

Evaluation of the Impact of a Targeted Lung Cancer Awareness Campaign

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Abstract

Aims

To evaluate a pilot lung cancer symptom-awareness advertisement campaign targeting a North Dublin area with elevated lung cancer incidence. The primary aim was to assess changes in symptom awareness and behaviour intent. The secondary aim was to examine for changes to rapid access lung cancer (RALC) e-referrals.

Methods

Face-to-face surveys were conducted pre- and post-campaign in target and control areas matched for deprivation, and assessed for differences. RALC referral changes were assessed comparing 6 weeks pre-, during, and post- campaign. Pearson's chi-squared and Kruskal-Wallis tests were used.

Results

Six-hundred surveys were completed. After advertisement exposure, 119 (79%) and 118 (79%) in the campaign area indicated that it would increase lung cancer symptom awareness, and help-seeking intent respectively. Prompted awareness of 'persistent cough' remained similar, increasing from 109 (73.6%) to 121 (80.7%), which was not statistically significant. There was a decline in unprompted awareness of cough from 94 (64%) to 75 (50%). RALC e-referral increase from 63 (pre-campaign) to 78 (post-campaign) was not statistically significant.

Discussion

These unexpected findings may reflect methodological limitations and limited follow-up duration. They underscore the need for multi-model campaigns to improve symptom awareness and help-seeking behaviour. Future evaluations should include longer follow-up and primary care data linkage to better assess intervention impact.

Introduction

Lung cancer remains a leading cause of cancer-related mortality in Ireland, accounting for approximately 1,900 deaths annually.¹ Prompt help-seeking is crucial for early-stage diagnosis and improved survival. Five-year survival for lung cancer is 57% for Stage I compared to 4% for Stage IV.^{2,3} Dublin north city and county has a higher incidence of lung cancer relative to other regions, yet public awareness of symptoms of lung cancer remains low and represents a potential barrier to early presentation and diagnosis.³ The National Survey on Lung Cancer Awareness (2020) highlighted that 39% of respondents identified a persistent cough lasting more than 3 weeks as a potential symptom.^{4,5} International evidence suggests that health promotion campaigns have the potential to improve symptom awareness and facilitate earlier diagnosis.⁶ The National Cancer Strategy (NCS) of Ireland 2017-2026 recommends the development of multimedia public awareness campaigns to promote earlier cancer detection in at-risk populations.⁷ However, evidence on the effectiveness of targeted lung cancer campaigns in Ireland remains limited.

The HSE '*Check that Cough*' campaign was developed by the National Cancer Control Programme (NCCP) in collaboration with HSE Dublin North City and County (DNCC) Health and Wellbeing Division (which now falls within the HSE Dublin and North East Health Region) and HSE Communications and Public Affairs. A pilot regional lung cancer symptom awareness campaign targeting areas of deprivation in North Dublin was delivered, emphasising '*persistent cough*' as a key symptom of lung cancer and encouraging consultation with a GP. Despite being a common presenting symptom of lung cancer, public awareness of '*cough*' as a symptom of lung cancer remains low.^{8,9}

To evaluate the pilot campaign, a pre- and post-campaign survey was conducted alongside an analysis of routinely collected data. The primary aim of the evaluation was to assess changes in awareness of '*cough*' as a symptom of lung cancer and changes in help-seeking intent. The secondary aim was to examine for changes in GP e-referrals to the rapid access lung cancer (RALC) pathway. This is a clinical pathway which aims to offer an appointment and assessment to people with suspected lung cancer within two weeks. The hypothesis is that the campaign will increase recall and awareness of '*change in cough*' as a potential sign of lung cancer among the target population.

Methods

The target population comprised adults aged ≥ 50 years residing in areas of socioeconomic deprivation in North Dublin. Campaign creatives were co-developed by the NCCP, DNCC Health and Wellbeing Division, HSE Communications and a marketing communications

company (see [Figure 1](#) for an example of the creatives). A static text-based advertising format was selected for out-of-home (bus shelters, digital towers, pharmacy screens, advertising boxes) and print advertisements in local newspapers. Static and animated advertisements were disseminated via social media platforms Facebook, X and Instagram. In addition, an information pack was sent to over 800 community stakeholders, containing campaign details and resources on early detection of lung cancer. The campaign ran for a six-week period from 29th July 2024 to 8th September 2024.



Figure 1: Storyboard of the social media advertisement for the HSE lung cancer pilot awareness campaign with two alternative starting images; one male and one female.

The survey used quota sampling by smoking status targeting individuals aged ≥ 50 residing in North Dublin. It was administered face-to-face through door-to-door recruitment by a marketing company prior to campaign implementation, with 80% of participants required to have a smoking history. The same methodology was applied in a socio-economically matched control area in South Dublin. Post-campaign surveys were conducted in both areas, with

additional items assessing recall of and engagement with campaign creatives. The campaign creatives were shown to respondents during the post-campaign surveys.

This evaluation utilised a subset of collected data; demographic characteristics, confidence in identifying lung cancer symptoms, awareness of ‘cough’ as a lung cancer symptom, help-seeking intent, and campaign reach. The survey tool was not a validated instrument. A more comprehensive multifaceted analysis is planned separately.

The target sample population size was 150 per group. Pre- and post- comparisons were conducted using Pearson’s chi-squared tests with weighted and unweighted responses (see [supplementary information](#) for more details). Statistical significance was defined as $\alpha < 0.05$ using weighted responses to account for disproportionate sampling between groups.

Routinely collected RALC referral data were obtained from the NCCP for three six-week intervals: pre-campaign (Interval 1: 17th June to 28th July 2024), campaign period (Interval 2: 29th July to 8th September 2024), and post- campaign (Interval 3: 9th September to 20th October 2024). Data were analysed for two RALC centres in the target area, and two in the control area. Corresponding data from the same centres during the equivalent period in 2023 when no campaign was implemented (19th June 2023 to 22nd October 2023), were used for comparison. Differences in referral activity across intervals were examined using Kruskal-Wallis test.

In accordance with the Standard Code of Governance and Management required for HSE Reference Research Ethics Committees (REC),¹⁰ service evaluation and Public Health work of this nature do not require formal REC review.

Results

Survey Results

The target number of interviews for each group was reached (total = 600). Despite quota sampling, age and gender distribution differed between groups (see [Table 1](#)). Over 80% of participants were current or past smokers. The majority were Irish.

Confidence in recognising lung cancer symptoms declined significantly in the target area (53.4% to 22%, $p_w < 0.001$) but increased in the control area (38% to 62%, $p_w = 0.003$) (see [Table 2](#)). Unprompted recall of ‘cough’ as a lung cancer symptom decreased in the target area ($p_w = 0.021$) with no significant change in the control area. Prompted recognition of a ‘change in usual cough’ as a lung cancer symptom increased in the target area (73.6% vs 80.7% respectively) but was not statistically significant ($p_w = 0.774$), while an increase was observed

in the control area (70.4% pre and 91.3% post) which was statistically significant ($p_w = 0.011$). These findings were unexpected given the study hypothesis.

Most respondents indicated that they would contact their doctor if concerned about lung cancer symptoms, with no significant change pre- and post-campaign. There was no statistically significant change in intended timeliness of help-seeking intent pre- and post-campaign in the target area, while a significant increase was observed in the control area ($p_w < 0.01$).

Table 1: Demography and advertisement reach of the four cohorts of telephone interviews.

Variable	North Dublin (ND)			South Dublin (SD)		
	Pre-campaign (n=148)	Post-campaign (n=150)	Comparison between ND groups <u>p-value</u>	Pre-campaign (n=152)	Post-campaign (n=150)	Comparison between SD groups <u>p-value</u>
		<u>n (%)</u>			<u>n (%)</u>	
Age-Group			0.003^a			0.016^a
50-54	61 (41.2%)	29 (19.3%)		55 (36.2%)	33 (22.0%)	
55-59	31 (20.9%)	37 (24.7%)		47 (30.9%)	42 (28.0%)	
60-64	23 (15.5%)	36 (24.0%)		27 (17.8%)	45 (30.0%)	
65-69	14 (9.5%)	18 (12.0%)		11 (7.2%)	15 (10.0%)	
70-74	13 (8.8%)	19 (12.7%)		7 (4.6%)	13 (8.7%)	
75+	6 (4.1%)	11 (7.3%)		5 (3.3%)	<5 (1.3%)	
Sex			0.034^a			0.051^a
Male	94 (63.5%)	77 (51.3%)		91 (59.9%)	73 (48.5%)	
Nationality			0.971^a			0.294^a
Irish	136 (91.9%)	138 (92.0%)		147 (96.7%)	141 (94.0%)	
Other	12 (8.1%)	12 (8.0%)		5 (3.3%)	7 (4.7%)	
Smoking Status			0.251^a			0.526^a
Current or past smoker	125 (84.5%)	119 (79.3%)		130 (85.5%)	132 (88.0%)	
Never smoker	23 (15.5%)	31 (20.7%)		22 (14.5%)	18 (12.0%)	

a = Chi-squared; ND= North Dublin, SD= South Dublin

Table 2: Comparison of pre and post survey results in relation to cough awareness and health-seeking behaviour intent in the campaign and control areas.

Variable	North Dublin				South Dublin			
	Pre-campaign	Post-campaign	Unweighted p-value (p) ^a	Weighted p-value (p _w) ^a	Pre-campaign	Post-campaign	Unweighted p-value (p) ^a	Weighted p-value (p _w) ^a
How confident would you be in spotting symptoms of lung cancer?			<0.001	<0.001			<0.001	0.003
Very/somewhat confident	79 (53.4%)	33 (22%)			58 (38.2%)	93 (62.0%)		
Not very/not at all confident	69 (46.6%)	117 (78%)			94 (61.8%)	57 (38.0%)		
Missing data (n)	0 (0.0%)	0 (0.0%)			0 (0.0%)	0 (0.0%)		
Able to recall cough as a symptom of lung cancer unprompted?			0.019	0.021			0.324	0.105
Yes	94 (63.5%)	75 (50.0%)			91 (59.9%)	91 (60.7%)		
No	54 (36.5%)	75 (50.0%)			61 (40.1%)	48 (32.0%)		
Missing data (n)	0 (0%)	0 (0%)			0 (0.0%)	11 (7.3%)		
Able to recognise a change in a usual cough as a symptom of lung cancer prompted?			0.285	0.774			<0.001	0.011
Yes	109 (73.6%)	121 (80.7%)			107 (70.4%)	137 (91.3%)		
No	31 (20.9%)	25 (16.7%)			33 (21.7%)	12 (8.0%)		
Missing data (n)	8 (5.4%)	4 (2.6%)			12(7.9%)	1 (0.7%)		
If you were worried about lung cancer symptoms, would you look for help or advice from your GP or doctor?			0.156	0.053			0.169	0.154
Yes	135 (91.2%)	143 (95.3%)			135 (88.8%)	125 (83.3%)		
No	13 (8.8%)	7 (4.7%)			17 (11.2%)	25 (16.7%)		
Missing data (n)	0 (0.0%)	0 (0.0%)			0 (0.0%)	0 (0.0%)		
Time to seeking help if you were worried			0.613	0.780			<0.01	<0.01
≤ 3 weeks	123 (83.1%)	114 (76.0%)			103 (67.7%)	137 (91.3%)		
> 3 weeks	22 (14.9%)	24 (16.0%)			40 (26.3%)	12 (8.0%)		

Would not seek help/don't know/ missing data (n)	3 (2.0%)	12 (8.0%)	9 (6.0%)	1 (0.7%)
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a= Chi-squared test; p = p-value; p_w = p-value from age-weighted responses

Of those interviewed post-campaign, only 13.3% (20) reported advertisement exposure in the target area compared to 6.7% (10) in the control area. After exposure to campaign creatives during the survey, 84% of respondents across both target and control areas reported that the advertisement would increase their likelihood of consulting their GP if they experienced symptoms (see [Table 3](#)). Seventy-seven percent indicated that the advertisement increased their awareness of lung cancer symptoms.

Table 3: Results of the survey on the impact of the ad on behaviour intent.

Variable	North Dublin post-campaign (n=150)	Control area post-campaign (n=150)	Both areas combined (n=300)
Have you seen this ad before			
Yes	20 (13.3%)	10 (6.7%)	30 (10.0%)
If I had a cough for 3-weeks or more, I would be more likely to visit my GP as a result of seeing this ad.			
Agree completely or somewhat	118 (78.7%)	133 (88.7%)	251 (83.7%)
Disagree completely or somewhat	32 (21.3%)	17 (11.3%)	49 (16.3%)
If someone I know had a cough for 3 weeks or more, I would advise them to visit the GP as a result of seeing this ad.			
Agree completely or somewhat	111 (74.0%)	141 (94.0%)	252 (84.0%)
Disagree completely or somewhat	39 (26.0%)	9 (6.0%)	48 (16.0%)
This ad makes me more aware of the signs and symptoms of lung cancer.			
Agree completely or somewhat	119 (79.3%)	111 (74.0%)	230 (76.7%)
Disagree completely or somewhat	31 (20.7%)	39 (26.0%)	70 (23.3%)

RALC Referrals

GP e-referrals in the target area rose from 63 pre-campaign (Interval 1) to 78 during the campaign (Interval 2) which is an increase of 24%. This was not statistically significant ($p=0.444$) (see [Supplementary Material](#)). This was sustained during Interval 3 (post-campaign; 78). Kruskal-Wallis Test showed no statistical significance between intervals (p -value 0.444).

RALC GP e-referrals in the control area decreased from 100 pre-campaign to 60 post-campaign (40% decrease). This was not statistically significant (p -value 0.444). Similar non-significant fluctuations were observed in 2023 (a non-campaign year).

Discussion

A multi-media campaign was developed to increase lung cancer symptom awareness and encourage timely help-seeking in an area of deprivation with a higher than national average incidence of lung cancer. This pilot campaign was conducted in DNCC, which now falls within the HSE Dublin and North East Health Region. This campaign evaluation yielded findings contrary to expectations. Post-campaign respondents' confidence in identifying lung cancer symptoms declined in the target area, but increased in the control area. Contrary to previous research on similar socio-economically deprived areas, the target area had a higher baseline level of awareness than the control area. Only 13.3% post-campaign survey participants in the exposed area recalled seeing the advertisement, suggesting that the observed changes in survey responses may not reflect the direct impact of the campaign. Although weighting the responses addressed some baseline demographic differences, the absence of additional data on socioeconomic status, ethnicity, and occupation may have contributed to residual confounding between groups.^{4,5,11,12}

Similarly, unprompted awareness of cough as a symptom of lung cancer declined post-campaign in the target area. However, prompted recognition of '*a change in your usual cough*' increased, albeit not significantly. Baseline prompted awareness was higher in the target area than in the control area, which is notable given the higher proportion of males in this group and the association between deprivation, male sex, and lower symptom awareness reported internationally.³

Over 90% of participants from the target area cited their doctor as a trusted source of advice, with approximately 80% indicating that they would seek consultation within 3 weeks of recognising concerning symptoms. Trust in healthcare professionals remains high, which is an important facilitator to early help-seeking and early diagnosis.

When shown the campaign creatives, participants indicated increased awareness of lung cancer symptoms and a greater likelihood of GP consultation if they experienced a persistent cough. This is an indicator that the campaign could have a potential positive effect on behavioural intent.

Although RALC e-referrals increased in the target area between the pre-campaign interval and the intervals during and post-campaign, these changes were not statistically significant. A similar change was mirrored in the non-campaign year, possibly indicating seasonal variation or residual unmeasured confounding. These findings were not contrary to expectations. The short follow-up time and small population size likely limited detectable changes in RALC e-referrals.¹² The absence of significant detectable changes in RALC e-referrals is consistent with prior evaluations internationally.¹³ The evaluation of the NHS Wales campaign, found that observed increases in symptom awareness and GP presentations did not translate into

increased rapid access referrals.¹³ Additionally, there is an attrition rate across the diagnostic pathway. Ireland has limited access to primary care data such as symptom presentation or radiological investigations. This constrains the ability to evaluate the impact of interventions on intermediary and early diagnostic steps. The development of a primary care database and access to these types of data would support the short and medium-term monitoring and evaluation of health promotion initiatives.

This study has some limitations. The relatively short campaign timeframe limits the potential to detect significant changes in symptom awareness, and the sample size may have been too small to detect material change in awareness or behaviour intent. Moreover, there were differential baseline characteristics between groups participating in the surveys, and variables that may have contributed to confounding were not collected. There was also potential overlap of the campaign reach between the target and control areas. Repeated or sustained campaigns across seasons would allow more time for the campaign to be seen by the target population. Longer-term evaluations with a larger sample size and improved access to primary care data may better capture campaign effects.

In conclusion, increasing lung cancer symptom awareness remains an important first step in promoting timely help-seeking behaviour. The HSE-led pilot lung cancer awareness multimedia campaign was positively received. Participants reported increased awareness of lung cancer symptoms and intention to seek help following exposure to the advertisement. However, the campaign did not result in significant improvements in recognition of a '*change in cough*' as a potential lung cancer symptom, nor in increased RALC GP e-referrals. These findings likely reflect inherent methodological constraints, short follow-up time, and restricted access to primary care data to evaluate intermediary outcomes. Continued efforts are needed to improve symptom awareness, address barriers to help-seeking behaviour, enhance primary care data linkage, and ultimately better understand the impact of public awareness campaigns. Key learnings from this pilot should directly inform the design and evaluation of future lung cancer awareness campaigns in Ireland, including the scale, statistical power and follow-up duration. This is essential for more comprehensive evaluation frameworks and the monitoring of the impact of health promotion interventions in Ireland.

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Declarations of Conflicts of Interest:

The NCCP commissioned and funded the survey which was carried out by CORE Marketing Communications Company. Otherwise, none declared.

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Supplementary Material:

Table 4: Weighing of survey results based on location, sex and age using health atlas data¹⁴ (which is based on the census).

Variable(s)				National Proportions (%)	Sample (Survey) Proportions (%)	Weighting
North Dublin	Male	50-54 55-59 60-64 65-69 70-74 75+		23	25.1	0.90
				19	23.4	0.82
				16	19.3	0.84
				13	11.1	1.21
				11	13.5	0.83
				17	7.6	2.26
	Female	50-54 55-59 60-64 65-69 70-74 75+		21	37.0	0.57
				18	22.0	0.82
				16	20.5	0.76
				13	10.2	1.28
				11	7.1	1.59
				21	3.1	6.62
South Dublin	Male	50-54 55-59 60-64 65-69 70-74 75+		20	21.3	0.92
				18	29.9	0.61
				16	26.8	0.61
				14	11.0	1.30
				12	7.9	1.52
				20	3.0	6.41
	Female	50-54 55-59 60-64 65-69 70-74 75+		19	38.4	0.48
				18	29.0	0.61
				16	20.3	0.78
		65-69 70-74 75+		14	5.8	2.34
				12	5.1	2.32
				23	1.4	15.69

Table 5: The number of e-referrals pre, during and post lung cancer awareness campaign targeting North Dublin comparing campaign year (2024) vs no campaign year (2023).

Variable	Catchment Area	
	North Dublin (n)	Outside of Catchment (n)
2024 (Campaign year)		
Interval 1: Pre-campaign	63	100
Interval 2: During	78	60
Interval 3: Post-campaign	78	88
2023 (No Campaign year)		
Interval 1	43	66
Interval 2	56	89
Interval 3	57	82

North Dublin



South Dublin

