

# National Report on Date of Diagnosis Differences in Colorectal Cancer Patients

Colorectal Malignancies  
Site-Specific Clinical Reference Group

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## Introduction

Colorectal cancer survival in the UK is below the European average. Several recent studies have sought to explore the survival deficit in depth and have demonstrated that for colon and rectal cancers it is mainly due to a high number of excess deaths in the first few months after diagnosis<sup>1 2 3 4</sup>. It is not entirely clear why so many people should die so quickly; many factors have been associated with early mortality such as advanced stage of disease at diagnosis, high levels of co-morbidities or even data related issues. This report aimed to investigate how and whether the recording of date of diagnosis varies across cancer registries, by case-mix factors and year of diagnosis. This report does not explore any potential influences on short term survival, which would require further analysis.

## Methods

Information on date of diagnosis of colon and rectal cancers between 1998 and 2008 was extracted from the National Cancer Data Repository (NCDR), a resource in which cancer registry (CR), Hospital Episode Statistics (HES), NHS Bowel Cancer Screening Programme (BCSP) and National Bowel Cancer Audit Programme (NBOCAP) data have been linked. The registry component of the NCDR contains a date of diagnosis for each tumour allocated by the cancer registries. In a large number of records the date of diagnosis of a person is after the date of the primary procedure and this indicates a potential error in the date of diagnosis captured by the registry, the primary procedure was obtained from HES that had been linked to the cancer registry data. The number of differences overall and by CR is presented in this report, by case-mix factors such as age, sex, deprivation, stage, primary procedure, admission method, route to diagnosis, co-morbidity and year of diagnosis.

A primary procedure was obtained for every individual who was identified in both registry and HES datasets within the NCDR. If a patient underwent two or more major colorectal resections during different episodes of treatment, the first operation was used. If they underwent two or more procedures, the most radical one was used. If no major resection could be identified for an individual, then other surgical interventions or palliative procedures were identified as primary procedure. If no primary procedure could be identified then patients were allocated to the “no surgical procedure” and if they could not be identified in HES then were allocated to the “no HES matched” category. The method of presentation at hospital was derived by combining the “route to diagnosis” information available in the NCDR with the method of admission from the episodes relating to the primary procedure or index admissions to hospital for every individual in the cohort. If an individual was categorised as an emergency in the routes to diagnosis data or if they had no known route to diagnosis but presented at hospital for their primary procedure or index hospital episode as an emergency they were deemed to be an emergency presentation. All other cases were considered elective cases. Only cases where the date of diagnosis is later than the date of the primary procedure have been identified as having a potential error.

## Results

During the period examined, (1998-2008) 319,746 individuals were diagnosed with colorectal cancer; 226,870 (71%) with colon (ICD 10: C18, C19) and 92,876 (29%) with rectum (ICD 10: C20) cancers. Tables 1 to 9 show the proportion of patients with a difference in diagnosis date to that which was recorded in HES as their primary procedure date, those dates where there was no difference and those where the record in the NCDR did not have a corresponding record in HES (no match HES), by several variables. Table 1 presents the proportion of differences by CR. NYCRIS had the highest percentage of no-differences in diagnosis date when compared to other registries (91.8%) whilst Oxford CR had the lowest (76.3%). The proportion of cases that have a different diagnosis date recorded on the NCDR to that which was recorded on HES for the patients primary procedure ranged from 5.9% (Thames CR) to 13.0% (Oxford CR). The proportion of cases that had no inpatient record on HES ranged from 5.3% (Trent CR) to 11.6% (Thames CR). Over time the number of differences has shown to be reducing with 11.4% of differences in 1998 to 5.3% of differences in 2008.

The percentage of differences was equally distributed across the different age groups ranging from 6.8% to 7.9%, however, those aged >80 years with a difference of 6.8% also had the highest proportion of no-matched HES records (14.5%) and this could be as a result of co-morbidities and subsequently complications which could prevent the patient undergoing surgery. Diagnosis dates showed that on average 84.3% of cases had no difference between the diagnosis date and the date of their primary procedure. The number of differences in diagnosis date does not seem to be strongly associated with gender, females (7.8%) and males (6.8%). Across England, however, when looking at gender variation by cancer registry, NYCRIS had the lowest number of differences (females 2.6% - males 2.2%), the highest gender differences can be seen in Oxford (females 14.6%- males 11.5%). Differences vary slightly when comparing stage at diagnosis with differences ranging from (4.6% - unknown) to (9.7% - Dukes B). The lowest proportion of no-differences was observed in the "unknown" stage category (77.7%), where 17.7% of cases did not have a HES record. The proportion of diagnosis dates that were observed as having a different diagnosis date to their procedure date varies according to the primary procedure a patient with colorectal cancer underwent, differences were greater in those who underwent a procedure for local excision (17.9%) major resection (10.1%) and bypass (9.7%), and these differences can be seen across all cancer registries with Oxford having the highest proportion of differences in patients who underwent a local excision (25.3%) major resection (18.8%) with NYCRIS having the lowest, local excision (10.6%), major resection (2.8%). Finally the proportion of differences is higher amongst patients who were admitted as an emergency (11.1%) than for patients who were electively admitted to the hospital (6.5%).

The same analysis was repeated for each Cancer Registry and is presented in tables 2 to 9. The proportion of differences between colon and rectal cancers varies from (2.9% for colon and 1.2% for rectum) in NYCRIS (table 4) to (16.3% for colon and 5.2% in rectum) in Oxford CR (table 5), with differences in colon cancer diagnosis dates being consistently higher than those in rectal cancer diagnosis dates for all CRs. The proportion of differences reduced over time for all CRs apart from

North West, where a steady increase was observed from 1998 until 2007 (table 3). Patients diagnosed with colon or rectal cancers within the 71-80 years age group had a higher proportion of differences reported than younger patients across England, however, some variation can be seen between cancer registries. Patients >80 years of age had fewer differences observed than the 71-80 year age group, though they do have the largest number cases with no record on HES (14.5%).

**Table 1:** Number and percentage of differences by each characteristic

Characteristic		No Difference		Difference		No HES match		Total
		n	%	n	%	n	%	
Registry	ECRIC	29,340	83.0%	3,164	8.9%	2859	8.1%	35,363
	NWCIS	36,013	83.6%	3,489	8.1%	3556	8.3%	43,058
	NYCRIS	41,876	91.8%	1,083	2.4%	2671	5.9%	45,630
	OCIU	11,778	76.3%	2,003	13.0%	1656	10.7%	15,437
	SWCIS	42,290	84.1%	3,842	7.6%	4145	8.2%	50,277
	ThCR	51,494	82.4%	3,710	5.9%	7267	11.6%	62,471
	TrCR	27,682	87.0%	2,432	7.6%	1,700	5.3%	31,814
	WMCIU	29,047	81.4%	3,495	9.8%	3,154	8.8%	35,696
Site	Colon	186,789	82.3%	19,819	8.7%	20,262	8.9%	226,870
	Rectum	82,731	89.1%	3,399	3.7%	6,746	7.3%	92,876
Year of Diagnosis	1998	21,723	75.8%	3,281	11.4%	3,659	12.8%	28,663
	1999	22,939	81.0%	2,362	8.3%	3,002	10.6%	28,303
	2000	23,423	82.0%	2,355	8.2%	2,799	9.8%	28,577
	2001	23,325	84.1%	1,792	6.5%	2,623	9.5%	27,740
	2002	23,450	84.1%	2,002	7.2%	2,418	8.7%	27,870
	2003	23,849	84.8%	2,085	7.4%	2,191	7.8%	28,125
	2004	24,976	86.3%	1,870	6.5%	2,110	7.3%	28,956
	2005	25,561	86.6%	1,818	6.2%	2,153	7.3%	29,532
	2006	26,090	86.7%	1,962	6.5%	2,056	6.8%	30,108
	2007	26,489	86.8%	2,041	6.7%	2,000	6.6%	30,530
	2008	27,695	88.4%	1,650	5.3%	1,997	6.4%	31,342
Age	<50	15,084	85.3%	1,200	6.8%	1,409	8.0%	17,693
	51-60	34,733	86.3%	2,824	7.0%	2,702	6.7%	40,259
	61-70	68,489	87.3%	5,540	7.1%	4,418	5.6%	78,447
	71-80	91,636	85.2%	8,492	7.9%	7,477	6.9%	107,605
	>80	59,578	78.7%	5,162	6.8%	11,002	14.5%	75,742
Sex	Male	149,106	86.1%	11,850	6.8%	12,278	7.1%	173,234
	Female	120,414	82.2%	11,368	7.8%	14,730	10.1%	146,512
Dukes' Stage	A	25,396	87.6%	1,924	6.6%	1,676	5.8%	28,996
	B	66,148	85.7%	7,457	9.7%	3,558	4.6%	77,163
	C	67,011	87.0%	7,299	9.5%	2,734	3.5%	77,044
	D	41,268	88.0%	2,450	5.2%	3,163	6.7%	46,881
	Unknown	69,697	77.7%	4,088	4.6%	15,877	17.7%	89,662
Primary Procedure	Major resection	180,495	89.9%	20,382	10.1%	0	0.0%	200,877
	Local excision	8,293	82.1%	1,803	17.9%	0	0.0%	10,096
	Bypass	1,309	90.3%	141	9.7%	0	0.0%	1,450
	Stoma	9,754	92.5%	787	7.5%	0	0.0%	10,541
	Stent	2,088	95.2%	105	4.8%	0	0.0%	2,193
	No surgical procedure	67,581	100.0%	0	0.0%	0	0.0%	67,581
	Not HES matched	0	0.0%	0	0.0%	27,008	100.0%	27,008
Index Admission Method	Elective	187,935	93.5%	12,993	6.5%	0	0.0%	200,928
	Emergency	81,585	88.9%	10,225	11.1%	0	0.0%	91,810
	No index admission	0	0.0%	0	0.0%	27,008	100.0%	27,008
Charlson Morbidity Score	0	221,617	92.9%	17,058	7.1%	0	0%	238,675
	1	31,020	88.1%	4,191	11.9%	0	0%	35,211
	2	10,677	89.5%	1,258	10.5%	0	0%	11,935
	>=3	6,206	89.7%	711	10.3%	0	0%	6,917
	Unknown	0	0.0%	0	0.0%	27,008	100%	27,008

**Table 2:** Number and percentage of differences for the Eastern Cancer Registration and Information Centre

Characteristic		No Difference		Difference		No HES match		Total
		n	%	n	%	n	%	
Site	Colon	20,233	80.5%	2819	11.2%	2,087	8.3%	25,139
	Rectum	9,107	89.1%	345	3.4%	772	7.6%	10,224
Year of Diagnosis	1998	2,448	78.6%	304	9.8%	364	11.7%	3,116
	1999	2,501	80.4%	297	9.5%	312	10.0%	3,110
	2000	2,531	79.8%	334	10.5%	305	9.6%	3,170
	2001	2,428	80.7%	289	9.6%	290	9.6%	3,007
	2002	2,552	82.7%	283	9.2%	249	8.1%	3,084
	2003	2,562	82.3%	303	9.7%	249	8.0%	3,114
	2004	2,603	84.0%	265	8.6%	229	7.4%	3,097
	2005	2,752	83.7%	315	9.6%	222	6.7%	3,289
	2006	2,888	84.9%	307	9.0%	205	6.0%	3,400
	2007	3,014	86.7%	242	7.0%	220	6.3%	3,476
2008	3,061	87.5%	225	6.4%	214	6.1%	3,500	
Age	<50	1,485	85.3%	124	7.1%	132	7.6%	1,741
	51-60	3,602	84.3%	373	8.7%	298	7.0%	4,273
	61-70	7,351	85.8%	728	8.5%	484	5.7%	8,563
	71-80	10,170	83.9%	1,181	9.7%	770	6.4%	12,121
	>80	6,732	77.7%	758	8.7%	1,175	13.6%	8,665
Sex	Male	16,011	84.8%	1,597	8.5%	1,271	6.7%	18,879
	Female	13,329	80.9%	1,567	9.5%	1,588	9.6%	16,484
Dukes' Stage	A	3,086	84.2%	326	8.9%	254	6.9%	3,666
	B	6,726	82.8%	1,028	12.7%	367	4.5%	8,121
	C	7,513	85.2%	990	11.2%	312	3.5%	8,815
	D	4,344	85.5%	418	8.2%	316	6.2%	5,078
	Unknown	7,671	79.2%	402	4.2%	1,610	16.6%	9,683
Primary Procedure	Major resection	20,301	88.1%	2,742	11.9%	0	0.0%	23,043
	Local excision	944	76.1%	296	23.9%	0	0.0%	1,240
	Bypass	158	89.8%	18	10.2%	0	0.0%	176
	Stoma	1,035	91.6%	95	8.4%	0	0.0%	1,130
	Stent	181	93.3%	13	6.7%	0	0.0%	194
	No surgical procedure	6,721	100.0%	0	0.0%	0	0.0%	6,721
	Not HES matched	0	0.0%	0	0.0%	2,859	100.0%	2,859
Index Admission Method	Elective	20,783	92.5%	1,686	7.5%	0	0.0%	22,469
	Emergency	8,557	85.3%	1,478	14.7%	0	0.0%	10,035
	No index admission	0	0.0%	0	0.0%	2,859	100.0%	2,859
Charlson Morbidity Score	0	24,059	91.1%	2,340	8.9%	0	0.0%	26,399
	1	3,479	85.6%	587	14.4%	0	0.0%	4,066
	2	1,141	87.5%	163	12.5%	0	0.0%	1,304
	>=3	661	89.9%	74	10.1%	0	0.0%	735
	Unknown	0	0.0%	0	0.0%	2,859	100.0%	2,859

**Table 3:** Number and percentage of differences for the North West Cancer Intelligence Service

Characteristic		No Difference		Difference		No HES match		Total	
		n	%	n	%	n	%		
Site	Colon	24,775	81.5%	2,890	9.5%	2,723	9.0%	30,388	
	Rectum	11,238	88.7%	599	4.7%	833	6.6%	12,670	
Year of Diagnosis	1998	3,273	84.3%	212	5.5%	396	10.2%	3,881	
	1999	3,358	85.4%	208	5.3%	367	9.3%	3,933	
	2000	3,339	85.8%	199	5.1%	352	9.0%	3,890	
	2001	3,223	83.9%	259	6.7%	358	9.3%	3,840	
	2002	2,988	82.4%	331	9.1%	306	8.4%	3,625	
	2003	3,206	84.5%	318	8.4%	272	7.2%	3,796	
	2004	3,131	82.3%	371	9.7%	304	8.0%	3,806	
	2005	3,097	80.4%	429	11.1%	326	8.5%	3,852	
	2006	3,296	81.9%	401	10.0%	327	8.1%	4,024	
Age	2007	3,430	82.2%	456	10.9%	285	6.8%	4,171	
	2008	3,672	86.6%	305	7.2%	263	6.2%	4,240	
	<50	2,058	83.8%	209	8.5%	189	7.7%	2,456	
	51-60	4,858	85.2%	480	8.4%	366	6.4%	5,704	
	61-70	9,558	86.5%	884	8.0%	613	5.5%	11,055	
	71-80	12,136	84.4%	1,230	8.5%	1,021	7.1%	14,387	
	>80	7,403	78.3%	686	7.3%	1,367	14.5%	9,456	
	Sex	Male	20,273	85.0%	1,917	8.0%	1,669	7.0%	23,859
		Female	15,740	82.0%	1,572	8.2%	1,887	9.8%	19,199
Dukes' Stage	A	2,857	86.5%	285	8.6%	159	4.8%	3,301	
	B	8,524	83.8%	1,213	11.9%	433	4.3%	10,170	
	C	9,605	85.8%	1,251	11.2%	343	3.1%	11,199	
	D	1,659	87.2%	134	7.0%	110	5.8%	1,903	
	Unknown	13,368	81.1%	606	3.7%	2,511	15.2%	16,485	
Primary Procedure	Major resection	23,588	88.4%	3,086	11.6%	0	0.0%	26,674	
	Local excision	1,146	83.6%	225	16.4%	0	0.0%	1,371	
	Bypass	175	88.8%	22	11.2%	0	0.0%	197	
	Stoma	1,442	91.3%	137	8.7%	0	0.0%	1,579	
	Stent	264	93.3%	19	6.7%	0	0.0%	283	
	No surgical procedure	9,398	100.0%	0	0.0%	0	0.0%	9,398	
	Not HES matched	0	0.0%	0	0.0%	3,556	100.0%	3,556	
Index Admission Method	Elective	24,450	91.5%	2,276	8.5%	0	0.0%	26,726	
	Emergency	11,563	90.5%	1,213	9.5%	0	0.0%	12,776	
	No index admission	0	0.0%	0	0.0%	3,556	100.0%	3,556	
Charlson Morbidity Score	0	27,568	92.3%	2,287	7.7%	0	0.0%	29,855	
	1	5,556	87.7%	779	12.3%	0	0.0%	6,335	
	2	1,769	86.7%	272	13.3%	0	0.0%	2,041	
	>=3	1,120	88.1%	151	11.9%	0	0.0%	1,271	
	Unknown	0	0.0%	0	0.0%	3,556	100.0%	3,556	

**Table 4:** Number and percentage of differences for the Northern and Yorkshire Cancer Registry and Information Service

Characteristic		No Difference		Difference		No HES match		Total
		n	%	n	%	n	%	
Site	Colon	29,016	90.8%	918	2.9%	2,027	6.3%	31,961
	Rectum	12,860	94.1%	165	1.2%	644	4.7%	13,669
Year of Diagnosis	1998	3,539	85.7%	163	3.9%	428	10.4%	4,130
	1999	3,616	88.5%	169	4.1%	301	7.4%	4,086
	2000	3,657	89.6%	132	3.2%	292	7.2%	4,081
	2001	3,649	92.1%	71	1.8%	242	6.1%	3,962
	2002	3,785	92.1%	85	2.1%	240	5.8%	4,110
	2003	3,747	92.8%	79	2.0%	211	5.2%	4,037
	2004	3,839	93.5%	68	1.7%	197	4.8%	4,104
	2005	3,878	92.8%	88	2.1%	215	5.1%	4,181
	2006	3,967	93.2%	90	2.1%	198	4.7%	4,255
	2007	4,125	93.9%	79	1.8%	188	4.3%	4,392
2008	4,074	94.9%	59	1.4%	159	3.7%	4,292	
Age	<50	2,222	93.7%	62	2.6%	62	2.6%	2,372
	51-60	5,595	93.9%	136	2.3%	136	2.3%	5,958
	61-70	10,962	94.5%	251	2.2%	251	2.2%	11,598
	71-80	14,449	92.4%	400	2.6%	400	2.6%	15,635
	>80	8,648	85.9%	234	2.3%	234	2.3%	10,067
Sex	Male	23,781	93.4%	549	2.2%	1,141	4.5%	25,471
	Female	18,095	89.8%	534	2.6%	1,530	7.6%	20,159
Dukes' Stage	A	4,668	94.5%	114	2.3%	159	3.2%	4,941
	B	10,915	94.9%	296	2.6%	295	2.6%	11,506
	C	10,038	94.7%	321	3.0%	240	2.3%	10,599
	D	9,775	92.2%	197	1.9%	632	6.0%	10,604
	Unknown	6,480	81.2%	155	1.9%	1,345	16.9%	7,980
Primary Procedure	Major resection	29,583	97.2%	860	2.8%	0	0.0%	30,443
	Local excision	1,343	89.4%	160	10.6%	0	0.0%	1,503
	Bypass	184	98.9%	2	1.1%	0	0.0%	186
	Stoma	1,548	96.4%	57	3.6%	0	0.0%	1,605
	Stent	484	99.2%	4	0.8%	0	0.0%	488
	No surgical procedure	8,734	100.0%	0	0.0%	0	0.0%	8,734
	Not HES matched	0	0.0%	0	0.0%	2,671	100.0%	2,671
Index Admission Method	Elective	29,592	98.4%	484	1.6%	0	0.0%	30,076
	Emergency	12,284	95.4%	599	4.6%	0	0.0%	12,883
	No index admission	0	0.0%	0	0.0%	2,671	100.0%	2,671
Charlson Morbidity Score	0	34,585	97.6%	836	2.4%	0	0.0%	35,421
	1	4,661	96.6%	165	3.4%	0	0.0%	4,826
	2	1,675	97.0%	51	3.0%	0	0.0%	1,726
	>=3	955	96.9%	31	3.1%	0	0.0%	986
	Unknown	0	0.0%	0	0.0%	2,671	100.0%	2,671



**Table 5:** Number and percentage of differences for Oxford Cancer Intelligence Unit

Characteristic		No Difference		Difference		No HES match		Total	
		n	%	n	%	n	%		
Site	Colon	7,860	72.5%	1,763	16.3%	1,223	11.3%	10,846	
	Rectum	3,918	85.3%	240	5.2%	433	9.4%	4,591	
Year of Diagnosis	1998	875	62.8%	317	22.7%	202	14.5%	1,394	
	1999	895	66.8%	280	20.9%	165	12.3%	1,340	
	2000	910	68.7%	257	19.4%	157	11.9%	1,324	
	2001	887	70.3%	215	17.0%	160	12.7%	1,262	
	2002	1,036	76.1%	184	13.5%	141	10.4%	1,361	
	2003	1,037	76.5%	167	12.3%	152	11.2%	1,356	
	2004	1,166	79.9%	143	9.8%	150	10.3%	1,459	
	2005	1,232	85.1%	94	6.5%	122	8.4%	1,448	
	2006	1,215	83.4%	103	7.1%	139	9.5%	1,457	
Age	2007	1,214	83.7%	120	8.3%	116	8.0%	1,450	
	2008	1,311	82.7%	123	7.8%	152	9.6%	1,586	
	<50	750	77.3%	106	10.9%	114	11.8%	970	
	51-60	1,676	78.6%	222	10.4%	235	11.0%	2,133	
	61-70	2,973	79.2%	480	12.8%	301	8.0%	3,754	
	71-80	3,860	76.6%	753	14.9%	429	8.5%	5,042	
	>80	2,519	71.2%	442	12.5%	577	16.3%	3,538	
	Sex	Male	6,517	79.0%	952	11.5%	778	9.4%	8,247
		Female	5,261	73.2%	1,051	14.6%	878	12.2%	7,190
Dukes' Stage	A	1,284	79.5%	170	10.5%	161	10.0%	1,615	
	B	2,934	74.6%	691	17.6%	309	7.9%	3,934	
	C	3,187	76.3%	759	18.2%	232	5.6%	4,178	
	D	1,610	79.6%	224	11.1%	188	9.3%	2,022	
	Unknown	2,763	74.9%	159	4.3%	766	20.8%	3,688	
Primary Procedure	Major resection	7,725	81.2%	1,786	18.8%	0	0.0%	9,511	
	Local excision	436	74.7%	148	25.3%	0	0.0%	584	
	Bypass	54	80.6%	13	19.4%	0	0.0%	67	
	Stoma	433	89.1%	53	10.9%	0	0.0%	486	
	Stent	62	95.4%	3	4.6%	0	0.0%	65	
	No surgical procedure	3,068	100.0%	0	0.0%	0	0.0%	3,068	
	Not HES matched	0	0.0%	0	0.0%	1,656	100.0%	1,656	
Index Admission Method	Elective	8,630	88.7%	1,103	11.3%	0	0.0%	9,733	
	Emergency	3,148	77.8%	900	22.2%	0	0.0%	4,048	
	No index admission	0	0.0%	0	0.0%	1,656	100.0%	1,656	
Charlson Morbidity Score	0	10,197	86.6%	1,576	13.4%	0	0.0%	11,773	
	1	988	77.1%	294	22.9%	0	0.0%	1,282	
	2	385	80.7%	92	19.3%	0	0.0%	477	
	>=3	208	83.5%	41	16.5%	0	0.0%	249	
	Unknown	0	0.0%	0	0.0%	1,656	100.0%	1,656	

**Table 6:** Number and percentage of differences for South West Cancer Intelligence Service

Characteristic		No Difference		Difference		No HES match		Total
		n	%	n	%	n	%	
Site	Colon	30,075	82.4%	3,267	9.0%	3,142	8.6%	36,484
	Rectum	12,215	88.6%	575	4.2%	1,003	7.3%	13,793
Year of Diagnosis	1998	3,244	74.8%	512	11.8%	579	13.4%	4,335
	1999	3,320	77.3%	499	11.6%	474	11.0%	4,293
	2000	3,417	78.7%	534	12.3%	392	9.0%	4,343
	2001	3,831	85.7%	224	5.0%	413	9.2%	4,468
	2002	3,691	82.3%	389	8.7%	405	9.0%	4,485
	2003	3,705	83.1%	399	9.0%	354	7.9%	4,458
	2004	4,212	89.8%	183	3.9%	297	6.3%	4,692
	2005	4,259	91.2%	112	2.4%	298	6.4%	4,669
	2006	4,145	86.3%	333	6.9%	323	6.7%	4,801
	2007	4,075	84.8%	417	8.7%	312	6.5%	4,804
	2008	4,391	89.1%	240	4.9%	298	6.0%	4,929
Age	<50	2,045	84.1%	169	7.0%	217	8.9%	2,431
	51-60	5,164	86.8%	435	7.3%	351	5.9%	5,950
	61-70	10,308	87.7%	862	7.3%	582	5.0%	11,752
	71-80	14,596	85.0%	1,456	8.5%	1,116	6.5%	17,168
	>80	10,177	78.4%	920	7.1%	1,879	14.5%	12,976
Sex	Male	22,777	86.1%	1,857	7.0%	1,818	6.9%	26,452
	Female	19,513	81.9%	1,985	8.3%	2,327	9.8%	23,825
Dukes' Stage	A	4,265	87.3%	334	6.8%	284	5.8%	4,883
	B	11,411	85.4%	1,347	10.1%	608	4.5%	13,366
	C	11,431	86.8%	1,357	10.3%	387	2.9%	13,175
	D	4,112	90.5%	206	4.5%	224	4.9%	4,542
	Unknown	11,071	77.4%	598	4.2%	2,642	18.5%	14,311
Primary Procedure	Major resection	28,339	89.4%	3,372	10.6%	0	0.0%	31,711
	Local excision	1,241	80.7%	296	19.3%	0	0.0%	1,537
	Bypass	221	86.3%	35	13.7%	0	0.0%	256
	Stoma	1,262	91.3%	120	8.7%	0	0.0%	1,382
	Stent	302	94.1%	19	5.9%	0	0.0%	321
	No surgical procedure	10,925	100.0%	0	0.0%	0	0.0%	10,925
	Not HES matched	0	0.0%	0	0.0%	4,145	100.0%	4,145
Index Admission Method	Elective	29,981	93.3%	2,162	6.7%	0	0.0%	32,143
	Emergency	12,309	88.0%	1,680	12.0%	0	0.0%	13,989
	No index admission	0	0.0%	0	0.0%	4,145	100.0%	4,145
Charlson Morbidity Score	0	35,658	92.5%	2,907	7.5%	0	0.0%	38,565
	1	4,237	86.8%	646	13.2%	0	0.0%	4,883
	2	1,548	90.1%	171	9.9%	0	0.0%	1,719
	>=3	847	87.8%	118	12.2%	0	0.0%	965
	Unknown	0	0.0%	0	0.0%	4,145	100.0%	4,145

**Table 7:** Number and percentage of differences for Thames Cancer Registry

Characteristic		No Difference		Difference		No HES match		Total	
		n	%	n	%	n	%		
Site	Colon	36,673	81.0%	3172	7.0%	5,449	12.0%	45,294	
	Rectum	14,821	86.3%	538	3.1%	1,818	10.6%	17,177	
Year of Diagnosis	1998	4,410	75.3%	384	6.6%	1,061	18.1%	5,855	
	1999	4,336	78.1%	367	6.6%	848	15.3%	5,551	
	2000	4,499	79.2%	395	6.9%	790	13.9%	5,684	
	2001	4,419	81.8%	281	5.2%	699	12.9%	5,399	
	2002	4,450	82.6%	274	5.1%	666	12.4%	5,390	
	2003	4,615	84.9%	291	5.4%	530	9.7%	5,436	
	2004	4,754	84.4%	328	5.8%	552	9.8%	5,634	
	2005	4,828	84.3%	360	6.3%	537	9.4%	5,725	
	2006	5,027	85.9%	313	5.4%	510	8.7%	5,850	
Age	2007	4,997	85.3%	343	5.9%	521	8.9%	5,861	
	2008	5,159	84.8%	374	6.1%	553	9.1%	6,086	
	<50	3,360	83.4%	214	5.3%	453	11.2%	4,027	
	51-60	6,350	84.1%	437	5.8%	765	10.1%	7,552	
	61-70	12,553	85.9%	834	5.7%	1,223	8.4%	14,610	
	71-80	17,043	83.6%	1,364	6.7%	1,987	9.7%	20,394	
	>80	12,188	76.7%	861	5.4%	2,839	17.9%	15,888	
	Sex	Male	27,293	84.1%	1,832	5.6%	3,336	10.3%	32,461
		Female	24,201	80.6%	1,878	6.3%	3,931	13.1%	30,010
Dukes' Stage	A	3,795	86.9%	278	6.4%	295	6.8%	4,368	
	B	11,715	85.0%	1,143	8.3%	925	6.7%	13,783	
	C	11,444	86.8%	987	7.5%	756	5.7%	13,187	
	D	12,001	87.0%	644	4.7%	1,156	8.4%	13,801	
	Unknown	12,539	72.3%	658	3.8%	4,135	23.9%	17,332	
Primary Procedure	Major resection	32,639	91.0%	3,221	9.0%	0	0.0%	35,860	
	Local excision	1,396	81.9%	308	18.1%	0	0.0%	1,704	
	Bypass	250	94.7%	14	5.3%	0	0.0%	264	
	Stoma	1,730	92.5%	141	7.5%	0	0.0%	1,871	
	Stent	378	93.6%	26	6.4%	0	0.0%	404	
	No surgical procedure	15,101	100.0%	0	0.0%	0	0.0%	15,101	
	Not HES matched	0	0.0%	0	0.0%	7,267	100.0%	7,267	
Index Admission Method	Elective	34,723	94.6%	1,971	5.4%	0	0.0%	36,694	
	Emergency	16,771	90.6%	1,739	9.4%	0	0.0%	18,510	
	No index admission	0	0.0%	0	0.0%	7,267	100.0%	7,267	
Charlson Morbidity Score	0	42,711	94.1%	2,666	5.9%	0	0.0%	45,377	
	1	5,663	89.2%	689	10.8%	0	0.0%	6,352	
	2	1,989	90.4%	212	9.6%	0	0.0%	2,201	
	>=3	1,131	88.8%	143	11.2%	0	0.0%	1,274	
	Unknown	0	0.0%	0	0.0%	7267	100.0%	7,267	

**Table 8:** Number and percentage of differences for Trent Cancer Registry

Characteristic		No Difference		Difference		No HES match		Total	
		n	%	n	%	n	%		
Site	Colon	16,706	75.4%	1,909	8.6%	1,283	5.8%	22,155	
	Rectum	8,719	90.3%	523	5.4%	417	4.3%	9,659	
Year of Diagnosis	1998	1,488	54.9%	1,012	37.4%	209	7.7%	2,709	
	1999	2,318	84.2%	256	9.3%	180	6.5%	2,754	
	2000	2,443	86.3%	213	7.5%	174	6.1%	2,830	
	2001	2,392	87.5%	166	6.1%	175	6.4%	2,733	
	2002	2,409	88.2%	170	6.2%	152	5.6%	2,731	
	2003	2,424	88.7%	167	6.1%	143	5.2%	2,734	
	2004	2,628	90.5%	141	4.9%	136	4.7%	2,905	
	2005	2,823	91.8%	104	3.4%	149	4.8%	3,076	
	2006	2,801	92.7%	108	3.6%	113	3.7%	3,022	
Age	<50	1,527	87.4%	140	8.0%	80	4.6%	1,747	
	51-60	3,482	88.9%	311	7.9%	124	3.2%	3,917	
	61-70	7,155	88.8%	635	7.9%	270	3.3%	8,060	
	71-80	9,519	87.4%	896	8.2%	477	4.4%	10,892	
	>80	5,999	83.3%	450	6.3%	749	10.4%	7,198	
	Sex	Male	15,736	88.4%	1,307	7.3%	767	4.3%	17,810
		Female	11,946	85.3%	1,125	8.0%	933	6.7%	14,004
	Dukes' Stage	A	2,453	92.7%	123	4.7%	69	2.6%	2,645
		B	5,782	90.4%	473	7.4%	141	2.2%	6,396
C		6,045	91.7%	449	6.8%	99	1.5%	6,593	
D		2,378	94.2%	56	2.2%	91	3.6%	2,525	
Unknown		11,024	80.7%	1,331	9.7%	1,300	9.5%	13,655	
Primary Procedure	Major resection	18,377	89.4%	2,173	10.6%	0	0.0%	20,550	
	Local excision	904	84.5%	166	15.5%	0	0.0%	1,070	
	Bypass	150	90.9%	15	9.1%	0	0.0%	165	
	Stoma	1,287	94.6%	73	5.4%	0	0.0%	1,360	
	Stent	191	97.4%	5	2.6%	0	0.0%	196	
	No surgical procedure	6,773	100.0%	0	0.0%	0	0.0%	6,773	
	Not HES matched	0	0.0%	0	0.0%	1,700	100.0%	1,700	
Index Admission Method	Elective	19,271	92.8%	1,496	7.2%	0	0.0%	20,767	
	Emergency	8,411	90.0%	936	10.0%	0	0.0%	9,347	
	No index admission	0	0.0%	0	0.0%	1,700	100.0%	1,700	
Charlson Morbidity Score	0	22,399	92.5%	1,804	7.5%	0	0.0%	24,203	
	1	3,384	88.6%	434	11.4%	0	0.0%	3,818	
	2	1,179	89.5%	138	10.5%	0	0.0%	1,317	
	>=3	720	92.8%	56	7.2%	0	0.0%	776	
	Unknown	0	0.0%	0	0.0%	1,700	100.0%	1,700	

**Table 9:** Number and percentage of differences for West Midlands Cancer Intelligence Unit

Characteristic		No Difference		Difference		No HES match		Total
		n	%	n	%	n	%	
Site	Colon	19,194	78.0%	3,081	12.5%	2,328	9.5%	24,603
	Rectum	9,853	88.8%	414	3.7%	826	7.4%	11,093
Year of Diagnosis	1998	2,446	75.4%	377	11.6%	420	13.0%	3,243
	1999	2,595	80.2%	286	8.8%	355	11.0%	3,236
	2000	2,627	80.7%	291	8.9%	337	10.4%	3,255
	2001	2,496	81.3%	287	9.4%	286	9.3%	3,069
	2002	2,539	82.3%	286	9.3%	259	8.4%	3,084
	2003	2,553	79.9%	361	11.3%	280	8.8%	3,194
	2004	2,643	81.1%	371	11.4%	245	7.5%	3,259
	2005	2,692	81.8%	316	9.6%	284	8.6%	3,292
	2006	2,751	83.4%	307	9.3%	241	7.3%	3,299
	2007	2,822	83.8%	314	9.3%	230	6.8%	3,366
2008	2,883	84.8%	299	8.8%	217	6.4%	3,399	
Age	<50	1,637	84.0%	176	9.0%	136	7.0%	1,949
	51-60	4,006	83.9%	430	9.0%	336	7.0%	4,772
	61-70	7,629	84.3%	866	9.6%	560	6.2%	9,055
	71-80	9,863	82.4%	1,212	10.1%	891	7.4%	11,966
	>80	5,912	74.3%	811	10.2%	1,231	15.5%	7,954
Sex	Male	16,718	83.4%	1,839	9.2%	1,498	7.5%	20,055
	Female	12,329	78.8%	1,656	10.6%	1,656	10.6%	15,641
Dukes' Stage	A	2,988	83.5%	294	8.2%	295	8.2%	3,577
	B	8,141	82.3%	1,266	12.8%	480	4.9%	9,887
	C	7,748	83.3%	1,185	12.7%	365	3.9%	9,298
	D	5,389	84.1%	571	8.9%	446	7.0%	6,406
	Unknown	4,781	73.2%	179	2.7%	1,568	24.0%	6,528
Primary Procedure	Major resection	19,943	86.4%	3,142	13.6%	0	0.0%	23,085
	Local excision	883	81.2%	204	18.8%	0	0.0%	1,087
	Bypass	117	84.2%	22	15.8%	0	0.0%	139
	Stoma	1,017	90.2%	111	9.8%	0	0.0%	1,128
	Stent	226	93.4%	16	6.6%	0	0.0%	242
	No surgical procedure	6,861	100.0%	0	0.0%	0	0.0%	6,861
	Not HES matched	0	0.0%	0	0.0%	3,154	100.0%	3,154
Index Admission Method	Elective	20,505	91.9%	1,815	8.1%	0	0.0%	22,320
	Emergency	8,542	83.6%	1,680	16.4%	0	0.0%	10,222
	No index admission	0	0.0%	0	0.0%	3,154	100.0%	3,154
Charlson Morbidity Score	0	24,440	90.2%	2,642	9.8%	0	0.0%	27,082
	1	3,052	83.6%	597	16.4%	0	0.0%	3,649
	2	991	86.2%	159	13.8%	0	0.0%	1,150
	>=3	564	85.3%	97	14.7%	0	0.0%	661
	Unknown	0	0.0%	0	0.0%	3,154	100.0%	3,154

## Discussion

The report has flagged that there are differences between the date of primary procedure and date of diagnosis. It has been suggested that for those patients who are diagnosed as an emergency admission, which results in surgery, the time difference between a biopsy taken during a surgical procedure and the subsequent resection and pathology report could be several weeks. Cancer registration rules state that the histology date always takes precedence over any other date obtained as it is accepted as being the most accurate method for diagnosis. The histology date recorded should be the date the sample was taken and not the report date, so in theory there should be no difference and if there is a difference no more than one day depending on the date/time of the procedure and the date/time of the biopsy.

There are a number of reasons why there could be a difference between the procedure date and the date of diagnosis, a patient may have been admitted and had a procedure which is palliative rather than curative, such as a bypass that may have been performed to relieve a patient's symptoms and then several weeks later a biopsy is taken, or the patient may have co-morbidities which need to be addressed before they can have a biopsy, a patient's health status can result in a delayed diagnosis.

There are also differences amongst registries in the way data are collected. For NYCRIS, up to 2009 registrations, registration staff went through case notes to collect information, and the diagnosis date would be the first date the tumour was identified either by imaging or histology. From 2010, Cancer Registries started to follow UKACR guidance that states the chosen incidence date is to be the first histology or cytology confirmation of malignancy unless a clinical or imaging diagnosis is made more than 3 months before the pathology date at which time the clinical or imaging date becomes the incidence date.

## Recommendations

It is recommended that the National Cancer Registration Service perform some quality assurance to ensure all teams are interpreting new registration rules in the same way.

## References

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The National Cancer Intelligence Network (NCIN) is a UK-wide initiative, working to drive improvements in standards of cancer care and clinical outcomes by improving and using the information collected about cancer patients for analysis, publication and research. Sitting within the National Cancer Research Institute (NCRI), the NCIN works closely with cancer services in England, Scotland, Wales and Northern Ireland. In England, the NCIN is part of the National Cancer Programme.