

# 揭開障礙：探索地區醫院結直腸癌篩檢計畫非遵從行為背後的因素

## Unveiling the Barriers: Exploring Factors behind Non-Compliant Behavior in Colorectal Cancer Screening Program at a Regional Hospital

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### Background

Colorectal cancer is the most common cancer in Taiwan, with more than 10,000 cases annually. Fecal Immunochemical Test (FIT) and, if necessary, colonoscopy are associated with reduced mortality from colorectal cancer. Some patients do not return screening tubes and others do not have a follow-up colonoscopy after a positive FIT. Recently, more younger patients have been diagnosed with colorectal cancer in Taiwan. The aim of this study is to find the predictors of the above mentioned non-return behavior.

### Materials and Methods

The project was approved by the IRB of E-Da Cancer Hospital. Patients receiving NHI FIT cancer screening between 2017 and 2020 were collected. The main objectives of the study were to investigate the likelihood of returning a FIT and the likelihood of undergoing follow-up examinations after a positive FIT. The variables included age, sex, history of colorectal cancer/other cancers, residence in Kaohsiung City, symptoms of colorectal cancer, value of fecal occult blood test, examination weekday, examination quarter, examination year, screening excuser experience, and completeness of referral document. Univariate and multivariate logistic regression were used to search for risk factors for non-compliant behavior. If the two-sided p-value < 0.05, it was statistically significant. We used R language (Ver 4.2.1) for statistical analysis.

### Result

Between 2017 and 2020, 7376 cases underwent FIT. Thirty-six cases were excluded because of missing data. Table 1 shows the baseline characteristics of the two groups (FIT tube returned and no FIT tube). The univariate logistic regression showed that hospital screening activities, young age, completion of referral notes, inexperienced staff, and winter were risk factors for not returning the tubes. On multivariate analysis, the above factors were all statistically significant, as was Friday (Table 2).

Of 7340 patients, 593 had a positive FIT. One case was excluded because of missing data. The demographics of these cases are shown in Table 3. In univariate logistic regression analysis, community screening activities, female cases, and higher education were associated with higher rates of follow-up. In multivariate logistic regression (Table 4), four factors were found to be statistically significant: gender, education, family history of colorectal cancer, and community screening.

The proportion of patients receiving follow-up was lower among those with any of these risk factors (72% vs. 81.6%).

Table 1.

Basic Characteristics For FIT Tubes Return Or Not			
Characteristic	No. N = 984 <sup>1</sup>	Yes, N = 6,356 <sup>1</sup>	p-value <sup>2</sup>
Gender			0.2
Man	537 (55%)	3,320 (52%)	
Woman	447 (45%)	3,036 (48%)	
Age	60 (55, 66)	61 (56, 67)	<0.001
Place			0.002
Community	3 (0.3%)	95 (1.5%)	
Hospital	981 (100%)	6,261 (99%)	
Year			0.072
106	148 (15%)	836 (13%)	
107	93 (9.5%)	734 (12%)	
108	213 (22%)	1,273 (20%)	
109	530 (54%)	3,513 (55%)	
Doctor_Referral			0.003
Lack of Note	274 (28%)	2,070 (33%)	
With Documented	710 (72%)	4,286 (67%)	
Excusers_Experienced_Cases	451 (234, 1,087)	482 (268, 1,087)	0.061
Weekday			0.2
Mon	189 (19%)	1,354 (21%)	
Tue	169 (17%)	1,142 (18%)	
Wed	223 (23%)	1,486 (23%)	
Thu	166 (17%)	1,041 (16%)	
Fri	150 (15%)	800 (13%)	
Weekends	87 (8.8%)	533 (8.4%)	
Kaohsiung	731 (74%)	4,895 (77%)	0.060
Quarter			<0.001
Spring	147 (15%)	1,257 (20%)	
Summer	206 (21%)	1,327 (21%)	
Autumn	174 (18%)	1,262 (20%)	
Winter	457 (46%)	2,510 (39%)	

Table 3.

Demographics of Positive FIT Cases With / Without Follow-up Colonoscopy		
Characteristic	Without Follow-up, N = 156 <sup>1</sup>	With Follow-up, N = 436 <sup>1</sup>
Gender		0.11
Man	107 (69%)	268 (61%)
Woman	49 (31%)	168 (39%)
Family_Hx_Colon_Ca		0.059
No	145 (93%)	421 (97%)
Yes	11 (7.1%)	15 (3.4%)
Family_Hx_Other_Ca		>0.9
No	132 (85%)	368 (84%)
Yes	24 (15%)	66 (15%)
Unknown	0 (0%)	2 (0.5%)
Symptoms	4 (2.6%)	25 (5.7%)
Value	248 (169, 493)	230 (145, 507)
Age	66 (62, 71)	66 (60, 72)
Place		0.012
Community	6 (3.8%)	3 (0.7%)
Hospital	150 (96%)	433 (99%)
Education_Group		0.046
Below_High_School	62 (40%)	135 (31%)
High_School_OrAbove	94 (60%)	301 (69%)
Kaohsiung	119 (76%)	338 (78%)

<sup>1</sup> n (%); Median (IQR)  
<sup>2</sup> Pearson's Chi-squared test; Fisher's exact test; Wilcoxon rank sum test

Table 2.

Univariate and Multivariate Analysis For No FIT TUBES							
Characteristic	Univariate				Multivariate		
	N	OR <sup>1</sup>	95% CI <sup>1</sup>	p-value	OR <sup>1</sup>	95% CI <sup>1</sup>	p-value
Gender	7,340			0.2			
Man							
Woman		0.91	0.80, 1.04		0.92	0.80, 1.05	0.2
Age	7,340	0.98	0.97, 0.99	<0.001	0.98	0.97, 0.99	<0.001
Place	7,340			<0.001			
Community							
Hospital		4.96	1.86, 20.2		5.16	1.90, 21.2	0.006
Year	7,340			0.070			
106							
107		0.72	0.54, 0.94		0.81	0.59, 1.13	0.2
108		0.95	0.75, 1.19		0.99	0.76, 1.29	>0.9
109		0.85	0.70, 1.04		0.62	0.49, 0.78	<0.001
Doctor_Referral	7,340			0.003			
Lack of Note							
With Documented		1.25	1.08, 1.45		1.23	1.06, 1.44	0.007
Excusers_Experienced_Cases	7,340	1.00	1.00, 1.00	0.028	1.00	1.00, 1.00	0.006
Weekday	7,340			0.2			
Mon							
Tue		1.06	0.85, 1.32		1.05	0.84, 1.31	0.7
Wed		1.08	0.87, 1.32		1.08	0.88, 1.34	0.5
Thu		1.14	0.91, 1.43		1.15	0.92, 1.45	0.2
Fri		1.34	1.06, 1.69		1.40	1.10, 1.76	0.005
Weekends		1.17	0.89, 1.53		1.16	0.87, 1.54	0.3
Kaohsiung	7,340			0.063			
No							
Yes		0.86	0.74, 1.01		0.87	0.75, 1.02	0.080
Quarter	7,340			<0.001			
Spring							
Summer		1.33	1.06, 1.66		1.32	1.05, 1.67	0.017
Autumn		1.18	0.93, 1.49		1.26	1.00, 1.61	0.055
Winter		1.56	1.28, 1.90		1.77	1.42, 2.21	<0.001

<sup>1</sup> OR = Odds Ratio, CI = Confidence Interval

Table 4.

Univariate and Multivariate Logistic Regression For 'No' Follow-Up Colonoscopy After A Positive FIT							
Characteristic	Univariate				Multivariate		
	N	OR <sup>1</sup>	95% CI <sup>1</sup>	p-value	OR <sup>1</sup>	95% CI <sup>1</sup>	p-value
Gender	592			0.11			
Man							
Woman		0.73	0.49, 1.07		0.63	0.42, 0.95	0.029
Family_Hx_Colon_Ca	592			0.072			
No							
Yes		2.13	0.93, 4.72		2.78	1.17, 6.51	0.018
Family_Hx_Other_Ca	592			0.5			
No							
Yes		1.01	0.60, 1.66		1.01	0.59, 1.69	>0.9
Unknown		0.00			0.00		>0.9
Symptoms	592	0.43	0.13, 1.14	0.093	0.42	0.12, 1.17	0.13
Value	592	1.00	1.00, 1.00	0.7	1.00	1.00, 1.00	0.7
Age	592	1.01	0.99, 1.04	0.3	1.00	0.98, 1.03	0.8
Place	592			0.011			
Community							
Hospital		0.17	0.04, 0.67		0.15	0.03, 0.61	0.011
Education_Group	592			0.048			
Below_High_School							
High_School_OrAbove		0.68	0.47, 1.00		0.60	0.38, 0.92	0.020
Kaohsiung	592	0.93	0.61, 1.45	0.8	0.88	0.57, 1.39	0.6

<sup>1</sup> OR = Odds Ratio, CI = Confidence Interval

Figure 1.

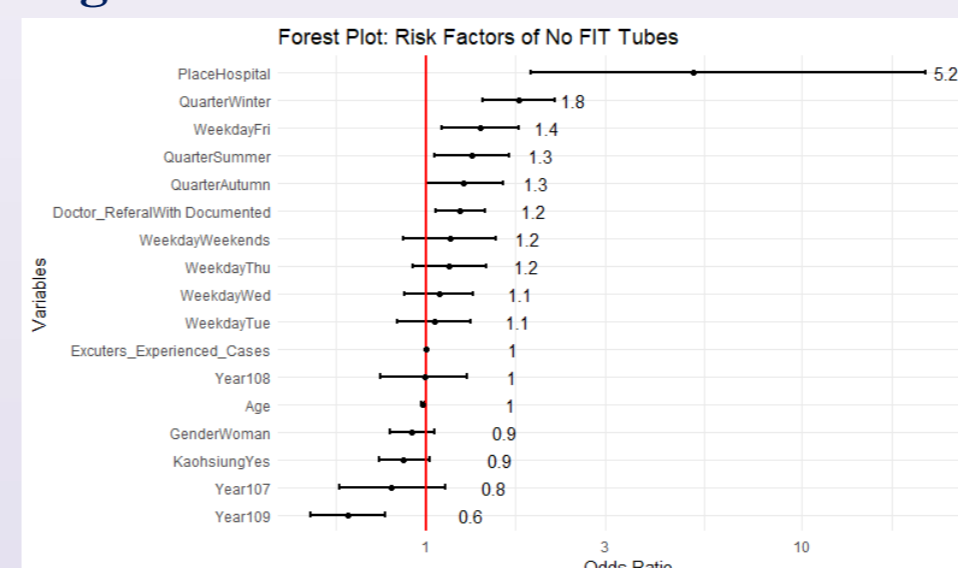
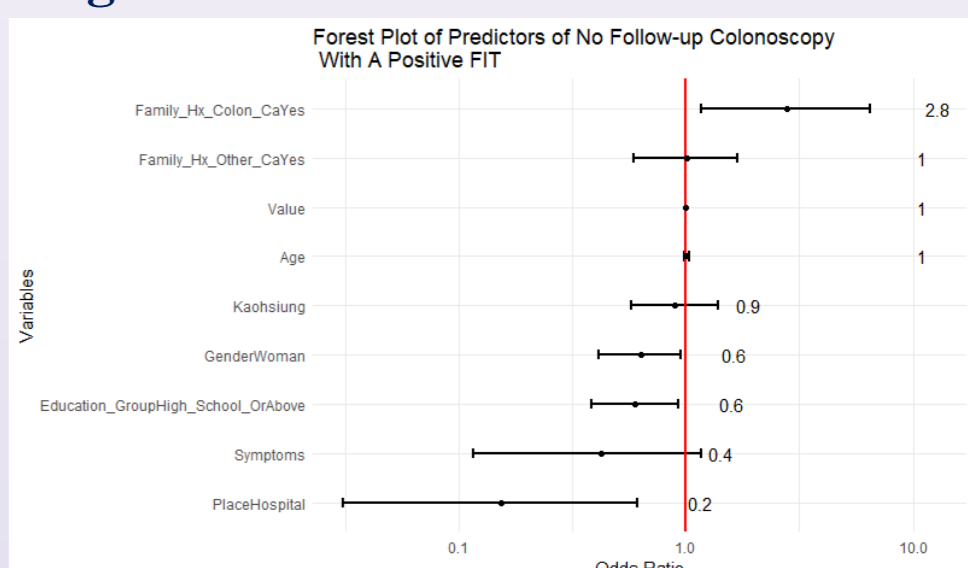


Figure 2.



### Conclusions

To achieving better result, we can adopt different policies for different risk factors at each stage of the screening program.

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