Supplementary analysis for patients starting treatment for breast cancer

Patients waiting over 104 days from urgent suspected cancer referral to starting treatment for breast cancer

The adjusted regression results (Table 1) for patients with invasive breast cancer indicated that there was no significant variation in likelihood of waiting over 104 days by gender or age, but that there was a strong deprivation gradient with those in the most deprived quintile the most likely to wait over 104 days, an association that remained when stage and comorbidity were controlled for. There was an increase in the likelihood of waiting over 104 days with increasing financial year but there was not a significant association between stage at diagnosis and waiting over 104 days. Those with a comorbidity score of 1 or 3+ were more likely to wait over 104 days compared to those with a score of 0. The results for those with in-situ breast cancer (Table 7) indicated no significant variation by gender, age, or deprivation at the 1% confidence level, but there was a significant increase in the likelihood of waiting over 104 days with increasing financial year.

The median interval from referral to being informed of diagnosis for those with invasive breast cancer who waited over 104 days (Table 2) was relatively short compared to other cancer sites such as lung and prostate, at 36 days in Q1 & Q2 2022/2023; however, the median time from informed of diagnosis to decision to treat (DTT) was longer at 56 days, suggesting that delay may be occurring in between a diagnosis and DTT. The interval between diagnosis and being given a DTT is something that is not fully captured by the current waiting times targets but would be an interesting target for further investigation. The most common reason for delay between referral and treatment among the invasive breast cancer cohort who waited over 104 days was deemed to be a medical reason for diagnosis delay (Table 3). However, both the referral to informed of diagnosis and decision to treat (DTT) to treatment intervals had healthcare provider-initiated delay as the most common reason for delay, suggesting that what was classed as 'medical reason for diagnosis delay' may have come in between a patient being informed of diagnosis and a DTT, potentially during the staging or molecular profiling process. Around 72% of patients met the 31-day standard from DTT to starting treatment in Q1 & Q2 2022/2023, but the number of patients meeting the 28-day standard from referral to being informed of diagnosis decreased over time from 47% in 2020/2021 to 27%. The reason for delay and interval results were similar for patients with in-situ breast cancer (Tables 8 & 9).

Patients waiting over 62 days from urgent suspected cancer referral to starting treatment for breast cancer

There were more significant associations between characteristics and likelihood of an invasive breast cancer patient waiting over 62 days compared to waiting over 104 days (Table 4). Those of male gender were less likely to wait over 62 days, while those aged 19-49 were more

likely compared to those aged 60-69 with likelihood decreasing with increasing age group. Similar to the results for over 104 days, there was a deprivation gradient with those in the most deprived quintile more likely to wait over 62 days, but this gradient was shallower than that seen for the likelihood of waiting over 104 days. There was increasing likelihood of waiting over 62 days in more recent financial years. These associations remained when stage and comorbidity were controlled for. In comparison to waiting over 104 days where there was not evidence of a significant relationship with stage, those at stage 2, 3 and 4 were more likely to wait over 62 days compared to stage 1. Those with a comorbidity score of 2 were more likely to wait over 104 days compared to those with a score of 0. The in-situ breast cohort showed similar associations to the invasive breast cancer cohort, although only the finding by age and financial year were significant (Table 10).

Similar to the over 104 day findings, there was a substantial median interval from patient being informed of diagnosis to getting a DTT for patients waiting over 62 days (Table 5), although this interval was shorter than for those waiting over 104 days, while time from referral to informed of diagnosis and DTT to treatment remained similar. The most common reason for delay from referral to treatment for patients with invasive breast cancer who waited over 62 days was healthcare provider-initiated delay, although the percentage with medical reason for diagnosis delay was also high. Similar to the findings for those waiting over 104 days however, the percentage with medical reason for diagnosis delay for referral to informed of diagnosis and DTT to treatment was low, suggesting that this reason for delay potentially comes after diagnosis. For Q1 & Q2 2022/2023 around 44% of patients met the 28-day standard from referral to informed of diagnosis and around 83% of patients met the 31-day standard from DTT to treatment, again suggesting that some delays are occurring in between diagnosis and DTT, although the percentage meeting both of these standards decreased over time. The in-situ breast cohort had similar delay and interval results (Tables 11 & 12).

Table 1: Regression analysis for likelihood of waiting over 104 days by characteristic for breast cancer. Results presented for both the original and RCRD (Rapid Cancer Registration Dataset) 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 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	Male	0.7 (0.39-1.24)	0.69 (0.39-1.22)	0.58 (0.31-1.08)	0.57 (0.31-1.07)	0.56 (0.3-1.05)
Age group	19-49	1.04 (0.89-1.21)	0.98 (0.83-1.14)	1.07 (0.91-1.26)	1.03 (0.88-1.21)	1.06 (0.9-1.25)
	50-59	1.01 (0.86-1.19)	0.98 (0.83-1.16)	1.02 (0.86-1.21)	1 (0.84-1.18)	1.02 (0.86-1.21)
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	0.88 (0.75-1.03)	0.91 (0.77-1.07)	0.93 (0.79-1.1)	0.96 (0.82-1.14)	0.93 (0.79-1.11)
	80+	0.89 (0.76-1.05)	0.93 (0.79-1.1)	0.93 (0.79-1.11)	0.97 (0.82-1.15)	0.86 (0.73-1.03)
Deprivation quintile	1 - most deprived	2.02 (1.73-2.37)*	1.73 (1.46-2.05)*	1.86 (1.59-2.18)*	1.59 (1.34-1.88)*	1.54 (1.3-1.82)*
	2	1.64 (1.4-1.93)*	1.44 (1.22-1.7)*	1.48 (1.26-1.75)*	1.31 (1.11-1.55)*	1.29 (1.09-1.52)*
	3	1.39 (1.18-1.63)*	1.31 (1.11-1.54)*	1.29 (1.1-1.52)*	1.22 (1.04-1.44)	1.21 (1.02-1.43)
	4	1.18 (1-1.4)	1.15 (0.97-1.36)	1.14 (0.96-1.34)	1.11 (0.94-1.31)	1.1 (0.93-1.3)
	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	3.85 (3.11-4.77)*	3.97 (3.22-4.91)*	2.73 (2.25-3.3)*	2.78 (2.3-3.37)*	2.81 (2.32-3.4)*
	2021/2022	5.28 (4.3-6.48)*	5.4 (4.4-6.62)*	3.85 (3.21-4.62)*	3.89 (3.25-4.67)*	3.98 (3.32-4.77)*
	Q1 & Q2 2022/2023	7.67 (6.21-9.47)*	7.85 (6.37-9.69)*	5.76 (4.77-6.95)*	5.79 (4.8-6.99)*	6 (4.97-7.24)*
Stage	1 (ref)			1 (ref)		1 (ref)
	2			0.92 (0.81-1.06)		0.92 (0.8-1.05)
	3			1.16 (0.96-1.39)		1.13 (0.94-1.36)
	4			1.05 (0.78-1.41)		0.98 (0.72-1.33)
	Not known			1.38 (1.2-1.59)*		1.24 (1.07-1.45)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			1.29 (1.08-1.54)*		1.36 (1.13-1.62)*
	2			1.26 (0.98-1.62)		1.32 (1.02-1.71)
	3+			1.59 (1.27-1.99)*		1.6 (1.27-2.03)*

*significant at the $p<0.01$ level

Table 2: Median and interquartile range for the intervals in the diagnostic and treatment pathway for breast 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)	13 (9 - 16)	14 (11 - 23)	16 (12 - 24)
First seen to informed of diagnosis	Data not available	14 (8 - 40.25)	15 (9 - 35)	15 (9 - 29.75)
Informed of diagnosis to decision to treat	Data not available	49 (15 - 81.5)	53 (28 - 76)	56 (33.25 - 77)
Decision to treat to treatment start	15 (8 - 27)	21 (11 - 42)	23 (13 - 34.75)	22 (12 - 34)
Referral to informed of diagnosis	Data not available	30 (21 - 62)	36 (25 - 59.25)	36 (28 - 50)
Referral to decision to treat	105 (88.25 - 118)	101 (77 - 120)	99 (82 - 114)	99 (84.75 - 116)
Referral to treatment start	118 (111 - 133.5)	123 (112 - 144)	121 (111 - 139)	120 (112 - 137)

Table 3: Breakdown of the reasons for delay in each financial year of start of treatment among breast 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	19 (17.8%)	95 (22.2%)	151 (24.0%)	132 (28.4%)
	Medical reason for diagnosis delay	34 (31.8%)	130 (30.4%)	308 (48.9%)	217 (46.8%)
	Medical reason for treatment delay	19 (17.8%)	35 (8.2%)	33 (5.2%)	28 (6.0%)
	Patient-initiated delay	15 (14.0%)	48 (11.2%)	48 (7.6%)	31 (6.7%)
	Other reason (not listed)	20 (18.7%)	119 (27.9%)	90 (14.3%)	56 (12.1%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	60 (18.6%)	112 (23.5%)	134 (37.4%)
	Medical reason for diagnosis delay	Data not available	37 (11.5%)	51 (10.7%)	28 (7.8%)
	Patient-initiated delay	Data not available	9 (2.8%)	25 (5.3%)	13 (3.6%)
	Other reason (not listed)	Data not available	39 (12.1%)	31 (6.5%)	40 (11.2%)
	No delay (standard met)	Data not available	152 (47.1%)	165 (34.7%)	98 (27.4%)
	Unknown	Data not available	26 (8.0%)	92 (19.3%)	45 (12.6%)
Decision to treat to treatment start	Healthcare provider-initiated delay	7 (6.6%)	47 (11.0%)	101 (16.0%)	78 (16.8%)
	Medical reason for diagnosis delay	<5	16 (3.7%)	28 (4.4%)	20 (4.3%)
	Medical reason for treatment delay	7 (6.6%)	13 (3.0%)	32 (5.1%)	14 (3.0%)

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	8 (1.9%)	11 (1.7%)	9 (1.9%)
	Other reason (not listed)	<5	49 (11.5%)	15 (2.4%)	9 (1.9%)
	No delay (standard met)	85 (80.2%)	294 (68.9%)	443 (70.3%)	334 (72.0%)

Table 4: Regression analysis for likelihood of waiting over 62 days by characteristic for breast 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 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	Male	0.72 (0.59-0.88)*	0.74 (0.6-0.92)*	0.71 (0.58-0.86)*	0.74 (0.6-0.91)*	0.73 (0.59-0.9)*
Age group	19-49	1.21 (1.15-1.29)*	1.23 (1.16-1.31)*	1.2 (1.13-1.27)*	1.22 (1.15-1.3)*	1.22 (1.15-1.3)*
	50-59	1.13 (1.07-1.2)*	1.14 (1.07-1.22)*	1.1 (1.03-1.17)*	1.12 (1.05-1.19)*	1.12 (1.05-1.19)*
	60-69 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
	70-79	0.9 (0.85-0.96)*	0.89 (0.83-0.94)*	0.86 (0.81-0.92)*	0.85 (0.8-0.91)*	0.84 (0.79-0.9)*
	80+	0.61 (0.57-0.65)*	0.57 (0.53-0.61)*	0.59 (0.55-0.63)*	0.56 (0.52-0.6)*	0.54 (0.5-0.58)*
Deprivation quintile	1 - most deprived	1.29 (1.22-1.37)*	1.2 (1.12-1.28)*	1.27 (1.2-1.35)*	1.18 (1.1-1.26)*	1.17 (1.09-1.25)*
	2	1.17 (1.1-1.24)*	1.08 (1.01-1.15)	1.18 (1.11-1.25)*	1.1 (1.03-1.17)*	1.09 (1.02-1.16)*
	3	1.18 (1.11-1.24)*	1.13 (1.06-1.2)*	1.15 (1.08-1.21)*	1.1 (1.04-1.17)*	1.1 (1.03-1.17)*
	4	1.04 (0.98-1.1)	1.01 (0.95-1.07)	1.04 (0.98-1.1)	1.01 (0.95-1.07)	1 (0.95-1.07)
	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	2.79 (2.61-2.99)*	2.92 (2.73-3.13)*	1.93 (1.82-2.05)*	1.97 (1.85-2.1)*	1.97 (1.85-2.1)*
	2021/2022	4.81 (4.51-5.12)*	5.36 (5.02-5.73)*	3.37 (3.18-3.56)*	3.66 (3.45-3.88)*	3.68 (3.47-3.91)*
	Q1 & Q2 2022/2023	6.42 (5.99-6.88)*	7.39 (6.88-7.94)*	4.53 (4.25-4.82)*	5.06 (4.74-5.4)*	5.12 (4.79-5.46)*
Stage	1 (ref)			1 (ref)		1 (ref)
	2			1.05 (1-1.1)		1.08 (1.02-1.14)*
	3			1.41 (1.33-1.51)*		1.52 (1.41-1.62)*
	4			1.22 (1.1-1.35)*		1.26 (1.13-1.41)*
	Not known			1.16 (1.1-1.22)*		1.21 (1.14-1.29)*
Comorbidity	0 (ref)			1 (ref)		1 (ref)
	1			0.89 (0.83-0.96)*		1.08 (1-1.17)
	2			0.9 (0.81-0.99)		1.16 (1.04-1.3)*
	3+			0.77 (0.69-0.86)*		1.01 (0.9-1.14)

*significant at the $p<0.01$ level

Table 5: Median and interquartile range for the intervals in the diagnostic and treatment pathway for breast 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	12 (9 - 14)	13 (10 - 19)	14 (12 - 22)	14 (10 - 22)
First seen to informed of diagnosis	Data not available	12 (8 - 20)	13 (8 - 19)	14 (8 - 19)
Informed of diagnosis to decision to treat	Data not available	26 (13 - 38)	27 (14 - 39)	27 (14 - 41)
Decision to treat to treatment start	16 (9 - 25)	18 (11 - 27)	19 (12 - 27)	20 (12 - 28)
Referral to informed of diagnosis	Data not available	28 (21 - 39)	29 (22 - 40.75)	30 (23 - 41)
Referral to decision to treat	61 (50 - 72)	57.5 (48 - 71)	58 (48 - 71)	60 (49 - 74)
Referral to treatment start	76 (69 - 87)	76 (68 - 89)	76 (69 - 89)	78 (70 - 91)

Table 6: Breakdown of the reasons for delay in each financial year of start of treatment among breast 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	293 (23.2%)	1196 (35.6%)	2613 (46.1%)	1706 (47.4%)
	Medical reason for diagnosis delay	424 (33.5%)	1065 (31.7%)	1818 (32.1%)	1151 (32.0%)
	Medical reason for treatment delay	~115	~200	~190	~115
	Patient-initiated delay	125 (9.9%)	220 (6.6%)	350 (6.2%)	201 (5.6%)
	Other reason (not listed)	307 (24.3%)	675 (20.1%)	692 (12.2%)	427 (11.9%)
	Unknown	<5	<5	<5	<5
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	577 (21.2%)	1269 (26.2%)	944 (32.0%)
	Medical reason for diagnosis delay	Data not available	204 (7.5%)	269 (5.6%)	149 (5.1%)
	Patient-initiated delay	Data not available	66 (2.4%)	111 (2.3%)	75 (2.5%)
	Other reason (not listed)	Data not available	272 (10.0%)	269 (5.6%)	246 (8.3%)
	No delay (standard met)	Data not available	1441 (52.8%)	2274 (47.0%)	1300 (44.1%)
	Unknown	Data not available	167 (6.1%)	646 (13.4%)	236 (8.0%)
Decision to treat to treatment start	Healthcare provider-initiated delay	68 (5.4%)	244 (7.3%)	616 (10.9%)	462 (12.8%)
	Medical reason for diagnosis delay	<5	43 (1.3%)	72 (1.3%)	56 (1.6%)

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Medical reason for treatment delay	33 (2.6%)	72 (2.1%)	98 (1.7%)	39 (1.1%)
	Patient-initiated delay	<10	~25	~25	~25
	Other reason (not listed)	23 (1.8%)	155 (4.6%)	70 (1.2%)	25 (0.7%)
	No delay (standard met)	1131 (89.5%)	2816 (83.9%)	4785 (84.5%)	2995 (83.1%)
	Unknown	<5	<5	<5	<5

Table 7: Regression analysis for likelihood of waiting over 104 days by characteristic for in-situ breast cancer. Results presented for the original cohort, unadjusted and adjusted.

		Original cohort	
Characteristic	**Category**	**Unadjusted odds ratio (95% CIs) (95% CIs)**	**Adjusted odds ratio (95% CIs) (95% CIs)**
Gender	Female (ref)	1 (ref)	1 (ref)
	Male	0.69 (0.16-2.87)	0.89 (0.21-3.8)
Age group	19-49	1.58 (1.08-2.3)	1.56 (1.06-2.3)
	50-59	1.26 (0.83-1.92)	1.29 (0.84-1.99)
	60-69 (ref)	1 (ref)	1 (ref)
	70-79	1.01 (0.65-1.56)	1.02 (0.65-1.59)
	80+	0.94 (0.59-1.52)	0.95 (0.59-1.54)
Deprivation quintile	1 - most deprived	1.3 (0.86-1.97)	1.27 (0.82-1.97)
	2	1.81 (1.24-2.63)*	1.63 (1.09-2.43)
	3	1.65 (1.14-2.38)*	1.53 (1.04-2.24)
	4	1.38 (0.95-2)	1.33 (0.91-1.95)
	5 - least deprived (ref)	1 (ref)	1 (ref)
Financial year	Base year (ref)	1 (ref)	1 (ref)

		Original cohort	
Characteristic	**Category**	**Unadjusted odds ratio (95% CIs) (95% CIs)**	**Adjusted odds ratio (95% CIs) (95% CIs)**
	2020/2021	2.54 (1.66-3.88)*	2.62 (1.7-4.02)*
	2021/2022	3.43 (2.29-5.12)*	3.61 (2.4-5.44)*
	Q1 & Q2 2022/2023	3.74 (2.41-5.81)*	3.85 (2.46-6.03)*

*significant at the $p<0.01$ level

Table 8: Median and interquartile range for the intervals in the diagnostic and treatment pathway for in-situ breast 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 (9 - 13)	11 (7 - 14)	14 (10 - 22)	17 (12 - 26)
First seen to informed of diagnosis	Data not available	20 (12 - 62.25)	21.5 (13 - 47.75)	20 (11.5 - 30.75)
Informed of diagnosis to decision to treat	Data not available	51.5 (16.25 - 98.25)	43.5 (15.75 - 76)	63 (42.5 - 84)
Decision to treat to treatment start	18 (9.5 - 29)	22 (9.75 - 37)	26 (14.5 - 38)	23 (13 - 31)
Referral to informed of diagnosis	Data not available	33 (22 - 82.25)	43.5 (27.25 - 68.75)	37 (28.25 - 56)
Referral to decision to treat	102 (90.5 - 122)	112.5 (84.25 - 140.75)	98 (82.25 - 116.75)	98 (83 - 125)
Referral to treatment start	120 (110.5 - 143)	132.5 (119.75 - 170.5)	121.5 (112 - 144.5)	119 (109 - 142)

Table 9: Breakdown of the reasons for delay in each financial year of start of treatment among in-situ breast 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	<5	16 (20.0%)	42 (33.3%)	21 (32.3%)
	Medical reason for diagnosis delay	12 (38.7%)	23 (28.7%)	47 (37.3%)	25 (38.5%)
	Medical reason for treatment delay	<5	5 (6.2%)	7 (5.6%)	<5
	Patient-initiated delay	<5	5 (6.2%)	13 (10.3%)	<10
	Other reason (not listed)	11 (35.5%)	31 (38.8%)	17 (13.5%)	11 (16.9%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	5 (8.9%)	24 (26.7%)	12 (26.1%)
	Medical reason for diagnosis delay	Data not available	11 (19.6%)	17 (18.9%)	6 (13.0%)
	Patient-initiated delay	Data not available	<5	<5	<5
	Other reason (not listed)	Data not available	9 (16.1%)	<10	<5
	No delay (standard met)	Data not available	25 (44.6%)	25 (27.8%)	12 (26.1%)
	Unknown	Data not available	<5	15 (16.7%)	10 (21.7%)
Decision to treat to treatment start	Healthcare provider-initiated delay	<5	10 (12.5%)	28 (22.2%)	8 (12.3%)
	Medical reason for diagnosis delay	<5	<5	<5	<5
	Medical reason for treatment delay	<5	<5	9 (7.1%)	<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	9 (11.2%)	<5	<5
	No delay (standard met)	26 (83.9%)	57 (71.2%)	81 (64.3%)	51 (78.5%)

Table 10: Regression analysis for likelihood of waiting over 62 days by characteristic for in-situ breast cancer. Results presented for the original cohort, unadjusted and adjusted.

		Original cohort	
Characteristic	**Category**	**Unadjusted odds ratio (95% CIs) (95% CIs)**	**Adjusted odds ratio (95% CIs) (95% CIs)**
Gender	Female (ref)	1 (ref)	1 (ref)
	Male	0.4 (0.17-0.96)	0.37 (0.14-0.95)
Age group	19-49	1.55 (1.26-1.91)*	1.62 (1.29-2.03)*
	50-59	1.23 (0.98-1.55)	1.29 (1-1.65)
	60-69 (ref)	1 (ref)	1 (ref)
	70-79	0.92 (0.73-1.16)	0.92 (0.71-1.18)
	80+	0.59 (0.45-0.77)*	0.59 (0.45-0.79)*
Deprivation quintile	1 - most deprived	1.09 (0.88-1.37)	1.14 (0.88-1.48)
	2	1.34 (1.09-1.66)*	1.28 (1.01-1.63)
	3	1.35 (1.1-1.65)*	1.29 (1.03-1.62)
	4	1.26 (1.03-1.53)	1.28 (1.03-1.59)
	5 - least deprived (ref)	1 (ref)	1 (ref)
Financial year	Base year (ref)	1 (ref)	1 (ref)

		Original cohort	
Characteristic	**Category**	**Unadjusted odds ratio (95% CIs) (95% CIs)**	**Adjusted odds ratio (95% CIs) (95% CIs)**
	2020/2021	2.55 (2.06-3.15)*	2.75 (2.18-3.46)*
	2021/2022	3.66 (2.99-4.49)*	4.35 (3.48-5.43)*
	Q1 & Q2 2022/2023	4.21 (3.33-5.31)*	4.87 (3.78-6.27)*

*significant at the $p<0.01$ level

Table 11: Median and interquartile range for the intervals in the diagnostic and treatment pathway for in-situ breast 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	12 (8 - 14)	12.5 (8 - 14)	14 (11 - 20)	14 (11 - 22)
First seen to informed of diagnosis	Data not available	17 (11 - 34)	20 (11.75 - 35)	20 (11.25 - 34)
Informed of diagnosis to decision to treat	Data not available	23 (0 - 39)	22 (0 - 40)	22.5 (5.5 - 42.75)
Decision to treat to treatment start	18.5 (10.75 - 28)	20 (13 - 28.75)	21.5 (13.25 - 30)	21 (13 - 29)
Referral to informed of diagnosis	Data not available	31 (22.5 - 49)	38 (27 - 52)	37 (28 - 53.75)
Referral to decision to treat	65 (55 - 79.5)	62 (48.25 - 80)	63 (51 - 79)	66.5 (51.75 - 83)
Referral to treatment start	84 (72.75 - 98.25)	83 (71 - 104)	85 (73 - 104)	86.5 (74 - 104)

Table 12: Breakdown of the reasons for delay in each financial year of start of treatment among in-situ breast 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	37 (23.7%)	105 (30.7%)	228 (44.0%)	123 (45.9%)
	Medical reason for diagnosis delay	49 (31.4%)	118 (34.5%)	170 (32.8%)	89 (33.2%)
	Medical reason for treatment delay	14 (9.0%)	14 (4.1%)	23 (4.4%)	<10
	Patient-initiated delay	16 (10.3%)	27 (7.9%)	40 (7.7%)	~20
	Other reason (not listed)	40 (25.6%)	78 (22.8%)	57 (11.0%)	28 (10.4%)
Referral to informed of diagnosis	Healthcare provider-initiated delay	Data not available	46 (17.2%)	126 (30.2%)	63 (30.0%)
	Medical reason for diagnosis delay	Data not available	57 (21.3%)	67 (16.1%)	34 (16.2%)
	Patient-initiated delay	Data not available	<5	9 (2.2%)	<10
	Other reason (not listed)	Data not available	30 (11.2%)	31 (7.4%)	~20
	No delay (standard met)	Data not available	114 (42.7%)	126 (30.2%)	64 (30.5%)
	Unknown	Data not available	~15	58 (13.9%)	25 (11.9%)
Decision to treat to treatment start	Healthcare provider-initiated delay	8 (5.1%)	33 (9.6%)	79 (15.3%)	34 (12.7%)
	Medical reason for diagnosis delay	<5	<5	11 (2.1%)	<5

Delay interval	Reason for delay	2017/2018 (Number and %)	2020/2021 (Number and %)	2021/2022 (Number and %)	Q1 & Q2 2022/2023 (Number and %)
	Medical reason for treatment delay	8 (5.1%)	8 (2.3%)	17 (3.3%)	<10
	Patient-initiated delay	<5	<5	<5	<5
	Other reason (not listed)	<10	26 (7.6%)	<5	<5
	No delay (standard met)	132 (84.6%)	272 (79.5%)	403 (77.8%)	220 (82.1%)