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# Head and Neck Cancers Data Quality Report

## Radiotherapy and Chemotherapy Data



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***With acknowledgements***

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## **Comparison of radiotherapy and chemotherapy data in the National Head and Neck Cancer Audit (DAHNO), Hospital Episode Statistics (HES) and the National Cancer Data Repository (NCDR)**

### **Background**

Cancer registries aim to record basic details of all radiotherapy and chemotherapy treatments delivered within six months of diagnosis and this information is available within the National Cancer Data Repository (NCDR).

Both the National Head and Neck Cancer Audit and the Hospital Episode Statistics (HES) dataset also aim to record CT and RT for head & neck cancers. In order to determine the completeness and quality of recording of radiotherapy and chemotherapy treatment in these datasets, both datasets were linked to the NCDR to determine agreement.

The DAHNO (Data for Head and Neck Oncology) system, which supports the National Head and Neck Cancer Audit, began a phased roll out and started receiving cases in 2004 on larynx and oral cavity cancers. Initially restricted to English cancer networks and subsequently eligible to Wales, all cancer networks in England and Wales now submit data to the audit, but not all eligible networks and trusts participated in the timeframe studied. Some organisations submitted a broader range of tumour site groups (in addition to larynx and oral cavity) at inception whilst others have retrospectively populated the DAHNO database in these site group areas. Formal national collection on pharynx and major salivary gland cancer began in 2008.

### **Methodology**

The current analysis was undertaken for the registration years 2004 to 2006, as data for these were the latest three years for which all three datasets were available. In order to make relevant comparisons, data were split by the cancer groups recorded in the DAHNO dataset: hypopharynx, larynx, major salivary glands, nasopharynx, oral cavity, oropharynx (*see Appendix 1*). In order to compare the NCDR with the HES dataset, data were extracted using OPCS4 codes for chemotherapy treatment (*see Appendix 2*).

Where possible data were also analysed for each of the eight English registries: NYCRIS, Trent, ECRIC, Thames, OCIU, WMCIU, SWCIS and NWCIS.

All datasets were analysed using Microsoft Access and Excel 2007.

The analysis method was undertaken in two stages:

**Stage 1:** The first stage was to produce a baseline comparison of radiotherapy and chemotherapy treatments for the different cancer sites within the NCDR and the DAHNO audit dataset. Data were extracted from the NCDR dataset if RT and CT flags were coded (i.e. Y/N), and DAHNO data was extracted by chemotherapy and radiotherapy date. For NCDR, selected

records were taken for tumours diagnosed from 2004 to 2006. For DAHNO, selected records were taken for all patients diagnosed from 2004 to 2006.

**Stage 2:** The second stage of the analysis was undertaken to determine the quality of Chemotherapy recording in HES compared to the NCDR. Analysis was carried out by linking NCDR and HES patient data using the NHS number. For NCDR, records were selected for tumours diagnosed from 2004 to 2006. Of this dataset, records were selected for each head and neck group for each year with and without chemotherapy flag where there is an NHS number, and with a diagnosis date. For HES, finished consultant episodes were selected for the years 2004 to 2007. Chemotherapy treatments within six months of diagnosis within the HES dataset were identified by using the diagnosis date from the NCDR and episode start date from HES. The final linked dataset was created by selecting all the patients in HES with a confirmed diagnosis in NCDR and a chemotherapy treatment record in HES within six months from diagnosis.

### Results

Analyses were carried out by head and neck cancer type and year. Data were also split by Cancer Registry, though many of the sub-national results provided numbers that were too small to present meaningful comparison of the cancer types for the DAHNO dataset. The results shown are England totals.

**Stage 1:** Summary analysis of NCDR and DAHNO for chemotherapy and radiotherapy treatments

Chemotherapy and radiotherapy were analysed separately using the flags (i.e. Y/N~including not known~) for NCDR data and the recording of a treatment date in DAHNO. The NCDR flags show treatment given within six months of diagnosis.

The method extracted 18,308 records from NCDR for the years 2004-2006. After allocating a cancer registry using the patient postcode, 18,263 records remained. The results based on 99.8% of the data extracted.

The DAHNO dataset was grouped by head and neck type for the years 2004-2006, providing 4,687 records. When allocating patient records to the registries, 4,221 records remained, 90.1% of the original data.

Table 1 shows the number of chemotherapy treatments in both databases, and the percentage.

Table 1: Recording of NCDR and DAHNO for chemotherapy flags, 2004-2006

Cancer type	Diag YEAR	Data from NCDR				Data from DAHNO			
		CT flag = Y	No CT flag	Total	% CT flag = Y	CT flag	No CT flag	Total	% CT flag
Larynx	2004	119	1634	1753	7%	23	294	317	7%
	2005	139	1638	1777	8%	30	496	526	6%
	2006	149	1628	1777	8%	59	758	817	7%
Oral cavity	2004	134	1799	1933	7%	15	315	330	5%
	2005	161	1777	1938	8%	27	503	530	5%
	2006	171	1920	2091	8%	36	808	844	4%
Oropharynx	2004	252	918	1170	22%	37	107	144	26%
	2005	330	961	1291	26%	67	129	196	34%
	2006	363	1061	1424	25%	50	161	211	24%
Hypopharynx	2004	67	292	359	19%	9	28	37	24%
	2005	52	279	331	16%	8	43	51	16%
	2006	72	327	399	18%	14	52	66	21%
Nasopharynx	2004	80	121	201	40%	2	12	14	14%
	2005	85	139	224	38%	10	7	17	59%
	2006	82	140	222	37%	6	12	18	33%
Major salivary glands	2004	14	433	447	3%	0	23	23	0%
	2005	16	427	443	4%	0	36	36	0%
	2006	20	463	483	4%	2	42	44	5%

The time period covered by this analysis relates to the early years of the DAHNO audit when the completeness of ascertainment of cases was much lower than in more recent years. Although the overall numbers of patients within the DAHNO dataset is lower, the proportion of total patients having chemotherapy within each of the tumour groups is similar to the NCDR dataset when looking at the latest comparable year – 2006. One notable difference was in Oral Cavity tumours, where the recording of chemotherapy appears to be lower in DAHNO than seen in the NCDR dataset. By comparing the confidence limits<sup>1</sup> around the proportions of both datasets, the

<sup>1</sup> APHO Technical Briefing 3: Commonly Used Public Health Statistics and their Confidence Intervals, APHO, 2009

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proportion of chemotherapy recording for Oral Cavity between the two datasets is significantly different at the 95% level.

Table 2 shows the number of radiotherapy treatments in both databases, and the percentage.

Table 2: Analysis of NCDR and DAHNO separately for radiotherapy

Cancer type	Diag YEAR	<i>Data from NCDR</i>				<i>Data from DAHNO</i>			
		RT flag	No RT flag	Total	% RT flag	RT flag	No RT flag	Total	% RT flag
Larynx	2004	746	1007	1753	43%	98	219	317	31%
	2005	773	1004	1777	44%	180	346	526	34%
	2006	710	1067	1777	40%	304	513	817	37%
Oral cavity	2004	500	1433	1933	26%	51	279	330	15%
	2005	516	1422	1938	27%	69	461	530	13%
	2006	474	1617	2091	23%	122	722	844	14%
Oropharynx	2004	510	660	1170	44%	62	82	144	43%
	2005	593	698	1291	46%	82	114	196	42%
	2006	613	811	1424	43%	76	135	211	36%
Hypopharynx	2004	149	210	359	42%	15	22	37	41%
	2005	112	219	331	34%	15	36	51	29%
	2006	140	259	399	35%	26	40	66	39%
Nasopharynx	2004	103	98	201	51%	5	9	14	36%
	2005	98	126	224	44%	8	9	17	47%
	2006	96	126	222	43%	8	10	18	44%
Major salivary glands	2004	163	284	447	36%	7	16	23	30%
	2005	148	295	443	33%	4	32	36	11%
	2006	172	311	483	36%	15	29	44	34%

Although the overall numbers of patients within the DAHNO dataset is lower, the proportion of total patients having radiotherapy for each of the tumour types is similar to the NCDR dataset when looking at the latest comparable year – 2006. As with chemotherapy, Oral Cavity tumours was the one notable difference, where the recording of radiotherapy treatments appears to be lower than seen in the NCDR dataset. By comparing the confidence limits<sup>2</sup> around the proportions of both datasets, the proportion of RT recording for Oral Cavity between the two datasets is significantly different at the 95% level.

<sup>2</sup> APHO Technical Briefing 3: Commonly Used Public Health Statistics and their Confidence Intervals, APHO, 2009

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**Stage 2:** Analysis of linked records between NCDR and HES for chemotherapy treatment within six months of diagnosis

The HES data were linked to NCDR data using the NHS number as an identifier, and patients having chemotherapy within six months of diagnosis were identified. Radiotherapy data are not normally recorded on inpatient HES as radiotherapy is an outpatient procedure and HES outpatient procedure recording is highly unreliable.

Data were extracted from the NCDR for patients diagnosed in the years 2004-2006 and categorised by the head & neck tumour groups. A total of 22,804 records were extracted with an NHS number.

HES finished consultant episodes were extracted for the years 2004 to 2007. From this group, 18,516 had a chemotherapy treatment recorded (according to codes in Appendix 2) within 6 months. Of this number, 17,828 had an NHS number (96.3%).

Table 3: Analysis of linked records of NCDR and HES for chemotherapy (CT)

Cancer Type	Diag YEAR	Data from NCDR (with NHS number)				HES (6 mnths treatment) (with NHS number)	
		CT flag	No CT flag	Total	% CT flag	CT treat	% CT treat of NCDR
Larynx	2004	119	1625	1744	7%	110	6%
	2005	134	1626	1760	8%	103	6%
	2006	147	1612	1759	8%	146	8%
Oral cavity	2004	134	1775	1909	7%	74	4%
	2005	160	1751	1911	8%	113	6%
	2006	169	1905	2074	8%	145	7%
Oropharynx	2004	252	912	1164	22%	216	19%
	2005	326	956	1282	25%	262	20%
	2006	361	1055	1416	25%	406	29%
Hypopharynx	2004	67	292	359	19%	49	14%
	2005	51	278	329	16%	52	16%
	2006	72	326	398	18%	84	21%
Nasopharynx	2004	77	116	193	40%	64	33%
	2005	84	139	223	38%	66	30%
	2006	81	140	221	37%	99	45%
Major salivary glands	2004	14	429	443	3%	5	1%
	2005	16	423	439	4%	7	2%
	2006	20	460	480	4%	22	5%
Thyroid gland	2004	15	1429	1444	1%	17	1%
	2005	16	1536	1552	1%	30	2%
	2006	31	1673	1704	2%	26	2%

A total of 2,346 patients were recorded on NCDR as having chemotherapy from the total of 22,804. A total of 2,096 patients were recorded on HES as having chemotherapy treatment that matched the total NCDR dataset of 2,346. Table 2 shows the matching HES records in the last two columns. The percentage figure for HES shows the percentage of HES records with chemotherapy as a percentage of the total NCDR (Head & Neck) dataset.

In 2004 and 2005, the number and percentage of matched HES records with chemotherapy was generally slightly lower than the number and percentage of NCDR records with chemotherapy.

Recording in HES has increased over the 3 years and in 2006 the number and percentage of chemotherapy records in HES was higher than in the NCDR for some cancer types (e.g. oropharynx).

### Conclusions

- There appears to be generally good agreement between the DAHNO audit and the NCDR on the percentage of head and neck cancer patients recorded as receiving chemotherapy and radiotherapy treatments within six months of diagnosis. The notable exception was oral cavity cancers, where the level of recording of chemotherapy and radiotherapy treatments in DAHNO was significantly lower than the level of recording in the NCDR.
- Overall there was reasonably good agreement between HES and NCDR on the recording of chemotherapy treatments for head and neck cancers. Recording of chemotherapy data on HES appears to have improved over the time period.
- HES was used as a source of chemotherapy data by some cancer registries during this time period. Registries should agree a standard approach to the use of chemotherapy data from HES.



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## *Appendix 1*

### Specification for data extraction

#### ICD-10 codes used to extract data

Cancer Type	ICD-10 codes
Larynx	C10.1 and C32
Oral Cavity	C00.3, C00.4, C02, C03, C04, C05.0, C05.8, C05.9 and C06
Oropharynx	C01, C05.1, C05.2, C09, C10.0, C10.2, C10.3, C10.8 and C10.9
Hypopharynx	C12 and C13
Nasopharynx	C11
Major salivary glands	C07, C08.0 and C08.1
Thyroid gland	C73

*Appendix 2*

OPCS4 codes used for chemotherapy treatments

OPCS4 code	Procedure
T133	Introduction of cytotoxic substances to pleural cavity (used here, but not used by ICBR)
T482	Introduction of cytotoxic substances to peritoneal cavity (used here, but not used by ICBR)
X352	Intravenous chemotherapy
X353	Intravenous immunotherapy (not included in this extract, but usually used by ICBR)
X373	Intramuscular chemotherapy
X384	Subcutaneous chemotherapy
X701	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 1
X702	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 2
X703	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 3
X704	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 4
X705	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 5
X708	Other specified procurement of drugs for chemotherapy for neoplasm in Bands 1-5
X709	Unspecified procurement of drugs for chemotherapy for neoplasm in Bands 1-5
X711	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 6
X712	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 7
X713	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 8
X714	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 9
X715	Procurement of drugs for chemotherapy for neoplasm for regimens in Band 10
X718	Other specified procurement of drugs for chemotherapy for neoplasm in Bands 6-10
X719	Unspecified procurement of drugs for chemotherapy for neoplasm in Bands 6-10
X721	Delivery of complex chemotherapy for neoplasm including prolonged infusional treatment at first attendance
X722	Delivery of complex parenteral chemotherapy for neoplasm at first attendance
X723	Delivery of simple parenteral chemotherapy for neoplasm at first attendance
X724	Delivery of subsequent element of cycle of chemotherapy for neoplasm
X728	Other specified delivery of chemotherapy for neoplasm
X729	Unspecified delivery of chemotherapy for neoplasm
X731	Delivery of exclusively oral chemotherapy for neoplasm
X738	Other specified delivery of oral chemotherapy for neoplasm
X739	Unspecified delivery of oral chemotherapy for neoplasm