

Supplementary analysis for patients starting treatment for head and neck cancer

Patients waiting over 104 days from urgent suspected cancer referral to starting treatment for head and neck cancer

There was no significant variation by gender for laryngeal, oral cavity, oropharyngeal or thyroid cancer. There was no significant variation by age for laryngeal, oropharyngeal or thyroid cancer. Those aged 70–79 were more likely to be a long waiter compared to those aged 60–69 for oral cavity patients, although only in the original cohort. There was no significant variation by deprivation for all sites, with the exception of thyroid cancer where those living in the most deprived quintile were more likely to wait over 104 days compared to the least. However, this association was only significant in the rapid cancer registration dataset (RCRD) linked cohort. There were increasing odds of being a long waiter with increasing financial year for each site, but oropharyngeal cancer had the smallest increase in odds of being a long waiter for both original analyses and RCRD linked. There were no significant differences by comorbidity for any sites, except oropharyngeal where those with a comorbidity score of 2 were more likely to wait over 104 days compared to those with a score of 0.

The longest subinterval was from referral to informed of diagnosis with median time from DTT to treatment in Q1 & Q2 2022/2023 around 20–25 days for laryngeal, oral cavity and oropharyngeal cancer and 27 days for thyroid cancer. Median time from informed of diagnosis to DTT was around 20 days for laryngeal and oropharyngeal cancer but 29 days for oral cavity cancer in Q1 & Q2 2022/2023. However, thyroid cancer had a median of 0 days from informed of diagnosis to DTT.

The most common reason for delay between referral and starting treatment was healthcare provider-initiated delay for laryngeal, oral cavity, oropharyngeal and thyroid cancer. Only very small numbers of patients met the 28-day referral to informed of diagnosis standard. The percentage that met the 31-day standard from decision to treat (DTT) to treatment increased from 2017/2018 to Q1 & Q2 2022/2023 for laryngeal (72.% to 85%), and oropharyngeal cancer (74% to 84%) but decreased for oral cavity (77% to 64%) and thyroid cancer (80% to 61.%).

Patients waiting over 62 days from urgent suspected cancer referral to starting treatment for head and neck cancer

The regression findings for likelihood of waiting over 62 days were similar to those waiting over 104 days, with no significant associations except for those aged 19–49 with thyroid cancer being less likely to wait over 62 days compared to those aged 60–69, and significant increases with financial year. The delay findings were also similar, although the percentages meeting the standards were higher. The median intervals from referral to informed of diagnosis and informed of diagnosis to DTT were shorter for those waiting over 104 days and median time from DTT to treatment was generally similar to that for patients waiting over 104 days.

Table 1: Regression analysis for likelihood of waiting over 104 days by characteristic for laryngeal cancer. Results presented for both the original and Rapid Cancer Registration Dataset (RCRD) linked cohort. The results for the original cohort are presented unadjusted and adjusted and results for the RCRD linked cohort are presented unadjusted, with minimal adjustment to align with the original cohort analysis and with full adjustment

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Gender	Female	1.27 (0.98-1.64)	1.26 (0.97-1.65)	1.25 (0.96-1.62)	1.29 (0.98-1.69)	1.27 (0.96-1.67)
	Male (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Age group	19-49	1.06 (0.66-1.72)	1.1 (0.67-1.82)	1.03 (0.63-1.66)	1.08 (0.66-1.79)	1.14 (0.69-1.88)
	50-59	1 (0.74-1.33)	1.01 (0.75-1.38)	1.05 (0.77-1.42)	1.1 (0.8-1.51)	1.13 (0.83-1.56)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	0.87 (0.67-1.14)	0.87 (0.66-1.14)	0.98 (0.75-1.28)	0.97 (0.74-1.28)	0.95 (0.72-1.25)
	80+	1.01 (0.73-1.4)	1.02 (0.72-1.44)	1.11 (0.79-1.56)	1.11 (0.77-1.58)	1.07 (0.74-1.53)
Deprivation quintile	1 - most deprived	1.01 (0.72-1.41)	1.01 (0.7-1.45)	0.95 (0.68-1.33)	0.91 (0.63-1.32)	0.88 (0.6-1.27)
	2	1.06 (0.74-1.51)	1.14 (0.79-1.67)	0.84 (0.58-1.21)	0.9 (0.61-1.33)	0.88 (0.6-1.29)
	3	0.77 (0.52-1.13)	0.79 (0.53-1.17)	0.75 (0.51-1.1)	0.74 (0.5-1.11)	0.74 (0.49-1.1)
	4	1.04 (0.72-1.51)	1.1 (0.75-1.62)	1.02 (0.7-1.48)	1.02 (0.69-1.5)	1.02 (0.69-1.51)
	5 - least deprived (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Financial year	Base year (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	2020/2021	1.77 (1.28-2.44)*	1.71 (1.23-2.38)*	1.52 (1.1-2.1)	1.52 (1.1-2.12)	1.54 (1.1-2.14)
	2021/2022	2.18 (1.6-2.96)*	2.12 (1.55-2.91)*	1.93 (1.43-2.62)*	1.99 (1.46-2.71)*	1.99 (1.46-2.72)*
	Q1 & Q2 2022/2023	2.98 (2.14-4.15)*	3.1 (2.2-4.35)*	2.6 (1.88-3.61)*	2.8 (1.99-3.93)*	2.84 (2.02-3.99)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1.44 (1.04-1.99)		1.41 (1.01-1.99)
	2			1.32 (0.87-1.99)		1.37 (0.89-2.13)
	3+			1.38 (0.92-2.05)		1.45 (0.95-2.21)

*significant at the $p < 0.01$ level

Table 2: Median and interquartile range for the intervals in the diagnostic and treatment pathway for laryngeal cancer patients who waited over 104 days from referral to treatment in each financial year of start of treatment

Interval	2017/2018 (Median and IQR)	2020/2021 (Median and IQR)	2021/2022 (Median and IQR)	Q1 & Q2 2022/2023 (Median and IQR)
Referral to first seen	12 (8 - 14)	10 (7 - 13)	11 (7 - 14)	11 (7 - 14)
First seen to informed of diagnosis	Data not available	65 (46 - 87)	63 (41 - 80)	65.5 (42.25 - 90)
Informed of diagnosis to decision to treat	Data not available	15 (6 - 46.5)	21 (7 - 42)	21 (11 - 45)
Decision to treat to treatment start	24 (20 - 34)	20 (17 - 28)	20 (15 - 26.75)	21 (15 - 27)
Referral to informed of diagnosis	Data not available	75 (58 - 94)	75 (55.5 - 90)	82 (60 - 103)
Referral to decision to treat	99 (85 - 119)	104 (91 - 113.5)	100 (89.25 - 119)	106 (91 - 120)
Referral to treatment start	123 (112 - 138)	125 (111.75 - 141.75)	118 (110.25 - 140)	128 (115 - 145)

Table 3: Breakdown of the reasons for delay in each financial year of start of treatment among laryngeal cancer patients who waited over 104 days from referral to treatment, with delay overall between referral and treatment, from referral to informed of diagnosis or from decision to treat to treatment

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
Referral to treatment start	Healthcare provider-initiated delay	14 (21.5%)	35 (33.7%)	50 (35.2%)	38 (37.6%)
	Medical reason for diagnosis delay	13 (20.0%)	21 (20.2%)	36 (25.4%)	27 (26.7%)
	Medical reason for treatment delay	<5	<5	<5	<5
	Patient-initiated delay	<5	<10	~10	<10
	Other reason (not listed)	30 (46.2%)	35 (33.7%)	41 (28.9%)	26 (25.7%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	25 (39.7%)	29 (27.1%)	27 (40.3%)
	Medical reason for diagnosis delay	Data not available	15 (23.8%)	21 (19.6%)	15 (22.4%)
	Patient-initiated delay	Data not available	<5	<10	<5
	Other reason (not listed)	Data not available	9 (14.3%)	<10	10 (14.9%)
	No delay	Data not available	7 (11.1%)	<5	<5
	Unknown	Data not available	<5	37 (34.6%)	9 (13.4%)
Decision to treat to treatment start	Healthcare provider-initiated delay	<5	6 (5.8%)	17 (12.0%)	10 (9.9%)
	Medical reason for diagnosis delay	<5	<5	<5	<5
	Medical reason for treatment delay	5 (7.7%)	<5	<5	<5

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Patient-initiated delay	<10	<5	<5	<5
	Other reason (not listed)	<5	7 (6.7%)	<5	<5
	No delay	47 (72.3%)	86 (82.7%)	121 (85.2%)	86 (85.1%)

Table 4: Regression analysis for likelihood of waiting over 62 days by characteristic for laryngeal cancer. Results presented for both the original and RCRD linked cohort. The results for the original cohort are presented unadjusted and adjusted and results for the RCRD linked cohort are presented unadjusted, with minimal adjustment to align with the original cohort analysis and with full adjustment

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Gender	Female	1.22 (1.03-1.45)	1.23 (1.02-1.48)	1.2 (1.01-1.43)	1.27 (1.05-1.53)	1.26 (1.05-1.53)
	Male (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Age group	19-49	0.94 (0.69-1.28)	0.9 (0.64-1.27)	0.94 (0.69-1.27)	0.95 (0.69-1.33)	0.97 (0.69-1.34)
	50-59	0.88 (0.73-1.06)	0.86 (0.7-1.05)	0.96 (0.8-1.17)	0.99 (0.8-1.22)	0.99 (0.81-1.22)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	0.93 (0.79-1.1)	0.92 (0.77-1.1)	0.96 (0.81-1.13)	0.94 (0.79-1.13)	0.94 (0.78-1.12)
	80+	0.78 (0.64-0.97)	0.76 (0.61-0.96)	0.87 (0.7-1.08)	0.88 (0.69-1.12)	0.87 (0.69-1.11)
Deprivation quintile	1 - most deprived	1.02 (0.82-1.26)	0.97 (0.76-1.23)	1.1 (0.88-1.37)	0.96 (0.75-1.23)	0.95 (0.74-1.22)
	2	0.97 (0.77-1.21)	1.05 (0.82-1.35)	1.08 (0.86-1.36)	1.13 (0.87-1.46)	1.12 (0.87-1.46)
	3	1.01 (0.8-1.27)	1.02 (0.79-1.32)	1.14 (0.9-1.45)	1.13 (0.87-1.47)	1.13 (0.87-1.47)
	4	0.98 (0.77-1.24)	0.97 (0.75-1.25)	1.19 (0.93-1.52)	1.13 (0.87-1.47)	1.13 (0.87-1.47)
	5 - least deprived (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Financial year	Base year (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	2020/2021	1.59 (1.33-1.9)*	1.58 (1.3-1.91)*	1.21 (1.01-1.45)	1.23 (1.01-1.49)	1.23 (1.01-1.5)
	2021/2022	2.1 (1.76-2.5)*	2.09 (1.74-2.52)*	1.62 (1.36-1.92)*	1.66 (1.37-2)*	1.66 (1.38-2.01)*
	Q1 & Q2 2022/2023	2.75 (2.24-3.38)*	2.96 (2.37-3.7)*	2.08 (1.69-2.56)*	2.25 (1.8-2.82)*	2.26 (1.8-2.83)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1.18 (0.95-1.48)		1.15 (0.9-1.47)
	2			1.04 (0.79-1.38)		1.12 (0.82-1.52)
	3+			1.02 (0.78-1.34)		1.05 (0.78-1.41)

*significant at the $p < 0.01$ level

Table 5: Median and interquartile range for the intervals in the diagnostic and treatment pathway for laryngeal cancer patients who waited over 62 days from referral to treatment in each financial year of start of treatment

Interval	2017/2018 (Median and IQR)	2020/2021 (Median and IQR)	2021/2022 (Median and IQR)	Q1 & Q2 2022/2023 (Median and IQR)
Referral to first seen	11 (7 - 13)	9 (6 - 13)	10 (7 - 14)	10 (6 - 13)
First seen to informed of diagnosis	Data not available	39.5 (27 - 55)	39 (28 - 51.5)	41 (27 - 56)
Informed of diagnosis to decision to treat	Data not available	12 (3 - 26)	14.5 (4 - 29)	13 (5 - 28)
Decision to treat to treatment start	23 (17 - 27)	19 (14 - 25)	20 (13 - 26)	20 (13 - 26)
Referral to informed of diagnosis	Data not available	48 (37 - 65)	50 (39 - 64)	50 (36 - 70)
Referral to decision to treat	62 (53 - 75)	64 (53 - 83)	67.5 (56 - 83)	69 (55.5 - 87.5)
Referral to treatment start	83 (74 - 97)	82 (70 - 102)	85 (75.25 - 103)	86 (75 - 109)

Table 6: Breakdown of the reasons for delay in each financial year of start of treatment among laryngeal cancer patients who waited over 62 days from referral to treatment, with delay overall between referral and treatment, from referral to informed of diagnosis or from decision to treat to treatment

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
Referral to treatment start	Healthcare provider-initiated delay	100 (27.4%)	165 (36.3%)	261 (43.9%)	160 (44.1%)
	Medical reason for diagnosis delay	74 (20.3%)	87 (19.1%)	113 (19.0%)	73 (20.1%)
	Medical reason for treatment delay	15 (4.1%)	14 (3.1%)	12 (2.0%)	<5
	Patient-initiated delay	19 (5.2%)	32 (7.0%)	43 (7.2%)	~25
	Other reason (not listed)	157 (43.0%)	157 (34.5%)	165 (27.8%)	103 (28.4%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	115 (37.3%)	128 (28.6%)	99 (36.3%)
	Medical reason for diagnosis delay	Data not available	71 (23.1%)	83 (18.5%)	62 (22.7%)
	Patient-initiated delay	Data not available	15 (4.9%)	23 (5.1%)	12 (4.4%)
	Other reason (not listed)	Data not available	45 (14.6%)	47 (10.5%)	39 (14.3%)
	No delay	Data not available	35 (11.4%)	48 (10.7%)	43 (15.8%)
	Unknown	Data not available	27 (8.8%)	119 (26.6%)	18 (6.6%)
Decision to treat to treatment start	Healthcare provider-initiated delay	9 (2.5%)	14 (3.1%)	35 (5.9%)	24 (6.6%)
	Medical reason for diagnosis delay	<5	<10	<5	<5
	Medical reason for treatment delay	10 (2.7%)	<5	<10	<5

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Patient-initiated delay	<10	<5	<5	<5
	Other reason (not listed)	14 (3.8%)	12 (2.6%)	<10	<5
	No delay	326 (89.3%)	416 (91.4%)	545 (91.8%)	332 (91.5%)

Table 7: Regression analysis for likelihood of waiting over 104 days by characteristic for oral cavity cancer. Results presented for both the original and RCRD linked cohort. The results for the original cohort are presented unadjusted and adjusted and results for the RCRD linked cohort are presented unadjusted, with minimal adjustment to align with the original cohort analysis and with full adjustment

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Gender	Female	1.06 (0.83-1.34)	1.03 (0.81-1.31)	1.1 (0.85-1.41)	1.07 (0.83-1.38)	1.07 (0.83-1.39)
	Male (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Age group	19-49	1.23 (0.78-1.93)	1.37 (0.87-2.17)	1.16 (0.72-1.88)	1.22 (0.75-1.98)	1.23 (0.76-1.99)
	50-59	1.14 (0.8-1.62)	1.18 (0.83-1.69)	0.97 (0.66-1.41)	0.99 (0.68-1.45)	1 (0.68-1.46)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	1.63 (1.18-2.24)*	1.66 (1.2-2.3)*	1.39 (0.99-1.95)	1.39 (0.99-1.96)	1.38 (0.98-1.95)
	80+	1.08 (0.73-1.6)	1.14 (0.76-1.7)	1.09 (0.73-1.63)	1.09 (0.72-1.65)	1.08 (0.72-1.64)
Deprivation quintile	1 - most deprived	1.25 (0.85-1.84)	1.38 (0.92-2.07)	1.04 (0.69-1.56)	1.1 (0.72-1.68)	1.09 (0.71-1.67)
	2	1.37 (0.93-2.03)	1.44 (0.97-2.15)	1.28 (0.85-1.91)	1.35 (0.89-2.05)	1.35 (0.89-2.04)
	3	1.09 (0.73-1.64)	1.11 (0.73-1.67)	1.05 (0.7-1.6)	1.09 (0.71-1.66)	1.09 (0.71-1.66)
	4	1.11 (0.74-1.67)	1.1 (0.73-1.66)	0.92 (0.6-1.42)	0.94 (0.61-1.45)	0.94 (0.61-1.45)
	5 - least deprived (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Financial year	Base year (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	2020/2021	1.28 (0.87-1.88)	1.31 (0.9-1.92)	1.15 (0.77-1.71)	1.17 (0.78-1.74)	1.17 (0.79-1.75)
	2021/2022	1.95 (1.38-2.77)*	1.91 (1.35-2.71)*	1.81 (1.27-2.6)*	1.78 (1.25-2.55)*	1.79 (1.25-2.56)*
	Q1 & Q2 2022/2023	2.85 (1.97-4.13)*	3.01 (2.07-4.38)*	2.53 (1.72-3.73)*	2.59 (1.75-3.82)*	2.59 (1.76-3.83)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1 (0.66-1.54)		1.01 (0.65-1.55)
	2			1.2 (0.71-2.03)		1.2 (0.71-2.05)
	3+			1.02 (0.61-1.73)		1.04 (0.61-1.76)

*significant at the $p < 0.01$ level

Table 8: Median and interquartile range for the intervals in the diagnostic and treatment pathway for oral cavity cancer patients who waited over 104 days from referral to treatment in each financial year of start of treatment

Interval	2017/2018 (Median and IQR)	2020/2021 (Median and IQR)	2021/2022 (Median and IQR)	Q1 & Q2 2022/2023 (Median and IQR)
Referral to first seen	11 (8.75 - 14)	11 (7.5 - 14)	11 (7 - 14)	11 (7 - 14)
First seen to informed of diagnosis	Data not available	40 (16.5 - 69)	34 (19.75 - 65.25)	51 (25 - 77.5)
Informed of diagnosis to decision to treat	Data not available	29 (14 - 55.5)	42.5 (21 - 69)	29 (16.5 - 56.5)
Decision to treat to treatment start	23.5 (18 - 29.25)	26 (12.5 - 34.5)	20.5 (12 - 31)	24 (15 - 43)
Referral to informed of diagnosis	Data not available	57 (26 - 75)	48.5 (28 - 83)	61 (38.5 - 89.5)
Referral to decision to treat	96.5 (89.75 - 109)	95 (81.5 - 113)	99.5 (85 - 118)	94 (80 - 110)
Referral to treatment start	116.5 (110.75 - 127.5)	117 (110.5 - 128)	119 (111 - 140)	119 (110 - 138)

Table 9: Breakdown of the reasons for delay in each financial year of start of treatment among oral cavity cancer patients who waited over 104 days from referral to treatment, with delay overall between referral and treatment, from referral to informed of diagnosis or from decision to treat to treatment

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
Referral to treatment start	Healthcare provider-initiated delay	7 (14.6%)	23 (36.5%)	45 (42.5%)	35 (45.5%)
	Medical reason for diagnosis delay	13 (27.1%)	14 (22.2%)	23 (21.7%)	18 (23.4%)
	Medical reason for treatment delay	5 (10.4%)	<5	6 (5.7%)	<5
	Patient-initiated delay	8 (16.7%)	<10	9 (8.5%)	<5
	Other reason (not listed)	15 (31.2%)	19 (30.2%)	23 (21.7%)	18 (23.4%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	11 (21.6%)	11 (14.5%)	13 (27.7%)
	Medical reason for diagnosis delay	Data not available	<10	13 (17.1%)	11 (23.4%)
	Patient-initiated delay	Data not available	<5	5 (6.6%)	<10
	Other reason (not listed)	Data not available	<10	5 (6.6%)	<10
	No delay	Data not available	15 (29.4%)	20 (26.3%)	<10
	Unknown	Data not available	<10	22 (28.9%)	<5
Decision to treat to treatment start	Healthcare provider-initiated delay	5 (10.4%)	11 (17.5%)	16 (15.1%)	20 (26.0%)
	Medical reason for diagnosis delay	<5	<5	<5	<5
	Medical reason for treatment delay	5 (10.4%)	<5	<5	<5

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Patient-initiated delay	<5	<5	<5	<5
	Other reason (not listed)	<5	<5	<5	<5
	No delay	37 (77.1%)	46 (73.0%)	84 (79.2%)	49 (63.6%)

Table 10: Regression analysis for likelihood of waiting over 62 days by characteristic for oral cavity cancer. Results presented for both the original and RCRD linked cohort. The results for the original cohort are presented unadjusted and adjusted and results for the RCRD linked cohort are presented unadjusted, with minimal adjustment to align with the original cohort analysis and with full adjustment

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Gender	Female	1.11 (0.99-1.23)	1.11 (0.99-1.25)	1.08 (0.96-1.21)	1.1 (0.97-1.24)	1.1 (0.97-1.25)
	Male (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Age group	19-49	0.78 (0.63-0.96)	0.85 (0.68-1.06)	0.73 (0.58-0.92)*	0.76 (0.6-0.97)	0.77 (0.6-0.98)
	50-59	0.96 (0.82-1.12)	0.98 (0.83-1.15)	0.96 (0.82-1.13)	0.97 (0.82-1.16)	0.98 (0.82-1.16)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	1.11 (0.96-1.29)	1.11 (0.95-1.3)	1.1 (0.94-1.28)	1.09 (0.92-1.29)	1.09 (0.92-1.29)
	80+	0.84 (0.71-1)	0.82 (0.68-0.99)	0.84 (0.7-1.01)	0.8 (0.66-0.97)	0.79 (0.65-0.96)
Deprivation quintile	1 - most deprived	1.06 (0.89-1.27)	1.06 (0.87-1.29)	1.02 (0.84-1.22)	0.99 (0.81-1.22)	0.98 (0.8-1.21)
	2	1.06 (0.89-1.27)	1.09 (0.9-1.32)	1.04 (0.86-1.26)	1.1 (0.89-1.35)	1.09 (0.88-1.34)
	3	1.07 (0.89-1.28)	1.09 (0.9-1.32)	1.02 (0.85-1.24)	1.07 (0.87-1.31)	1.06 (0.87-1.31)
	4	1.24 (1.04-1.49)	1.21 (1-1.46)	1.14 (0.95-1.38)	1.15 (0.93-1.4)	1.15 (0.94-1.4)
	5 - least deprived (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Financial year	Base year (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	2020/2021	1.16 (1-1.36)	1.18 (1-1.39)	1.05 (0.89-1.24)	1.05 (0.88-1.24)	1.05 (0.88-1.25)
	2021/2022	1.83 (1.57-2.12)*	1.89 (1.62-2.2)*	1.68 (1.44-1.96)*	1.71 (1.45-2.02)*	1.72 (1.46-2.03)*
	Q1 & Q2 2022/2023	2.61 (2.2-3.11)*	2.81 (2.34-3.38)*	2.4 (1.99-2.88)*	2.55 (2.1-3.1)*	2.56 (2.1-3.11)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1 (0.82-1.22)		1.02 (0.83-1.25)
	2			1.16 (0.9-1.5)		1.25 (0.95-1.65)
	3+			1.01 (0.79-1.28)		1.09 (0.84-1.41)

*significant at the $p < 0.01$ level

Table 11: Median and interquartile range for the intervals in the diagnostic and treatment pathway for oral cavity cancer patients who waited over 62 days from referral to treatment in each financial year of start of treatment

Interval	2017/2018 (Median and IQR)	2020/2021 (Median and IQR)	2021/2022 (Median and IQR)	Q1 & Q2 2022/2023 (Median and IQR)
Referral to first seen	10 (7 - 14)	9 (6 - 13)	11 (7 - 14)	11 (8 - 14)
First seen to informed of diagnosis	Data not available	27 (16 - 40)	24 (15 - 35)	28 (16 - 40)
Informed of diagnosis to decision to treat	Data not available	20 (9 - 32)	21 (10 - 35)	21 (11 - 35)
Decision to treat to treatment start	21 (13 - 27)	21 (12 - 29)	20 (12 - 28)	19 (12 - 28)
Referral to informed of diagnosis	Data not available	35 (26 - 49)	35 (25 - 48)	38.5 (27 - 50.25)
Referral to decision to treat	59 (48 - 71)	58 (47 - 71)	60 (49 - 76)	63 (50 - 79)
Referral to treatment start	78 (70 - 91)	77 (69 - 91.5)	78 (70 - 94)	81 (71 - 96)

Table 12: Breakdown of the reasons for delay in each financial year of start of treatment among oral cavity cancer patients who waited over 62 days from referral to treatment, with delay overall between referral and treatment, from referral to informed of diagnosis or from decision to treat to treatment

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
Referral to treatment start	Healthcare provider-initiated delay	151 (35.4%)	209 (42.6%)	356 (48.6%)	238 (52.5%)
	Medical reason for diagnosis delay	80 (18.7%)	103 (21.0%)	158 (21.6%)	74 (16.3%)
	Medical reason for treatment delay	28 (6.6%)	21 (4.3%)	27 (3.7%)	13 (2.9%)
	Patient-initiated delay	38 (8.9%)	34 (6.9%)	38 (5.2%)	36 (7.9%)
	Other reason (not listed)	130 (30.4%)	124 (25.3%)	154 (21.0%)	92 (20.3%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	79 (21.8%)	138 (24.5%)	106 (30.8%)
	Medical reason for diagnosis delay	Data not available	63 (17.4%)	70 (12.4%)	45 (13.1%)
	Patient-initiated delay	Data not available	15 (4.1%)	19 (3.4%)	24 (7.0%)
	Other reason (not listed)	Data not available	50 (13.8%)	36 (6.4%)	51 (14.8%)
	No delay	Data not available	120 (33.1%)	190 (33.7%)	95 (27.6%)
	Unknown	Data not available	35 (9.7%)	110 (19.5%)	23 (6.7%)
Decision to treat to treatment start	Healthcare provider-initiated delay	31 (7.3%)	73 (14.9%)	108 (14.7%)	59 (13.0%)
	Medical reason for diagnosis delay	<5	<10	<5	<5
	Medical reason for treatment delay	15 (3.5%)	11 (2.2%)	<10	<10

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Patient-initiated delay	<5	<10	<10	<5
	Other reason (not listed)	15 (3.5%)	12 (2.4%)	7 (1.0%)	<5
	No delay	363 (85.0%)	381 (77.6%)	604 (82.4%)	381 (84.1%)

Table 13: Regression analysis for likelihood of waiting over 104 days by characteristic for oropharyngeal cancer. Results presented for both the original and RCRD linked cohort. The results for the original cohort are presented unadjusted and adjusted and results for the RCRD linked cohort are presented unadjusted, with minimal adjustment to align with the original cohort analysis and with full adjustment

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Gender	Female	1.09 (0.9-1.32)	1.09 (0.9-1.33)	1.07 (0.86-1.32)	1.08 (0.87-1.34)	1.08 (0.87-1.34)
	Male (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Age group	19-49	0.65 (0.45-0.93)	0.66 (0.46-0.94)	0.61 (0.41-0.91)	0.61 (0.41-0.91)	0.63 (0.42-0.94)
	50-59	0.85 (0.69-1.06)	0.86 (0.69-1.07)	0.84 (0.66-1.06)	0.84 (0.67-1.06)	0.85 (0.67-1.08)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	1.1 (0.87-1.39)	1.07 (0.84-1.36)	1.17 (0.91-1.5)	1.14 (0.88-1.47)	1.13 (0.87-1.46)
	80+	1.27 (0.87-1.84)	1.32 (0.9-1.92)	1.08 (0.71-1.64)	1.11 (0.73-1.71)	1.08 (0.7-1.66)
Deprivation quintile	1 - most deprived	1.26 (0.96-1.67)	1.3 (0.98-1.74)	1.16 (0.86-1.55)	1.18 (0.87-1.6)	1.14 (0.84-1.55)
	2	0.9 (0.67-1.22)	0.98 (0.72-1.34)	0.93 (0.68-1.27)	1 (0.72-1.38)	0.98 (0.71-1.36)
	3	1.22 (0.92-1.61)	1.29 (0.96-1.72)	1.19 (0.88-1.6)	1.2 (0.88-1.62)	1.19 (0.88-1.61)
	4	1.11 (0.83-1.49)	1.12 (0.83-1.5)	1.01 (0.74-1.37)	0.96 (0.7-1.31)	0.94 (0.69-1.29)
	5 - least deprived (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Financial year	Base year (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	2020/2021	0.98 (0.76-1.27)	0.97 (0.75-1.26)	1.13 (0.85-1.51)	1.12 (0.84-1.49)	1.12 (0.84-1.49)
	2021/2022	1.31 (1.03-1.67)	1.3 (1.02-1.66)	1.53 (1.18-2)*	1.51 (1.15-1.96)*	1.51 (1.16-1.97)*
	Q1 & Q2 2022/2023	1.77 (1.36-2.31)*	1.7 (1.3-2.23)*	2.15 (1.61-2.85)*	2.06 (1.54-2.74)*	2.06 (1.54-2.74)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1.01 (0.72-1.42)		1 (0.71-1.42)
	2			1.69 (1.12-2.56)		1.75 (1.15-2.66)*
	3+			1.38 (0.89-2.12)		1.28 (0.82-1.98)

*significant at the $p < 0.01$ level

Table 14: Median and interquartile range for the intervals in the diagnostic and treatment pathway for oropharyngeal cancer patients who waited over 104 days from referral to treatment in each financial year of start of treatment

Interval	2017/2018 (Median and IQR)	2020/2021 (Median and IQR)	2021/2022 (Median and IQR)	Q1 & Q2 2022/2023 (Median and IQR)
Referral to first seen	10 (7 - 13)	10 (6 - 13)	12 (8 - 14)	12 (8 - 14)
First seen to informed of diagnosis	Data not available	63 (33 - 81)	61 (34 - 84.5)	60 (40.5 - 87.75)
Informed of diagnosis to decision to treat	Data not available	22 (8 - 51)	28 (7.75 - 50.5)	21 (1.5 - 39)
Decision to treat to treatment start	26 (18 - 32)	21.5 (14.25 - 29)	18 (8 - 26)	21 (11 - 28)
Referral to informed of diagnosis	Data not available	72 (46 - 92)	73.5 (47.75 - 103)	77 (56 - 99)
Referral to decision to treat	94 (83 - 108.5)	99 (88.25 - 112.75)	106 (94 - 121)	103 (91 - 118)
Referral to treatment start	118 (111 - 126.5)	119 (110 - 129)	121 (112 - 134.25)	119 (111 - 136.5)

Table 15: Breakdown of the reasons for delay in each financial year of start of treatment among oropharyngeal cancer patients who waited over 104 days from referral to treatment, with delay overall between referral and treatment, from referral to informed of diagnosis or from decision to treat to treatment

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
Referral to treatment start	Healthcare provider-initiated delay	21 (18.3%)	42 (32.3%)	68 (37.0%)	49 (39.8%)
	Medical reason for diagnosis delay	39 (33.9%)	44 (33.8%)	58 (31.5%)	32 (26.0%)
	Medical reason for treatment delay	<5	<5	<5	<5
	Patient-initiated delay	<10	<10	~15	<10
	Other reason (not listed)	46 (40.0%)	32 (24.6%)	40 (21.7%)	32 (26.0%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	27 (31.8%)	29 (22.7%)	39 (47.0%)
	Medical reason for diagnosis delay	Data not available	26 (30.6%)	30 (23.4%)	22 (26.5%)
	Patient-initiated delay	Data not available	6 (7.1%)	5 (3.9%)	<5
	Other reason (not listed)	Data not available	10 (11.8%)	5 (3.9%)	8 (9.6%)
	No delay	Data not available	11 (12.9%)	9 (7.0%)	<5
	Unknown	Data not available	5 (5.9%)	50 (39.1%)	6 (7.2%)
Decision to treat to treatment start	Healthcare provider-initiated delay	6 (5.2%)	14 (10.8%)	14 (7.6%)	13 (10.6%)
	Medical reason for diagnosis delay	<5	5 (3.8%)	<5	<5
	Medical reason for treatment delay	8 (7.0%)	<10	<5	<5

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Patient-initiated delay	<5	<5	<5	<5
	Other reason (not listed)	14 (12.2%)	<5	<5	<5
	No delay	85 (73.9%)	101 (77.7%)	160 (87.0%)	103 (83.7%)

Table 16: Regression analysis for likelihood of waiting over 62 days by characteristic for oropharyngeal cancer. Results presented for both the original and RCRD linked cohort. The results for the original cohort are presented unadjusted and adjusted and results for the RCRD linked cohort are presented unadjusted, with minimal adjustment to align with the original cohort analysis and with full adjustment

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Gender	Female	1.09 (0.98-1.21)	1.13 (1.01-1.26)	1.02 (0.91-1.13)	1.05 (0.94-1.18)	1.05 (0.94-1.17)
	Male (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Age group	19-49	0.89 (0.75-1.05)	0.92 (0.77-1.09)	0.81 (0.68-0.97)	0.84 (0.7-1.01)	0.85 (0.71-1.03)
	50-59	0.97 (0.87-1.09)	0.98 (0.87-1.11)	1.02 (0.91-1.15)	1.03 (0.91-1.16)	1.04 (0.92-1.17)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	1.02 (0.9-1.16)	1 (0.87-1.15)	1.03 (0.9-1.17)	1.01 (0.88-1.17)	1.01 (0.87-1.16)
	80+	1.07 (0.86-1.32)	1.06 (0.84-1.33)	0.98 (0.78-1.22)	1 (0.79-1.26)	0.98 (0.77-1.23)
Deprivation quintile	1 - most deprived	0.99 (0.86-1.15)	1.01 (0.86-1.18)	0.95 (0.82-1.11)	0.97 (0.83-1.14)	0.96 (0.81-1.13)
	2	0.85 (0.74-0.99)	0.95 (0.81-1.12)	0.87 (0.75-1.02)	0.99 (0.84-1.17)	0.98 (0.84-1.16)
	3	0.97 (0.84-1.12)	1.03 (0.88-1.2)	0.93 (0.8-1.09)	0.97 (0.82-1.14)	0.96 (0.82-1.13)
	4	0.89 (0.77-1.03)	0.89 (0.76-1.05)	0.92 (0.79-1.07)	0.89 (0.75-1.04)	0.88 (0.75-1.04)
	5 - least deprived (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Financial year	Base year (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	2020/2021	1.14 (1-1.29)	1.17 (1.02-1.33)	0.92 (0.81-1.05)	0.94 (0.82-1.08)	0.94 (0.82-1.08)
	2021/2022	1.42 (1.25-1.6)*	1.49 (1.31-1.7)*	1.17 (1.03-1.33)	1.23 (1.08-1.4)*	1.23 (1.08-1.4)*
	Q1 & Q2 2022/2023	1.9 (1.64-2.2)*	1.98 (1.7-2.31)*	1.58 (1.36-1.83)*	1.64 (1.41-1.92)*	1.65 (1.41-1.93)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1.04 (0.88-1.24)		1.09 (0.91-1.3)
	2			1.18 (0.92-1.51)		1.26 (0.97-1.64)
	3+			1.2 (0.94-1.52)		1.17 (0.91-1.51)

*significant at the $p < 0.01$ level

Table 17: Median and interquartile range for the intervals in the diagnostic and treatment pathway for oropharyngeal cancer patients who waited over 62 days from referral to treatment in each financial year of start of treatment

Interval	2017/2018 (Median and IQR)	2020/2021 (Median and IQR)	2021/2022 (Median and IQR)	Q1 & Q2 2022/2023 (Median and IQR)
Referral to first seen	10 (7 - 13)	9 (6 - 13)	11 (7 - 14)	11 (7 - 14)
First seen to informed of diagnosis	Data not available	35 (21 - 49)	34 (21 - 49)	35 (22 - 54)
Informed of diagnosis to decision to treat	Data not available	18 (5.5 - 32)	17 (7 - 33)	18 (5 - 34)
Decision to treat to treatment start	25 (17 - 29)	19 (11 - 26)	17 (8 - 24)	18 (7 - 25)
Referral to informed of diagnosis	Data not available	44 (31 - 60.5)	45 (32 - 59)	46 (33 - 66)
Referral to decision to treat	60 (49 - 74)	64 (54 - 79)	65 (55 - 81)	68 (57 - 83)
Referral to treatment start	83 (73 - 97)	81 (71 - 96)	80 (70 - 97)	84 (72 - 100)

Table 18: Breakdown of the reasons for delay in each financial year of start of treatment among oropharyngeal cancer patients who waited over 62 days from referral to treatment, with delay overall between referral and treatment, from referral to informed of diagnosis or from decision to treat to treatment

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
Referral to treatment start	Healthcare provider-initiated delay	167 (24.2%)	305 (35.3%)	464 (43.8%)	277 (44.2%)
	Medical reason for diagnosis delay	170 (24.6%)	256 (29.7%)	260 (24.6%)	155 (24.8%)
	Medical reason for treatment delay	36 (5.2%)	25 (2.9%)	13 (1.2%)	<5
	Patient-initiated delay	45 (6.5%)	38 (4.4%)	63 (5.9%)	~45
	Other reason (not listed)	273 (39.5%)	239 (27.7%)	259 (24.5%)	143 (22.8%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	154 (27.2%)	216 (27.2%)	147 (33.2%)
	Medical reason for diagnosis delay	Data not available	176 (31.0%)	184 (23.1%)	107 (24.2%)
	Patient-initiated delay	Data not available	21 (3.7%)	23 (2.9%)	22 (5.0%)
	Other reason (not listed)	Data not available	68 (12.0%)	56 (7.0%)	53 (12.0%)
	No delay	Data not available	122 (21.5%)	154 (19.4%)	83 (18.7%)
	Unknown	Data not available	26 (4.6%)	162 (20.4%)	31 (7.0%)
Decision to treat to treatment start	Healthcare provider-initiated delay	38 (5.5%)	28 (3.2%)	38 (3.6%)	37 (5.9%)
	Medical reason for diagnosis delay	<5	10 (1.2%)	<5	<5
	Medical reason for treatment delay	38 (5.5%)	<10	<10	<10

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Patient-initiated delay	~10	<5	8 (0.8%)	<5
	Other reason (not listed)	46 (6.7%)	11 (1.3%)	<10	<5
	No delay	557 (80.6%)	802 (92.9%)	999 (94.3%)	576 (92.0%)

Table 19: Regression analysis for likelihood of waiting over 104 days by characteristic for thyroid cancer. Results presented for both the original and RCRD linked cohort. The results for the original cohort are presented unadjusted and adjusted and results for the RCRD linked cohort are presented unadjusted, with minimal adjustment to align with the original cohort analysis and with full adjustment

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Gender	Female	1.12 (0.91-1.38)	1.13 (0.91-1.41)	1.06 (0.85-1.32)	1.07 (0.85-1.34)	1.07 (0.85-1.34)
	Male (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Age group	19-49	0.83 (0.63-1.1)	0.75 (0.56-1.01)	0.85 (0.63-1.16)	0.79 (0.58-1.09)	0.8 (0.58-1.1)
	50-59	1.14 (0.84-1.56)	1.11 (0.8-1.54)	1.12 (0.8-1.58)	1.12 (0.79-1.6)	1.13 (0.79-1.61)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	1.14 (0.8-1.6)	1.15 (0.8-1.65)	1.32 (0.92-1.9)	1.39 (0.95-2.03)	1.35 (0.92-1.98)
	80+	1.04 (0.68-1.59)	1.04 (0.66-1.63)	1.22 (0.77-1.93)	1.18 (0.73-1.91)	1.1 (0.68-1.79)
Deprivation quintile	1 - most deprived	1.34 (1-1.79)	1.39 (1.01-1.92)	1.55 (1.13-2.13)*	1.59 (1.13-2.25)*	1.59 (1.12-2.25)*
	2	0.84 (0.61-1.15)	0.92 (0.65-1.28)	1.12 (0.8-1.56)	1.21 (0.85-1.71)	1.2 (0.84-1.7)
	3	1.04 (0.77-1.4)	1.1 (0.8-1.5)	1.29 (0.93-1.77)	1.4 (1-1.96)	1.41 (1-1.97)
	4	0.89 (0.66-1.21)	0.92 (0.67-1.26)	1.01 (0.72-1.4)	1.03 (0.73-1.45)	1.03 (0.73-1.45)
	5 - least deprived (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Financial year	Base year (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	2020/2021	2.6 (1.93-3.52)*	2.62 (1.93-3.57)*	2.38 (1.75-3.26)*	2.43 (1.77-3.34)*	2.48 (1.8-3.41)*
	2021/2022	2.26 (1.67-3.04)*	2.29 (1.68-3.11)*	2.15 (1.58-2.93)*	2.26 (1.65-3.1)*	2.31 (1.68-3.16)*
	Q1 & Q2 2022/2023	2.84 (2.03-3.96)*	2.96 (2.1-4.18)*	3.15 (2.25-4.41)*	3.45 (2.44-4.88)*	3.5 (2.48-4.96)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1.22 (0.81-1.83)		1.06 (0.69-1.63)
	2			1.54 (0.86-2.76)		1.88 (1-3.53)
	3+			1.55 (0.72-3.34)		1.21 (0.53-2.78)

*significant at the $p < 0.01$ level

Table 20: Median and interquartile range for the intervals in the diagnostic and treatment pathway for thyroid cancer patients who waited over 104 days from referral to treatment in each financial year of start of treatment

Interval	2017/2018 (Median and IQR)	2020/2021 (Median and IQR)	2021/2022 (Median and IQR)	Q1 & Q2 2022/2023 (Median and IQR)
Referral to first seen	10 (7 - 13)	9 (6 - 13)	11 (7 - 14)	11 (7 - 14)
First seen to informed of diagnosis	Data not available	84 (30 - 122)	79 (50 - 130.5)	71 (36 - 106)
Informed of diagnosis to decision to treat	Data not available	0 (-35 - 48)	0 (-41.75 - 35)	0 (0 - 43)
Decision to treat to treatment start	22 (12 - 28)	28 (14 - 57)	29 (16 - 50.5)	27 (16.75 - 42.25)
Referral to informed of diagnosis	Data not available	96 (41 - 129)	95.5 (66.5 - 142.25)	84 (51 - 120)
Referral to decision to treat	101 (91 - 124)	96 (73 - 125.75)	94 (75 - 118.5)	99.5 (85.5 - 126)
Referral to treatment start	123 (112 - 138)	129 (115.25 - 152)	122 (113 - 146.25)	132 (118.5 - 155)

Table 21: Breakdown of the reasons for delay in each financial year of start of treatment among thyroid cancer patients who waited over 104 days from referral to treatment, with delay overall between referral and treatment, from referral to informed of diagnosis or from decision to treat to treatment

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
Referral to treatment start	Healthcare provider-initiated delay	23 (35.4%)	61 (35.9%)	69 (39.2%)	49 (49.0%)
	Medical reason for diagnosis delay	16 (24.6%)	32 (18.8%)	55 (31.2%)	24 (24.0%)
	Medical reason for treatment delay	<5	8 (4.7%)	5 (2.8%)	<10
	Patient-initiated delay	<10	9 (5.3%)	17 (9.7%)	14 (14.0%)
	Other reason (not listed)	15 (23.1%)	60 (35.3%)	30 (17.0%)	<10
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	17 (22.1%)	27 (33.8%)	14 (31.1%)
	Medical reason for diagnosis delay	Data not available	19 (24.7%)	24 (30.0%)	13 (28.9%)
	Patient-initiated delay	Data not available	<5	<5	<10
	Other reason (not listed)	Data not available	12 (15.6%)	10 (12.5%)	5 (11.1%)
	No delay	Data not available	~10	<5	<5
	Unknown	Data not available	15 (19.5%)	12 (15.0%)	6 (13.3%)
Decision to treat to treatment start	Healthcare provider-initiated delay	7 (10.8%)	42 (24.7%)	48 (27.3%)	30 (30.0%)
	Medical reason for diagnosis delay	<5	<5	<10	<5
	Medical reason for treatment delay	<5	<5	<10	<5

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Patient-initiated delay	<5	<5	<10	<5
	Other reason (not listed)	5 (7.7%)	25 (14.7%)	12 (6.8%)	<5
	No delay	52 (80.0%)	95 (55.9%)	94 (53.4%)	61 (61.0%)

Table 22: Regression analysis for likelihood of waiting over 62 days by characteristic for thyroid cancer. Results presented for both the original and RCRD linked cohort. The results for the original cohort are presented unadjusted and adjusted and results for the RCRD linked cohort are presented unadjusted, with minimal adjustment to align with the original cohort analysis and with full adjustment

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Gender	Female	1.03 (0.89-1.18)	1.02 (0.87-1.19)	0.99 (0.86-1.15)	1 (0.86-1.17)	1 (0.86-1.17)
	Male (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Age group	19-49	0.83 (0.69-1.01)	0.78 (0.63-0.96)	0.76 (0.62-0.92)*	0.7 (0.57-0.87)*	0.7 (0.57-0.87)*
	50-59	1.08 (0.87-1.36)	1.07 (0.84-1.36)	1 (0.8-1.26)	0.96 (0.75-1.23)	0.96 (0.75-1.23)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	1 (0.78-1.28)	0.96 (0.73-1.26)	0.87 (0.67-1.12)	0.85 (0.65-1.12)	0.85 (0.64-1.11)
	80+	0.81 (0.59-1.09)	0.78 (0.56-1.09)	0.94 (0.69-1.3)	0.92 (0.66-1.29)	0.9 (0.64-1.26)
Deprivation quintile	1 - most deprived	1.06 (0.86-1.3)	1.17 (0.92-1.48)	1.14 (0.92-1.41)	1.22 (0.96-1.55)	1.23 (0.97-1.56)
	2	0.98 (0.79-1.21)	1.14 (0.9-1.45)	1.05 (0.85-1.3)	1.21 (0.96-1.53)	1.21 (0.96-1.53)
	3	1.04 (0.85-1.29)	1.14 (0.91-1.43)	1.14 (0.92-1.4)	1.27 (1.01-1.59)	1.27 (1.01-1.59)
	4	1.05 (0.85-1.29)	1.09 (0.88-1.37)	1.1 (0.9-1.35)	1.13 (0.9-1.41)	1.12 (0.9-1.4)
	5 - least deprived (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)

		Original cohort		RCRD linked cohort		
Characteristic	Category	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs)	Unadjusted odds ratio (95% CIs)	Adjusted odds ratio (95% CIs) (minimal adjustment)	Adjusted odds ratio (95% CIs) (fully adjusted)
Financial year	Base year (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	2020/2021	2.06 (1.7-2.48)*	2.14 (1.75-2.61)*	1.94 (1.61-2.34)*	2.05 (1.69-2.5)*	2.07 (1.7-2.52)*
	2021/2022	2.29 (1.91-2.74)*	2.43 (2.01-2.95)*	2.2 (1.84-2.64)*	2.37 (1.96-2.87)*	2.4 (1.98-2.9)*
	Q1 & Q2 2022/2023	3.02 (2.42-3.76)*	3.53 (2.79-4.47)*	3.08 (2.47-3.83)*	3.62 (2.87-4.57)*	3.65 (2.89-4.61)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1.12 (0.85-1.49)		1.05 (0.77-1.43)
	2			1.3 (0.83-2.01)		1.55 (0.96-2.51)
	3+			0.81 (0.45-1.47)		0.68 (0.36-1.31)

*significant at the $p < 0.01$ level

Table 23: Median and interquartile range for the intervals in the diagnostic and treatment pathway for thyroid cancer patients who waited over 62 days from referral to treatment in each financial year of start of treatment

Interval	2017/2018 (Median and IQR)	2020/2021 (Median and IQR)	2021/2022 (Median and IQR)	Q1 & Q2 2022/2023 (Median and IQR)
Referral to first seen	10 (7 - 13)	9 (6 - 12.25)	10 (7 - 13)	11 (7 - 14)
First seen to informed of diagnosis	Data not available	49 (29.5 - 84.5)	50 (29 - 79)	42 (28 - 70)
Informed of diagnosis to decision to treat	Data not available	0 (-15.25 - 18.25)	0 (-23 - 22)	0 (0 - 27)
Decision to treat to treatment start	20 (8 - 27)	23 (13 - 37)	23 (14 - 35)	25 (15 - 35)
Referral to informed of diagnosis	Data not available	59 (39 - 93)	61 (41 - 92)	55 (40.5 - 82.5)
Referral to decision to treat	68 (52 - 89)	63 (48 - 87)	63 (51 - 83)	64 (49 - 86)
Referral to treatment start	86 (75 - 102)	89.5 (76 - 117)	88 (76 - 109)	90 (77 - 115)

Table 24: Breakdown of the reasons for delay in each financial year of start of treatment among thyroid cancer patients who waited over 62 days from referral to treatment, with delay overall between referral and treatment, from referral to informed of diagnosis or from decision to treat to treatment

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
Referral to treatment start	Healthcare provider-initiated delay	96 (34.7%)	226 (46.9%)	318 (53.5%)	195 (61.5%)
	Medical reason for diagnosis delay	71 (25.6%)	98 (20.3%)	147 (24.7%)	59 (18.6%)
	Medical reason for treatment delay	11 (4.0%)	14 (2.9%)	15 (2.5%)	<10
	Patient-initiated delay	20 (7.2%)	24 (5.0%)	42 (7.1%)	~20
	Other reason (not listed)	79 (28.5%)	120 (24.9%)	72 (12.1%)	34 (10.7%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	63 (23.5%)	99 (30.5%)	60 (39.7%)
	Medical reason for diagnosis delay	Data not available	75 (28.0%)	82 (25.2%)	34 (22.5%)
	Patient-initiated delay	Data not available	11 (4.1%)	11 (3.4%)	<10
	Other reason (not listed)	Data not available	38 (14.2%)	35 (10.8%)	17 (11.3%)
	No delay	Data not available	37 (13.8%)	34 (10.5%)	17 (11.3%)
	Unknown	Data not available	44 (16.4%)	64 (19.7%)	~15
Decision to treat to treatment start	Healthcare provider-initiated delay	22 (7.9%)	89 (18.5%)	127 (21.4%)	82 (25.9%)
	Medical reason for diagnosis delay	<5	9 (1.9%)	~10	<5
	Medical reason for treatment delay	<5	<10	18 (3.0%)	<10

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Patient-initiated delay	<5	<10	~10	<5
	Other reason (not listed)	16 (5.8%)	47 (9.8%)	19 (3.2%)	<10
	No delay	233 (84.1%)	326 (67.6%)	408 (68.7%)	217 (68.5%)