commensurate decrease in the proportion of patients managed by general surgeons. The involvement of oncologists in management also increased during the study period especially in the last three-year period, together with a switch from clinical to medical oncology. Combined management by both gynaecologist and oncologist also increased during the last three-year time period.

4.4.2. Specialist Management by Year

▼ **Specialist management by Year**

Year	N	Non-Gynaecologist		"Other" Gynaecologist		Specialist Gynaecological Oncologist	
1986	**315**	98	***31.1%***	200	***63.5%***	17	***5.4%***
1987	**322**	93	***28.9%***	211	***65.5%***	18	***5.6%***
1988	**326**	82	***25.2%***	230	***70.6%***	14	***4.3%***
1989	**305**	84	***27.5%***	203	***66.6%***	18	***5.9%***
1990	**334**	95	***28.4%***	208	***62.3%***	31	***9.3%***
1991	**310**	77	***24.8%***	207	***66.8%***	26	***8.4%***
1992	**323**	64	***19.8%***	215	***66.6%***	44	***13.6%***
1993	**336**	66	***19.6%***	208	***61.9%***	62	***18.5%***
1994	**325**	65	***20.0%***	187	***57.5%***	73	***22.5%***
Total	**2896**	724	***25.0%***	1869	***64.5%***	303	***10.5%***

During the period of the study, there was an increase in the proportion of patients managed by specialist gynaecological oncologists and a corresponding decrease in the proportion managed by non-gynaecologists. The proportion managed by "other" gynaecologists declined slightly. By 1994, around 1 in 5 women was managed by a specialist.

4.4.3. Specialist Management by District of Residence

▼ **Specialist Management by District of Residence**

District	N	Non-Gynaecologist		"Other" Gynaecologist		Specialist Gynaecological Oncologist	
Hull	**232**	55	***23.7%***	176	***75.9%***	1	***0.4%***
East Yorkshire	**171**	49	***28.7%***	121	***70.8%***	1	***0.6%***
Grimsby	**100**	17	***17.0%***	83	***83.0%***	0	***0.0%***
Scunthorpe	**135**	41	***30.4%***	94	***69.6%***	0	***0.0%***
Northallerton	**64**	9	***14.1%***	54	***84.4%***	1	***1.6%***
York	**225**	39	***17.3%***	177	***78.7%***	9	***4.0%***
Scarborough	**130**	18	***13.9%***	111	***85.4%***	1	***0.8%***
Harrogate	**114**	35	***30.7%***	75	***65.8%***	4	***3.5%***
Bradford	**263**	108	***41.1%***	131	***49.8%***	24	***9.1%***
Airedale	**125**	30	***24.0%***	88	***70.4%***	7	***5.6%***
Calderdale	**133**	34	***25.6%***	97	***72.9%***	2	***1.5%***
Huddersfield	**160**	40	***25.0%***	118	***73.8%***	2	***1.3%***
Dewsbury	**142**	36	***25.4%***	97	***68.3%***	9	***6.3%***
Leeds West	**351**	85	***24.2%***	123	***35.0%***	143	***40.7%***
Leeds East	**288**	68	***23.6%***	124	***43.1%***	96	***33.3%***
Wakefield	**113**	35	***31.0%***	75	***66.4%***	3	***2.7%***
Pontefract	**150**	25	***16.7%***	125	***83.3%***	0	***0.0%***
Total	**2896**	724	***25.0%***	1869	***64.5%***	303	***10.5%***

The availability of specialist management was largely confined to the districts of Leeds and Bradford. Non-gynaecologists managed between 14.1% and 41.1% of the cases, depending on the District.

4.4.4. Gynaecologist Workload

Degree of specialist management was estimated on a median annual workload basis. Workloads were calculated according to practising years, to account for any new posts and retirements.

▼ **Frequency of Gynaecologist Workload (mean number of new cases managed per year)**

Gynaecologist Workload	Overall		86 - 88		89 - 91		92- 94	
Non Gynaecological	724	***25.0%***	273	***28.3%***	256	***27.0%***	195	***19.8%***
1 to 3	805	***27.8%***	304	***31.6%***	249	***26.2%***	252	***25.6%***
4 to 5	697	***24.1%***	221	***22.9%***	245	***25.8%***	231	***23.5%***
> 5	670	***23.1%***	165	***17.1%***	199	***21.0%***	306	***31.1%***
Total	2896	***100.0%***	963	***100.0%***	949	***100.0%***	984	***100.0%***

In this time period only 3 gynaecologists managed more than 10 cases per year. The highest average was 18 cases per year. Less than a quarter of patients were treated by those gynaecologists dealing with more than 5 cases annually. This proportion rose from 17.1% in 1986-88 to 31.1% in 1992-4. Overall 25.0% were treated by non gynaecologists, but this proportion declined slightly over the three time periods, from 28.3% to 19.8%.

▼ **Surgery by Gynaecologist Workload (mean number of new cases managed per year)**

Gynaecologist Workload	None		Biopsy		Other Surgery		Full Surgery	
Non Gynaecological	201	***27.8***	295	***40.7***	179	***24.7***	49	***6.8***
1 to 3	53	***6.6***	136	***16.9***	279	***34.7***	337	***41.9***
4 to 5	34	***4.9***	137	***19.7***	252	***36.2***	274	***39.3***
> 5	23	***3.4***	108	***16.1***	185	***27.6***	354	***52.8***
Total	311	***100.0***	676	***100.0***	895	***100.0***	1014	***100.0***

There was an increased number of full surgery procedures performed with increased consultant workload.

Those gynaecologists with more than 5 cases per year performed full surgery on 52.8% of their cases compared to about 40% in those performing 1-5 cases and only 6.8% in those not seen by a gynaecologist. Full surgery was carried out in 6% of those seen by a general surgeon (see surgical procedure table below), and other

surgery in 30.4%. The case mix presenting to non-gynaecologists may differ to that presenting to gynaecologists.

▼ **Chemotherapy by Gynaecologist Workload (mean number of new cases per year)**

Gynaecologist Workload	N	Receiving chemotherapy	
Non Gynaecological	724	282	***39.0%***
1 – 3	805	449	***55.8%***
4 – 5	697	432	***62.0%***
> 5	670	417	***62.2%***
Total	2896	1580	***54.6%***

Chemotherapy use increased with increased consultant workload.

▼ **Surgical procedures carried out for patients managed by a general surgeon only**

Surgical procedure	N	%
No surgery	50	***15.5***
Biopsy	154	***47.8***
Other Surgery	98	***30.4***
Full Surgery	20	***6.2***
Total	322	***100.0***

4.4.5. Hospital Workload

▼ **Frequency of Hospital Workload (mean number of new cases per year)**

Hospital Workload	n	%
1- 11	1123	***38.8***
12 - 18	817	***28.2***
> 18	956	***33.0%***
Total	2896	***100%***

A total of 58 hospitals managed ovarian cancer patients. 38% of patients were managed in low workload hospitals seeing less than 12 patients per year. One third of patients were managed in the 5 hospitals seeing more than 18 patients per year. 28% of cases were managed in 6 hospitals managing 12-18 patients per year. 26 hospitals managed less than one patient per year, a total of 66 patients.

▼ **Operation Type by Hospital Workload (mean number of new cases per year)**

Hospital Workload	No Surgery		Biopsy		<Full Surgery		Full Surgery	
1 - 11	167	***14.9%***	307	***27.3%***	336	***29.9%***	313	***27.9%***
12 - 18	75	***9.2%***	194	***23.7%***	291	***35.6%***	257	***31.5%***
>18	69	***7.2%***	175	***18.3%***	268	***28.0%***	444	***46.4%***
Total	311	***10.7%***	676	***23.3%***	895	***30.9%***	1014	***35.0%***

There was an increased number of procedures performed with increased hospital workload.

▼ **Chemotherapy by Hospital Workload (New cases per year)**

Workload	N	Receiving chemotherapy	
1 - 11	1123	526	***46.8%***
12 - 18	817	476	***58.3%***
> 18	956	578	***60.5%***
Total	2896	1580	***54.6%***

Chemotherapy use increased with increased hospital workload.

4.5. MANAGEMENT AT INDIVIDUAL TRUSTS

4.5.1. Number of cases at each Trust

▼ **Number of patients with ovarian cancer by NHS Trust**

NHS Trust	n	%
United Leeds Teaching Hospitals	372	***12.8%***
St James's & Seacroft University Hospitals	294	***10.2%***
Bradford Hospitals	272	***9.4%***
Royal Hull Hospitals NHS	250	***8.6%***
York Health Services	222	***7.7%***
Scarborough & North East Yorkshire Healthcare	159	***5.5%***
Huddersfield Healthcare	158	***5.5%***
Pontefract Hospitals	139	***4.8%***
Dewsbury Health Care	138	***4.8%***
Calderdale Healthcare	131	***4.5%***
Pinderfields Hospitals	129	***4.5%***
Scunthorpe & Goole Hospitals	127	***4.4%***
Harrogate Health Care	123	***4.2%***
North East Lincolnshire	99	***3.4%***
Airedale	97	***3.3%***
East Yorkshire Hospitals	78	***2.7%***
Northallerton Health Services	64	***2.2%***
Community Trusts	26	***0.9%***
Others	18	***0.6%***
Total	2896	***100%***

4.5.2. Age Variation by Trust

▼ **Median Age at Diagnosis by NHS Trust**

NHS Trust	Median	1st Quartile	3rd Quartile	25-75% Range
Community Trusts	60	51	69	18
North East Lincolnshire	61	54	71	17
Scunthorpe & Goole Hospitals	61	50	71	21
Pinderfields Hospitals	62	51	70	19
Pontefract Hospitals	62	53	72	19
York Health Services	63	53	71	18
St James's & Seacroft University Hospitals	63	54	73	19
Scarborough & North East Yorkshire Healthcare	64	56	74	18
Calderdale Healthcare	64	51	73	22
Northallerton Health Services	64	52	74	22
Royal Hull Hospitals	65	55	73	18
United Leeds Teaching Hospitals	65	55	75	20
Huddersfield Healthcare	65	54	75	21
Airedale	65	54	75	21
Dewsbury Health Care	66	56	74	18
Bradford Hospitals	67	55	74	17
East Yorkshire Hospitals	68	59	74	15
Harrogate Health Care	69	61	78	17
Others	75	62	83	21
Yorkshire	**64**	**54**	**74**	**20**

4.5.3. Treatment by Trust

▼ **Surgery rate by NHS Trust**

NHS Trust	N	No Surgery		Biopsy		> Full Surgery		Full Surgery	
United Leeds Teaching Hospitals	**372**	52	***14.0%***	78	***21.0%***	95	***25.5%***	147	***39.5%***
St James's & Seacroft University Hospitals	**294**	27	***9.2%***	43	***14.6%***	79	***26.9%***	145	***49.3%***
Bradford Hospitals	**272**	35	***12.9%***	90	***33.1%***	86	***31.6%***	61	***22.4%***
Royal Hull Hospitals	**250**	29	***11.6%***	63	***25.2%***	71	***28.4%***	87	***34.8%***
York Health Services	**222**	19	***8.6%***	59	***26.6%***	61	***27.5%***	83	***37.4%***
Scarborough & NE Yorkshire Healthcare	**159**	14	***8.8%***	38	***23.9%***	45	***28.3%***	62	***39.0%***
Huddersfield Healthcare	**158**	15	***9.5%***	38	***24.1%***	65	***41.1%***	40	***25.3%***
Pontefract Hospitals	**139**	14	***10.1%***	23	***16.5%***	40	***28.8%***	62	***44.6%***
Dewsbury Health Care	**138**	11	***8.0%***	35	***25.4%***	42	***30.4%***	50	***36.2%***
Calderdale Healthcare	**131**	19	***14.5%***	25	***19.1%***	49	***37.4%***	38	***29.0%***
Pinderfields Hospitals	**129**	5	***3.9%***	34	***26.4%***	38	***29.5%***	52	***40.3%***
Scunthorpe & Goole Hospitals	**127**	8	***6.3%***	40	***31.5%***	46	***36.2%***	33	***26.0%***
Harrogate Health Care	**123**	15	***12.2%***	42	***34.1%***	44	***35.8%***	22	***17.9%***
North East Lincolnshire	**99**	16	***16.2%***	17	***17.2%***	36	***36.4%***	30	***30.3%***
Airedale	**97**	10	***10.3%***	9	***9.3%***	48	***49.5%***	30	***30.9%***
East Yorkshire Hospitals	**78**	6	***7.7%***	23	***29.5%***	23	***29.5%***	26	***33.3%***
Northallerton Health Services	**64**	8	***12.5%***	13	***20.3%***	16	***25.0%***	27	***42.2%***
Others	**44**	8	***18.2%***	6	***13.6%***	11	***25.0%***	19	***43.2%***
Total	**2896**	311	***10.7%***	676	***23.3%***	895	***30.9%***	1014	***35.0%***

▼ **Variation in Chemotherapy Rate by NHS Trust**

NHS Trust	N	Receiving chemotherapy	
United Leeds Teaching Hospitals	**372**	206	***55.4%***
St James's & Seacroft University Hospitals	**294**	163	***55.4%***
Bradford Hospitals	**272**	119	***43.8%***
Royal Hull Hospitals	**250**	164	***65.6%***
York Health Services	**222**	111	***50.0%***
Scarborough & North East Yorkshire Healthcare	**159**	60	***37.7%***
Huddersfield Healthcare	**158**	109	***69.0%***
Pontefract Hospitals	**139**	84	***60.4%***
Dewsbury Health Care	**138**	88	***63.8%***
Calderdale Healthcare	**131**	70	***53.4%***
Pinderfields Hospitals	**129**	72	***55.8%***
Scunthorpe & Goole Hospitals	**127**	82	***64.6%***
Harrogate Health Care	**123**	63	***51.2%***
North East Lincolnshire	**99**	37	***37.4%***
Airedale	**97**	43	***44.3%***
East Yorkshire Hospitals	**78**	44	***56.4%***
Northallerton Health Services	**64**	40	***62.5%***
Others	**44**	25	***56.8%***
Total	**2896**	1580	***54.6%***

Chemotherapy rate varies with individual Trust from 37.4% at North East Lincolnshire Trust to 69.0% at Huddersfield Healthcare Trust.

5.1. NYCRIS REFERRAL DATA

5.1.1. Symptom to 1st Hospital Visit Interval

Completeness: Analysis of the interval between symptom to first hospital visit was based upon 1080 patients, 37% of all cases.

▼ **Symptom to 1st Hospital Visit Interval (days)**

Mean	Median	Range	1st Quartile	3rd Quartile
97	59	0-1485	25	105

50% of cases were seen at hospital within 9 weeks of their first symptom. The average waiting time is skewed by the long interval between first symptoms and first hospital visit in some patients. 61 patients (2%) had noticed symptoms one year or more before their first hospital visit.

▼ **Symptom to 1st Hospital Visit Interval by District**

District	Median	1st Quartile	3rd Quartile
Calderdale	**31**	17	99
Wakefield	**42**	28	79
Harrogate	**42**	12	77
Scunthorpe	**42**	22	99
Pontefract	**44**	28	122
Huddersfield	**45**	20	97
East Yorkshire	**45**	21	103
Dewsbury	**45**	23	125
Bradford	**49**	29	109
Airedale	**61**	30	90
Scarborough	**61**	27	101
Grimsby	**61**	27	106
Hull	**61**	30	131
Leeds East	**61**	29	130
Leeds West	**65**	31	106
York	**65**	34	118
Northallerton	**91**	43	232

Median times from symptom to first hospital visit varied from 31 days to 91 days across Yorkshire.

5.1.2. Hospital to Surgery Interval

Completeness: Analysis of the interval between first hospital visit to surgery was based upon 1835 patients, 63% of all cases but 96% of those 1909 patients who had surgery (excluding those cases who only had a biopsy).

▼ **Hospital to Surgery Interval (Days)**

Mean	Median	Range	1st Quartile	3rd Quartile
25.469	12	663	5	26

The average time from first hospital visit to surgery was 25 days. This figure was heavily weighted by relatively few cases with very long intervals to surgery. 50% of

cases had surgery within 12 days, 75% of patients within 26 days and 95% within 100 days.

▼ **Hospital to Surgery Interval (days) by District of Residence**

District	Median	1st Quartile	3rd Quartile
Harrogate	**8**	4	21
Grimsby	**8**	3	23
Dewsbury	**9**	6	23
Airedale	**10**	2	26
Scarborough	**11**	7	23
Wakefield	**11**	6	22
Leeds West	**11**	4	22
York	**12**	6	25
East Yorkshire	**12**	4	25
Northallerton	**13**	4	24
Bradford	**13**	5	26
Huddersfield	**13**	6	27
Hull	**13**	6	29
Calderdale	**14**	7	29
Leeds East	**14**	6	30
Pontefract	**15**	6	27
Scunthorpe	**18**	6	37

There was a range of median times between districts from 8-18 days. The 75% range varies from 21-37 days.

5.1.3. Surgery to chemotherapy interval

Completeness: Analysis of the interval between surgery to chemotherapy interval was based upon 1121 patients, 39% of all cases but 99.7% cases receiving both modalities of treatment.

▼ **Surgery to chemotherapy interval (days) if chemotherapy occurred *after* surgery (or same day)**

Number	Mean	Median	Range	1st Quartile	3rd Quartile
992	37.4	22	0-1088	11	44

75% of cases received chemotherapy within 44 days of operation and 95% within 84 days.

▼ **Surgery to chemotherapy interval (days) if chemotherapy occurred *before* surgery**

Number	Mean	Median	Range	1st Quartile	3rd Quartile
29	-136	-115	-1 to - 434	-52	-188

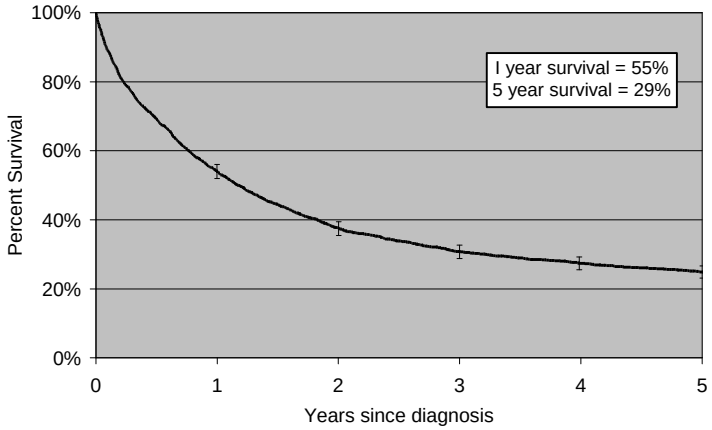
75% of the 29 cases having chemotherapy followed by surgery were operated on within 6 months.

▼ **Surgery to chemotherapy interval (days) by district if chemotherapy occurred *after* surgery (or same day)**

District	Median	1st Quartile	3rd Quartile
Hull	**10**	6	27
Leeds West	**16**	10	32
Scunthorpe	**16**	10	36
East Yorkshire	**22**	10	39
Airedale	**25**	14	42
Leeds East	**27**	15	38
Bradford	**27**	19	48
Pontefract	**28**	15	43
Wakefield	**29**	21	39
Dewsbury	**29**	16	50
Huddersfield	**30**	12	42
Harrogate	**31**	14	44
Calderdale	**33**	21	43
York	**34**	12	49
Northallerton	**39**	27	47
Scarborough	**42**	13	55
Grimsby	**43**	11	67

6.1. OVERALL SURVIVAL

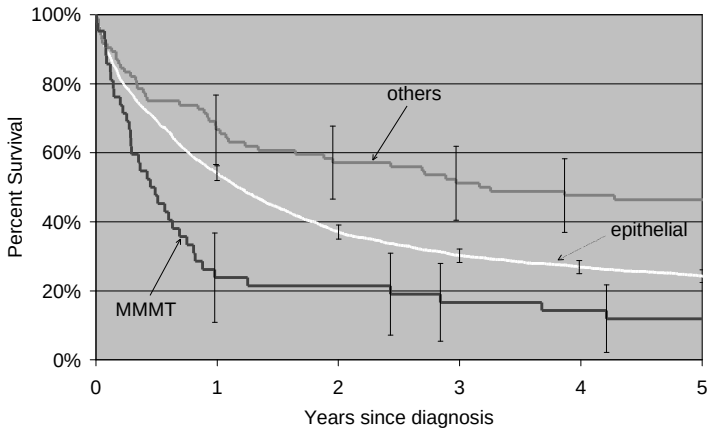
▼ **Overall Survival**



Median survival was about 14 months.

6.1.1. Survival by Type

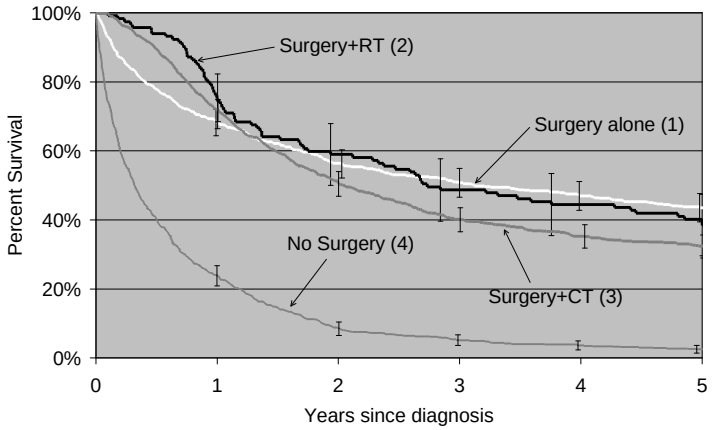
▼ **Survival by Type**



This graph shows that different types of ovarian tumour have different prognoses. The group of "other" histologies (114 cases) contains the relatively good prognosis germ cell and sex cord-stromal tumours as well as some rarer cancers. Median survival in this group of cancers was over 5 years. Mixed Mullerian tumours and sarcomas (62 cases) are much more aggressive but rare. Median survival was about 6 months. The most common ovarian cancers are epithelial (2720 cases, including 405 less well differentiated tumours). Median survival was about 14 months in this group.

6.1.2. Survival by Surgery

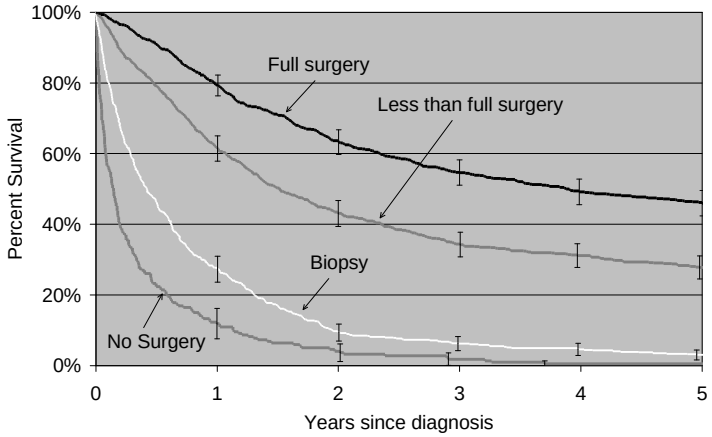
▼ **Survival by Surgery**



Survival is better in those who receive surgery with or without other treatment. In those who had no surgery median survival was about 10 weeks; less than 25% were alive at one year and fewer than 5% survived 5 years. At one year, survival was over 70% in all those who received surgery but slightly higher in those who also received radiotherapy or chemotherapy. By 5 years 47% of those who had surgery alone were alive and similar rates were observed in those who also had radiotherapy. In contrast, only 35% of those who also received chemotherapy survived. It is likely that casemix was one of the main determinants of treatment options. It is likely that those patients with a worse prognosis received chemotherapy or radiotherapy which may explain the better late survival in some of the surgery alone cases.

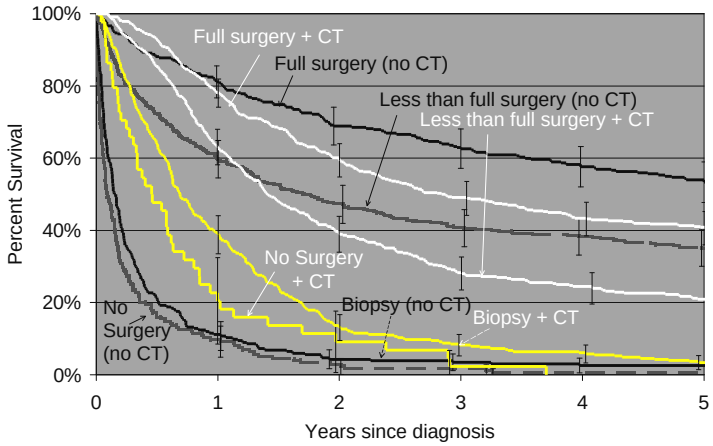
6.1.3. Survival by Surgical Group

▼ **Survival by Surgical Group**



Nearly 80% of full surgery cases are alive at one year whereas just over 10% of no surgery cases are alive at one year. About 50% of full surgery cases survive 5 years. Those who have less than full surgery have poorer survival curves. It is likely that most cases in this group could not have full surgery because of the advanced state of their disease, but others may have been under treated. Due to limited case mix information, it is not possible to determine the extent to which this is a result of disease stage.

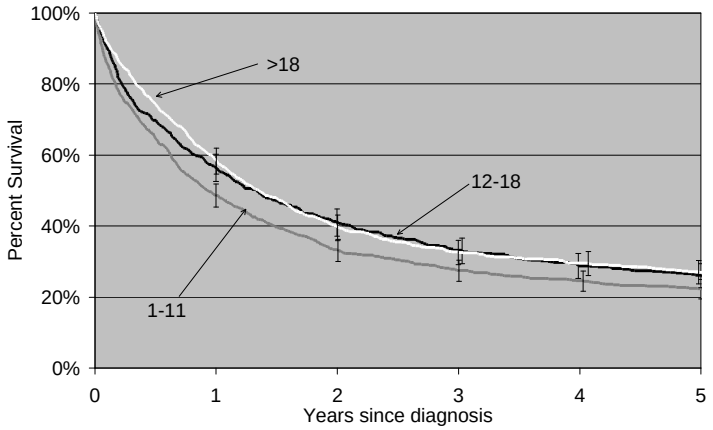
▼ **Survival by Surgical Group (/- chemotherapy)**



In those cases receiving no surgery or only a biopsy the addition of chemotherapy appeared to marginally improve survival. The addition of chemotherapy to those having surgery improved survival over the first year but thereafter survival decreased in this group. It may be that those receiving chemotherapy had a worse prognosis than those without it, and that chemotherapy initially delays death in a percentage of cases. Alternatively those dying early in the postoperative period would not have survived long enough to be considered for chemotherapy and thus these possibilities are explored further in the relative risk section.

6.1.4. Survival by Hospital Workload

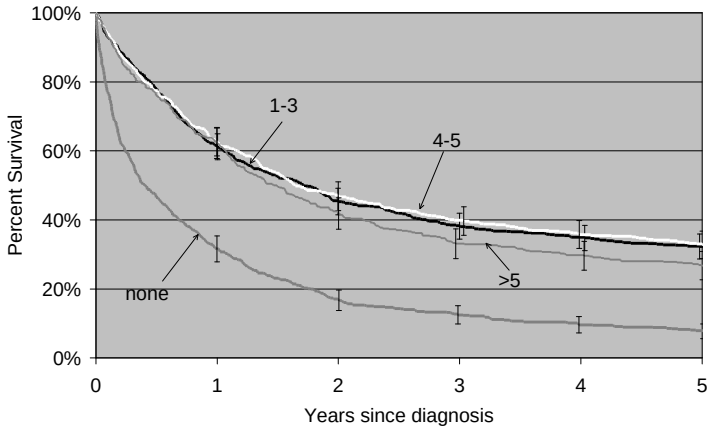
▼ **Survival by Hospital Workload (mean number of new cases per year)**



Cases at those hospitals which managed more than 18 patients a year had marginally better survival outcomes over the first 15 months. Thereafter hospitals that treated more than 12 patients a year had better outcomes than those who treated less than this number. The difference at 5 years was about 5%.

6.1.5. Survival by Gynaecologist Workload

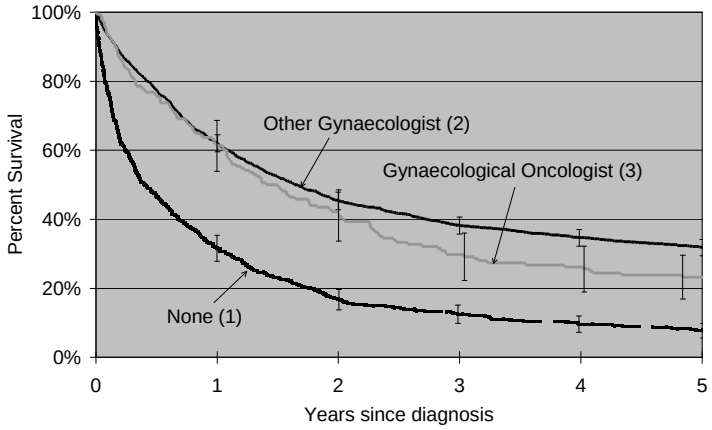
▼ **Survival by Gynaecologist Workload (mean number of new cases per year)**



Cases not treated by gynaecologists had a far poorer outcomes than those treated by gynaecologists with only 32% alive at one year compared to 62%. There was little difference in survival with differing categories of gynaecologist workload.

6.1.6. Survival by Gynaecological Oncologist Group

▼ **Survival by Gynaecological Oncologist Group**



This graph shows that those treated by any gynaecologist were almost twice as likely to be alive at one year (62% to 32%) than those not treated by gynaecologists. Those treated by the specialist gynaecologists had a poorer survival curve from one year so that by 5 years survival in that group was about 30% whereas survival in those treated by other gynaecologists was about 37%.

It is likely that these differences in survival between gynaecologists were mainly a result of differential casemix. That is stage at presentation was likely to be the main prognostic factor for survival, with patients not treated by gynaecologists being less likely to receive surgery because of their advanced disease and gynaecologist oncologists receiving more difficult cases on average than their colleagues. These possibilities are explored further in the relative risk section.

6.1.7. Post-operative Mortality

Post-operative mortality is defined as % of definitive surgical cases where death occurred within 30 days from operation. Overall 3.2% of cases (61/1888) treated by surgery died within this time limit.

▼ **Post-Operative Mortality by District**

District	n	%
Northallerton	3	***7.0%***
Scarborough	5	***5.7%***
Leeds East	12	***5.9%***
Huddersfield	6	***5.6%***
Grimsby	3	***4.7%***
Hull	7	***4.6%***
Bradford	5	***3.6%***
Leeds West	8	***3.5%***
Wakefield	2	***2.6%***
East Yorkshire	3	***2.8%***
Scunthorpe	2	***2.4%***
Airedale	2	***2.1%***
York	2	***1.4%***
Dewsbury	1	***1.1%***
Calderdale	0	***0%***
Harrogate	0	***0%***
Pontefract	0	***0%***
Total	61	***3.2%***

There was variation in post operative mortality between health authority districts.

▼ **Post Operative Mortality by Trust**

Provider	n	%
Northallerton Health Services NHS Trust	3	***7.0%***
Scarborough & North East Yorkshire Healthcare NHS Trust	7	***6.6%***
Huddersfield Healthcare NHS Trust	6	***5.7%***
St James's & Seacroft University Hospitals NHS Trust	12	***5.4%***
North East Lincolnshire NHS Trust	3	***4.7%***
Community Trusts	1	***4.3%***
Royal Hull Hospitals NHS Trust	6	***3.9%***
United Leeds Teaching Hospitals NHS Trust	7	***2.9%***
Bradford Hospitals NHS Trust	5	***3.4%***
Scunthorpe & Goole Hospitals NHS Trust	2	***2.6%***
Airedale NHS Trust	2	***2.6%***
Pinderfields Hospitals NHS Trust	2	***2.3%***
Dewsbury Health Care NHS Trust	2	***2.2%***
East Yorkshire Hospitals NHS Trust	1	***2.0%***
York Health Services NHS Trust	2	***1.4%***
Pontefract Hospitals NHS Trust	0	***0.0%***
Calderdale Healthcare NHS Trust	0	***0.0%***
Harrogate Health Care NHS Trust	0	***0.0%***
Others	0	***0.0%***
Total	61	***3.2%***

There was variation in post operative mortality between hospitals. It is impossible to say from cancer registry data whether these differences were due to casemix, surgical and team skills or to chance. The variation does suggest that post-operative mortality is a suitable subject for audit by teams and across cancer networks to establish avoidable causes of such mortality.

▼ **Post Operative Mortality by Hospital Workload**

Hospital Workload	n	%
1 - 11	24	***3.7%***
12 - 18	13	***2.4%***
>18	24	***3.4%***
Total	61	***3.2%***

Post operative mortality was lowest in those hospitals undertaking 12 –18 operations per year but the differences between groups were very small.

▼ **Post Operative Mortality by Gynaecologist Workload**

Gynaecologist Workload	n	%
Non Gynae	11	***4.9%***
1 - 3	16	***2.6%***
4 - 5	10	***1.9%***
>5	24	***4.5%***
Total	61	***3.2%***

Post operative mortality was highest in cases treated by non-gynaecologists (4.9%) but almost as high in gynaecologists with a higher volume of patients. This may be an effect of casemix. That is, it is possible that those who operated most often attempt operations on those who have more advanced disease in an attempt to prolong survival. It is also possible that those having surgery from non-gynaecologists are more often operated on in an emergency and again have higher post operative mortality rates. As in the other analyses it is not possible to provide definitive explanations from these data.

7 MULTIVARIATE ANALYSES

7.1. RELATIVE RISK

7.1.1. Relative Risk

▼ **Relative Risk**

Factors		Relative Risk					
		Factors Alone		Allowing Casemix		All Factors Together	
Casemix							
Age (yrs)	<40	1.00		1.00		1.00	
	40-59	2.70	(1.92 - 3.78)	2.35	(1.68 - 3.31)	2.35	(1.67 - 3.30)
	60-74	4.29	(3.07 - 6.00)	3.69	(2.63 - 5.17)	3.11	(2.22 - 4.37)
	75+	7.38	(5.25 - 10.37)	6.96	(4.94 - 9.81)	4.57	(3.23 - 6.47)
Stage	No known nodes / mets	1.00		1.00		1.00	
	Nodal involvement	1.25	(0.56 - 2.80)	1.77	(0.76 - 3.97)	1.70	(0.76 - 3.82)
	Metastases	3.03	(2.73 - 3.36)	3.12	(2.81 - 3.46)	2.46	(2.19 - 2.77)
Socio-economic Profile	1-3	1.00		1.00		1.00	
	4-7	1.16	(1.03 - 1.31)	1.10	(0.97 - 1.25)	1.13	(1.00 - 1.28)
	8-10	1.15	(0.99 - 1.33)	1.08	(0.93 - 1.25)	1.09	(0.93 - 1.26)
Type	Epithelial	1.00		1.00		1.00	
	Others	0.54	(0.40 - 0.72)	0.85	(0.63 - 1.13)	0.77	(0.57 - 1.03)
	MMMT	1.71	(1.25 - 2.36)	1.77	(1.29 - 2.44)	2.21	(1.60 - 3.04)
Period	1986-88	1.00		1.00		1.00	
	1989-90	1.05	(0.93 - 1.17)	0.86	(0.76 - 0.96)	0.90	(0.81 - 1.01)
	1991-92	1.03	(0.92 - 1.15)	0.82	(0.73 - 0.92)	0.89	(0.79 - 1.00)
Hospital Factors							
Treatment	Surgery, no CT	1.00		1.00		1.00	
	Surgery & CT	1.26	(1.11 - 1.43)	0.98	(0.86 - 1.12)	0.99	(0.87 - 1.13)
	CT, no surgery	3.38	(2.92 - 3.92)	1.94	(1.65 - 2.28)	1.85	(1.57 - 2.18)
	No surgery or CT	8.28	(7.16 - 9.58)	4.55	(3.89 - 5.32)	4.27	3.64 - 5.02)
Workload							
Hospital	1-11	1.00		1.00		1.00	
	12-18	0.85	(0.76 - 0.96)	0.88	(0.78 - 0.99)	1.00	(0.89 - 1.13)
	>18	0.81	(0.73 - 0.91)	0.84	(0.75 - 0.94)	1.03	(0.92 - 1.16)
Gynae-cologist	no gynaecologist	1.00		1.00		1.00	
	1-3	0.42	(0.37 - 0.47)	0.59	(0.52 - 0.67)	0.80	(0.70 - 0.91)
	4-5	0.41	(0.36 - 0.47)	0.61	(0.53 - 0.70)	0.81	(0.70 - 0.94)
	>5	0.48	(0.42 - 0.55)	0.58	(0.50 - 0.66)	0.79	(0.68 - 0.92)

Relative risk was examined by individual factors alone (such as age), then with consideration of factors affecting case mix (age, stage, socio-economic profile and histological type), and finally with management factors such as treatment, hospital and gynaecologist workload included. This allows partial consideration for the effects of casemix and management.

The risk of death increased substantially and significantly with increasing age of the patient even when known casemix and management factors were included in the analysis. As might be expected, risk of death was about 3 times more likely in those with known metastases, a statistically significant effect. There was a small difference in the risk of death when comparing different socio-economic classes, towards an adverse effect in the more deprived groups, but this was of borderline statistical significance. There were statistically significant differences in survival between different histological diagnosis groups. The MMMT group's survival was 70% worse than the epithelial group, and this variation remained despite allowance for casemix and management. There was some variation over the 3 time periods showing improved survival in succeeding time periods after adjustment for casemix. This effect became of borderline significance when hospital and workload factors were

included in the model, suggesting that these factors have, in part, contributed to the improved outcomes.

Risk of death increased in all the treatment groups in comparison with those who had surgery alone. However when risk was adjusted for casemix, those having had chemotherapy as well as surgery do as well as those with surgery alone. Similarly those receiving only chemotherapy or no treatment showed a decrease in their relative risk of death when adjustment was made for casemix or all factors. This indicates that their poorer risk of survival is, in some part, due to their more advanced disease or worse histological type, with a possible further effect from management factors.

Risk of death decreased with increased hospital workload. This difference remained when casemix was considered but disappeared when all the management factors were taken into account. This suggests that management factors associated with treatment and workload can improve outcomes.

Risk of death was significantly decreased in gynaecologists compared to non-gynaecologists. This remained statistically significant when casemix was included in the risk factor analysis and when all factors were considered, although the successive adjustments decreased the magnitude of the differences. This indicates that some of the difference in survival was due to casemix, but some may be due to management. Those gynaecologists operating on 5 or more cases had a slightly adverse survival compared with other gynaecologists, but the increased risk of death disappears when casemix was taken into account. This suggests that the casemix profile of gynaecologists who dealt with more than 5 cases per year was somewhat worse than those of other gynaecologists.

The effect of management by specialist gynaecological oncologists was not considered in this multivariate analysis. The use of workload as a surrogate for specialism enabled greater numbers of patients to be included in the "most specialised" category as, during the period of the study, there were only 3 recognised gynaecological oncologists managing 10% of patients. The results showing no survival benefit to patients managed by gynaecologists in the highest workload category (> 5 patients per year) are, at least superficially, at variance with results from a Scottish study (Junor et al, 1999). This showed a 25% reduction in the risk of death for women operated on by specialist gynaecological oncologists compared with other general oncologists. This may be due to casemix differences in referral patterns between the two populations. These results are, however, in agreement with those from a West Midlands study (Kehoe et al, 1994) showing a survival benefit of management by a gynaecologist in comparison with a general surgeon.

APPENDIX 8

8.1. REFERENCES

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8.2. DATA & METHODS

8.2.1. Data Quality

In addition to the routine data quality assurance mechanisms which are maintained by NYCRIS, the dataset used in this particular study was subject to a specifically developed programme of quality control, prior to analysis.

8.2.2. Overview of Study Dataset

Data held by the Northern and Yorkshire Cancer Registry and Information Service (NYCRIS) have been analysed in this report. The results presented are applicable to the population of the former Yorkshire Regional Health Authority, a socially diverse yet relatively stable population of 3.6 million. In total, approximately 17,500 new malignant cancer patients are registered annually within that region, the details being extracted from hospital clinical notes by trained cancer registration staff.

The data collected by the former Yorkshire Cancer Registry have been analysed in this report. Data include information regarding tumour histology and definitive treatment within the first 9 weeks of diagnosis of a primary tumour. Treatment modalities; definitive surgery (not biopsies or palliative procedures), radiotherapy and chemotherapy have been routinely recorded, along with managing hospitals, managing consultants and specialties and corresponding treatment starting dates. Investigations, drug types and dosage information and consultants providing opinion, without the actual transfer of management were not recorded. The dataset also included patient information such as age at diagnosis, and district of residence.

▼ **Availability of Relevant Data Items**

Data Type	Available	Not Available
Patient	Age	
	Sex	Presentation (eg Acute)
	District of residence	Performance status
	Socio-economic status	Symptoms
	Year of diagnosis	
	Date of birth & death	
Tumour	Site of Tumour	Staging data for all cases
	Histology of tumour	
	Grade of tumour	
	Lymph node involvement & metastases	
Management	Managing consultant & speciality	Consultants providing opinion only
	Managing hospital & trust	Consultants administering each treatment
	Radiotherapy hospital	Multidisciplinary management
Treatment	Definitive surgical procedures	Biopsies and investigative procedures
	Radiotherapy (where given)	
	Chemotherapy	Drugs used & dosage
	Dates of treatment	Other palliative care
Referral	Date of first hospital visit	Presentation Pathway- GP/Acute/Other
	Dates of Surgery, RT, Chemotherapy	Chronological referral pathway
Outcome	Survival	Quality of Life
		Recurrences
		Other Quality of Care

8.3. STATISTICAL METHODS

Definitions

For the purposes of this report, the region studied was that of the former Yorkshire Regional Health Authority, and districts studied were the districts of residence, and corresponds to the District Health Authority of the period. Data were presented for patients who were resident within the Yorkshire Health region at the time of diagnosis and treated within the region.

All populations referred to in the methodology are the ONS mid-year population estimates based on the 1981 or 1991 censuses.

Registrations and Deaths

A registration is any new case of primary invasive cancer, identified by the Northern and Yorkshire Cancer Registry, arising in the population under study. The incidence rate gives the annual number of new patients registered with an invasive tumour per 100,000 population.

Age-Standardised Rate

Age-standardised registration rates (ASRs) have been calculated where the comparison of incidence between groups was of interest. This rate enables such comparisons to be made allowing for differences in their population structures, and is equivalent to the rate that would be seen if the standard population were subject to the same rates as that of the group. ASRs have been standardised against the European standard population.

To obtain the observed annual rate by five-year age groups for each area, the total number of registrations in the time period was divided by the area population for that period. The ASR was then calculated by multiplying the standard population for the five-year period by the observed rate, within each age group. The result was summed to give a rate per 100,000 population. This is known as the direct method of age standardisation.

The charts show the ASR as a dot, with the 95% Confidence Interval for the ASR as an error line around it. The Yorkshire rate is shown as a double line, the middle representing the rate and the line thickness depicting the confidence interval.

Survival

Survival times were calculated from date of diagnosis (taken as date of first hospital visit) to date of death or censoring. Death certificate only registrations were excluded, as their survival times were unknown, so they could not contribute to any survival analysis. Patients were deemed to be alive if no death certificate had been received by the time the analysis was undertaken. They were censored at the 1st January 1997.

Survival distributions were estimated for each variable separately using the Kaplan-Meier method. These were presented as curves.

Multivariate Relative Risk Analysis

Multivariate survival comparisons were made by Cox's Proportional Hazards regression. For each histological type, age, period of diagnosis, treatment and hospital centre were entered into the model. The results were presented as relative risk estimates, compared to a base category (value 1.00). Estimates were presented for each factor separately, for each factor allowing for case mix and for all factors together. Interactions between factors were also examined, but where insignificant they were omitted from the results tables.

Socio-economic Profile Classification

This was based on an analysis of 120 original census variables, at Enumeration District (ED) level, many of which are highly correlated. A transformation was applied to these variables by Principal Components Analysis to create uncorrelated derived variables. The EDs were then grouped together using Cluster Analysis based on the new derived variables or principal component scores.

Initially there were 160 relatively homogenous profile groups. These were further aggregated by cluster analysis into 40 groups and then into 10 groups, or 'Super Profiles'. The names attached to the different Super Profiles are an attempt to capture the wider characteristics of the groups in a name that can be easily referred to. A summary and characteristic description of the 10 Super Profile groups and the 40 groups contained within them is given below.

▼ **Socio-economic Profile Classification**

Super Profile Group		Description
I	**'Affluent Achievers'**	Very high income professionals in exclusive areas. Mature families with large detached properties in 'stockbroker belts'. Mature families in select suburban properties.
II	**'Country Life'**	Prosperous and farming communities. Small holders and rural workers (mainly Scotland)
III	**'Thriving Greys'**	High income households in genteel neighbourhoods. Affluent ageing couples, many in purchase property. Older professionals in retirement areas. Comfortably well off older owner occupiers. Affluent ageing couples in rural areas.
IV	**'Settled Suburbans'**	White collar families in owner occupied suburban semis. Mature white collar couples in established suburban semis. White collar couples in mixed suburban housing.
V	**'Nest Builders'**	Mortgaged commuting professionals with children in detached properties. Double income young families in select properties. Military families. Young white collar families in small semis and terraces. Young white collar families in smaller semis. Young blue and white collar families in semis and terraces. Young families in terraces, mainly council.
VI	**'Producers'**	Older blue collar owner occupiers in semis. Older workers established in semis and terraces. Older and retired blue collar workers in small council properties.
VII	**'Senior Citizens'**	Retired white collar workers in owner occupied flats. Older residents and young transient singles many in seaside towns. Old and young buying terraces and flats. Retired blue collar workers in council flats, mainly in Scotland.
VIII	**'Urban Venturers'**	High income young professionals mainly renting (mainly Greater London). Young white collar workers in multi racial areas (mainly London). Young professionals buying property. Young families buying terraces in multi racial areas. Young families renting basic accommodation. Young white collar singles sharing city centre accommodation.
IX	**'Hard Pressed Families'**	Blue collar families in council properties. Young blue collar families in council terraces. Manufacturing workers in terraced housing.
X	**'Have Nots'**	Families in council flats in multiracial areas with high unemployment. Blue collar young families in council properties with high unemployment. Young families, many single parent, with high unemployment. Young singles and pensioners in council flats with high unemployment.